



AMERICAN
Entomological Society.

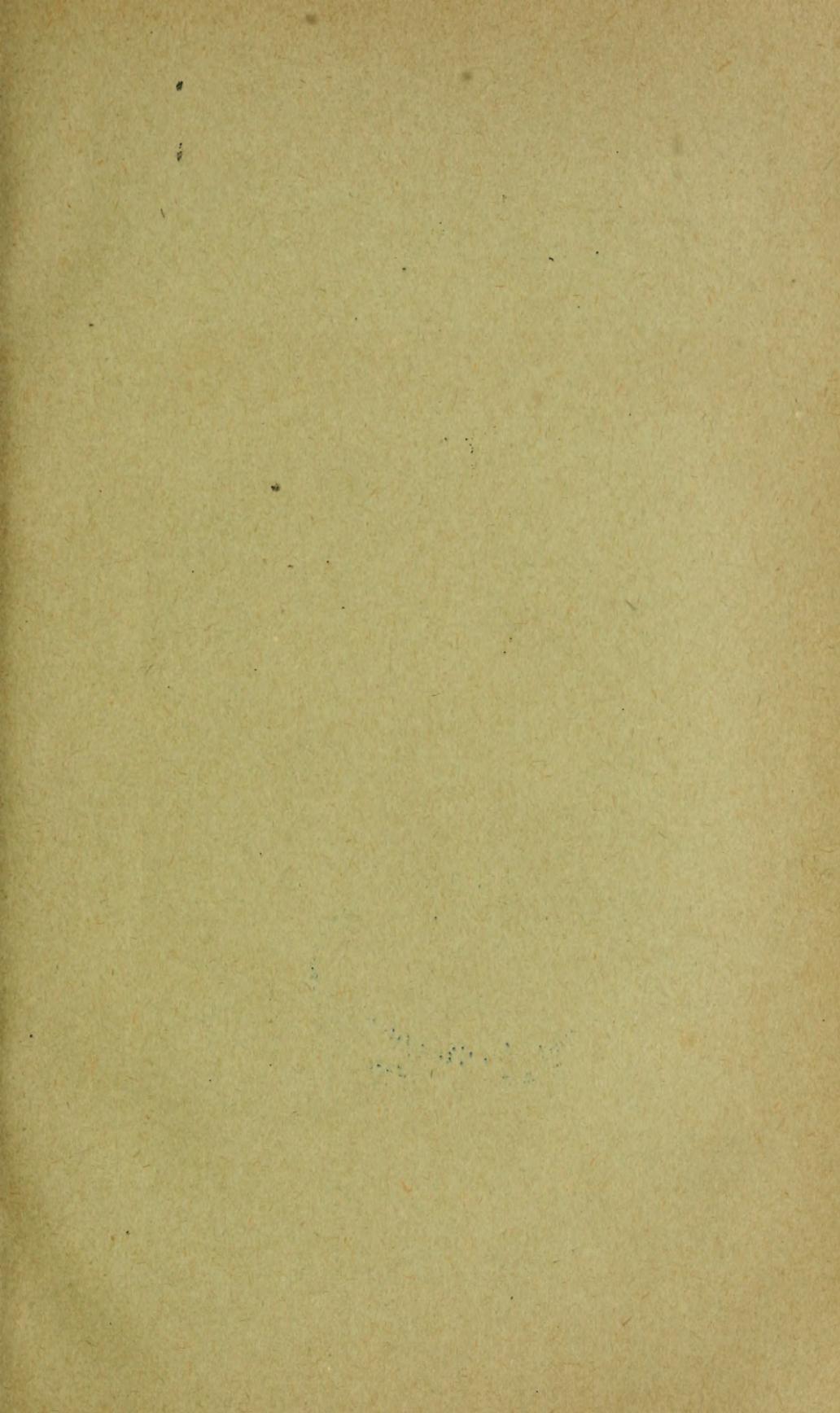
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THE SOUTH LONDON Entomological & Natural History Society

(ESTABLISHED 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

1909-1912

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1910-II

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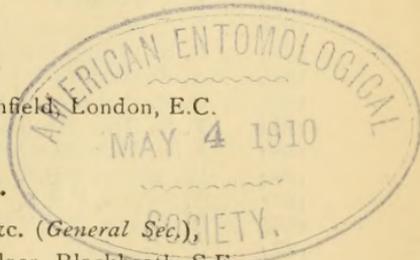
T. W. HALL, F.E.S., 61, West Smithfield, London, E.C.

Hon. Secretaries.

S. EDWARDS, F.L.S., F.Z.S., F.E.S., &c. (*General Sec.*),
15, St. German's Place, Blackheath, S.E.

H. J. TURNER, F.E.S. (*Report Sec.*),

98, Drakefell Road, New Cross, S.E.



**THE SOUTH LONDON
ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,
HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.**

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The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invites the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting Specimens.

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SUBSCRIPTION.

*Seven Shillings and Sixpence per Annum, with an Entrance
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All Communications to be addressed to the Hon. Gen. Secretary,

STANLEY EDWARDS, F.L.S., &c.,

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**PAST PRESIDENTS**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1872 ... J. R. WELLMAN (dec.).<br>1873 ...        "<br>1874 ...        "<br>1875 ... A. B. FARN, F.E.S.<br>1876 ...        "<br>1877 ... J. P. BARRETT.<br>1878 ... J. T. WILLIAMS (dec.).<br>1879 ... R. STANDEN, F.E.S.<br>1880 ... A. FICKLIN (dec.).<br>1881 ... V. R. PERKINS, F.E.S.<br>1882 .. T. R. BILLUPS, F.E.S.<br>1883 ... J. R. WELLMAN (dec.).<br>1884 ... W. WEST, L.D.S.<br>1885 ... R. SOUTH, F.E.S.<br>1886 ... R. ADKIN, F.E.S.<br>1887 ...        "<br>1888 ... T. R. BILLUPS, F.E.S.<br>1889 ...        "<br>1890 ... J. T. CARRINGTON, F.L.S.<br>(dec.) | 1891 ... W. H. TUGWELL, Ph.C. (dec.).<br>1892 ... C. G. BARRETT, F.E.S. (dec.).<br>1893 ... J. J. WEIR, F.L.S., etc. (dec.).<br>1894 ... E. STEP, F.L.S.<br>1895 ... T. W. HALL, F.E.S.<br>1896 ... R. SOUTH, F.E.S.<br>1897 ... R. ADKIN, F.E.S.<br>1898 ... J. W. TUTT, F.E.S.<br>1899 ... A. HARRISON, F.L.S., etc.<br>1900 ... W. J. LUCAS, B.A., F.E.S.<br>1901 ... H. S. FREMLIN, F.E.S., etc.<br>1902 ... F. NOAD CLARK.<br>1903 ... E. STEP, F.L.S.<br>1904 ... A. SICH, F.E.S.<br>1905 ... H. MAIN, B.Sc., F.E.S.<br>1906 ... R. ADKIN, F.E.S.<br>1907 ...        "<br>1908 ... A. SICH, F.E.S.<br>1909 ...        " |
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## LIST OF MEMBERS.

—••—

Chief subjects of Study :—*h*, Hymenoptera ; *o*, Orthoptera ; *he*, Hemiptera ; *n*, Neuroptera ; *c*, Coleoptera ; *d*, Diptera ; *l*, Lepidoptera ; *ool*, Oology ; *orn*, Ornithology ; *r*, Reptilia ; *m*, Mollusca ; *cr*, Crustacea ; *b*, Botany ; *mi*, Microscopy ; *e*, signifies Exotic forms.

—••—

YEAR OF  
ELECTION.

- 1886 ADKIN, B. W., F.E.S., Trenowith, Hope Park, Bromley, Kent.  
*l, orn.*
- 1882 ADKIN, R., F.E.S., Wellfield, 4, Lingard's Road, Lewisham,  
S.E. *l.*
- 1901 ADKIN, R. A., 4, Lingard's Road, Lewisham, S.E. *m.*
- 1908 ADLARD, R. E., Bartholomew Close, E.C. *m.*
- 1907 ALDERSON, J., 143, Boundaries Road, Balham, S.W. *l.*
- 1907 ANDREWS, H. W., F.E.S., Shirley, Welling, Kent. *d.*
- 1903 ANSORGE, E. C., 12, Addison Road, Bedford Park, W. *l.*
- 1901 ARMSTRONG, R. R., B.A., B.C.(Cantab), M.R.C.S., L.R.C.P.,  
55, Granville Park, Lewisham, S.E. *e l.*
- 1895 ASHBY, S. R., F.E.S., 119, Greenvale Road, Eltham Park,  
Kent. *l.*
- 1895 ASHDOWN, W. J., Belmont Road, Leatherhead. *l, c, he.*
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Nor-  
folk. *l.*
- 1872 AVEBURY, The Right Hon. Lord, D.C.L., F.R.S., F.L.S.,  
F.G.S., F.E.S., etc., High Elms, Down, nr. Farnborough,  
Kent (*Hon. member*). *h, b.*
- 1908 BAKER, P. N., 141, Chandos Road, Stratford, E. *l.*
- 1896 BARNETT, T. L., 81, Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1900 BARRETT, J. P., 30, Endwell Road, New Cross, S.E. *l.*
- 1907 BARTER, H. W., 5, Brunswick Road, Camberwell, S.E. *l, b.*
- 1909 BAUMANN, R. T., 70, Station Road, Chingford. *l.*
- 1905 BELLAMY, F. G., *l.*
- 1897 BISHOP, E. B., 2, Hunter Road, Guildford. *l.*
- 1898 BLISS, M. F., F.E.S., Coningsburgh, Montpelier Road, Ealing. *l.*

YEAR OF  
ELECTION.

- 1909 BOWEN, G., 37, Chatham Road, Kingston-on-Thames. *l.*
- 1895 BOWMAN, K., The May Sharp Construction Co., Ltd., Edmonton, Alta, Canada. *l.*
- 1905 BRIAULT, G. H., 6, Burlington Gardens, Acton, W. *l.*
- 1887 BRIGGS, C. A., F.E.S., Rock House, Lynmouth, R.S.O. N. Devon. *l, m, n, o, British fishes.*
- 1891 BRIGGS, H. M., 8, High Street, Canterbury. *l, orn.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, R.S.O., N. Devon. *l.*
- 1909 BRIGHT, P. M., F.E.S., Wimborne Road, Bournemouth. *l.*
- 1895 BROOKS, W., Thundercliffe Grange, near Rotherham. *l.*
- 1898 BROOME, E. G., Hurst Vicarage, Twyford, Berks. *l.*
- 1900 BROWNE, G. B., 43, Southbrook Road, Lee, S.E. *l.*
- 1909 BUCKSTONE, A. A. W., 18, Burlington Lane, Chiswick, W. *l.*
- 1897 BURR, M. B., B.A., F.Z.S., F.L.S., F.E.S., 23, Blomfield Court, Maida Vale, W. *o.*
- 1890 BUTLER, W. E., F.E.S., Hayling House, Oxford Road, Reading. *l, c.*
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l.*
- 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l, mi.*
- 1910 CARDEW, Capt. P. A., 50, Melbury Gardens, Wimbledon. *l.*
- 1886 CARPENTER, J. H., F.E.S., Redcot, Belmont Road, Leatherhead, Surrey. *l.*
- 1899 CARR, F. B., 46, Handen Road, Lee, S.E. *l.*
- 1899 CARR, Rev. F. M. B., M.A., L.Th., 10, St. Alban's Crescent, Woodford Green, Essex. *l, n.*
- 1897 CHAPMAN, T. A., M.D., F.E.S., F.Z.S., Betula, Reigate, Surrey. *l.*
- 1888 CHITTENDEN, D., 14, Limes Grove, Lewisham, S.E. *l.*
- 1896 CLARK, F. N., Paddington Infirmary, Harrow Road, W. *mi.*
- 1879 CLODE, W. (*Life member*).
- 1899 COLTHRUP, C. W., 127, Barry Road, E. Dulwich, S.E. *l.*
- 1907 COOTE, F. D., 25, Pendle Road, Streatham, S.W. *l, b.*
- 1909 COULSEN, F. J., 14, Aden Grove, Stoke Newington. *l.*
- 1902 COWHAM, F. W., 118, Minard Road, Hither Green, S.E. *l.*
- 1899 CRABTREE, B. H., F.E.S., Cringle Lodge, Levenshulme, Manchester. *l.*
- 1885 CROKER, A. J., 1045, McClure St., Victoria, British Columbia. *l.*
- 1898 CROW, E. J., 26, Tindal Street, North Brixton. *l.*

YEAR OF  
ELECTION.

- 1888 DAWSON, W. G., 31, King's Gardens, West End Lane, Hampstead, N.W. (*Life member*). *l*.
- 1900 DAY, F. H., F.E.S., 26, Currock Terrace, Carlisle. *l, c*.
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W. *l, mi, b*.
- 1906 DOBSON, A. A., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn*.
- 1884 DOBSON, H. T., F.E.S., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn*.
- 1901 DODS, A. W., *Hon. Librarian*, 88, Alkham Road, Stamford Hill. *l*.
- 1904 EAST, F. J., 69, Cazenove Road, Stamford Hill. *l*.
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, 15, St. German's Place, Blackheath, S.E. *l, e l*.
- 1886 ENOCK, F., F.L.S., F.E.S., F.R.M.S., F.R.H.S., 13, Tufnell Park Road, Holloway, N. *d, mi*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex (*Life member*). *l*.
- 1889 FORD, A., South View, Irving Road, West Southbourne, Bournemouth, Hants. *l, c*.
- 1907 FOUNTAINE, Miss M. E., F.E.S., Thirlmere, Godalming, Surrey. *l*.
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Government Lymph Laboratories, Chelsea Bridge, S.W. *l, mi*.
- 1903 FURNIVAL, T.F., F.E.S., 86, Minet Avenue, Harlesden, N.W. *l*.
- 1899 GADGE, S. W., 59, Frankfort Road, Herne Hill, S.W. *l*.
- 1901 GARRETT, H. E., 3, Brewers Green Mews, W. *l*.
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l*.
- 1909 GIBBS, A. E., F.L.S., F.E.S., Kitchener's Meads, St. Albans, Herts (*Life member*). *l*.
- 1908 GOFFE, E. R., 46, Vardens Road, Wandsworth Common, S.W. *l*.
- 1908 GREEN, E. D., 17, Manor Park, Lee, S.E. *l*.
- 1904 GROSVENOR, T. H. L., F.E.S., 8, Gloucester Road, Redhill, Surrey. *l*.
- 1893 HALL, A., F.E.S., 16, Park Hill Rise, Croydon, Surrey. *l, e l, ool*.
- 1888 HALL, A.E., F.E.S., Norbury, Pitsmoor, Sheffield. *l*.

YEAR OF  
ELECTION.

- 1884 HALL, T. W., F.E.S., *Hon. Treasurer*, Stanhope, The Crescent, Croydon, Surrey; and 61, West Smithfield, E.C. *l*.
- 1891 HAMM, A. H., 22, Southfields Road, Oxford. *l*.
- 1906 HAMMOND, L., 38, Mercer's Road, Tufnell Park, N. *l*.
- 1903 HARE, E. J., F.E.S., Dunham, Boscombe, Hants. *l*.
- 1892 HARRISON, A., F.C.S., F.L.S., F.E.S., F.R.M.S., Thames Sugar Refinery, Silvertown, E., and Delamere, Grove Road, S. Woodford, Essex. *l, mi*.
- 1909 HEMMING, A. F., Cambridge Lodge, Horley, Surrey. *l*.
- 1909 HEMMING, Mrs. C. U. H., Cambridge Lodge, Horley, Surrey. *l*.
- 1900 HEWITT, R. L., "Hlabisa" Coalfield, Natal, S. Africa. *l*.
- 1903 HICKMAN, J., 21, Raleigh Road, Penge, S.E. *l*.
- 1905 HILL, E., 3, Dorville Road, Lee. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1907 HODGSON, G. C., M.D., Stoneleigh, Redhill, Surrey. *l*.
- 1888 HOPKINS, H. E., 31, Farnaby Road, Bromley, S.E. *l*.
- 1889 HORNE, A., F.E.S., 60, Gladstone Place, Aberdeen. *l*.
- 1886 JÄGER, J., 65, St. Quentin's Avenue, North Kensington, W. *l*.
- 1887 JENNER, J. H. A., F.E.S., 209, School Hill, Lewes, Sussex. *l, c, d, m, b*.
- 1904 JOY, E. C., F.E.S., 2, St. Kilda's Road, Stoke Newington. *l*.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Dadmans, Sittingbourne, Kent. *l, mi, marine invertebrata*.
- 1898 KAYE, W. J., F.E.S., *President*, Caracas, Ditton Hill, Surbiton, Surrey. *l*.
- 1900 KEMP, S. W., B.A., F.E.S., Indian Museum, Calcutta. *l, c*.
- 1903 LISTER, W. K., F.E.S., Great Walton, Eastry, Kent. *l*.
- 1901 LOWE, F., 92, Hurlingham Road, Fulham, S.W. *l*.
- 1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *Brit. o., odonata, n, m, b*.
- 1892 MAIN, H., B.Sc., F.E.S., Almondale, Buckingham Road, S. Woodford, Essex. *l*.
- 1886 MANGER, W. T., 100, Manor Road, New Cross, S.E. *l, c, cr*.
- 1889 MANSBRIDGE, W., F.E.S., 27, Elmbank Road, Sefton Park, Liverpool. *l*.
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l*.

YEAR OF  
ELECTION.

- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
- 1896 MONTGOMERY, A. M., F.E.S., 34, Shalimar Gardens, Pembroke Road, N. Acton, W. *l.*
- 1880 MONTIERO, A. A. DE C., F.E.S., 70, Rua do Alecrim, Lisbon.
- 1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l, e h, e d, mi.*
- 1904 MOORE, H. W., 34, Farnaby Road, Shortlands, Kent. *l.*
- 1910 MORFORD, D. R., Sunnysdene, Coombe Lane, Wimbledon. *l.*
- 1906 NEWMAN, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l.*
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1906 PAYLER, D., *l.*
- 1906 PAYNE, W., 77, Killyon Road, Clapham, S.W. *l.*
- 1905 PENN-GASKELL, W. W., Townshend House, North Side, Regent's Park, N.W.
- 1908 PENNINGTON, F., Manning's Hill, Cranleigh, Surrey. *l.*
- 1901 PEPPER, A. W., The Horniman Museum, Forest Hill, S.E. *mi.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire. *l, h, d.*
- 1888 PERKS, F. P., 22, May's Buildings, St. Martin's Lane, Charing Cross, W.C. *zoology, mi, pond life.*
- 1899 PICKIN, J. R., 2, Industry Terrace, Brixton, S.W. *l.*
- 1887 PORRITT, G. T., F.L.S., F.E.S., Elm Lea, Dalton, Huddersfield. *l, n.*
- 1903 PRATT, W. B., F.E.S., 10, Lion Gate Gardens, Richmond, Surrey. *l.*
- 1897 PREST, E. E. B., Arva, Dakers Road, Forest Hill. *l.*
- 1903 PRISKE, R. A. R., F.E.S., 9, Melbourne Avenue, W. Ealing, W. *l, m.*
- 1902 RAYWARD, A. L., F.E.S., 3, Albert Mansions, Lansdowne Road, Croydon, Surrey. *l.*
- 1909 RAMSAY, A., 15, Lawn Crescent, Kew Gardens.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. *orn.*
- 1904 RICHARDS, P., Wellesley Cottage, Kingston Hill, Surrey.
- 1906 RICHMOND, B. A., M.B., B.Sc., 28, Lower Road, Rotherhithe, S.E. *l.*

YEAR OF  
ELECTION.

- 1902 RILEY, N. D., 94, Drakefield Road, Upper Tooting, S.W. *l*.
- 1910 ROBERTSON, G. S., M.D., St. Anne's, 101, Thurlow Park Road, Dulwich, S.E.
- 1887 ROBINSON, A., B.A., 5, King's Bench Walk, Temple, E.C. *l*.
- 1894 ROBINSON, L., Parliament Mansions, Victoria Street, Westminster, London, S.W. *l*.
- 1888 ROBSON, H., 9, Trump Street, E.C. *l, b*.
- 1909 ROHDE, J. H., Cranham Lodge, Croydon Road, Reigate.
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l, c*.
- 1900 ROWDEN, A. O., 4, St. John's Road, Exeter. *l, b*.
- 1904 ROWLAND-BROWN, H., F.E.S., Oxhey Grove, Harrow Weald. *l*.
- 1890 ROWNTREE, J. H., Folkton Manor, Ganton, Yorks. *l*.
- 1898 RUSSELL, A., F.E.S., Wilverley, Dale Road, Purley.
- 1888 SAUZÉ, H. A., 22, Earlsthorpe Road, Sydenham, S.E. *l*.
- 1906 SCHOON, J. W., 2, St. Luke's Road, Bayswater, W. *l*.
- 1902 SCOLLICK, A. J., F.E.S., 8, Mayfield Road, Merton Park, Wimbledon, S.W. *l*.
- 1903 SHAKESPEARE, J. J., St. Mary's, Cobham Road, Kingston-on-Thames. *l*.
- 1898 SICH, ALF., F.E.S., *Vice-President*, Corney House, Chiswick, W. *l*.
- 1903 SMALLMAN, R. S., F.E.S., Wressil Lodge, Wimbledon Common, W. *l*.
- 1908 SMITH, B. H., Edgehill, Warlingham, Surrey. *l*.
- 1899 SMITH, E. W., 16, Tresco Road, Linden Grove, S.E. *l*.
- 1890 SMITH, WALTER, 6, Exmouth Villas, Hampton Hill, Middlesex. *l*.
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l*.
- 1882 SOUTH, R., F.E.S., 96, Drakefield Road, Upper Tooting, S.W. *l*.
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton.
- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex (*Life member*). *l*.
- 1908 STAUBYN, J. S., Tregothnan, Endlesham Road, Balham, S.W. *l*.
- 1872 STEP, E., F.L.S., Oakwood House, Barnett Wood Lane, Ashted, Surrey. *b, m, orn, cr*.

YEAR OF  
ELECTION.

- 1899 STONE, F. J., 141, Bedford Road, Clapham, S.W.  
 1902 STONELL, B., 25, Studley Road, Clapham, S.W. *l*.
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, ool*.  
 1910 TAUTZ, P. H., 33, North Audley Street, W.  
 1902 TONGE, A. E., F.E.S., *Vice-President*, Aincroft, Grammar  
 School Hill, Reigate. *l*.
- 1895 TUNALEY, HY., F.E.S., 13, Becmead Avenue, Streatham,  
 S.W. *l, h*.
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 98, Drakefell  
 Road, New Cross, S.E. *l, c, n, he, b*.
- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Hill,  
 Blackheath, S.E. *l, continental l*.
- 1887 VERRALL, G. H., F.E.S., M.P., Sussex Lodge, Newmarket. *d*.  
 1889 VINE, A. C., 45, Temple Street, Brighton, Sussex. *l*.
- 1889 WAINWRIGHT, C. J., F.E.S., 45, Handsworth Wood Road,  
 Handsworth, Staffs. *l*.
- 1880 WALKER, J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale  
 Road, Summertown, Oxford. *l, c*.
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S.,  
 F.L.S., F.Z.S., F.E.S., &c., Merton Hall, Thetford, Norfolk  
 (*Hon. member*). *l, orn*.
- 1907 WATERER, W. J., 19, Adelaide Road, Brockley, S.E.  
 1888 WEBB, S., 9, Waterloo Crescent, Dover. *l*.
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road,  
 S.E. *l, c, he*.
- 1878 WEST, W., L.D.S., Holmwood, Barnett Wood Lane, Ashted,  
 Surrey. *l, mi*.
- 1887 WHIFFEN, W. H., Holmwood Lodge, Laton Road, Hastings. *l*.  
 1905 WINKWORTH, J. T., 290, Burdett Road, E. *l*.  
 1905 WRIGHT, J., 30, Coleman Street, Woolwich, S.E. *l*.

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Members will greatly oblige by informing the Hon. Sec. of any errors,  
 additions, or alterations in the above Addresses and descriptions.



## LIBRARY FUND.

| <i>Receipts.</i>             | <i>£ s. d.</i> | <i>Expenditure.</i>            | <i>£ s. d.</i> |
|------------------------------|----------------|--------------------------------|----------------|
| To Balance from 1908 ...     | 0 0 10         | By Binding (C. J. Andrews) ... | 0 12 6         |
| " Fines ...                  | 0 1 10         | " Balance ...                  | 0 10 2         |
| " Vote from General Fund ... | 1 0 0          |                                |                |
|                              | <u>£1 2 8</u>  |                                | <u>£1 2 8</u>  |

## PUBLICATION FUND.

| <i>Receipts.</i>             | <i>£ s. d.</i> | <i>Expenditure.</i>                             | <i>£ s. d.</i> |
|------------------------------|----------------|-------------------------------------------------|----------------|
| To Balance from 1908 ...     | 0 14 7         | By Knight's Account for 1908 "Transactions" ... | 40 8 1         |
| " Donations ...              | 24 11 6        | " Balance ...                                   | 0 16 3         |
| " Sales of "Proceedings" ... | 0 18 3         |                                                 |                |
| " Vote from General Fund ... | 15 0 0         |                                                 |                |
|                              | <u>£41 4 4</u> |                                                 | <u>£41 4 4</u> |

## ASSETS AND LIABILITIES.

| <i>Assets.</i>                                      | <i>£ s. d.</i>  | <i>Liabilities.</i> | <i>£ s. d.</i>  |
|-----------------------------------------------------|-----------------|---------------------|-----------------|
| To Balance, General Fund ...                        | 0 12 0          | By Balance ...      | 38 18 5         |
| " " Suspense Account ...                            | 28 10 0         |                     |                 |
| " " Library Fund ...                                | 0 10 2          |                     |                 |
| " " Publication Fund ...                            | 0 16 3          |                     |                 |
| " Arrears of Subscriptions, £32 15s., valued at ... | 8 10 0          |                     |                 |
|                                                     | <u>£38 18 5</u> |                     | <u>£38 18 5</u> |

Audited and found correct, *January 24th, 1910.*

FRED. NOAD CLARK, }  
A. L. RAYWARD, } *Auditors.*

## REPORT OF THE COUNCIL, 1909.

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THE Council of the South London Entomological and Natural History Society, in presenting their Thirty-eighth Annual Report, is pleased to state that the affairs of the Society continue in a very satisfactory condition.

During the year just passed thirteen new Members have been elected, while only six names have been deleted from the list, of which five were by resignation and one by death. The last was that of Mr. J. Tolhurst, who had been a member since 1895.

The Membership, therefore, now stands as follows: 2 Honorary, 6 Life, 33 Country, and 134 Ordinary Members, making a total of 175.

The Meetings have been well attended throughout the year, and the Recorder, Mr. A. W. DENNIS, reports that there has been an average attendance of thirty-three at the twenty-three meetings.

At the Annual Special Exhibition Meeting in November last upwards of ninety Members and friends were present, a number never reached before. Of these no less than forty brought exhibits. As in previous years, the Society is much indebted to Mr. F. Noad Clark for his skilful working of the lantern, which has been used even more than in previous years.

Mr. WEST, the Hon. Curator, reports that early in the year, through the kind instrumentality of Mr. Rowland-Brown, F.E.S., the Hon. Secretary of the Entomological Society of London, two cabinets containing a fine representative collection of European Butterflies, formed by the late F. F. Freeman, Esq., of Tavistock, Devon, were

presented to the Society by Mrs. Freeman. This Collection, the only one of its kind available for reference in London, will be, no doubt, of great use to the largely increasing number of students of Continental Rhopalocera; and the best thanks of the Society are due to Mrs. Freeman for her handsome gift.

Messrs. TONGE, E. GREEN, A. HARRISON, R. ADKIN, R. ASHBY, and W. WEST have given series and specimens of British Lepidoptera and Coleoptera for the Reference Collections. The Coleoptera are being cleaned, re-mounted, and re-arranged, and possibly by Easter the greater portion will be again available for reference.

The Council wishes to thank Mr. WEST for his untiring devotion to the Curatorship, and also to thank Mr. R. ASHBY for his kind help with the work.

The usual "Abstract of Proceedings" was published in May, and consisted of a volume of 110 pages with four plates.

There have been six Field Meetings held during the year, as under :

May 15th.—HOLMWOOD, conducted by Mr. KAYE.

June 19th.—MICKLEHAM, conducted by Mr. STEP.

July 10th.—COOMBE WOOD, conducted by Mr. RICHARDS.

July 24th.—REIGATE, conducted by Mr. SICH.

September 4th.—WESTERHAM, conducted by Mr. TURNER.

October 9th.—OXSHOTT (Fungus Foray), conducted by Mr. STEP.

At three of these the attendance was small, owing, no doubt, to the inclement weather. In addition, a visit was paid to the Tring Museum, by kind permission of the Hon. Walter Rothschild, M.P., on Saturday, March 27th, when thirty-four members availed themselves of the opportunity for seeing his grand and unique collection of Lepidoptera. The arrangements were kindly undertaken by Mr. A. L. RAYWARD. To all the above-named gentlemen the thanks of the Society are due for the trouble they took in making the necessary arrangements respecting trains and tea.

Mr. DODS, the Hon. Librarian, reports that although the number of books borrowed was about the same as last year,

greater use of the library has been made by the members for the purpose of reference, both before and after the meetings.

Some fifteen papers and addresses have been given to the Society during the year, besides numerous detailed notes on the exhibits.

The following is a list of the papers read :

"A Gossip about the Blue Butterflies," by J. W. TUTT ;  
 "Notes on a Series of *Boarmia repandata*," by R. ADKIN ;  
 "Resting Attitudes of Insects," by A. E. TONGE ; "The  
 Flora of the Basingstoke Canal," by E. STEP : "The Scotch  
 Fir, *Pinus sylvestris*," by W. J. LUCAS ; "Report of the  
 Delegates to the South-Eastern Union of Scientific Societies,"  
 by E. STEP ; "The Darwin Commemoration—Thoughts—  
 Species," by J. W. TUTT ; "Fruits," by H. MAIN ; "Our  
 Authorities: An Introduction to the Early Literature of  
 Entomology," Pt. II, by HY. J. TURNER ; "A Few Stray  
 Notes on Ticks," by F. NOAD CLARKE ; "Report of the  
 Meeting of Delegates of Societies Affiliated to the British  
 Association," by R. ADKIN ; "Notes on Diptera," by H. W.  
 ANDREWS ; "Some Notes on the Earlier Stages of *Nola  
 albulalis*," by R. ADKIN ; "Notes on *Chrysopora (Gelechia)  
 hermannella*," by A. SICH ; "Living Insects," by F. ENOCK.

#### DONATIONS, ETC.

##### *Collections.*

Mrs. FREEMAN: European butterflies; nearly all the hitherto discovered species and local forms and races. British butterflies; a short series of each species.

Mr. TONGE: Series of *Agrotis corticea*.

Mr. E. GREEN: Series of *Epunda lutulenta*.

Mr. HARRISON: *Aplecta nebulosa* and var. *robsoni*.

Mr. ADKIN: *Crymodes exulis* and *Anthrocera achilleæ*.

Mr. ASHBY and Mr. WEST: Numerous series and specimens of British Coleoptera and Hemiptera.

##### *Albums.*

A number of photographs of Lepidoptera in various stages from H. MAIN and E. STEP.

*Books.*

"European Butterflies and Moths," by W. F. KIRBY, from Mr. WEST (Greenwich).

"European Butterflies and Moths," by W. F. KIRBY, 2nd Edition, from R. SOUTH.

"Woolwich Surveys," from R. ADKIN.

"Plant Galls," by CONNOLD, from R. ADKIN.

"Aquatic Insects of New York State," from G. W. KIRKALDY.

"Insect Variety," by A. H. SWINTON, and "British Flies," by THEOBALD, from E. GREEN.

"Noctuides and Pyralides," by GUENÉE, five vols., from Dr. CHAPMAN.

"The Genitalia of the Noctuidæ," by F. N. PIERCE, from A. SICH.

*Annual Reports and Transactions.*

"Ontario Entomological Society," from LACHLAN GIBB.

"Horniman Museum Report," by Exchange.

"British Museum Guides" (Anthropology, Elephants, Recent and Fossil Horses, Domesticated Animals, Whales, etc., Fishes, Exhibited Series of Insects, Introduction to the Study of Rocks), from the Trustees.

"British Association Report," from R. ADKIN.

"Lancashire and Cheshire Entomological Society Report," by Exchange.

"Proceedings of the Croydon Natural History Society," by Exchange.

"Haslemere Museum Report," by Exchange.

"Carlisle Natural History Society," from R. ADKIN.

"Torquay Natural History Society's Journal," by Exchange.

"South Eastern Union of Scientific Societies," by Exchange.

"Norfolk and Norwich Science Society," by Exchange.

"Wisconsin Academy of Science," by Exchange.

"City of London Entomological Society," by Exchange.

"The Smithsonian Institute Report for 1907," by Exchange.

*Periodicals.*

- "Entomologist," from R. SOUTH.  
 "Entomologist's Monthly Magazine," from J. J. WALKER.  
 "Irish Naturalist," by Exchange.  
 "Rochester Naturalist," by Exchange.  
 "Canadian Entomologist," by Exchange.  
 "Philippine Journal of Science," by Exchange.  
 "Bulletin de la Société Entomologique de France," by Exchange.  
 "Bolletino Lab. Zool. Portici," by Exchange.  
 "Essex Naturalist," by Exchange.  
 "Pomona Journal of Entomology," by Exchange.  
 "Entomological News," by Exchange.  
 "Canadian Forest Journal," from LACHLAN GIBB.

*Pamphlets and Separata.*

- "Five Weeks in the Vosges," by A. E. GIBBS, from the AUTHOR.  
 "Flowering Plants and Ferns around Haslemere," by Miss R. JACKSON, from the AUTHOR.  
 "The Prickly Pear."  
 "Obituary of Mr. J. A. Clark."  
 "Address to the Entomological Society, 1909."  
 Various Pamphlets from Prof. T. D. A. COCKERELL.

## Stray Notes on the Variation and Distribution of *Boarmia repandata* in Britain.

By ROBERT ADKIN, F.E.S. *Read April 8th, 1909.*

THERE are few species that have a wider range of distribution in Britain, or that show a greater tendency to variation, than *Boarmia repandata*. It is a common species, and there is therefore no great difficulty in obtaining material, but I fear that even the somewhat extensive series used to illustrate these notes, occupying as it does the whole of two ordinary cabinet drawers, and consisting of specimens obtained from localities representing the greater portion of the British Islands, is yet hardly sufficient to fully exhibit the vast range of variation that obtains in the species.

The main features of its coloration are varying shades of grey and brown, and it is to the predominance of the one or the other and their arrangement as either bands, patches, or speckling, that the variation is chiefly due.

The natural resting-place of the moth is the trunks of trees, but in some of the situations where it occurs tree-trunks are not available, and it then has to find some other situation, as, for instance, rocks, where it may assume its natural position of rest with outspread wings. It has been suggested that in such cases its colour assimilates with the object on which it rests, but although this suggestion appears to hold good in regard to some of its more specialised forms, there are others that can hardly be held to support it.

Whether its range extends to our northernmost islands is a question that is open to considerable doubt. Barrett ("Lep. Brit. Islands," vol. vii, p. 214), distinctly refers to a form from Shetland, and one is not inclined to treat the writings of so careful an observer lightly; but my inquiries of those who have worked these islands, and probably know them as well or better than anybody else, elicit the information that they have never met with the species either in Shetland or Orkney, and they express the opinion that, at any rate so far as the former is concerned, it is most unlikely that it occurs there. But whether it occurs in these northern islands or not, it is a common species in the western islands, where, in the Isle of Lewis, Outer Hebrides, a very distinct form occurs. In it the brown tones are practically absent, leaving a mottled-grey insect, in size somewhat smaller than the average *B. repandata*, and of slighter build. It was, I believe, first brought from Lewis by Harper, when he was collecting for Meek in 1881, and was described and figured by Jenner Weir under the name of ab. *sodorensium* ("Entomologist,"

vol. xiv, p. 220, pl. 1, figs. 12, 13). I learn from Mr. McArthur, who has had a very considerable experience of this form in its native haunts, that its usual and almost only resting-place is on rocks, its peculiar shade harmonising so closely with their grey colour as to make it exceedingly difficult to find, especially as it usually rests on the parts of the rocks that are in shade.

On the Scottish mainland we find a greater range of variation, the brown tints entering pretty generally into the composition of the wing pattern, but the insects are often, particularly on the higher grounds, but not always, somewhat undersized and slender as compared with the average of our southern examples. There is one form, however, to which I would call special attention. The series representing it was brought from Aviemore (Inverness) last year by Mr. McArthur. In tone of colour the specimens are almost as completely grey as the Isle of Lewis examples, but of a softer, warmer tone and less distinctly mottled (Pl. I, fig. 1). They were all taken at from 900 to 1000 feet up the hills in the pine forest, where the trees are of all ages up to probably some hundreds of years old, their stems are of all colours, from the dark bark of the comparatively young ones to the grey lichen-covered patriarchs of the forest, but such moths as did rest upon them did not appear to show any preference for the one or the other, and were so restless that very few indeed were taken from such positions, nor were there any rocks in this locality for them to rest upon, and, indeed, the species appeared to have developed a special habit; perhaps it will be best described in Mr. McArthur's own words, as follows: "When the woodmen cut the timber they draw only the trunks; the tops and branches are left in heaps to rot, which takes many years. In course of time these heaps get very bleached. It is in these that *repandata* is very fond of hiding, and it was by tapping these heaps that I got nearly all of them." It will be noted that these heaps are purely artificial, and may or may not have existed for any lengthened period. In these circumstances one cannot suppose that the insect has adapted its tone of colour to them, but it may suggest that the moth has taken advantage of their presence, and in course of time acquired the habit of seeking the shelter and protection that they afford.

Such series as I have from the Isle of Man and from North Wales call for no very special remark; both show an amount of variation within certain lines, but do not exhibit any very extreme forms.

In Yorkshire the most notable form is a melanic race which occurs in the Huddersfield district. In it the brown shades are replaced by smoky black, which in extreme cases, especially in the females, almost completely obscures the usual markings; but in some of the forms, more particularly in the males, the pale grey, sub-marginal wavy lines stand out in strong relief, and there is also a certain amount of grey mottling, most prominent on the hind-wings (Pl. I, fig. 2). This melanic form appears to be the one described

PLATE I.

BOARMIA REPANDATA.

FIG. 1.



FIG. 2.



FIG. 3.



FIG. 1.—Aviemore.      FIG. 2.—Huddersfield.  
FIG. 3.—Ireland.



by Fuchs in the "Stettin Ent. Zeitung" under the name of ab. *nigricata*. Some intermediate forms that lead up to this race are also interesting, while the more ordinary examples tend rather towards the dark-brownish forms.

The Delamere specimens also are distinctly dark, the prevailing tone being a rich deep brown relieved by an underlying soft grey, which, however, is not very prominent except in the submarginal lines of some of the specimens. In general facies they closely resemble the browner of the Yorkshire forms.

A unicolorous smoky-black specimen sent to me some time since as a Delamere melanic form of this species should, I think, without doubt be referred to *B. gemmaria*, and I am not aware that a melanic form of *B. repandata* has yet been found in Delamere.

From North Devon, among a considerable range of the more usual forms, there is one that is, perhaps, the most interesting that occurs in Britain. In it the tendency is for the brown and grey colours which usually give the species its mottley appearance, to separate out into distinct bands, so that in its extreme form we have an almost white insect with a broad dark brown fascia across the middle of its wings and paler brown borders; while in the intermediate forms the pale ground colour is more or less irrorated with brown, in some cases densely so. This banded form was originally described by Hübner as a distinct species under the name of *conversaria*, and a good figure of it was given in the "Entomologist" for 1881 (vol. xiv, Pl. I, fig. 14). Although this variety is more frequently met with in Devon and Cornwall than elsewhere, and perhaps there reaches its most extreme forms, it is by no means confined to those two counties. It not infrequently occurs throughout the southern portions of England and in Ireland; Barrett mentions it from Wales, and South from Durham, but I have been unable to trace any record of it from Scotland, and, indeed, the prevailing Scottish forms do not suggest the likelihood of it occurring there.

Ireland also furnishes an interesting series; it includes well-marked forms of var. *conversaria*, a melanic form with an almost pure white submarginal line, and some dark, mottled grey forms not quite like any that I have seen from elsewhere. The general tone of colour in the Irish specimens is towards the greys rather than the browns, and in the extreme of this particular form the basal third of the fore-wings is densely speckled with dark brownish-grey; this is followed by a pale grey-white area forming an irregular patch, which extends from just below the costa to the inner margin; a pale yellowish line passes through it near its outer margin, and this is followed by a submarginal whitish line, beyond which the border of the wing is densely speckled like the base; the hind-wings are pale, like the central area of the fore-wings, to the whitish submarginal line, beyond which they are dark bordered as in the fore-wings (Pl. I, fig. 3).

Series from various parts of the south-east of England, Kent, Sussex, the New Forest, etc., include the largest and most robust

specimens, and show a very considerable amount of variation, but there is nothing among them calling for special comment.

In addition to the three named forms already referred to, viz., ab. *sodorensium*, Weir, ab. *nigricata*, Fuchs, and ab. *conversaria*, Hüb., there are two other that I should mention. Curtis described under the name of *Aleis muraria* ("Brit. Ent.," vol. vi, p. 113) an insect of which he says: "*A. muraria* is a new species that I found upon walls in the Isle of Arran; it is nearest allied to *A. repandaria*; it is, however, smaller, of an uniform grey, more speckled, and the markings more obscure." At first sight this description seems to apply not inaptly to the Isle of Lewis form (ab. *sodorensium*, Weir), but that form does not appear to occur in the Isle of Arran, and the light thrown upon the matter by Stephens, who says that the speckling is with fuscous ("Illustrations," Haust., vol. iii, p. 185), shows clearly that it could not have been this form that Curtis described, and I think Weir was right in regarding the Isle of Lewis form as one not previously named.

The other form to which I would refer is *Geometra destrigaria* of Haworth. It was described as a new species, and we are told of it that "all the wings are speckled and clouded with greyish ash colour with a white repandated undulated striga on both wings towards the posterior margin, bordered within with ash colour (Haw., p. 276). Stephens, after repeating Haworth's description, says that it "differs from the preceding (*i. e. repandata*) by being paler, more thickly irrorated with fuscous, and by wanting the fuscous striæ in the middle of the wings: it may probably be a mere variety of the former" (*i. e. repandata*). ("Illustrations," Haust., vol. iii, p. 185.)

It is now known that both *destrigaria*, Haw., and *muraria*, Curt., are but forms of *repandata*, and Staudinger, both in his 1871 and in his 1901 catalogues, groups them together, and South also brackets them in the "Entomologist" list; indeed in both descriptions the only tangible character that is not common to the majority of the forms of *repandata* is the speckling; and it is evident that the grey, very speckled form that is found, among others, in most places where the species occurs, is the one referred to by both authors, and it appears to me that the Irish specimens just mentioned may well be included in this twice-described form.

## Resting Attitudes of Lepidoptera.

By A. E. TONGE, F.E.S. *Read April 22nd, 1909.*

THE attitudes assumed by butterflies and moths when at rest afford an exceedingly interesting study and an opportunity for a large amount of conjecture as to the reasons for the wonderful variety of pose adopted by different genera or species.

Probably the main object attained is the better protection of the insect from its natural enemies, either by mimicry of some inedible object, such as a dead leaf, or by resemblance to its immediate surroundings of so close a nature that the insect is passed by unobserved. But although very many examples of this protection are to be found, some of them positively marvellous in their perfection, there are so many exceptions that it becomes obvious that other causes are at work to account for them. No doubt one of these is due to the limitations of the human eyesight, resulting in the probability of a large number of well-hidden insects being missed by the searcher, while all, or, at any rate, most of those which are less in harmony with their surroundings, are discovered.

I had an excellent instance of this on one occasion when photographing a moth on the trunk of a black poplar tree. I daresay that, after finding the insect, I spent fully ten minutes in erecting my camera, focussing, and taking my picture, all the time with my interest centred on the small piece of the tree-trunk on which the moth was sitting; but it was not until I had finished, and was boxing the moth to take home for a cabinet specimen, that I became aware of a large caterpillar of the red underwing moth, between two and three inches in length, which was sitting exposed upon the bark so near the moth that it had almost been included in my photograph. The caterpillar had fitted itself so marvellously to the rough edges of a ridge of the bark, with which it exactly harmonised in colour, that, although I think I can fairly lay claim to rather more than an ordinary amount of skill in finding insects, as I have collected ever since my schooldays, I had entirely overlooked it.

This faculty of protection by mimicry and resemblance has no doubt been developed in the course of generations by the law of the survival of the fittest. Like the human hunter, the natural enemies of insects found most of those which were less effectually concealed, and consequently the well-hidden ones carried on the race and transmitted their protective faculty to their progeny, without, of course, any conscious intention, until it became a natural habit. In illustration I may, to take a single species, allude to the marbled

green moth, *Bryophila muralis (glandifera)* (Pl. II, fig. 1). This is a medium-size moth, about 1 to 1½ in. across the spread wings, which is found during the summer resting on walls and rocks around our south and west coasts. Its coloration is very similar to that of old lichen-covered stucco, but is exceedingly variable within definite limits, and careful study soon provides a theory to account for this. The caterpillars feed upon the green confervoid growths to be found on all old stone- and brick-work, especially after damp weather, and consequently each wall has a colony of them to itself, large or small.

Now, of course, the general tone of colour on an old stone wall is different from that of old brick, and in different localities there is even greater variation due to local conditions and the type of the local rocks. But it will be found that the majority of the moths on each wall harmonise so perfectly with it as to be very difficult to find; and the conclusion at once presents itself, that those which do not do so in each succeeding generation have met with a speedy and violent death from natural causes, leaving those that are best protected to propagate their species, and producing more or less on each wall, certainly in each locality, a varietal race, and, of course, in the aggregate accounting very satisfactorily for the great variability of the insect.

Another very potent factor bearing on the position selected by an insect for resting is the weather. They object to wind, and most moths object to sunshine as well.

My own experience has led me to conclude that it is very little use searching on palings or the sides of tree-trunks which have faced the wind during the previous night, especially if it has been at all strong, and I have often been struck with the particular potency of this factor when cycling or walking along a road bordered on both sides with palings, at finding practically all the moths on one side of the road. I feel so confident on this point now that I pay very little attention to the side which has been facing the wind of the previous night. The point that I want to settle to my own satisfaction is—what happens when the sun shines full on the sheltered side of a tree or fence, or the wind changes after daybreak? Actually, the result one finds is that the moths disappear, and I fully expect they creep away into the grass near the ground, but I have never been able to catch one actually doing so and satisfy myself as to its intentions. Moths usually, if undisturbed, pass the whole time between sunrise and sunset without moving, and it would be an experiment of very great interest to locate one at rest on the south side of an exposed tree-trunk on a bright, sunny morning, and keep him under close observation, as the sun worked round until it shone upon him, to see whether he moved away, or the sunlight passed round and left him in the shade again. Unfortunately, the experiment would take a good deal of time in all probability, and if the experimenter relaxed his attention for a few minutes, the anticipated move would be *sure*

RESTING ATTITUDES OF LEPIDOPTERA.

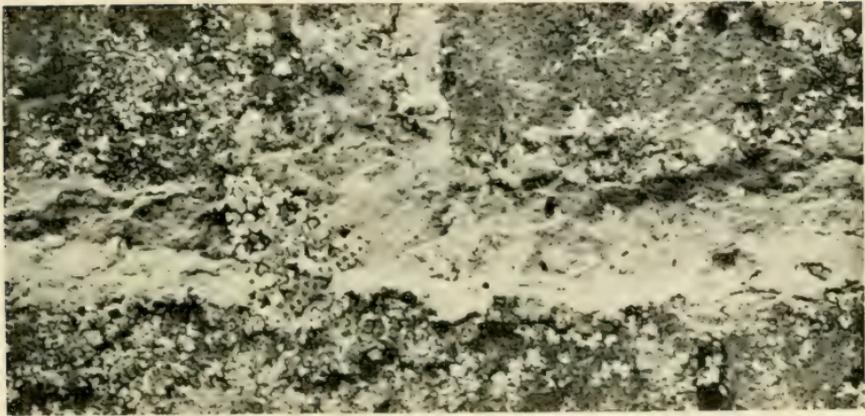


FIG. 1.—*Bryophila muralis* on Lichen-covered wall.



FIG. 2. *Vanessa atalanta* on stem of alder tree.



FIG. 3. *Anisopteryx ascutaria* on a tree-trunk.



PLATE III.

RESTING ATTITUDES OF LEPIDOPTERA.



FIG. 1.—*Lobophora carpinata* on tree-trunk.



FIG. 2.—*Acidalia marginipunctata* on rough stone wall.



FIG. 3.—*Eupithecia exiguata* on tree-trunk.



FIG. 4.—*Hellinsia carphodactylus* on paling.



FIG. 5.—*Anticlea nigrofasciaria* on tree-trunk.



FIG. 6.—*Hybernica marginaria* ♀ on tree-trunk.



to take place just then. But I really think it would be worth doing, and as I have only found a very few moths resting in full sunlight against hundreds in the shade, I feel sure that something would happen.

There is a very large number of moths which are rarely if ever found at rest in the daytime, and these afford ample scope for investigation as to their resting habits. Do they sit on the high branches or twigs of trees, or do they creep down to the ground and hide amongst roots or within curled dead leaves? Probably both, and the fact that when beating for caterpillars moths not infrequently fall into the beating-tray is a fairly positive proof in this direction. Some, too, rest upon the stems of flowers and low plants, and I know of one species—*Eremobia ochroleuca*—which I have not as yet been fortunate enough to see, which rests head downwards beneath the flower-heads of the common knapweed on our south coasts, and is, I am told, quite easily passed over unless the searcher knows exactly what to look for. Another species, *Gnophos obscuraria*, which occurs on Colley and Reigate hills, rests not infrequently inside the burrows of rabbits, and I have several times disturbed and captured it by poking the handle of my butterfly-net into a burrow and rattling the earth inside.

The photographs which accompany these notes unfortunately do not show so much of the surroundings of the insects as I should wish, as the negatives from which they were printed were mostly taken natural size upon quarter-plates with the object of showing more clearly the exact attitude adopted by each species, and the position in which it placed its wings. This varies very much, but is more or less constant with species which are nearly related. Some, especially butterflies, hold the wings vertically over the back with the upper surfaces pressed closely together, and the front pair largely covered by the hind ones, and such gaily-coloured insects as *Vanessa atalanta* (Pl. II, fig. 2) and *V. io* render themselves most inconspicuous by these means, as their under-side coloration is dull and neutral.

From this position examples may be found in which the wings are held at all degrees down to the horizontal, and pressed closely to the surface on which the insect is sitting, and should this not be flat the wings will go lower and lower, until, in the case of a moth resting on a blade of grass, they may be pressed together beneath the insect's body and below its support.

Then, again, there is a great difference in the amount of spread in the wings from the attitude assumed by the *Eupithecia* (Pl. III, fig. 3), and the *Acidalie* (Pl. III, fig. 2), which is very similar to that of a set specimen in the cabinet, through all sorts of obtuse and acute-angled triangles to a position like that of *Anisopteryx ascularia* (Pl. II, fig. 3), in which the wings, while being held flat over the back, are overlapped to such an extent that the full visible width of the entire insect is no more than that of a single fore-wing.

The special resting habit of the plume moths (Pl. III, fig. 4), is particularly interesting, as the wings in these species are divided longitudinally into five plumes or feathers on each side of the body. These are closed one over the other like a fan, and held out stiffly at an angle to the body, making the insect very unlike a moth in appearance. I have not as yet investigated the resting habits of moths and butterflies sufficiently to say whether any attempt at systematic classification of species could be made from it, but the attitude assumed by each species is so constant—even to resting with the head up or down (Pl. III, fig. 5), or the body horizontal—that, when one has had a considerable amount of experience, it becomes possible to get a fairly accurate idea of the identity of an insect, even from the very brief inspection that is possible when driving or cycling rapidly by.

## The Scotch Fir (*Pinus sylvestris*).

By W. J. LUCAS, B.A., F.E.S. *Read May 27th, 1909.*

In some parts of England the Scotch fir is practically unknown, and to read a paper on it would be much out of place. In Surrey it is a different matter, for we have in this delightful county great stretches of a geological formation, known as the Bagshot Sand, which, though very barren as regards vegetation as a whole, is particularly well suited for a few plants, one being that with which the present paper treats.

Near Oxshott, Claygate and Esher the Bagshot Sand is well developed, and is therefore easily accessible to members of this Society, thus rendering unnecessary any excuse for bringing forward some facts connected with this in many ways interesting plant. One such fact I must refer to at once. It is needless to state that plants naturally form various groups, such as algæ, fungi, mosses, ferns, flowering-plants. Now the Scotch fir and the other plants belonging to *its* group hold an interesting position between the fern-group and the thorough-going flowering-plants such as the buttercup and the horse-chestnut. By studying the three groups we seem to see that as during the ages such flowering-plants were being evolved from some members of the fern-group, the fir-group came as a link—not this time missing—between the other two.

Scientifically, this group of plants is known as Gymnosperms. It so happens that there are but three members of the group that are real natives of Britain. These are the yew, the juniper, and the plant with which we are immediately concerned. Plants constituting the Natural Order to which the Scotch fir belongs are named Conifers, that is, producing their seeds in cones—fir-cones. The yew and the juniper, though belonging to this order, are rather distantly related to the cone-bearers proper, their fruit taking the form of a so-called “berry.”

To the botanist the conifer we have now to deal with is *Pinus sylvestris*, which, being literally interpreted, is the “pine of the woods.” As the plant seems to be naturally at home in Scotland, it is known almost universally as the Scotch fir. Some people prefer to translate the word *Pinus* into the English word “pine,” and hence call the tree the Scotch pine, but as the vernacular English name for the tree is Scotch fir, that we should call it when we use an English name at all. Besides, it would seem that the name “fir” was originally given to the Scotch example; and therefore, I am given to understand, by the law of priority “Scotch fir” must stand,

and this settles the matter. If I still seem to be making a mistake in calling the plant by its right name, I am content to err in such good company as that of Charles Darwin and Sir Joseph Hooker.

“Fir” is connected with “fire,” and the “fir-tree” really means the “fire-tree,” quite an appropriate name considering the inflammable nature of the wood. Right across the northern parts of Asia and Europe forests of Scotch fir are to be found, while in Southern Europe it occurs on the mountains, for it prefers a cool situation. At the present day we can scarcely consider that it is truly wild in many parts of Britain, if any, other than Scotland, though it used to be so in England and Ireland. The numerous specimens in Surrey, in the New Forest, and elsewhere are the results of planting; yet in the less rigorous conditions of our southern climate they seem to come to greater perfection than they do in their native home on the Scotch mountains. I was on one occasion by the side of the Black Pond on Esher Common with a Scotchman, whose home was in the Grampian district. Looking at the fine trees, which, I suppose, provide the name of the pond, he said *they* were not Scotch firs: they ought to be gnarled and twisted and broken, not tall, upright, and well grown like those he saw around him.

For taking a walk through a fir-clad country the time of year scarcely matters, as even in winter many a pleasant hour may be spent walking over the dry springy beds of fir-needles, and watching perchance the red wintry sun setting behind the fir-trunks, when it “resembles most some city in a blaze seen through the leafless woods.” Indeed, winter sometimes provides a picture of even greater splendour, for perhaps the woods never look better than on a bright cold morning, when hoar-frost decks the scene, and the trees—

“Fledged with icy feathers  
Nod superb.”

With such a district within easy reach a photographer need never be at a loss for subjects on which to display his skill during the winter months. A fir wood with its evergreen trees, and the dry needles on the ground, never seems so thoroughly sunk in winter sleep as do so many country scenes. As we pass a spot where the trees grow thick, we note the “dim religious light,” the dearth of vegetation under the shade of the trees, and the absence of lower branches, not sufficient light penetrating from above to keep them alive. A picture made up chiefly of straight lines is not usually very pleasant to look upon; but this does not seem to apply to one portraying a mass of Scotch firs.

Most of the individuals will be seen to possess a single straight trunk. This is not, however, always the case. Not seldom may be seen trees springing from the ground in two main trunks, while it is not a difficult matter to find cases of three. There is one tree near the Black Pond on Esher Common with four distinct trunks, but I think it is the only one in the locality. Whether this means that

four seedlings started in contact or whether the four trunks are due to damage at a very early stage I cannot say.

Not every fir wood has a lake in it similar to the Black Pond in the Esher woods. Where it is absent there is a distinct loss, for the Scotch fir in combination with water is very effective. In spring the young, soft, pale-green foliage of the silver birches near the water is set off by the dark-green masses of the evergreen conifers behind them. The pond and its surroundings, however, make perhaps the grandest picture when the sun, setting behind the fir-trees some evening near the end of June, makes them look absolutely black, this dark background being relieved by the golden water in front of it, the cotton-grass in full fruit forming a somewhat striking foreground. Near the trees, where the light does not strike it, the water is indeed black, and no one need then ask why the pond obtained its name.

By the side of the pond is a fine specimen of the Scotch fir with trunk some seven feet in circumference at three feet above the ground. This is the largest I have noticed on the Common, but the species may attain a height of a hundred feet and have a trunk more than twelve feet in girth.

If the larger trees grow at all closely the soil beneath them becomes covered with fir-needles, which generally extend to a considerable depth—several inches at least. These decay very slowly, and do not seem to afford an agreeable soil for most plants. This is not the case with some of the lower plants, however, numerous mosses, lichens, and fungi, the last especially, doing very well upon them, as many members of this Society can testify from experience. The fir-needles are appropriated by the red ants for building their nests, which sometimes attain an enormous size and contain a vast number of inhabitants. One found on an excursion of the New Forest Natural History Society by Bartley Water in August, 1908, was taken to be some twenty feet round and three feet high. If not too much disturbed the ants occupy the same nests year after year.

Having glanced a little at the Scotch fir in its natural surroundings, we will look at it in another aspect and examine its life-history from seed to full-grown tree and thence to seed again. If on a bright, mild day towards the end of March we journey to Esher to catch—or try to catch—that very pretty spring moth, the Orange Underwing, it is not at all unlikely that we may capture at least one specimen of a smaller whitish “moth” being borne away on the wing before us. The apparent moth turns out to be a seed of the Scotch fir, which, being winged, spins along in the breeze in a very moth-like manner. Since it is so well provided for an aerial journey, and will readily germinate, it is not surprising that a wood of conifers rapidly spreads in the direction of the prevailing spring winds.

At the present time, that is, during May, the wind-spread seeds germinate. The seedlings appear above the surface of the ground with the seed-case still holding together the tips of the numerous

cotyledons, which look like the seams of an expanding balloon. Anon they become free and spread open, showing the apical shoot in their midst. Should no accident happen, a specimen in five years will have attained a height of about a yard, and of the five rings of branches will probably show three pretty clearly. At twenty years of age its trunk may be expected to measure some six inches in diameter.

As just mentioned, the branches occur round the trunk in rings, and in the younger trees they are particularly well marked as a rule. The sub-branches on these branches also appear in the same way. The reason for this is clear if the resting buds at the tip of a shoot are examined in the winter. There is an apical shoot, in virtue of which the branch increases in length, and a ring of subordinate shoots around it, which may be some ten in number, but are usually less. These latter produce the whorl of branches.

When, in the spring, these buds begin to lengthen, they are seen to be covered with small, brown scale-leaves, in the axils of which are produced dwarf shoots, which, after producing two foliage leaves only, cease to develop further. The brown scale-leaves fall immediately, but the foliage-leaves persist for a long time, and eventually the dwarf-shoots fall entire, as the fir-needles that are so well known.

When a tree has reached a certain age some of the young spring branches, instead of bearing dwarf shoots exclusively, have a cluster of them turned into pollen-bearing flowers, the branch as it grows producing dwarf shoots beyond. There is nothing attractive about the blossoms; they are not intended to entice insects as are the flowers of the honeysuckle or the may.

It is near the beginning of June, as a rule, that these flowers are mature and ready to discharge their pollen, which is produced in immense quantities. The least puff of wind sets it free in clouds and covers everything with an impalpable yellow dust, its fall quite justifying the name of "sulphur showers," which country people have bestowed on the phenomenon.

Everyone interested in plants knows that no fruit or seed can be obtained unless the pollen is conveyed to the place where the embryo seeds are being produced—in other words, unless the plant-egg is fertilized. We must recollect that the conifer is one of Nature's early attempts at making a flowering plant, and it seems that she first arranged that the wind should carry the pollen—hence the immense amount produced. I suppose the pollen grains actually used must be reckoned as one against millions produced in vain—apparently a sheer waste of energy on the part of Nature. Later she evolved a more economic method, and by the attraction of bright flowers and sweet scents enticed the insects to carry the pollen. Still, many of the older type of plants live on to the present day.

About this date—the end of May or beginning of June, 1909—when the male flowers are shedding their pollen, it will be found that on some branches the secondary buds forming the ring round



PISTILLATE FLOWERS AND FRUIT OF *PINUS SYLVESTRIS*.

(Specimens from Esher Common, Surrey.)

PLATE IV.



FIG. 1.—Erect and ready for pollination about May, 1909 (about natural size).



FIG. 2.—Till the time of fertilization about May, 1910 (about natural size).



PLATE V.

PISTILLATE FLOWERS AND FRUIT OF *PINUS SYLVESTRIS*.

(Specimens from Esher Common, Surrey.)



FIG. 1.—After fertilization, summer of 1910  
(about natural size).



FIG. 2.—After seeds have been shed in spring  
of 1911 (reduced).

the apical one have taken the form of small cones of pinkish scales (the female flowers), each scale having two ovules (immature seeds) at their base. These cones are at first erect, with the scales somewhat spread, and therefore ready to catch the pollen as it is carried hither and thither by the wind (Pl. IV, fig. 1).

Pollination being effected, the erect position is no longer advantageous, and the cones turn over (Pl. IV, fig. 2). Within the cones the pollen grains extrude their tubes as usual, which will convey the fertilizing atoms of protoplasm to the egg-cells of the female flowers. The growth is slow, however, and the tubes will not reach the eggs and bring about fertilization till the spring of 1910, and meanwhile the cones will increase but little in size. During the year 1910 the green cones will grow rapidly (Pl. V, fig. 1), and by the spring of 1911 will be full-grown and brown, the seeds being full-grown also. Then in March or April of that year the scales of which the cone is composed will spread open with a crackling sound (Pl. V, fig. 2). The seeds will be set free, to be whirled away by means of their wings to spread the fir-wood on such poor soil as will produce but little besides.

## Fruits.

By HUGH MAIN, B.Sc., F.E.S. *Read September 9th, 1909.*

THE popular and botanical conceptions of a fruit are by no means the same. The first example of a fruit a non-botanical speaker would give would probably be an apple, and a strawberry would find a ready mention, while a tomato would be ruled out as a vegetable.

The botanist would admit the tomato as the best example of the three, the apple being called a spurious fruit, while in the case of the strawberry, botanical authorities themselves would differ as to how it should be regarded. Some call it a succulent fruit, while others consider the small hard bodies on the surface of the strawberry as the true fruits, calling each an achene. Personally I incline to this latter view, and call the product of each carpel which remains separate and distinct a fruit.

According to my definition a fruit consists essentially of the mature ovary or ovaries of a plant. Where the ovaries remain free or separate we have separate fruits; where they are united we have a compound fruit. In some cases other parts of the flower besides the ovaries are present and enter into the composition of the fruit. Such fruits are called spurious fruits in contra-distinction to the true fruits, but in many cases the separation is not adhered to even by systematists who use these divisions.

I think my definition of a fruit can be justified logically and practically, and it gets over some of the difficulties of one's scheme of classification.

The term seed-vessel has some advantages over that of fruit, and perhaps conveys a better all-round idea of the subject of this paper, as the larger proportion of my illustrations are taken from the dry fruits, which can be so easily collected and kept safely for study or demonstration. Specimens of dry fruits can, of course, be found most abundantly in autumn, but odd examples may be picked up at almost any time of the year. One's own garden, and the gardens of our friends, will supply many interesting examples, while others may be found on every country walk, by hedgerow, wood, or stream.

As regards a scheme of classification, no two authorities you may consult will agree as to the details of their plans, and many seem to adopt quite different principles. Each student will probably build up a scheme of his own, and should endeavour to illustrate it by examples.

The development of the fruit after fertilization of the ovules is a

part of the subject one might enlarge upon here, but although this should logically come first, it may, and often will, be studied after one's acquaintance has been made with the fully-developed fruit.

Taking first the fruits whose walls are dry and more or less hard, the so-called dry fruits, we find that some of them open to liberate the seeds—the dehiscent fruits, while others do not open—the indehiscent fruits. Beginning with the latter, the dry indehiscent fruits, a good example is seen in the wild clematis or traveller's joy. As the fruits ripen the styles at the apex of the little fruits grow long and feathery, and finally present the appearance to which the plant owes its name of old man's beard (Pl. VI, fig. 1). Each of the little fruits is called an achene, and is a superior one-celled, one-seeded fruit, whose wall can be separated from the seed although it wraps it closely round.

If we wish to get good examples of the fruits of the dandelion, they should be gathered in the condition of that in Pl. VI, fig. 2, and then put in water singly. The specimen shown was photographed one morning, and in the evening it had developed into the fine dandelion clock seen in Pl. VI, fig. 3. It is very interesting to watch how the globular shape is brought about by the simultaneous opening of the little parachutes. Of course, this is a good example of a fruit which owes its distribution to the parachute arrangement and the help of the wind. The fruit is somewhat similar to the achene, but differs from it in being inferior (it is crowned by the pappose calyx), and it is bicarpellary in origin, as indicated by the two stigmas of the flower. It is sometimes called a cypsela, but much more frequently and quite erroneously it is called a seed of the dandelion.

The nut has been developed from an ovary of two or more cells containing one or more ovules in each cell, but the ripe fruit has usually one cell containing a single seed, the other cells and ovules having become abortive. The wall is hard and is surrounded by a cupule or cup, which varies somewhat in its appearance and structure in different plants. In the hazel the cup is somewhat tough and leathery. The acorn is another variety of nut, but the cup is harder and denser than in the previous example. In the beech the cup contains two nuts. Another example is seen in the sweet chestnut. The prickly cup often contains three nuts, but generally we find that one is much more developed than the others.

We must distinguish the nuts of the sweet chestnut as fruits from the seeds which we shall see later in the horse chestnut. In the sweet chestnut we find the remains of the styles at the apex of the fruits, while in the horse chestnut the large hilum of the seed indicates its morphological value. The sweet chestnut has indehiscent fruits; it is the cupule which opens to liberate the fruits, and this is very different from the horse chestnut, whose fruit dehisces to liberate the seeds.

In the hornbeam we may consider the fruit as a nut partly enclosed

by a three-lobed bract, but altogether the morphology of the *Cupulifera* is rather difficult.

The keys of the ash may be considered as winged fruits or samaræ, the wall of the fruit being extended into a winged expansion whose resistance to the air, as it falls, allows the seed to be carried away from the shade of the parent tree.

In the elm we get fruits with a more rounded wing, and in the birch also we get little samaræ.

There are a number of fruits which separate into little portions corresponding to the carpels, but these do not liberate their seeds, and so do not come under our definition of dehiscent fruits. These are called schizocarps. A good example is seen in the hollyhock (Pl. VI, fig. 4). In the lower fruit the epicalyx is turned down and part of the calyx removed and also some of the segments, so that the structure can be seen. Each little segment contains a seed, and separates from its neighbour and the central axis.

In the sycamore (Plate VI, fig. 5) we have a schizocarp which divides into two parts, each of which is sometimes called a samara. The success of the well-known arrangement for distributing the seeds is evident to anyone whose garden is near a sycamore; the little seedlings are found growing up all over the place. There is a similar structure in the maple, but the samaræ are arranged more in a straight line.

In the *Umbellifera* the special name of cremocarp has been given to the fruit, which splits into two halves or mericarps.

In *Tropæolum* (Pl. VI, fig. 6) the fruit separates into three parts. The walls of these are not very hard, so some may, from their definition, include them among the succulent fruits, but they come conveniently in here with the other schizocarps.

I now pass on to the dehiscent fruits, or those which open to liberate their seeds. There are a large number of these, but they can be grouped fairly easily into a number of varieties.

The simplest form will be that in which we have a single carpel, which opens down one side, as in the monkshood (Pl. VI, fig. 7). Each of the separate parts is called a "follicle." If we regard one as a leaf which is folded inwards from the mid-rib we get the edges uniting at the ventral suture, while the mid-rib is represented by the dorsal suture. The seeds are attached to the edges down the ventral suture, and it is along this line that the follicle dehisces.

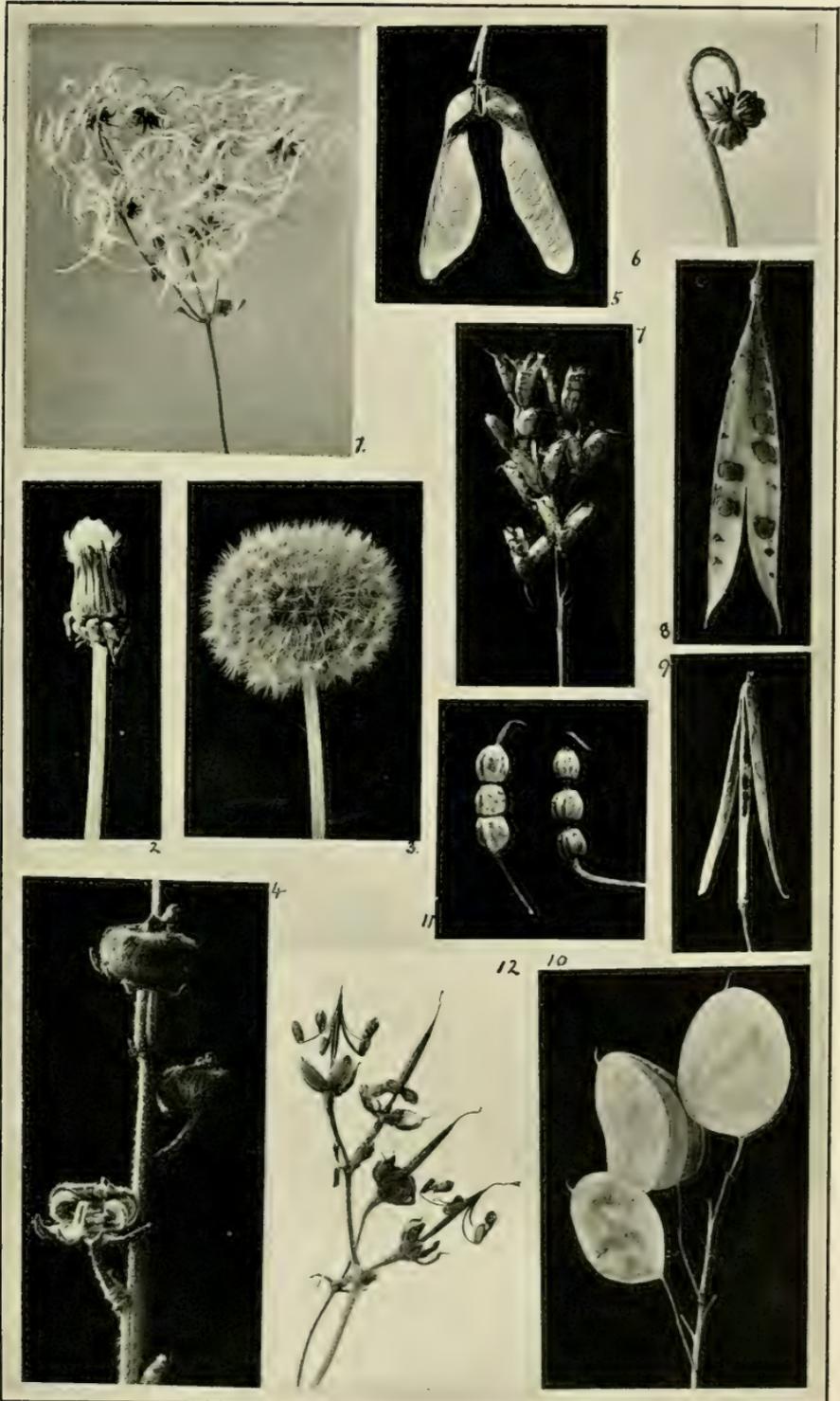
If the carpel opens down both dorsal and ventral sutures, as in the pea-pod (Pl. VI, fig. 8), the fruit is called a "legume." Here, also, as in the follicle, it is on the sides of the ventral suture that the peas or seeds are attached. This form of fruit is characteristic of the *Leguminosæ*, the name of the order being derived from that of the seed-vessel.

We now come to those dehiscent fruits which are derived from a compound or polycarpellary ovary.

In the wallflower (Pl. VI, fig. 9) there is a two-celled fruit formed

PLATE VI.

FRUITS.





from a one-celled ovary by the growth of a false septum across it. The false septum is frequently referred to as the "replum," but this term only properly refers to the framework across which the septum stretches. Dehiscence in the *Cruciferae* commences at the bottom, extending upwards, but in other dehiscent fruits it generally commences at the apex, extending to the base. The long-shaped fruit of the wallflower, etc., is called a "siliqua."

When the fruit is about as broad as long it is called a "silicula." A good example is seen in honesty (Pl. VI, fig. 10). In the upper fruit dehiscence has only just commenced. In the middle one the valves are just adhering at the apex, while in the lowest they have fallen off, leaving the replum with the septum stretched across it. The seeds often remain closely applied to the septum, but here have fallen away.

In the radish (Pl. VI, fig. 11) there is a structure formed as in the other *Cruciferae*, but it does not open in the same way. It divides off transversely, and is called a lomentaceous siliqua, a lomentum being a variety of the legume (found in acacia), which contracts in a similar manner.

In the crane's-bill (Pl. VI, fig. 12) the carpels separate from one another, as in the schizocarps, but each carpel also opens, and the seed is ejected with some force by the contraction of the walls of the carpel. The carpels remain attached by the upper part of the withered styles.

There are a number of dehiscent fruits called "capsules," and they are classified according to their mode of dehiscence.

In the pink family we have a partial dehiscence by means of teeth (Pl. VII, fig. 13). Fruits of the campions, if found in wet weather in the winter, will be seen to have these teeth meeting together, but as they dry they open out again.

A number of capsules with complete dehiscence split open longitudinally. This splitting may occur in three ways—either down the middle of each cell, or at the line of juncture of the several cells, or the outer walls may separate, leaving the seeds attached to a central axis, or to walls radiating from it.

In the tulip (Pl. VII, fig. 14) there are three cells, one of which is seen with the dehiscence down the middle, which represents the dorsal suture.

The box (Pl. VII, fig. 15) is another example of this type. Shortly after bringing some of the specimens home I heard the seeds, which are smooth and wedge-shaped, dropping all about the room as they were shot out to some distance by the contraction of the walls of the fruits.

The fruit of the horse-chestnut is a further example of the same type. A seed can be seen (Pl. VII, fig. 16) with the large hilum or area by which it was attached to the placenta.

In the violet (Pl. VII, fig. 17) we have a one-celled fruit formed from three carpels, and it opens along the lines of the dorsal sutures.

As the valves dry their edges come together and the seeds are squeezed out with some force and projected, just as a boy squeezing an orange pip between his finger and thumb shoots it across the room. In one case all the seeds have been squeezed out, and the sides of the valve, or rather the contiguous halves of the neighbouring carpels, are in contact.

In the flax (Pl. VII, fig. 18) the carpels open first along the dorsal suture, and then separate from each other along the line of juncture of the carpels, and we thus get twice as many divisions as the number of carpels.

When the walls of the carpels split away so as to leave a central part to which the seeds are attached, we get the third form of dehiscence. In the convolvulus (Pl. VII, fig. 19) two of the fruits have not yet opened. One has the outer walls splitting off, the seeds remaining in the angles of the radiating walls, while in the other the outer walls and seeds have fallen away.

The fruit of *Streptocarpus* (Pl. VII, fig. 20), a plant I came across in a friend's greenhouse, struck me as being very peculiar at first, as having a spiral dehiscence. However, on examination one sees that the carpels form a spire, and the dehiscence is simply longitudinal. One fruit is not yet ripe, but shows the line of dehiscence, while the other is fully developed.

Dehiscence, instead of being longitudinal as in the previous examples, may be transverse. The fruit in this case is called a pyxidium. In the henbane (Pl. VII, fig. 21) we have a good example of this. The lowest fruit is surrounded by the persistent calyx. In the next two, half of the calyx has been cut away, showing the complete fruit in the upper one, and in the lower one the lid has fallen off.

Another pretty example is seen in the pimpernel (Pl. VII, fig. 22). Two of the fruits are complete; in one the lid has nearly fallen off, while in another it has gone, exposing the seeds, which are attached to a free central placenta.

Other capsules open by means of pores. In the poppy (Pl. VIII, fig. 23) these are formed just beneath the flat stigmatic surface. Thus we have a sort of pepper-pot arrangement that allows the loose seeds inside to be occasionally scattered when the stem is shaken violently by the wind, or jarred by some animal brushing against it.

In the snap-dragon (Pl. VIII, fig. 24) three pores may be seen towards the apex of the capsule.

The capsule is, strictly speaking, a superior fruit. In the iris (Pl. VIII, fig. 25) we have a fruit which only differs from this in being inferior, and to distinguish it from a true capsule it is sometimes called a diplotegia. The dehiscence is down the middle of the carpel, or along the dorsal suture.

In the evening primrose (Pl. VIII, fig. 26) we have another inferior fruit, but in this case the valves separate from each other and from the central axis.

PLATE VII.

FRUITS.



13.



14.



18.



15.



21.



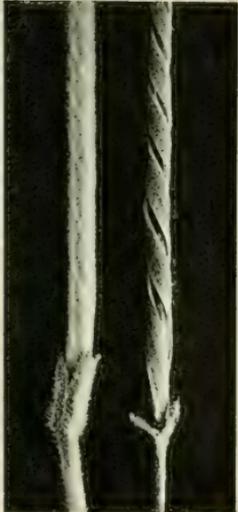
17.

20.

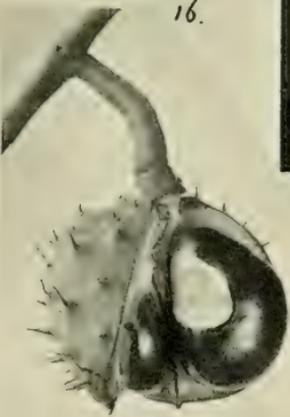
22.



19.



16.





The fruit of *Campanula* is, again, inferior, and the dehiscence is by pores. In one species (Pl. VIII, fig. 27) the fruits stand upright, and it will be seen that the pores are near their apex. In another species (Pl. VIII, fig. 28) the pores are right at the base, and if the fruits were upright as in the previous case, the seeds would all run out as soon as they were liberated on ripening. However, it will be noticed that the stems have bent round, so that the seeds are only liberated when the plant is shaken. This brings me to the end of the dry fruits.

We come now to consider the succulent fruits.

These are produced by the walls of the ovary becoming more or less juicy or fleshy. Sometimes we can distinguish three layers or regions in this wall. For example, in a plum we have the outer tough skin, then a fleshy layer, and finally a hard layer, the stone, enclosing the seed. Such a fruit is called a drupe or stone fruit.

In the almond we have a slightly different arrangement of the walls of the fruit. The two outer layers previously mentioned, which are not well differentiated as in the plum, form an outer coat, and this splits along the ventral suture (Pl. VIII, fig. 29), and later on falls off, leaving exposed the innermost layer or stone (Pl. VIII, fig. 30). This is not a real dehiscence of the fruit, as the seed is not liberated, but remains enclosed in the stone which is part of the wall of the carpel.

The walnut is not a true drupe as it is inferior, and it is formed from an originally compound ovary, but it is very similar to the drupe in its composition.

In the bramble the separate carpels develop into little drupes or drupels.

The berry is familiar as the fruit of the gooseberry and currant. Here we have the tough outer layer or skin, with the two inner layers, together with the placentas on which the seeds are formed, as the succulent inner portion. Here the hard bodies in the interior are the seeds.

Although a true berry is an inferior fruit the name "berry" is applied to many fruits of a pulpy nature, such as we find in the deadly nightshade, etc.

The fruits of the rose present a little difficulty. The hip (Pl. VIII, fig. 31) is really a concave fleshy receptacle which bears the carpels. The longitudinal section shows the true fruits, which should be described as achenes; so the hips are not fruits, but contain these in their interior.

The apple presents a somewhat similar difficulty, but here the carpels, instead of being free, are united together and are enclosed in the fleshy tube of the calyx.

When we come to the conifers we find a good deal of difference among authorities as to the morphology of the different structures. There is no closed ovary, and opinions are divided as to whether we

should consider the cone as a spurious fruit formed from a single flower, or as a collection of fruits.

In the pine (Pl. VIII, fig. 32) we get a cone, consider it what we may, and we can distinguish a variety of the cone which is of a globular shape as a galbulus, such as is found in the cypress (Pl. VIII, fig. 33).

In the yew there is a naked seed whose base is surrounded by a fleshy cup or aril, so it cannot properly be called a fruit at all.

In the above notes I have tried to point out the differences and peculiarities of a number of fruits, and have given illustrations of them. However, in the study of Nature an acquaintance with only the pictures and descriptions of natural objects is of little value. We want to come into contact with the things themselves, to watch how they grow and develop, to see them in their natural environment, and to note the part they take in it and the effect of the environment on them. Fruits cannot be studied from pictures of them, neither can their full lessons be learnt from the dried specimens which we preserve. These tell a part of their story, and an interesting one. In well-chosen examples we may get specimens which illustrate the various changes which go on in the formation, ripening and opening of the different varieties of fruits, and we may record passing stages by drawing or photography; but we must watch these changes going on in the living plants themselves, and notice the small gradual progress which goes on in the production of those stages which leave their permanent record behind.

Nature study, like charity, should begin at home, and whatever branch we take up, we should first study those examples which are nearest to us, at our own doors.

I cannot pretend to have exhausted anything like all the interest of the study of fruits, but if I have done anything to awaken the enthusiasm of any who have previously seen little of interest in the subject, it will not have been in vain.

PLATE VIII.

FRUITS.



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## Our Authorities: an Introduction to the Early Literature of Entomology.

By HY. J. TURNER, F.E.S. *Read September 23rd, 1909.*

### PART II.

At the end of my former paper \* on "Our Authorities," reference was made to the "dozens of workers of repute in entomology who lived and wrote in the earlier half of the nineteenth century." It occurred to me that a summary of what the chief of these workers did, coupled with an exhibit of the more interesting books, might form the subject of one of our evening meetings of this present session.

Hence these few notes, culled from various sources, and illustrated with numerous books, which a number of our members, at my suggestion, are very kindly exhibiting to-night.

As we get nearer to our own times it becomes increasingly more difficult to select authors for comment, on account of the multiplicity of workers of more or less repute, and of the necessity for those workers to concentrate their energies upon restricted sections of the Insecta.

Looking to our own country first, we find that in 1803 was published a thin volume entitled "Lepidoptera Britannica," by A. H. Haworth. This was succeeded in the next twenty years or so by three similar volumes, the whole work being described as "a monograph the most complete, most learned, and most useful ever published on the entomology of Britain." Haworth described from Nature, and he described well. He possessed large collections of all orders of insects, both British and foreign—a splendid basis for description and for comparison. Not only was he an admirable entomologist, but his botanical knowledge and work was of no mean order. He possessed a large collection of living succulent plants, and his memoirs on certain groups, including one on the Mesembryanthemum, are almost classical works in botany. Many of his specimens of insects still exist in our national collections, having been purchased by Stephens, whose collections are now in the British Museum (Natural History), South Kensington.

Then we have two illustrious and laborious describers and systematists, working simultaneously, but not always in harmony—Curtis and Stephens.

Curtis was originally an artist, and drifted from drawing insects to the study of their habits, forms, and relationships. Between 1824

\* "Proc. South Lond. Ent. and Nat. Hist. Soc.," 1907-8, pp. 1-7.

and 1840 there appeared his great work in sixteen volumes, "British Entomology," which is universally considered to contain some of the best entomological figures in existence. The work does not treat of all species, but comprises illustrations and descriptions of the various genera of all orders of insects, many of the plates portraying life-histories being noteworthy works of art. Later in his life he brought out a comprehensive and valuable work, "Farm Insects: the Natural History and Economy of Insects Injurious to the Field Crops of Great Britain," a book equally well illustrated. He passed through the Chair of the Entomological Society of London.

James Francis Stephens, even as a lad, was an enthusiastic collector of insects. At the early age of sixteen he began to prepare a catalogue of British insects. His chief work was "Illustrations of British Entomology: a Synopsis of Indigenous Insects," which was published from 1827-1846. The intention was to describe and classify all known British species, but this idea was never completed. Perhaps that portion (four volumes) comprising the Lepidoptera is the most complete section. These four volumes are one of the best systematic works on our Lepidoptera that we have. Still, there is much that is superficial and erroneous, descriptions, etc., being incorporated from untrustworthy sources, without comparison and verification. His "Manual of British Coleoptera," although now completely out of date, for many years served its purpose. In 1829 the work he had commenced as a boy was completed—"A Systematical Catalogue of British Insects," enumerating more than 10,000 indigenous species. Although a Government official he wrote extensively for magazines, natural histories, society transactions, and assisted in the arrangement of the British Museum collections. We are told that he was a most estimable man, throwing open his huge collections and his library to every entomologist, and imparting information to one and all with the utmost readiness. At his death, in 1852, his collections went to the British Museum; his extensive library came into the possession of Stainton, and now, through the liberality of Mrs. Stainton, many of these historic volumes are on the shelves of the Entomological Society of London. Possibly nothing did more, during the first half of the nineteenth century, to aid the progress of the study of entomology than the genial sociability of James Francis Stephens.

Most of the works on entomology up to the middle of the nineteenth century, even those of a popular character, were expensive, and consequently limited in their circulation. It was not until 1856, when Stainton commenced to issue his "Manual of British Butterflies and Moths" in threepenny monthly parts, that a book scientifically accurate, and at the same time cheap and popular in form, was issued. Stainton was a man of independent means, and, like Stephens, threw open his collections and library, and freely imparted his knowledge to one and all who were interested in his favourite study. Especially did he welcome the beginner, "tyro," as

he used to call him, recognising the fact that to the younger generation must we look for an advance on the progress of the older. Stainton devoted his energies mainly to the British Micro-lepidoptera, so-called, and to him we are indebted for the thirteen beautifully illustrated volumes, "The Natural History of the *Tineina*." Early appreciating the fact that much careful work had been done by the German-speaking peoples of Europe, he placed himself in very friendly communion with many of the leading students in the study of the smaller Lepidoptera on the Continent. Hence many observations were made in this country suggested by what had been done by his friends abroad, and his own independent observations were often confirmed by similar ones made by his co-workers. Only by most careful and systematic methods was he able to get through the huge amount of work he undertook. In addition to the various books he wrote, the production and editing of periodical literature absorbed much of his energies. "The Entomologist's Annual," for twenty years a record of work done in various orders; "The Entomologist's Weekly Intelligencer" for some years; the "Entomologist's Monthly Magazine" from 1864 onwards kept him continuously working. Still he found time to compile a book on "South European *Tineina*," and another on the "*Tineina* of N. America," as well as to make several journeys to the Alps of Switzerland. No one man ever did more to advance the study of the Micro-lepidoptera, especially from the natural history side.

Perhaps I ought not to omit some mention of Douglas, one of the collaborators with Stainton in "The Natural History of the *Tineina*," and a great helper in the conduct of the periodical literature he was responsible for. In the sixties he forsook the study of the Lepidoptera, and henceforward to the various sections of the Hemiptera the remainder of his very long life was devoted. In conjunction with John Scott a volume of the Ray Society Series was produced, comprising life-histories of the British species of Hemiptera-Heteroptera, which was superior in every way to anything hitherto attempted in this order. At his death the whole of his notes, excerpts, etc., came into the possession of the Entomological Society, and almost a shelf in their library is devoted to this handsome bequest. He was the author of that interesting little book, "The World of Insects."

Turning to those whose fame rests chiefly on their skill and success in delineating the objects of their admiration, we must, in order of time, first speak of Donovan. He was a most indefatigable artist, but without any power of appreciating the scientific progress of the time, hence his fame rests entirely on his illustrations. "British Insects," "Insects of New Holland, etc.," "Insects of China," "Insects of India," "British Birds," "British Shells," "British Fishes," and many others, are still considered as of value to connoisseurs, and contain the first published figures of many species. Some of his figures are perfect gems of colour. Curiously, his "Insects of India" are not Indian, but S. American or African species.

Other writers of less merit brought out periodical illustrated parts of "Miscellanies," with figures of any object of Natural History as it came to hand. Swainson's "Zoological Illustrations" is an example. His figures of shells were very beautifully executed.

Wood's "Index Entomologicus," issued in 1833-39, was the first attempt made to figure all the known species of British Lepidoptera. This book consists of a series of plates of coloured figures, all of which are reduced to a uniform size. The figures and colouring were good, and the book still has a good market value. The letter-press was a mere catalogue, with localities.

Doubleday (Edward) and Hewitson issued two folio volumes of coloured plates of Butterflies from 1846 to 1852, entitled "Genera of Diurnal Lepidoptera"; and Hewitson, with the assistance of W. W. Saunders, Prof. Westwood, and others, subsequently published five volumes of "Exotic Butterflies" from 1851 to 1857, and a volume of "Lycænidæ" in 1878. These volumes contain a very large number of figures of butterflies, a considerable proportion of which represent species obtained by Bates and Wallace on the Amazon, Wallace in the Malay Archipelago, and Buckley in Ecuador and Bolivia. The huge, rich, and unrivalled collections of Hewitson were bequeathed to the British Museum, and those of us who frequent the lower regions of that building have seen the richly carved cabinets which contained them.

John Obadiah Westwood. No summary would be complete, even partially, without mention of this remarkable man. Living to the ripe age of 87, for more than sixty years his name was always to the fore in entomology. Not only did he study all orders of insects deeply, but he found time to do good and lasting work among the Crustacea. His post of Professor of Zoology in the University of Oxford and his Curatorship of the Hope Museum kept him in touch with all that was being done. Of his writings, from their purely scientific aspect, his "Modern Classification of Insects" is undoubtedly the most enduring. Although published in 1839, it still maintains much of its scientific value. His delight was to produce books that were beautifully illustrated, and during his long career but few works of any pretention, no new edition of any old work of value was produced, unless Prof. Westwood had some part in its production. Not only had he a facile pen, but his pencil showed what a skilful hand was behind it. Moses Harris' "Aurelian," Donovan's works, Drury's works, Wood's "Index," and many others were re-issued with his assistance. Up to the year 1862, thirty years before his death, Hagen gives a list of 379 books, articles, papers, etc., produced by him. In fact his knowledge was encyclopædic, and his power for work herculean. In the spread of general scientific knowledge of insect forms he was possibly more instrumental than any one man has been or even could be again.

In 1815 was published the first volume of "Elements of Entomology" by Messrs. Kirby and Spence; the fourth and last appeared

in 1826. These volumes consist of a series of "Letters" from one friend to another discoursing upon the habits and structure of insects in a chatty and attractive manner. The work is replete with an enormous number of observations taken from practically all the best books of natural science hitherto issued. Many editions have been published. Most public and private libraries of the early part of the century contained a copy, and for many years it was the popular natural history of insects.

Others we might mention, had we time, such as Samouelle, who wrote "The Entomologist's Useful Compendium," a book particularly adapted for collectors, the forerunner of Merrin, etc.; Duncan, who wrote and illustrated numerous volumes in Jardine's Naturalist's Library, a cheap and popular series of books; Rennie, whom Stephens charged with piracy of his works, issued a small pocket-book, "Conspectus of British Butterflies and Moths." This last is remarkable for the English names of ingenious manufacture applied to every species, even of the micros.

We must now leave authors of our own country and turn to the continent. Hübner we have already spoken of in eulogistic terms. His splendid work was continued in the first two decades of the century, and after his death, in 1826, it was carried on by Geyer and Herrich-Schäffer. The letterpress was almost *nil*, but the plates were in hundreds and exquisite in their delicate accuracy.

In 1807 appeared the first of a long series of seventeen volumes commenced by Ochsenheimer, an actor of Vienna, who had already written a small work on the "Moths of Saxony." Mutual objects of study drew to him a much younger actor, and a most energetic student of Nature, Treitschke; together they collected insects, together they worked on the stage, and together they studied when work was over; but, after four volumes were issued, the elder man died, in 1816, and at short intervals other volumes were brought out by Treitschke, until we get the seventeenth in 1835. At the time they formed a companion letterpress to Hübner's plates, and contain much that is original and of permanent value. "The Butterflies of Europe" was for years a standard work.

Herrich-Schäffer, a doctor of Ratisbon, who had assisted Geyer to complete what Hübner had left unfinished, afterwards issued a series of six volumes, from 1843 to 1856, supplementary to Hübner's works. This work was a thoroughly good systematic natural history of every known species of Lepidoptera indigenous to the continent of Europe, illustrated with hundreds of plates, for the main part figuring species and forms not on Hübner's plates. The colouring and the figures generally, although not quite equal to Hübner's, leave little to be desired. The analyses and classification suggest that the scientific work of Herrich-Schäffer was of a high order, and the test of time has proved it so.

The father of the modern study of the Micro-lepidoptera undoubtedly is Prof. Zeller, of Glogau, Germany, and I am indebted

to our President for the following particulars of his life and work, abstracted from the "Stett. Ent. Zeit," 1883, pp. 405-418.

Phillip Christoph Zeller was born in 1808. After his university career he became a teacher at Glogau, where he remained till 1869, when in consequence of chronic illness he retired and settled near Stettin. In 1883 he died of heart failure at the age of 75. When only fifteen years old Zeller began an entomological diary, but it appears that he did not publish anything till 1838, when an article on the Lepidoptera mentioned by Réaumur appeared in Oken's "Isis." In the same publication the year following (1839) was printed one of Zeller's most famous masterpieces, "An Attempt at the Natural Classification of the *Tineina*." It is almost impossible for living entomologists to properly appreciate this paper of Zeller's, because they can hardly understand the chaotic condition of ideas on the *Tineina* held by the entomologists at the beginning of the nineteenth century. In 1844 Zeller was collecting in Italy and Sicily, and his doings are chronicled in the "Isis" for 1847. In 1846 the Stettin Entomological Society began publishing that important work known as the "Linnæa Entomologica," the first volume of which contained monographic articles by Zeller on *Lithocolletis* and *Eudorea*. These were followed by similar articles on other families of the *Tineina* and *Pyralidina*, that on the genus *Coleophora* appearing in 1849. The revision of the *Pterophoridae* appeared in 1852. In this year Zeller, in company of Dr. Dohrn, visited England, both of them staying with Stainton at Lewisham. Stainton arranged visits to Charlton sand-pit, West Wickham Wood, Mickleham, and Sanderstead, and also to Prof. Westwood at Hammersmith, and to Henry Doubleday at Epping. It is to be feared, however, that, as Stainton says, Zeller did not much enjoy this visit on account of the "water-feeling," as he called it, that he acquired on his passage from Ostend to Dover, and also from his strange antipathy to the smell of camphor. Three years later Stainton returned this visit, staying at Glogau with Zeller, and at Stettin with Dr. Dohrn. In this year (1855) also appeared the first volume of the "Natural History of the *Tineina*," by Stainton, Douglas, Zeller, and Frey, Zeller writing the German and Latin texts. Zeller spent June and July in 1867 in Carinthia. In each of the years 1871, 1873, and 1875, he spent about two months in the neighbourhood of Bergün in Switzerland. During these and later years he wrote several articles on "Exotic Micro-lepidoptera."

Zeller's collections are in the British Museum, and with them are included some of his books, which are carefully annotated with beautifully coloured drawings and neatly written notes, supplementary to what he had published.

Fischer von Röslerstamm, of Bohemia, in 1834 and *seq.*, brought out a most valuable work on about a hundred species of European Lepidoptera, illustrated with magnificent plates, also as a supplement to the work of Hübner. They are chiefly devoted to micros, and the finish and accuracy are exquisite.

Ratzburg, of Berlin, is another of the earlier specialists. His life's work was the production of the huge book on "Forest Insects," dealing with all orders and figuring many species in various stages. For many years this was the standard work of reference throughout Europe for all those connected with forestry. It has gone through many editions.

As worthy successors to Linné and Fabricius in the Scandinavian Peninsular we get Zetterstedt and Tengström. Zetterstedt, a Swede, published in 1840 a monograph of the "Insects of Lapland," a good foundation for work in the far north. Tengström was a native of Finland, and in 1847 published an account of the Lepidoptera of his native land, a work containing much original observation, more particularly valuable as coming from a region practically unknown and difficult of access. Some twenty years later he published a "Catalogue of Finland Lepidoptera," with notes.

The turmoil of the early nineteenth century was not conducive to much earnest systematic study on the Continent. People of all ranks had as much as they could do to live, and very little time and opportunity could be utilised in the study of zoology. Particularly was this so in France. Still, as the century proceeded we get the results of one or two indefatigable workers.

Latreille, Professor at the Paris Museum of Natural History, a great student of all orders and a voluminous writer, was one of the first to see that the work of Linnæus, on account of the vast increase in the number of species known, must be modified. He saw that characters important in one group were of only secondary importance in other groups. Linné had considered wings as affording the best characters. Latreille employed dissection in all his work, and his collection of preparations of coleopterous insects, with his notes and sketches, were secured for the Hope Museum at Oxford, where they may be still seen.

In 1820 Godart commenced his "Natural History of the Lepidoptera of France," which at his death was continued by Duponchel, and completed in fifteen volumes in 1842. For many years it was the standard work in France. The letterpress is fairly good, but the plates certainly do not reach the perfection of those of Hübner. Duponchel supplemented this by an illustrated work on the "Larvæ of European Lepidoptera."

Boisduval amassed a huge collection, and about the same period as Duponchel was issuing his "Lepidoptera of France" was bringing out a work on the larvæ, and in 1844 wrote an important classificatory "Catalogue of the Lepidoptera of Europe." Previously to this he had published a series of plates of European Lepidoptera, but, on the whole, although his knowledge of species was most extensive, he but little appreciated the value of characters from a systemic point of view.

One of the most valuable additions to the study of European Heterocera was the work of Guenée, who, in continuation of Bois-

duval's work, from 1852-57 wrote six volumes, comprising the Noctuids, Deltoides and Pyrales, Uranides and Phalenites. With his classification of the first of these groups, the Noctuids, many of us are familiar practically, since it formed the basis of the famous "Doubleday List." The Noctuids were divided into groups and families, and many genera were founded. Although the work was well done it was much over-estimated, especially in this country.

Perhaps the best all-round entomologist France has produced was Millière, a member of the Society of Lyons. He was a close observer and a splendid delineator, and for many years, at short intervals, issued his observations on various species of Lepidoptera, including many micros. The plates are admirably executed, and his three volumes of "Iconography" are considered very valuable additions to a library. They were completed in 1874.

As many present-day entomologists are studying the Lepidopterous fauna of Switzerland mention must be made of Frey, a Professor at Zurich. He was a great friend of Stainton, and his name appears on the title-page of the "Natural History of the *Tineina*," in conjunction with those of Stainton, Zeller, and Douglas. A microlepidopterist of the first order, he wrote in 1858 the "Tinea and Pterophori of Switzerland," just in the period when lepidopterists seemed to vie with each other in issuing books on their favourite study, and the number of students was increasing by leaps and bounds. Subsequently, he wrote a work on the "Lepidoptera of Switzerland," which is to-day scarcely out of date.

In Russia the only entomologist of much importance was Prof. Eversmann, who wrote in 1844 a work on the "Lepidopterous Fauna of the Ural-Volga Provinces," the result of twenty-five years' residence and observation. This work is of much value intrinsically, and also because of its rarity, a very large proportion of the impression having been destroyed by fire. Eversmann contributed for many years valuable papers, monographs, etc., to the "Memoires" and "Bulletin" of the Moscow Society of Naturalists. This periodical began as far back as 1829, and Eversmann's first communication is dated 1831.

But my paper is growing too long. Yet it seems necessary to note the marvellous output of entomological literature in the period 1850 to 1860, the culmination of a half-century of gradually increasing study and interest. Not only were a vast number of works of scientific value issued, but the prices of the volumes were now by no means exclusive, owing partly to many authors devoting their attention solely to one order or even to only a section, partly to the spread of education, and partly to the increasing facility of communication. Perhaps, with your permission, a critical review of the works brought out in and about that decade may form the subject of a future paper.

In conclusion, I wish to thank those gentlemen who, by bringing many of the works mentioned, have so very kindly helped to make a paper, which savours more of the study than of the green fields and blue sky, acceptable to you.



PLATE IX.

TICKS.



FIG. 1.—*Melophagus ovinus* × 8.



FIG. 2.—*Ixodes ricinus* × 13.  
♀ nymph, dorsal view.

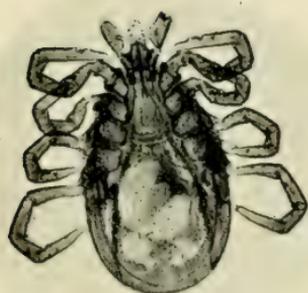


FIG. 3.—*Ixodes ricinus* × 13.  
♂ dorsal view.

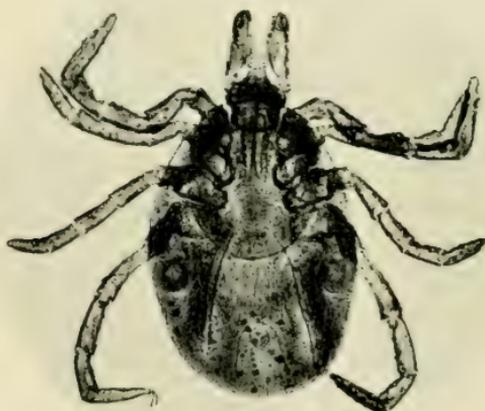


FIG. 4.—*Ixodes ricinus* × 13. ♀ dorsal view.



FIG. 5.—*Ceratixodes putus* × 8.  
♂ ventral view.



FIG. 6.—*Ceratixodes putus* × 8.  
♀ ventral view.

## Stray Notes on Ticks.

By F. NOAD CLARK. *Read October 14th, 1909.*

I HAVE given to my paper the title "Stray Notes," because I am unable, as, indeed, it would be no easy task even for an expert, to illustrate and treat of the British ticks alone, much less of the many foreign genera and species. I will therefore endeavour to interest you with a few typical examples.

The study of ticks is an important one from the aspect of economic zoology. Although popularly regarded as an insect it will presently be seen that the tick is not an insect strictly speaking. In the tropics ticks are intolerable pests to beasts, birds and reptiles, and are without doubt the cause of a widespread number of diseases in cattle, poultry, and in some instances man himself. Whether these are conveyed by the ticks *per se*, or simply as an intermediary for infection, had for some time been in doubt up till the researches of Lounsbury, Wheler and others, who are now of opinion that specific febrile diseases are certainly communicated to animals by their means. As instances may be mentioned the destructive Texas cattle fever or "redwater," East coast fever, "heart-water" in sheep and goats, and in England "louping ill" in cattle.

The *Ixodoidea* form a family of the *Acarina* or mites, included in the class *Arachnida*, of which group the spiders, scorpions and mites form the typical examples.

It may be convenient here to give an illustration of the common sheep tick or "ked" or "keb," *Melophagus ovinus* (Pl. IX, fig. 1), which is not a "true tick" but belongs to the order *Diptera*. When these first appear they possess wings, but when located on a host lose them either by biting or casting off, although while winged they may live on birds, but it is evident to any entomologist that their structure is very different from that of the "true ticks."

Ticks may be regarded as gigantic mites, and they pass through an incomplete metamorphosis from egg\* (Pl. X, fig. 2) to larva (six-legged), nymph (Pl. IX, fig. 2), and adult (eight-legged). They are brown to brown-black in colour and are in shape a more or less flattened oval, according to the genus. The body is partly covered by a hard shield, and has a false head or capitulum which carries two palpi and the mouth organs, consisting of a hard transparent chitinous labium, or hypostome provided with a tube for sucking blood

\* The egg is spherical in shape and of a yellowish-brown colour. Fig. 2 of Plate X illustrates the method by which the larva emerges, the shell being split open from apex to base.

from the host and armed with recurved teeth. On each side of the hypostome are the mandibles or chelifers, also barbed. The whole constitutes the rostrum (Pl. X, fig. 3), and is highly developed even in the earliest stage after hatching. It will thus be gathered that the food of the tick is exclusively the blood of the host. Eyes are present in some genera and not in others, or else are rudimentary. Respiration is said to be tracheal, and on each side of the body near the fourth pair of legs there is a spiracle or peritreme, with a central stigma (Pl. X, fig. 5), though why this is absent in the larval stage is not quite clear.

The sexual organ of the female is situated far forward, between the leg bases, and is absent in both larval and pupal stages.

The reproductive organs of the male I will refer to later on. The anus is situated lower down on the ventral surface and surrounded in part by a groove, the contour of which is an important factor in determining genera and species, as to whether this groove encircles the anus in front or behind. The second pair of legs is the shortest, as the fourth pair is the longest. The feet have two claws, and in the young a membranous pad or pulvillus. On the tarsus of the first pair of legs there is a structure called Haller's organ (Pl. X, fig. 4), whose function is little understood, but is supposed to be the seat of some special sense of touch, hearing, or smell. The integument has a curiously striated appearance under a high power.

The super-family of the *Ixodoidea* comprises the families *Argasidae* and *Ixodidae*, the distinguishing features of which are mainly as follow :

In the *Ixodidae* the dorsal surface of the male, except for a narrow margin, is covered by a shield or scutum, which prevents any large degree of distension, whilst in the female (which is the larger) it is a small patch on the anterior part of the dorsum; the rest of the body being capable of enormous distension after feeding (Pl. X, fig. 1).

In the *Argasidae* there is no scutum, the body being covered by a more or less horny integument.

Other differences are as follow :

|                                           | <i>Argasidae.</i>       | <i>Ixodidae.</i>          |
|-------------------------------------------|-------------------------|---------------------------|
| Sexual dimorphism . . . . .               | Slight . . . . .        | Marked.                   |
| Capitulum . . . . .                       | Ventral, . . . . .      | Anterior,                 |
|                                           | under shield . . . . .  | projecting beyond shield. |
| Scutum . . . . .                          | Absent . . . . .        | Present.                  |
| Festoons (or abdominal margins) . . . . . | Absent . . . . .        | Generally present.        |
| Spiracles . . . . .                       | Very small . . . . .    | Large.                    |
| Legs . . . . .                            | Without spurs . . . . . | With spurs.               |
| Pad or pulvillus . . . . .                | Absent . . . . .        | Present.                  |

The *Argasidae* are much larger than the *Ixodidae*, live several years, feed moderately, lay a few eggs in small batches, have two or more nymphal stages, and moult frequently, whilst the *Ixodidae* do not live more than two years ; the females, as before mentioned, when gorged

PLATE X.

TICKS.



FIG. 1.—*Ceratixodes putus*  $\times 4\frac{1}{2}$ .  
Distended ♀ dorsal view.



FIG. 2.—*Ceratixodes putus*  $\times 45$ .  
Hatching egg.

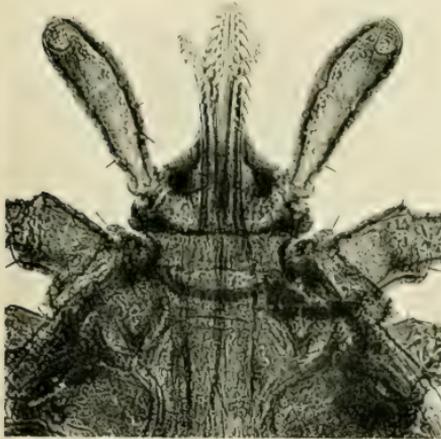


FIG. 3.—Rostrum of *Ixodes ricinus*.  
♀  $\times 80$ .



FIG. 4.—Anterior legs of *Ixodes ricinus*,  
showing Haller's organ.  $\times 75$ .

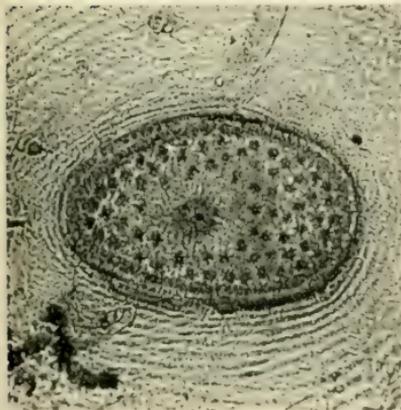


FIG. 5.—Cast skin of peritreme of  
*Ceratixodes putus*  $\times 150$ .

Photo. by F. Noad Clark.



FIG. 6.—Marginal brushes of *Ceratixodes*  
*putus* ♂.  $\times 25$ .

Adlard & Son, Impr.



are much distended in size, with the coxæ widely separated, lay a single large batch of eggs, and moult twice only, viz. when leaving the larval and nymphal stages. The *Argasidæ* have a flattened appearance like that of bed-bugs, are mostly found in warm climates, and are nocturnal in habits.

The life-history of a tick is sharply divided between a free and a parasitical existence. In the first stage it can live without a host for long periods. Mr. Wheler records a case of a headless female of *Ixodes ricinus*, lacking all the mouth organs, surviving for over a year in captivity, and eventually lost sight of.

Of the *Argasidæ* the genus *Argas* has six well-established species—*persicus*, *transgaripepinus*, *brumpti*, *aqualis*, *reflexus*, and *vespertilionis*. The two latter are British.

The genus *Ornithodoros* has no indigenous British species, and comprises the following: *savignyi*, *moubata*, *coriaceus*, *turicata*, *talaje*, *pavimentosus*, *erraticus*, *tholozani*, *lahorensis*, *furcosus*, and *megnini*.

*Argas persicus* is a well-known species, and widely cosmopolitan. It lays eggs in batches in cracks and crevices of walls, about a week after feeding, in warm weather, and hatching begins in three weeks. It has been known to live three and a half years in captivity. Its bite is dangerous to man, one fatal case being recorded after twenty-four hours. It makes serious ravages on fowls, masses of *persicus* being found under the wings, causing rapid death of the host. The remedies applied for their destruction are kerosene, turpentine, hot coal tar, and burning the habitats.

*Argas reflexus* infests pigeons, hiding in the pigeon-coops, and in cracks of walls and wood-work, and attacking at night. Its habitats are Europe and North Africa.

*Argas vespertilionis* has been found in England, parasitical on bats.

*Ornithodoros savignyi*, known in South Africa as the "tampan," is closely related to *A. persicus*, and is a great pest to man and animals, frequenting the native huts.

Of the family *Ixodidæ* the group *Ixodæ* comprises the genera *Ixodes*, *Ceratixodes*, *Eschatocephalus*, *Aponomma*, *Amblyomma*, and *Hyalomma*.

Of the group *Rhipicephalæ* we have the genera *Rhipicephalus*, *Hæmaphysalis*, and *Dermacentor*.

Professor Neumann describes over sixty species of the genus *Ixodes*.

*I. ricinus* is the best known of our British species, and is commonly called the "grass-tick." It was named *reduvius* by Leach. The investigations of Mr. E. G. Wheler, late of Alnwick, have proved conclusively that this tick is the cause of "louping ill" in sheep, the symptoms of which are loss of muscular power, cramp, trembling, paroxysms, reeling, etc. The adult male (Pl. IX, fig. 3), is about 2·35 mm. to 2·80 mm. in length, the female (Pl. IX, fig. 4) from

3 mm. when fasting, to 10 mm. long by 6.50 mm. wide when fully distended. It lays its eggs on herbage and attacks sheep, goats, cattle, and deer.

*I. hexagonus*, another British species, is found on stoats, ferrets, and hedgehogs, and *I. tenuirostris*, a smaller species, on voles.

*Ceratixodes* is a new genus with one species only—*C. putus*. The female (Pl. IX, fig. 6) was described by Cambridge in 1879 as *Ixodes putus*, *Hyalomma puta*, and *Ixodes borealis* (Kramer and Neumann). The male (Pl. IX, fig. 5) *I. fimbriatus* (Kr. and Nn.) was then identified by Neumann to be the consort of *I. putus*, and it may be remembered that I was instrumental in establishing the identity of the two species in 1902, specimens of which I exhibited at a meeting of the Society. Neumann subsequently described this male under a new genus—*Ceratixodes*. Mr. Hewett, of York, found the specimens on cliffs frequented by guillemots. The male is certainly the most remarkable of the British ticks, on account of the extreme sexual dimorphism exhibited. The marginal brushes at the posterior end of the abdomen are found only in the male (Pl. X, fig. 6).

Of *Eschatocephalus* seven species are described. *E. vespertilionis* has been found in Britain and is widely distributed on the Continent.

Of *Aponomma* twelve species are described, but none as British.

*Amblyomma* has eighty-six species, but none British. *A. hebraicum*, the South African "bout" or variegated tick, is the carrier of "heart-water" in sheep and goats, and is said to lay as many as 17,000 eggs.

*Hyalomma* has three species described by Neumann, one of which (*syriacum*) I took from a tortoise and exhibited at a meeting of the Society in 1899. *H. egyptium*, the "striped-leg" or "bout-leg" tick, is found at the Cape. It has about thirty synonyms, and is probably known all over Africa and the greater part of Asia.

Of the group *Rhipicephale* the genus *Rhipicephalus* has twenty-three species, mostly African. They are identified with tick and Texas fever; the species *decoloratus* is the "blue tick" and *evertsi* the "red tick." *Simus* and *appendiculatus* convey East Coast fever.

*Hemaphysalis* has twenty-two species. *H. punctata* has been taken in England on a hedgehog. *Dermacentor* has seventeen species; one species, *reticulatus*, is British, and found occasionally on sheep. The specimens exhibited came from Mr. Pocock, of Revelstoke, Devon. It is probably an imported species.

The *Amblyomma*, *Hyalomma*, *Rhipicephalus*, and *Dermacentor* are genera in which eyes are present.

In the pairing of the sexes there is considerable doubt as to the method of copulation in ticks, but most observers agree that insertion of the mouth organs of the male into the orifice of the female takes place at the time of coition. Mr. R. T. Lewis, at the Quekett Club in 1900, communicated some interesting observations he had made as to the existence of two organs at the base of the hypostome in

*Ixodes ricinus*, which conveyed the impression that these were possibly the organs by means of which impregnation took place. Lounsbury says that *R. decoloratus* remain *in coitus* several days, and in the case of *A. hebraeum*, a male remained attached to a female almost a full year.

The process of egg-laying is no less remarkable, and both Messrs. Wheler and R. T. Lewis have contributed excellent descriptions of oviposition by ticks. No less than 2050 eggs laid by one female *ricinus* were counted by the former.

The literature of the ticks is fairly extensive. Andrew Murray, in his "Economic Entomology (Aptera)," 1876, deals with the better known species; Mr. C. P. Lounsbury, Cape Government entomologist, is an acknowledged authority; Dr. G. H. F. Nuttall and Cecil Warburton have in hand a monograph of the *Ixodoidea*, which promises to be an exhaustive work on the subject; Professor L. G. Neumann, of Toulouse, is the recognised continental authority; and Mr. E. G. Wheler's very complete work on the "British Ticks," published in 1906, is a standard book of reference. It is to the latter gentlemen I am indebted for the loan of material and some of the slides for the purpose of this paper. Mr. Harry Moore has also kindly lent me some of the specimens I am handing round.

## Notes on the Diptera.

By H. W. ANDREWS, F.E.S. *Read October 28th, 1909.*

I PROPOSE to-night to make some general remarks about the Diptera which may perhaps attract a recruit or two to the slowly growing numbers of British Dipterists, by pointing out some of the various ways whereby the study of this order may be approached.

The Diptera is one of the "neglected" orders. The word "flies" brings to the mind of the non-entomological public the annoyance of house-fly and bluebottle, with, perhaps, thoughts of daddy-longlegs and gnats; and, judging from my own experience, it does not represent very much more to the average lepidopterist. As a matter of fact it yields to none of the other orders of insects in importance; it contains some of the most highly specialized forms, judging from the completeness of their metamorphoses, that exist among insects; it exhibits extreme variety in structure and habits; and one has only to recall such terms as the Hessian fly, malaria and mosquitoes, sleeping-sickness, and the tse-tse fly to realise how large a part the Diptera play in economic entomology. It is one of the larger orders in point of numbers; a total of over 40,000 described species was mentioned by Dr. Sharp in "Cambridge Natural History," published in 1899,\* and it is probable that this number will have to be greatly extended. In the British list of between 2000 and 3000, new species are recorded every year, and it is probably due to the scarcity of workers that additions are not made more rapidly.

An examination of the external forms of the Diptera will give some idea of the remarkable variation and modification of structure that obtain within the limits of the order. As might be expected in an order containing such a large number of aerial species, the eyes are a very prominent feature, in some genera taking up the greater part of the head space. There are, as a rule, three small ocelli, but the faceted eyes are of much more importance; they are often hairy, more so perhaps in the males than in the females, and in some species are banded or otherwise marked with bright colours during life. In the males of the genus *Bibio* the eyes are distinctly separated into two portions with different-sized facets; this division of the facets is found in many other species, though not quite so prominently, and like the hairiness, is usually confined to the males. A similar arrangement of facets is found in certain dragon-flies, and it has been supposed that the insect obtains a double vision as it were,

\* "Insects," part ii, p. 438.

the larger upper facets giving a wider range and the lower ones a more distinct view of close objects. A fact to be noted in connection with the prominence of the eyes is the extreme mobility of the whole head, which is only attached to the thorax by a very slender neck, thus giving scope for wide range of movement. There is an extraordinary tropical family (*Diopsidæ*) which has the side of the head produced into two horns, each bearing an eye and an antenna at the extremity. I recollect that when some specimens were being exhibited at a meeting of the Entomological Society the question of the use of this arrangement cropped up, but beyond the suggestion that the fly was able to see on both sides of a leaf at once no reason was brought forward for this strange modification. The antennæ are very variable within certain broad limits. In the *Nemocera* (daddies, gnats, etc.) the antennæ consist, as the name implies, of a varying number of joints arranged in a thread-like form, the usual insect type; but in the other two great divisions of the order, the *Brachycera* and the *Athericera*, they are formed quite differently, there being, as a rule, two short basal segments and a larger third one, the flagellum, which frequently has a slender bristle attached, called the arista. The arista may be plumose or bare, terminal, dorsal, or altogether wanting, and the proportionate size of the three joints may also vary considerably, with the result that much use is made of the antennæ in classification. The mouth-parts are variously adapted for the purposes of suction. To take two types, I suppose all are familiar with the enlargements of the mouth-parts of the house-fly and the piercing apparatus of the mosquitoes. In the *Æstridæ* or bot-flies the mouth-parts are atrophied in the imago. The palpi are of importance from the point of view of classification, and the proboscis, though sometimes jointed and doubled back and sometimes permanently extended, is never coiled as in the Lepidoptera.

The legs are quite as variable as the antennæ. They are found modified for purposes of sexual ornamentation, especially in the *Dolichopodidæ*, furnished with strong bristles and spines in some predacious Diptera, and with extremely delicate "touch hairs" in other species. It is often possible to name the family of a specimen from the legs alone without other aid.

The body varies from the typical house-fly form to the globular *Cyrtidæ*, the wasp-like *Conopidæ*, and the flattened *Pupipara*; it may be bare and polished, covered with dense pubescence or with coarse bristles, and numerous gradations exist between the different states. The bristles and hairs of Diptera have already given rise to a distinct form of classification known as "chaetotoxy" and are well worth study, serving as they do for purposes of offence in the predacious *Asilidæ*; defence, possibly, in the dense, hairy covering of some species; cleanliness, as can be seen by anyone who watches a house-fly cleaning itself; and ornament, as in some of the *Dolichopodidæ*. The wings of Diptera differ less, perhaps, than any other portion of the external anatomy (I am not speaking now of

the arrangement of veins and cells). They are usually unornamented, though often showing handsome iridescent colours, but in some genera, e.g. the *Trypetidæ*, are covered with intricate patterns not formed with scales, but pigmental. A few families, usually parasitic in habits, are wingless. As is well known, the Diptera possess but a single pair of wings, the place of the hind wings of other orders being taken by a pair of small organs known as halteres, which, with the exception of certain male Coccids, are peculiar to flies. These small drumstick-shaped rods are of use as balancers in flight, as it has been experimentally proved in several cases that when cut off the insect appeared quite unable to control its movements. The halteres are often covered by hood-like organs called squamæ. The genitalia agree with the rest of the external parts in being greatly variable. The *Dolichopodidæ* again, as in antennæ and legs, afford the most varied examples, and it is rather curious that although great modifications are to be observed in the males, the female genitalia are as a rule extremely simple. The difference has been quaintly summed up by some author with the remark that it is like using a most complicated key to open a lock that could be easily forced by a bent hair-pin. The foregoing remarks will show, I think, that there is a large field here for workers in the study of morphology alone; excellent work has been done by Mr. Wesché in his microscopic studies, but there is room for much further investigation.

The anatomy of Diptera has been thoroughly worked out in the case of a few species, but of a few species only. I know nothing of this branch of study myself, but the principal points appear to be the extremely specialized arrangement of the nerve ganglia that is found in some of the *Muscidæ*, the presence of large air-sacs at the base of the abdomen, the presence of a sucking stomach as in the Lepidoptera, the constant number of the Malpighian tubes, and various peculiarities in the reproductive organs. The large thoracic spiracles contain "vocal cords" which give rise to the "crying" sound often noticed in some species when captured, and which arises quite independently of wing movements. There are special nervous structures situated in the joints of the antennæ which have been experimentally proved to act as olfactory organs, and others at the base of the halteres supposed to be of an auditory character, or, as other consider, organs of orientation.

The same remarks apply to the life-histories of Diptera as to the internal structure. In some species, especially those whose larvæ are aquatic, the life-histories have been studied from the time of Réaumur onwards; but, on the other hand, little or nothing is known of the life-histories of many other whole genera. This may be partly due to the fact that most Diptera spend their larval existence in concealment, and, moreover, they are often very unattractive, being, as a rule, mere footless maggots without visible heads. The larvæ, however, fully carry out the great variability that I have already remarked on as obtaining generally in the order. They may

occur anywhere and everywhere; they have been found in the tobacco refuse of an American spittoon, in hot salt springs, in water, in earth, mining leaves, in decaying wood, in fungi, and in filth of all kinds. They are found in the nests of bees and ants, well known as parasites on lepidopterous larvæ, less well known perhaps as parasites on Hemiptera and Hymenoptera. The ox, horse, ass, sheep, and red-deer suffer from the larvæ of the bot-flies (*Æstridæ*), and in Africa there is a Muscid fly whose larvæ are parasitic on dogs, monkeys, and men. Fabre\* has given a most interesting account of the life-history of one of the species of the genus *Anthrax*, whose larvæ are parasitic on those of the mason bee. The eggs are laid on the ground in the neighbourhood of the cemented cells of the bee. The larva when newly hatched has the form of a hair-like worm. It can exist seemingly without nourishment, and endeavours to attain the interior of the bee's cell through some minute crack or crevice in the protecting masonry. When one has succeeded it completely changes its form, and appears in the next stage as a grub or maggot with a sucker-like mouth, with which it absorbs the contents of the body of the unfortunate bee-larva without injury to the delicate skin of the latter. A further change to the pupal condition turns this feeble grub into a robust creature, with a well-developed head armed with thorny spines, and having the body circled with rings of strong, backward-pointing bristles. With its armed head it breaks its way through the cement walls of the cell, the backward-pointing bristles preventing it from slipping back in the tunnel it makes for itself, and finally there emerges from this spined and bristle-bearing pupa the perfect insect, making the fifth form from the egg state, a particularly fragile-looking fly which Fabre compares to "a morsel of down almost as fragile as a snowflake." I should like here, though not bearing on the subject of this paper, to testify to the great pleasure I have experienced in reading the works of the great French naturalist Fabre, of whose studies in natural history (*i. e.* the life-histories and habits of insects, apart from the classification of specimens) Darwin† wrote, "Never have the wonderful habits of insects been more vividly described, and it is almost as good to read about them as to see them."

Many of the non-parasitic dipterous larvæ are of predacious habits. Syrphid larvæ prey on *Aphides*, and there are several instances recorded of their attacking lepidopterous larvæ. Dr. Chapman‡ has described the case of a Syrphid larva which preys on the larvæ of Tortrices of semi-gregarious habits; and there are records of dipterous larvæ preying on those of Coleoptera, Hemiptera, and Hymenoptera. In the family *Cecidomyidæ* the phenomenon of pseudo-genesis occurs, certain Cecidomyid larvæ themselves producing other larvæ. This unusual state continues for several genera-

\* J. H. Fabre, "Souvenirs Entomologiques," vol. iii.

† "Life and Letters of Charles Darwin," vol. iii, p. 220.

‡ "Ent. Mo. Mag.," July, 1905, and January, 1906.

tions, until the following summer to that in which the original larvæ were hatched, when they revert to the usual procedure of pupa and imago. On the other hand, the family *Sarcophagæ* (flesh-flies) often produce living larvæ, and in the *Hippoboscidæ* (forest-flies and allied species) both egg and larval stages are passed in the body of the parent, the young being produced in the form of pupæ.

The pupæ of Diptera are divided into two sharply defined groups—the *Orthorrhapha* and the *Cyclorrhapha*—and the entire order falls under one or the other of these groups. In the former the pupa is free or enclosed in the larval skin, showing more or less clearly legs, head, etc., and the imago escapes by means of a T-shaped opening in the back of the larval skin. The pupa of the common daddy-longlegs is a good example of this group. In the *Cyclorrhapha*, on the other hand, the pupa is always enclosed in the hardened larval skin, forming a smooth barrel-shaped object, and the imago escapes by means of a circular orifice at the anterior end of this puparium. This is usually effected by means of an air-sac situated on the frons of the insect, which, when distended, forces off the cap of the puparium. This air-sac—the ptilinum—is afterwards retracted into the head, and is seldom noticed in the mature fly except when caught just after emergence. Some Diptera, especially the *Muscidæ*, undergo a most complete metamorphosis in the pupal state, the larval body being reduced to an absolute creamy pulp from which the imaginal body-parts are subsequently built up. This very complete metamorphosis, together with the specialized arrangement of nerve-ganglia in the perfect insect, has led systematists to place the Diptera high up among the orders of insects. The geological record tends to confirm this view, as Diptera do not appear until the Mesozoic or Secondary period, and are not met with in any numbers till the Cainozoic or Tertiary period. To this epoch, however, a considerable quantity of fossil Diptera have been referred, and it is at this period also that the Hymenoptera and Lepidoptera begin to appear, all three orders being thus coincident with the appearance of the earlier forms of flowering plants.

There is another side to the study of Diptera to which I should like to draw attention. I refer to what is comprehensively termed "bionomics." The "habits" of flies offer a fascinating field for research, though a difficult one, as it is necessary to be very careful not to deduce too much from the facts observed in order to help them to fit in with some plausible theory or other. In mimicry, for instance, one gets material from the Diptera that tells both for and against the theory. The life-history of an *Eristalis* fly compared with that of a bee refutes a frequently suggested reason for the resemblance between two imagines, namely, that similar conditions of growth have brought about similar results. The *Volucelle* are remarkably similar to the bumble-bees in whose nests their larvæ live, but it does not appear that the bees notice them either more or less for the resemblance; and *Volucella inanis*, whose larvæ are found

in hornets' nests, has only a slight colour resemblance to its host. Still, there are many remarkable mimics of aculeate Hymenoptera amongst Diptera. To take another instance, in several of the *Syrphidae* there is a dark blotch in the middle of the wings usually correlated with a pale area at the base of the abdomen. When the fly is at rest this dark blotch does not cover the pale area as might be supposed, but as a rule comes into line with, and spreads out on both sides of, the darkened abdominal segments immediately below the pale area above referred to. This arrangement of light and shade helps to break up the outline of the insect when settled and motionless, and fits in admirably with Mr. Thayer's theories of colour protection;\* but, if this is so, how is it that we meet with so few examples compared with the vast number of Diptera that employ no such device? Another subject that has attracted attention lately is that of the predacious Diptera,† and there are many points of interest in this connection: The different kinds of prey affected by various Diptera, some keeping more or less closely to one kind, others with more catholic tastes; the manner in which the victims are overcome; if, for example, some of the larger *Asilidae* poison their prey; the extraordinary mating habits of certain *Empidae*, the male obtaining and giving to the female living prey, presumably to distract her attention from himself as a possible victim instead of husband. Then, too, there is the subject of the fertilization of flowers by Diptera,‡ in which the flies appear quite able to exercise a choice as to colour, and to some extent effect a modification of flower-structure. Lastly, one can approach the study of Diptera from the side of Economic Entomology. I am not personally acquainted with this branch of science, so must pass it over briefly. Diptera are of course of great importance in economic entomology, and if we consider those insects that directly attack man the order is more important than any other. The mosquitoes that are associated with malaria and yellow-fever, and the tse-tse fly that carries the infection of sleeping-sickness, are of course pre-eminent, but in our own country the house-fly has been accused of being an active agent in spreading disease. The various species of flies that torment live stock, the Hessian fly and many others that infest crops, have all to be taken into account by the student of agricultural zoology. This is but the briefest summary of the connection of flies with economics, but the subject is an important one, and has attracted a vast deal of attention recently; for it is only a decade ago that Dr. Sharp, writing in the "Cambridge Natural History,"§ said: "There is good reason for supposing that mosquitoes may act as disseminators of disease, but there is no certain knowledge on the subject"; whereas, in August of this year, Mr. A. E. Shipley, in his address to the

\* "Ent. Soc. Trans.," 1903, pt. iv,

† *Ibid.*, 1906, p. 323.

‡ *Ibid.*, 1896, p. 117.

§ "Insects," pt. ii, p. 468.

Zoological Section of the British Association at Winnipeg, could say: "A few years ago no knowledge could seem more useless to the practical man, no research more futile, than that which sought to distinguish one species of gnat or tick from another, yet to-day they knew that that knowledge had rendered it possible to open up Africa and to cut the Panama Canal."

There only remains to say a few words on what may be termed the personal side of the subject. Flies are easy to catch as a rule, and are to be found pretty well anywhere. They can be set or not according to one's taste. The chief drawback is due to the want of reliable works by which to identify specimens, but this is being gradually met, both by works such as Mr. Verrall's two volumes and by monographs on various families appearing in the entomological magazines. For Londoners, too, there is the advantage of easy access to the collections in the British Museum at South Kensington.

There is still a great scarcity of workers, and reliable local lists are few and far between, besides being, as a rule, very incomplete, so that there is ample scope for those who, like myself, merely make a hobby of fly-catching, and, while willing to help, do not themselves enter into the deeper waters of scientific study of the order.



PLATE XI.

NOLA ALBULALIS.



FIG. 1.—Ova *in situ* on leaf of dewberry.  $\times 10$ .

*Photo. by A. E. Tonge.*



FIG. 2.—Larva three days after leaving ovum.  $\times 15$ .

*Photo. by F. Noad Clark.*

## Notes on the Earlier Stages of *Nola albulalis*.

By ROBERT ADKIN, F.E.S. *Read November 11th, 1909.*

DURING each of the past three summers I have obtained a few ova of *Nola albulalis* from East Sussex parents, and although from the point of view of rearing imagines from them I have not been particularly successful, I have at least been able to get the larva through all its stages, and to have the satisfaction of seeing the moth emerge, but out of its due season. All attempts to hibernate the larva have failed, but this last autumn some half-dozen larvæ, yielding to a warm temperature and an abundant food supply, very obligingly fed up, pupated, and produced moths early in November, thus enabling me to follow the life-history of the species, even if under somewhat artificial conditions.

On all three occasions the eggs have been laid in confinement, but as they have invariably been deposited in exactly similar positions, I take it that we shall be right in assuming such positions to be the natural ones. They are on the back of the leaf of the dewberry (*Rubus cœsius*), and either at the junction of a vein with the mid-rib, by the side of the mid-rib, or beside one of the longer veins, sometimes singly, but more often two or three together, the number apparently depending upon the depth of the cavity formed by the junction of the mid-rib and vein or the size of the rib or vein, but I do not think they would, in Nature, usually be laid so thickly in one spot as shown in the accompanying figure (Pl. XI, fig. 1). In colour they are white with, perhaps, a delicate greenish tone, almost exactly matching the colour of the leaf on which they are laid, and owing to this and their position on the leaf they are exceedingly difficult to see. Under an ordinary pocket lens—without which it is almost impossible to detect them—they look smooth, to some extent shiny, and practically round; but under a fairly high power they are seen to be flattened at the top and at the base, very like an orange, and regularly ribbed down the sides from near the top to the base, the small, unribbed, flat space at the top no doubt containing the micropyle.

In from ten to fourteen days from the time when they are laid the eggs hatch and the young larva commences to feed on the back of the leaf of its food-plant, the dewberry, eating only part-way through and leaving the upper cuticle intact, so that in looking at the leaf from above the presence of the larva is not easily discernible. It is a most curious little creature, delicate greenish-white in colour, with a row of large warts along each side of its back, from each of which

springs a long black bristle, those at the extremities being at least twice as long as the body of the larva ; there are also two rows of tubercles on each side of the larva, and from these as well as from the warts on the back a number of long white hairs spring as well as a still larger number of shorter, white, black-tipped hairs ; indeed, it is more like a minute porcupine than anything else I can liken it to, and so strong are the black bristles that it may be lifted by them in a pair of forceps without in any way touching the body of the larva (Pl. XI, fig. 2).\*

In about ten days from the time of hatching out the first moult takes place, and the larva on emerging from it shows little alteration in appearance, but it now eats holes right through the leaf and grows somewhat more rapidly. It moults a second time in from ten days to a fortnight, again showing but slight change, except that the long black spines appear to be, in proportion to the length of the body, somewhat shorter. I suspect that it would be after the second moult, or possibly the following one, that under natural conditions the larva would pass the winter before again moulting ; but, as those that I endeavoured to hibernate came to an untimely end, I am unable to speak with certainty.

Those that I fed up this autumn appeared to have moulted for the third time by September 9th—just one month from the time of hatching—and from that time they fed up very rapidly, eating great patches out of the leaves by night and resting by day, usually on the undersides of the leaves of their food plant. They changed their skins pretty regularly at about weekly intervals, and by September 25th a couple of them were making cocoons for pupation (Pl. XII, fig. 2).

With each moult the long bristles, so noticeable in the infant larva, became less pronounced, so that the adult larva, although intensely hairy, has nothing of the remarkable appearance noticeable before the first moult, and from the time that the larva is half grown sundry blackish markings appear (Pl. XII, figs. 1 and 3). As the full-fed larva and its method of pupation have already been described, from examples taken after hibernation, by our member Mr. J. Platt Barrett ("Entom.," vol. ix, pp. 177-178), it is unnecessary that I should enter further into those details here, except to say that the black band which he mentions as joining up the two rows of markings at the seventh and eleventh segments appear to me to result, so far as the seventh segment is concerned, from a row of black, fleshy processes placed on that segment, which, although fairly prominent in the later larval stages, I was unable to detect in the infant larva.

\* The plate is taken from a "prepared" specimen, which, although bringing out the detail, somewhat loses the natural effect.

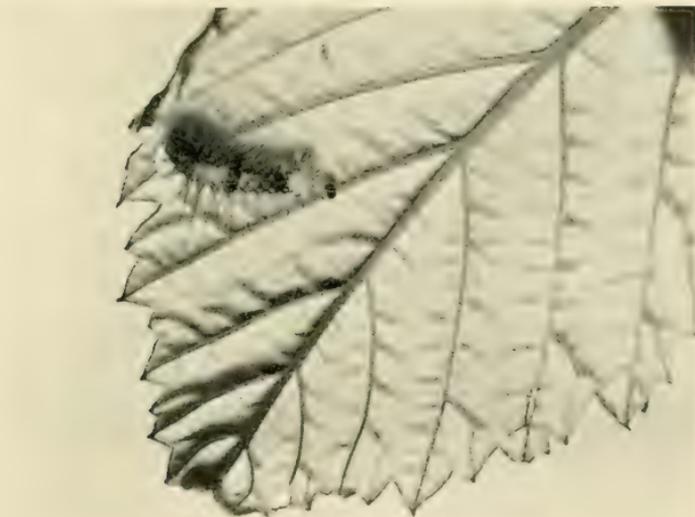


FIG. 1.—Half-grown larva in *siti*.  
× 2 approximately.



FIG. 2.—Cocoon in *siti*.  
× 2 approximately.

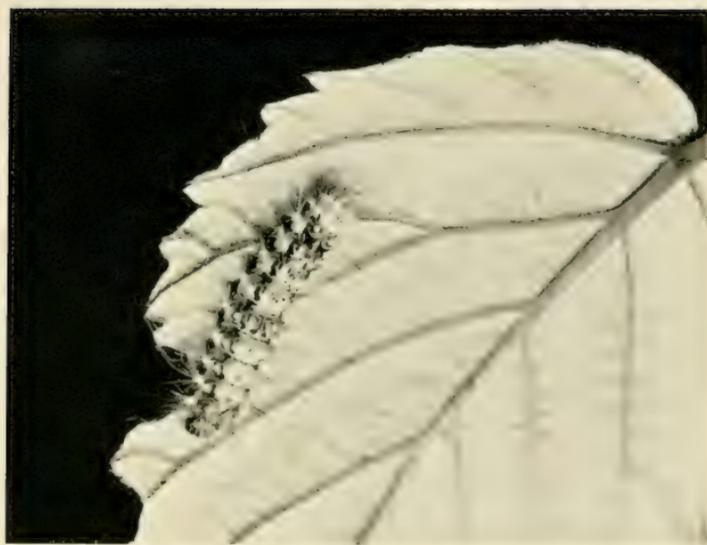


FIG. 3.—Full-fed larva in *siti*. × 2 approximately.



## Larval Stages of *Chrysopora hermannella*, Fab.

By ALFRED SICH, F.E.S. *Read December 9th, 1909.*

THIS small but very beautiful moth may be occasionally seen on sunny mornings, flitting about plants of *Chenopodium*, in May and June, and again in August. Its colours are black, orange, and silver. It may be known from all our other British black and red moths by the shape of the hind wing, the hind margin of which is sinuate and the apex elongate. It looks as though a piece had been bitten out of the hind margin.

The larva mines between the cuticles of the leaves of the common goose foot (*Chenopodium*), and is somewhat remarkable for the colour changes that it undergoes during its larval existence. In 1908 the larva was very abundant in Chiswick, and I therefore took the opportunity of making a few notes, a summary of which I have the pleasure of bringing before you to-night.

The larva quits the egg by boring through the shell into the leaf, and if the egg has been laid on the lower surface of the leaf, as is generally the case, the larva makes a spiral mine through the thickness of the leaf in order to reach the upper surface, because throughout the feeding period the larva always mines just below the upper cuticle of the leaf. Also, it always mines venter uppermost and is essentially a gallery miner, though in the last stadium the wide gallery is turned often so closely on itself that the mine has somewhat the appearance of a blotch mine. The mining life of the caterpillar is divided into four distinct stages, and each stage has its own particular mine. The first part of the mine, corresponding to the first stadium of the larva, is a very slender gallery, only 0.15 mm. wide, and it runs with several turns to a length of from 7-10 mm. It has the appearance of a very fine black thread. If we examine the end of the mine we shall see that the last millimetre has a dark pink line running down the centre of the mine. This is the ventral stripe of the larva showing through the cuticle of the leaf. This portion of the mine takes the young larva about three days to complete. The larva now slightly widens the mine and then lies up for the first change of skin, which takes place some twenty-four hours later. The full-fed larva in the first instar measures just about 1 mm. in length. As in many young miners, the thorax is rather swollen. The body is very shining pale grey on the back, but beneath, it is yellowish with a broad orange band running nearly the whole length of the larva. It has three pairs of thoracic legs, which are broad and strong. After the change of skin the larva continues

to mine much in the same manner, but being larger it makes a wider mine—0.5 mm.—and, as the excrement does not occupy the whole breadth of the gallery, the mine has a greener appearance.

In three and a half days the caterpillar will have eaten out the parenchyma to a length of some 25 mm. It is now in its second instar, and if we examine it we shall find it has made some advance in structure, for it now has very small prolegs, but they are without crochets. The colour is nearly the same as in the first instar, but the orange band is not so wide in proportion, and has a tendency to break up into spots. After changing its skin a second time the larva soon resumes its work in the leaf. It continues as before to form serpentine windings, going apparently haphazard anywhere in the leaf. Whether these windings are due to chance alone, or whether the larva takes the path of least resistance, has not, I think, been yet determined. This part of the gallery is about 1 mm. in width and 36 mm. in length. The excrement is here placed less evenly over the surface and tends to run into lines and blotches, which gives the mine a more variegated and paler appearance. Some five days are occupied in making this portion of the mine. The larva is now 3 mm. long, and has quite serviceable legs and prolegs; it is pale yellow in colour, and when newly changed still has the orange band beneath. After a day or two this band begins to vanish from the tail upwards, and when the larva is nearly full grown in this instar there remains only a spot or two of orange on the thoracic segments, and this colour finally disappears altogether. Besides this, the larva somewhat changes its shape at the end of this stadium, becoming less cylindrical, more flattened dorsally and ventrally, so that it assumes somewhat the appearance of a dipterous maggot. It now makes a large chamber at the end of its mine and then turns round and hides the head and thorax under the excrement which is deposited on the upper cuticle of the leaf. In this condition the pale yellow larva is very inconspicuous and can only be made out with care. The mine looks as though the larva had deserted it, and when the larva is seen it looks as if it were dead.

It would appear that this special period of the larva's existence must be a very critical one, as it takes so much care to conceal itself while undergoing this third change of skin. It remains in the position described for three or four days before casting its old skin. It may be particularly prone to ichneumon attack during this period. In preparing for either of the two previous changes of skin the larva simply widens the mine slightly (which enables it later to thrust the old head aside) and ceases to feed, but does not change its position at all. After the change the larva, now in its last stadium, appears in the mine as a pale, yellowish-green caterpillar with a broad, dark-green central line. Its mine is now 3 mm. in width, and the larva eats out nearly all the parenchyma, leaving only a very slight layer on the upper cuticle, and a slightly thicker layer of cells on the lower cuticle. The mine therefore always retains a greenish appear-

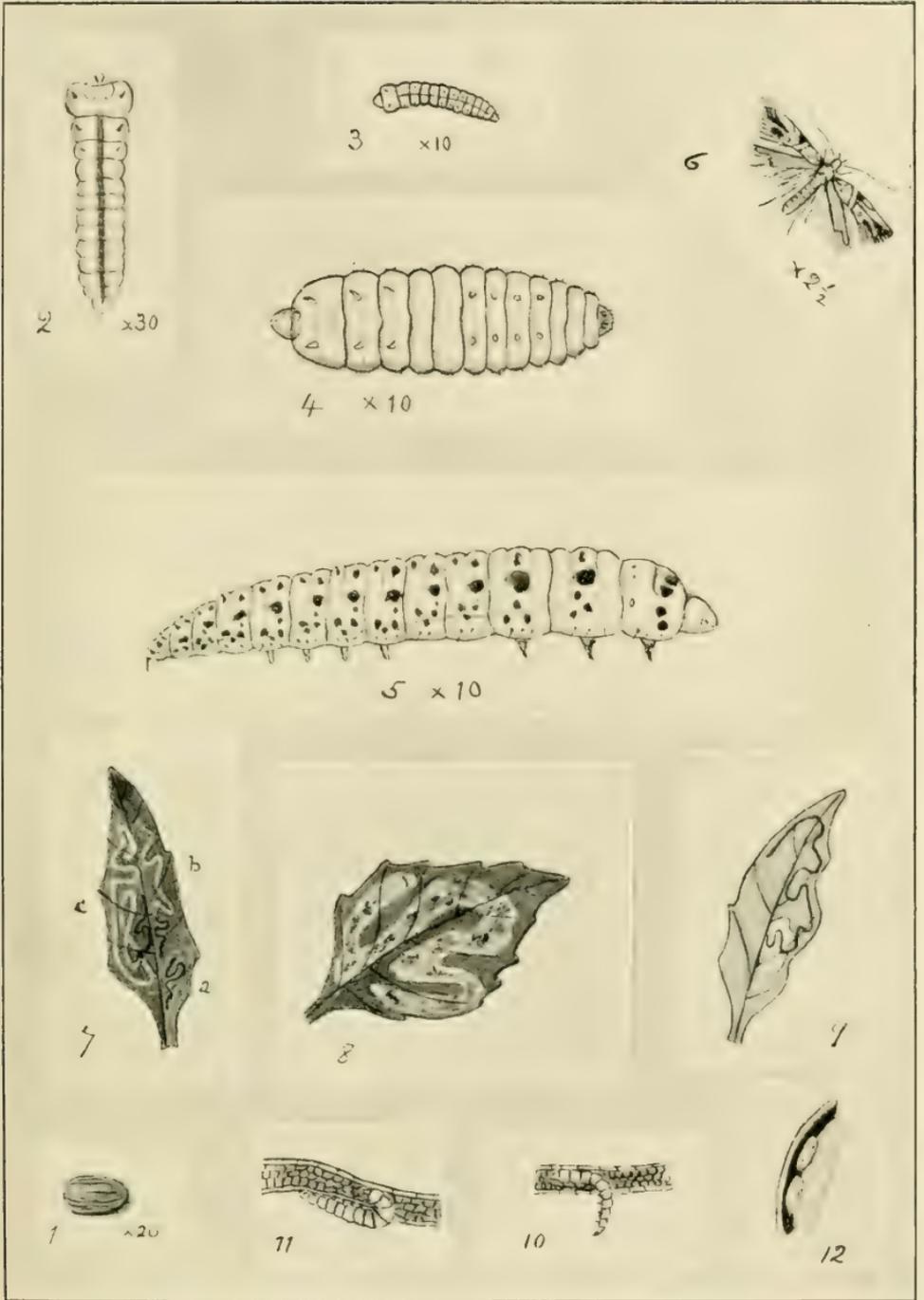


EXPLANATION OF PLATE XIII.

*Chrysopora (Gelechia) hermannella*, Fab.

- FIG. 1.—Ovum.  $\times 20$ .  
FIG. 2.—Larva, first instar, showing ventral stripe.  $\times 30$ .  
FIG. 3.—Larva, second instar, ventral view.  $\times 10$ .  
FIG. 4.—Larva, third instar, lying up for change of skin, ventral view.  $\times 10$ .  
FIG. 5.—Larva, fourth instar, showing situation of the crimson spots.  $\times 10$ .  
FIG. 6.—Female imago.  $\times 2\frac{1}{2}$ .  
FIG. 7.—Leaf of *Chenopodium album* containing larval mines. *a*. Mine of first stadium. *b*. Mines of first and second stadia. *c*. Mines of first, second, and third stadia.  
FIG. 8. Leaf of *C. album*, containing last portion of mine of the fourth stadium.  
FIG. 9.—Leaf of *C. album* containing old mine of *C. hermannella* and the white blotch mine of *Chrysopora stipella*, Hb.  
FIGS. 10 and 11.—Imaginary sections of leaf, showing larvæ entering through the lower cuticle.  
FIG. 12.—Cocoons in portion of paste-board box.

PLATE XIII.



*Chrysopora hermannella.*

*Del. A. Sich.*



ance, which distinguishes it at once from the white mines made in the same leaves by *Chrysopora stipella*. It is rather strange that these two species, so closely allied, make mines of such divergent characters. This point we shall touch on again later.

The larva of *C. hermannella* in the fourth stadium continues mining straight ahead, but as the mine is now a wide one and the larva's course runs all over the leaf, it breaks into its own galleries and the whole leaf often becomes one large blotch mine, though not originally formed on the blotch principle. The larva mines very rapidly and the severed cells keep the mine wet. The excrement is deposited in an almost fluid state and adheres chiefly to the upper cuticle of the leaf, hence the mine becomes clouded with green and black. If the larva, after mining all over the leaf, has not attained its full growth, it bites a hole generally through the lower cuticle of the leaf, comes out of its mine, and crawls about the plant till it finds another suitable leaf, which it enters and commences to mine in the new leaf in the same manner as previously.

In this fourth stage the larva makes altogether a mine of about 150 mm. in length, and usually requires two or three leaves for this purpose, and about ten days is taken up in making this part of the mine. Thus we see that it takes the larva some thirty days to feed up, and that the total length of the mines is some nine inches. The length and width of the mine is not at all a fixed quantity, some larvæ making wider or longer mines than others. I believe it depends somewhat on the nourishment which each particular leaf affords; in a poor leaf the larva will have to mine over a longer space to obtain the same amount of nourishment it would extract from a shorter mine in a leaf of good condition. Three or four days before the larva becomes full fed it loses all its green colour and becomes a clear, pale yellow, which colour again changes to cream, and about thirty hours before the larva finally leaves the mine reddish-brown spots begin to appear on its body, and these gradually change to crimson. Before quitting the mine the larva often wanders about inside the leaf, biting here and there at the upper cuticle and spinning a few threads on the lower cuticle. Finally it makes a slit in the upper cuticle of the leaf, comes out, and wanders off to find a suitable place in which to spin its cocoon. The crimson spots on the cream ground make it a very handsome little caterpillar.

Where the larva spins up in freedom I do not know, but it does not seem to take kindly to earth or leaves. Those I have had made no difficulty of spinning up in a hole in a cork or in the angles made by the sides and tops or bottoms of pasteboard boxes. The cocoon is composed of fine white silk and is very tough. If it be opened a few days after it has been spun the larva inside will be found to have lost its cream ground colour and to have become all deep reddish ochreous. There are two broods of this species, and those larvæ which spin up in September do not change to pupæ till the following April. They pass the winter as larvæ in the cocoon. I examined

three cocoons on April 16th of this year and found the larvæ had again assumed the pale yellow tint, and that all the spots had vanished.

The moths make their appearance in May and early June. These lay eggs which produce larvæ, which feed through July and give rise to the moths which appear in August, the parents of the September larvæ.

The interesting colour-changes which the larva goes through are probably of protective value. Red is usually considered a warning colour, and the crimson spots, which appear when this larva is about to wander about in the open, may help to protect it against attack, while the orange band on the young larva may help to disguise its real nature.

I doubt whether the larva in the first stage can change from one leaf to another. It is able to do so in the second stage, but I believe that, as a rule, it remains in the same leaf until well into the third stage at least. The larva remains in the same leaf as long as it can, but many of the leaves on which eggs are laid are very small, and occasionally when the larva mines too near the stalk of larger leaves it cuts off the flow of sap, and the leaf begins to wither; then the larva has to leave it. I have many times watched the larvæ of this species, and also those of *C. stipella*, entering new leaves. The process is the same in both instances. The larva crawls generally on the underside of the leaf, and having selected the point at which to enter the leaf, it spins a number of short threads of silk just in front of the spot. It then grasps the threads with the thoracic legs, and turning its head upwards bites a slit in the cuticle of the leaf and commences to feed on the parenchyma. As the head gets more bent under the larva the metathorax is forced up, and, being anchored by the silk, lifts up the partly severed cuticle and prevents it being torn by the pro- and meso-thorax as they enter the leaf, or, at any rate, keeps the lower margin of the slit clear of these segments. As further progress is made the body is also raised from the leaf surface, but the anal claspers are still attached to the leaf. By this time the mine is deeper, and the metathorax, freed from the silken strands, enters the leaf. The head and thorax now being bent right under the body, the anal claspers loose their hold, and the larva, as it enters the mine, thus gradually turns a complete somersault. When the larva is entirely within the mine it blocks the hole where it entered with excrement, thus preventing any small creature entering the mine. Anyone who is accustomed to examine plants with a lens is aware of the vast numbers of small creatures that run over the leaves and flowers. If the mine were left open some of these might enter and worry the larva.

*Chrysopora stipella*, var. *næviferella*, also, as above-mentioned, feeds in the same plants at the same time as *C. hermannella*. This species is a blotch-miner, and instead of mining straight ahead and making a long tunnel, it makes a small, roundish hole and continues

eating out the parenchyma at the circumference of the mine all round, so that it forms a more or less roundish blotch; and as it almost entirely consumes the inner cells of the leaf, only the upper and lower cuticles of the leaf remain, which causes the mine to have a white and very conspicuous appearance. On August 23rd, 1908, I found a leaf of *Chenopodium album* at Chiswick, containing two mines, one of *C. stipella* and one of *C. hermannella*. The egg of the latter had been laid on the upper surface and had hatched first, the larva mining right across the space which was afterwards occupied by the larva of *C. stipella*.

The leaves of *Chenopodium* are frequently mined by Dipterous maggots; these make large, greenish blotches, and several larvæ occur in the same blotch. Though two or three larvæ of *C. hermannella* often occur in the same leaf, they almost always keep to their own mines; yet I remember one case where two larvæ, most amicably, made a common mine for some distance.

The ova are laid on either side of the leaf, but more commonly on the under side, and usually close to the mid-rib or one of the lateral veins. They are strongly attached. In shape the egg is ovoid, but almost flat on the upper surface, rather truncated at the micropylar end, and bluntly pointed at the opposite end. The long axis measures 0.34 mm. and the shorter 0.25 mm., while the depth is on an average about 0.1 mm., but this varies considerably more than the other dimensions. The sculpture consists of very deep longitudinal wrinkles on the upper surface, the walls or sides are strongly pitted, the pits being less deep at each extremity, and the micropylar rosette is rather neat, with five oval cells. The colour is whitish, strongly iridescent; the green of the leaf shows through the egg, so that it appears pale green when *in situ*. The eggs hatch within a week. On hatching the larva partly fills the egg-shell with excrement.

*Larva, first instar.*—Head rather large; width 0.12 mm. Thorax rather swollen, body fairly cylindrical, tapering towards the bluntly rounded posterior extremity. Segments not very well marked. Three pairs of thoracic legs, strong and broad, with sharply-pointed claw. Spiracles circular. I failed to see any trace of prolegs, tubercles, or skin points. Head pale brown; body very shining pale grey. A dark grey transverse mark on the dorsum of prothorax; dorsal vessel green. Venter yellowish, with a broad orange band running from the prothorax near the head down the centre of the body to the tenth abdominal segment. As the larva is somewhat transparent the orange band shows through, giving the larva a pinkish tinge on the dorsum. Length, 1 mm.

*Second instar.*—Width of head 0.24 mm. Head brown, body pale yellow, ventral band not so broad in proportion as in first instar. Four pairs of prolegs besides the claspers, but all without crotchets. Length of larva 1.5 mm.

*Third instar.*—Width of head 0.4 mm. Head large, body fairly cylindrical, rather transparent, narrowed slightly posteriorly. In

profile the metathorax is highest, and the body slopes gradually to the tenth abdominal segment. Legs large. Prolegs very long and slender; anal claspers short and cushion-like. Head brown; body pale yellow; dorsal vessel green. A reddish-orange line runs from the prothorax to the tenth abdominal segment. This line disappears during this stadium, and, as already pointed out, the larva becomes flatter. Length of the larva 3 mm. The usual tubercles and setæ are present; the setæ very small and simple. Tubercle i is placed further from the mediodorsal line than ii; iv and v are separate, subspiracular, and iv is also post-spiracular. Below these two is a small tubercle, which, I think, must be tubercle vii. There are many skin points.

*Fourth instar.*—Width of head, 0.6 mm.; length of larva, 7 mm. Larva rather flattened dorsally and ventrally, widest at the second abdominal segment. The segmental divisions are well marked laterally. The meso- and metathorax have three sub-segments, and the abdominals two sub-segments. The tubercles are all simple, each with a single seta, which is rather short. On the abdominal segments tubercles i and iii are on the first sub-segment, and ii is on the second subsegment and nearer the mediodorsal line than i. Tubercles iv and v are both sub- and post-spiracular; vi is rather more central than in some other larvæ, while tubercle vii has now developed into the usual three tubercles, the posterior one bearing a very long seta, the longest of all the setæ. This measures 0.23 mm., while tubercle iv only measures 0.15 mm. Tubercle viii is as usual on the inner side of the proleg. The skin-hairs are very numerous, but absent round the spiracle and round the bases of the tubercles, and also in certain patches on the dorsum, viz. a small circular patch behind tubercle i, and an elongate patch between i and iii, but behind both. There are two very minute tubercles on the anterior of the segment and one near tubercle iii. The prolegs are long and slender, with about five crochets. The crimson spots, which develop when the larva leaves the mine, are situated round the tubercles, except vii and viii, which take no colour. The spot round tubercle i is rather large, smaller round ii, very large round iii, and of moderate size round iv, v, and vi. The largest spots of all on the larva occur on the meso- and metathorax round the second pair of tubercles, counting from the mediodorsal line downwards. These spots vary in different larvæ both as to size and brilliancy.

*Diary of Larva Labelled "No. 1."*

August 17th, 1908.—No. 1 larva hatched.

18th.—Had mined about 3 mm.

19th.—A further 3 mm. mined.

20th.—Had mined  $1\frac{1}{2}$  mm. and laid up for change at 1 p.m.

21st.—Twenty minutes past noon had changed, and was again feeding.

- 22nd.—Had mined  $6\frac{1}{2}$  mm.  
 23rd.—Mined 7 mm.  
 24th.—Mined about 7 mm. The leaf fell off the stem.  
 25th.—Had mined 4 mm. and then laid up for second change.  
 The leaf now getting dry.  
 26th.—Had changed, and I took it out of the dry leaf and placed it on a fresh leaf, in which it soon commenced a new mine.  
 27th.—Mined 5 mm.  
 28th.—Mined 6 mm.  
 29th.—Mined 9 mm. The orange band begins to vanish.  
 30th.—Mined 8 mm. The band only visible on thorax.  
 31st.—Had mined 8 mm., and was forming chamber for the third change.  
 September 1st.—Had turned round in mine for change.  
 2nd, 3rd, and 4th.—As on the 1st.  
 5th.—Had changed and mined 4 mm. No. 3 larva had invaded No. 1's leaf and was taken out and placed on another leaf.  
 6th.—Had mined 15 mm. This leaf had now fallen from the stem.  
 7th.—7.30 a.m., larva not yet out of leaf. 10.20., larva crawling on top of leaf; placed on a fresh leaf, which it soon entered. Had mined 17 mm. since yesterday.  
 8th.—Had mined 19 mm.  
 9th.—Had mined 11 mm.  
 10th and 11th.—Had mined 41 mm.  
 12th.—Had mined 19 mm.  
 13th.—Had mined 20 mm. Red spots begin to appear.  
 14th.—Had mined 3 mm. and had come out of the leaf. Put in box to spin up.  
 This larva therefore took twenty-eight days to feed up, and mined a total length of rather over 8 in.

ANNUAL ADDRESS TO THE MEMBERS  
 OF THE  
 South London Entomological and Natural History  
 Society.

*Read January 27th, 1910.*

By ALFRED SICH, F.E.S.

I THINK we may congratulate ourselves on having passed through another prosperous year. We have increased our membership and the average attendance at our meetings; and though on the whole the elements were not altogether propitious, we have had exhibited a large number of interesting specimens captured during the season. Perhaps the chief event of the year, as regards our Society, was the arrival of the splendid collections of British and European Rhopalocera, so generously presented by Mrs. Freeman. As so many of us now take a great interest in the butterflies of Europe, and as there are so few first-class collections available for reference, this valuable gift is especially acceptable, and should be the means of furthering still more the study of those beautiful insects which we see around us during our holidays abroad, as well as of helping us to understand more fully our own limited number of British Rhopalocera.

The President whom you have elected for 1910, Mr. W. J. Kaye, has, as I think you are aware, sailed this day for South America, and is, therefore, to his own and to our regret, unable to be with us to-night. He contemplates being away for about four months, and intends to study, in their various aspects, the Rhopalocera of Brazil. As you all know Mr. Kaye so well, it seems unnecessary for me to dilate on his

entomological and other virtues. I am sure he will make an ideal President, and I think you will all agree that we not only grant him leave of absence, but also wish him the best of good luck on his enterprise.

Turning to matters outside this Society, I may say that entomologists in general, and Micro-lepidopterists in particular, are extremely pleased to learn that Lord Walsingham is shortly handing over to the British Museum his magnificent collection of Micro-lepidoptera. Without any doubt this is the finest and most complete collection of its kind in the world, and will constitute the greatest of Lord Walsingham's many generous gifts to the Natural History Museum.

I am sorry to have to record the death of one of our members. John Tolhurst, J.P., F.S.A., died on October 9th last, at the age of seventy-five. Joining in 1895, he was at one time a regular attendant at our meetings, but after the death of his friend, the late J. J. Weir, we saw him less frequently. He continued, however, a generous supporter of our Society, taking an interest in natural history up to the time of his decease.

Henry William Barker, very well known to many of you, I regret to say passed away September 21st, 1909, at the age of forty-nine. He was from 1886 to 1893 our Hon. Secretary, and the prosperity of the Society during those years was in no small measure due to his energy. He joined the Entomological Society in 1887. His studies lay with the British Macro-lepidoptera, of which he formed a very good collection.

To those who studied the European Rhopalocera in the early eighties the death of the Rev. Henry Charles Lang, M.D., on December 20th, came as a shock. Though of late years we have had nothing important from his pen, that beautiful book, "Rhopalocera Europa," published in 1884, will always serve to keep his name in memory. I think that the sight of these coloured plates incited many collectors to extend their activity to continental areas.

Edward T. Connold, F.Z.S., F.E.S., passed away at Hastings on January 9th, 1910, at the age of forty-seven. He wrote several books, but his three on British galls are perhaps the best known. He will be much missed by the members of the scientific societies of his native town.

The annual instalment of Mr. Taylor's "Monograph of the Land and Fresh-Water Mollusca of the British Isles" duly appeared last October. In this Part, XVI, the *Helicidæ*

is reached, and we have the first portion of the account of *Helix pomatia*, besides the full accounts of three other snails. This part contains also a coloured plate showing figures of those delicate shells belonging to the genus *Hyalinia* and others. These figures are both so truthful and beautiful that they seem beyond praise.

Besides giving all the details of a species, with maps of its distribution, Mr. Taylor treats of the fossil and Nearctic allies, and gives portraits of both the older and the living conchologists. The book is therefore not only of high scientific value, but contains also much of what the late Mr. Stainton was wont to term readable matter.

The handy volume, "Plant Galls of Great Britain," by the late E. T. Connold, contains 354 excellent illustrations, mostly of galls that occur in Britain on various plants. We constantly find galls in the course of our rambles, and this book will enable us to identify many of them and learn something of the lives of their inhabitants. This volume is a small edition of the late author's two other works on galls, and contains the galls of the oak and those of other plants, arranged for easy reference.

That monumental work, "A Natural History of the British Butterflies," by Mr. Tutt, though so thoroughly worked out, has almost reached the end of volume iii. For a work of this kind the progress is rapid. The present volume treats of five very interesting species of "Blues" and their allies. One of the great features of this work is that the author and his collaborators have, whenever possible, worked out the life-histories of each species anew and much more fully than has ever before been attempted. The structure of the perfect insect and of the insect in its earlier stages has been carefully examined, whilst the literature dealing with the subject, of which there is a vast amount, has all been digested. Thus, the author has arrived at a standpoint from which he could take a comprehensive view of each species and present the same to his readers.

The volume by Mr. F. N. Pierce, "The Genitalia of the British Noctuidæ," containing descriptions and 350 figures of the ancillary appendages of the *Noctuidæ*, constitutes a new departure in entomological literature, and will, no doubt, be an incentive to many entomologists who have not yet done so, to study the morphology of these organs. This study, so ably carried on by Mr. Pierce for over twenty years, provides a further set of factors of great use in the determination of species.

The total number of additions to the Fauna of Britain recorded during the year is again so large that individual treatment is precluded. I will therefore only mention what seem to me to be the more interesting items.

COLEOPTERA.—Mr. E. G. Elliman describes a species of *Homalota* under the name of *H. scotica*, new to science. It appears to be quite a distinct species, and was taken at Nethy Bridge in September, 1908, by Prof. Hudson Beare and Mr. Donisthorpe ("Ent. Rec.," vol. xxi, p. 33).

*Anaspis hudsoni* is the name of a new species, taken by Mr. Donisthorpe from a fungus on Scots fir at Nethy Bridge, Inverness-shire, also in September, 1908. In connection with this notice there is a beautiful plate from drawings by H. C. Dollman showing the male appendages of all the British species of this genus ("Ent. Rec.," vol. xxi, p. 60).

*Thinobius pallidus*.—Specimens of this Staphylinid beetle, new to science, were taken by Mr. Britten in Cumberland, and described by Mr. Newbery ("E. M. M.," vol. xlv, p. 4).

Mr. James Edwards separates *Dryops anglicanus* from other similar species. He took this at Horning in May, 1888 ("E. M. M.," vol. xlv, p. 218).

Under the name of *Myrmecopora brevipes* Mr. E. A. Butler separates a shorter legged species of this genus, found on the Devon and Cornish coasts, from *M. uvida*, which haunts the coasts of Hants and Kent ("E. M. M.," vol. xlv, p. 29).

Dr. David Sharp describes *Rabocerus bishopi*, a small species taken by himself and Mr. Bishop off dead birch twigs in Inverness-shire ("E. M. M.," vol. xlv, p. 245).

DIPTERA.—Mr. Hamm has taken two interesting species of Diptera, new to Britain, *Miltogramma germari*, Mg., near Oxford, and *Setulia grisea*, Mg., in the New Forest. They are both parasitic on burrowing Hymenoptera ("E. M. M.," vol. xlv, pp. 105 and 273).

Dr. Wood has continued his studies on the genus *Phora*, with the result that he has described forty-five more species new to science from England, and Mr. Malloch has added one from Scotland ("E. M. M.," vol. xlv, p. 24, *et seq.*).

Mr. Enoch records, "with feelings of anything but pleasure," the occurrence of *Clinodiplosis equestris*, a wheat pest new to Britain, at Tenby. The bright red larvæ live in cavities in the stalks ("Entom.," vol. xlii, p. 217).

HEMIPTERA.—*Cymus obliquus*, Horv., has been recorded by Mr. E. A. Butler, from the Hastings district, where it occurs on *Solanum dulcamara* in damp places ("E. M. M.," vol. xlv, p. 59).

Mr. E. C. Bedwell has discovered in the Lowestoft district, under *Erodium*, in June last, eight specimens of *Odontoscelis dorsalis*, Fab. ("E. M. M.," vol. xlv, p. 253).

HYMENOPTERA.—Mr. Claude Morley describes two new species of *Braconidæ* parasitic on ants. *Spilomma falconivibrans*, bred from a nest of *Formica fusca* from Somerset, and *Euphorus bistigmaticus*, hovering over a nest of *Formica rufa* at Weybridge. Both these species were captured by Mr. Donisthorpe ("E. M. M.," vol. xlv, p. 212).

Mr. Enock is still actively carrying on his researches on the minute but beautiful family of the *Mymaridæ*, of which he has named many new species; and he told us quite recently that he still has many more to describe.

LEPIDOPTERA.—On August 26th last Mr. South exhibited here a curious looking noctuid moth, taken by Mr. Esson in Aberdeen, at sugar, on July 12th last. This specimen has now been presented by the Hon. N. C. Rothschild to the National Collection. Besides being a new species, it appears to represent a new genus; it is described by Sir G. F. Hampson under the name of *Peucephila essoni* ("Trans. Ent. Soc. Lond.," 1909, p. 461, with plate).

A species, new to Britain, *Depressaria putridella*, Schiff., is recorded for the first time this year, though Mr. E. D. Green was fortunate enough to discover the larvæ at Whitstable in 1906 ("Ent. Record," vol. xxi, p. 221, *et seq.*).

THYSANURA.—Mr. R. S. Bagnall describes *Anaphothrips orchidaceus*, new to science, from Northumberland, Surrey, and Dublin, in orchid houses, where it is injurious to the plants. It appears to have been known to horticulturists as the "yellow thrips" from its colour. The same author also describes another new species, *Megathrips nobilis*, a large species, taken by Dr. Sharp in 1896, from a bundle of dried sedge in Wicken Fen ("E. M. M.," vol. xlv, pp. 33 and 130).

TRICHOPTERA.—*Limnophilus fuscineruis*, Zett., has been recorded by Mr. Morton, from a specimen taken by Mr. Halbert from Castlebar Lough, co. Mayo, last June ("E. M. M.," vol. xlv, p. 233).

Last summer, as we are all unfortunately well aware, was not a very propitious season for entomologists. It began well, in May, when the great feature was the abundance of common geometrid larvæ, which swarmed in all the woods and some of the parks. In the late summer we were, in any case around London, inflicted with a plague of the larvæ of that beautiful butterfly, *Pieris brassicæ*. These did great damage in the market gardens, but were themselves very severely

attacked by *Apanteles glomeratus*. This was not the only immigration from the Continent that arrived on our shores; many observers were gladdened by the sight of numerous crossbills (*Loxia curvirostra*), which, as Mr. W. L. Distant very kindly informs me, were seen in nearly all parts of the country. Mr. Distant has called 1909 the "crossbill" year, and no doubt it will, among ornithologists, long hold this designation.

#### LEPIDOPTEROUS EVOLUTION.

During the last few years my attention has been drawn, as far as entomology is concerned, more particularly to the life-cycle, or, as we often wrongly call it, life-history, of various species of Lepidoptera. I have bred from the egg, and have made more or less detailed notes on the external appearance and habits, as far as can be done in captivity, of some of the species of what we call the lower forms of Lepidoptera, as well as of some of those species which, we generally consider, have reached a higher status from an evolutionary point of view. In rearing Lepidoptera from the egg we may obtain a fair notion of the various stages through which our captives pass, of some of their habits, and of the disposition even of certain individuals, but of their real life-history we gain but little. That can only be approximately learnt by patient study of a species in its natural surroundings, extending over many seasons. In rearing Lepidoptera from the egg one is insensibly led to weigh in the mind various points connected with the theory of evolution.

The evolution of a lepidopterous insect appears far more complicated than the evolution of, say, such an animal as we now call a quadruped, for when once the quadruped commences life on its own account—that is to say, when it is born—its own structure and the conditions under which it usually lives remain practically the same throughout its whole life. The lepidopteron, on the other hand, may be said to have four distinct phases of life—the life in the egg after that has been deposited, the larval, pupal, and the imaginal life. I think there is no doubt that evolution takes place in all these four lives, or phases of life, independently. The aim of life, the structure, and the conditions of environment are different in all the four phases. The height of evolution reached in one stage does not, or need not, affect any of the other stages, except in so far as to make that change in the germ-cells which may be necessary to the further evolution

of the individual. It is difficult to see how evolution could have arisen in the egg stage, but the different forms of the lepidopterous ovum show that it has taken place. The shell of the ovum, when once formed within the body of the female, cannot then alter its structure, and therefore, when once the ovum is deposited, no further evolution in structure can take place in that particular ovum, though we know that the ovum, even after deposition, does in some cases suffer a change in the colour of the shell, as in the ova of the genus *Hepialus*. The apparent evolution of the ovum in its external appearance is really, therefore, imaginal evolution, affecting those organs of the female imago which form the shell of the egg.

Those species which comprise the genus *Coleophora* have, in the imaginal condition, so many essential features in common that they are still, even in these days when the splitting up of genera is so much in vogue, all included in the same genus. We have in Britain alone some eighty species, and thanks chiefly to the efforts of Mr. Henry J. Turner, we now know the ova of a bare dozen species. Among these few ova that we do know there are three distinct types. *Coleophora cæspitiella* has an ovoid egg without any sculpture. Then we find the ribbed ovum of *C. fuscedinella* and its allies, from which the larva emerges into the atmosphere before commencing its mine in the leaf of its food-plant. Thirdly, there is the very evident upright egg with a flat base of *C. gryphipennella* and others, through the base of which the larva bores direct into the leaf without coming into the outer atmosphere at all. Yet the oval life in all these is much the same; they all hatch in a few days; none of them hibernate in the ovum. It appears, therefore, that though the Coleophorids, judging from their imaginal characters, have all reached to such a point in their development that entomologists place them all in the same genus, which shows, at least, that they have all a very similar appearance—neurulation, etc.—yet in their oval life some species have progressed further than others, or, in any case, have developed in three separate directions, giving rise to three separate types of ovum. Again, these two species of the genus *Dicranura*, *erminea* and *vinula*, are very closely allied in the larval and imaginal stages, and yet the shape of the ovum is different in each species. Speaking generally of the ovum, we find that ova laid by the same individual vary in size and in proportion of height to breadth, and, in the ribbed forms, also in the number of ribs. It is well

known that the ovum of *Chrysophanus dispar*, var. *rutilus*, has sometimes six and sometimes seven large ribs. I have dissected out both forms from the body of the same female.

When we come to consider the larva, it is quite easy to see that the special conditions under which each species passes its larval existence must sooner or later exercise a modifying influence on, at least, the external appearance. It seems also that such an influence may be felt and responded to by a larva without producing any effect on the imago. Take, for instance, the two forms of the larva of *Acronycta leporina*, the green form, more often attached to alder, and the yellow form, usually feeding on birch.

Dr. Chapman has described these two forms ("Ent. Rec.," vol. iii, pp. 25 and 29), and states that imagines reared from one form will pair readily with those bred from the other form.

The larva of *Cemiostoma laburnella*, which lives in a flat mine in the leaves of laburnum, is an ordinary-looking leaf-miner, but the larva of *C. spartifoliella*, which lives in a gallery under the bark of the twigs of broom, is very peculiar in appearance, being very elongate. The moths produced by these two larvæ are so much alike, however, that entomologists at present separate them only by one slight character. The *Nymphalidæ* supply many cases of peculiar larval development, such as the strange larvæ of *Charaxes jasius* and *Apatura iris* ("Proceedings," 1907-8, Pl. IV), also the larvæ of Vanessids and Argynnidæ with their thorn-like structures. Among the butterflies, too, we find the very highly developed larvæ of the genus *Chrysophanus*, so well adapted to their surroundings. Among the moths there is the genus *Charocampa*, having larvæ with eye-like spots and retractile segments, the strange larva of *Stauropus fagi* and the larvæ of *Hoplitis milhauseri*, *Acronycta alni*, and *Euclidia mi*, as well as all the curious larvæ of the *Geometridæ*.

All these appear to be instances of purely larval evolution, brought about by the various conditions under which each species has been obliged to carry on its larval existence. On the other hand many larvæ of the *Tortricidæ* which have similar habits, living between leaves spun together, are extremely similar in appearance, but give rise to moths differently marked and coloured, which we recognise as different species. From this we may infer that the conditions of larval life, remaining more or less the same, have allowed the larvæ to continue their existence without causing any essential change in their outward appearance, although

the imagines show that each species as a whole has continued its progress. Before leaving the larva I must mention that if we admit of a separate kind of evolution for each stage of lepidopterous life we must also admit of an evolution for each stage of the larval life, as the habits and environment may differ in the different stages. We can see this does occur if we look closely enough. It is, however, more marked in some species than in others; for instance, *Papilio machaon*, *Dicranura vinula*, and *Plusia moneta* are familiar examples of larvæ differing in different instars. *Bucculatrix ulmella* is at first a leaf-miner, and later the larva with an altered appearance feeds exposed. But perhaps the best instance of all is that of *Phyllocnistis suffusella*, which in three of its instars is so unlike that the uninitiated would take the larva, in these three stages for three quite distinct organisms. We have not quite done with the larva yet, for though I believe it undergoes some change, it is still a larva while spinning the cocoon. This change is quite plain in *Phyllocnistis*, as when the larva is full fed it undergoes an ecdysis and is completely changed in appearance. It does not feed at all in this instar, and its sole function is to spin its cocoon.

The lepidopterous cocoon may be a tough structure, like that of *Lasiocampa quercus*, or open network, like that of *Plutella maculipennis*, or simply a boss of silk, like that of *Vanessa io*. In every case its form has been, no doubt, brought about by evolution, and must be taken into account when treating of the life-history of any species.

As regards pupal development I can say but little, as I have only made very few observations on that stage of lepidopterous life. So long as the pupa is enclosed, whether it be in an earthen cell, a dense silken or an open network cocoon, it seems to retain, more or less, what may be called the normal pupal shape, such as that of the Noctuid, Tineid, or even those of *Hesperia malva* and *Parnassius apollo*; though, of course, all of these differ vastly in many particulars. When, however, the pupa dispenses with a cocoon and becomes exposed, it develops various protuberances and loses the normal shape, as we see in most butterflies, in the geometrid genus *Ephya*, and in the genera *Elachista* and *Bedellia* among the Tineina. It seems that these various protuberances and points which we see on the pupa of the Pierids, Nymphalids, especially on that of *Limenitis silylla* and others, are special developments of the pupa. I have observed that in *Pieris brassicae* these prominences are not fully developed until some minutes after the larval skin has

been cast by the pupa ("Proceedings," 1908-9, Pl. III, figs. 3-8), and this seems to be generally the case, if not always, in other species with similar projections. Then, again, the various hooks, teeth and beaks, all of which aid, in one way or another, the escape of the imago from the cocoon in those species which spin such domiciles, all appear to be brought about by pupal development.

The imagines I think afford us many examples of what I might call secondary evolution, affecting only one stage of the life of the insect as a whole. Take, for instance, the genus *Bryophila*. Our two species, *perla* and *muralis*, vary immensely in the ground colour, and also in the strength of the markings. *B. perla*, ab. *flavescens*, Tutt, occurs on walls covered with orange-coloured lichens, and on some walls is almost as common as the type ("Brit. Noct.," vol. i, p. 8). It seems probable, therefore, that if we found ova, larvæ or pupæ on one of these walls, we could not tell whether we should breed from them the type, or ab. *flavescens*, or both. Again, in *Gnophos obscuraria* we have light and dark forms, generally from light or dark soils: but I believe these forms would freely interbreed, and that if we received larvæ without knowing whence they came, we could not tell what form the resulting imagines would take. In both these instances we see causes, which need not apparently affect the earlier stages, resulting in the variation of the imago. There is another form of variation which apparently affects only the imagines—that of dimorphism.

In *Dryas paphia* we have the var. *valesina*, which is, I believe, generally considered the more ancestral form of the female, which inhabited the ancient forests when they were larger, more moist, and perhaps less sun-lit, than are our smaller woods of to-day, in which that form of the female, coloured like the male, is now more usually found. Yet we know that from eggs laid by the var. *valesina* we can breed both forms of the female. Only last year Mr. E. C. Joy bred from eggs laid by one female var. *valesina*, forty-one males, twenty-three ordinary females, and thirteen var. *valesina*. These were exhibited here on October 14th. The late J. A. Clark had in his collection a specimen intermediate between the two forms.

*Hepialus humuli* has two forms of the male, the possibly ancestral form, var. *thuleus* (*hethlandica*), which occurs abundantly in the Shetland Islands, where it flies in daylight and therefore does not need to be so conspicuous an attraction to the female as does the more ordinary white form which

flies in the dark. Mr. McArthur says that in Unst, the most northern of the Shetland Isles, more or less typical *H. humuli* occur, as well as the other form ("Moths of the British Isles," vol. ii, p. 361). This var. *thuleus* also occurs as an aberration in Holland. There seems to be no reason to doubt that the ovum, larva and pupa of both forms are identical, and that the type and var. *thuleus* would freely interbreed, but unfortunately I have no proof of this.

There is one most beautiful example of what I call pure imaginal evolution, and though I am personally only acquainted with the imago, the early stages have been described and its affinities pointed out by one of the greatest entomologists of our time. The eggs and their disposition in imbricated sets, the larva and its habits, and the structure of the pupa, all show distinctly that *Arsilonche venosa* belongs to the *Viminia* group of the *Acronyctidæ*, and is very closely allied to *Acronycta rumicis*. The coloration of the imago is, however, absolutely different. From its long abode among the reeds in the fens it has developed the protective colour and markings which we so often find associated with the reed-frequenting Lepidoptera ("Ent. Record," vol. i, p. 1, *et seq.*).

The forces which bring about the evolution of an organism appear to be of two distinct kinds: The outside forces, which, as the outer conditions of life change, call upon the organism to alter and meet the changes, and the inner forces, which, while holding the organism within certain limits, allow it to respond more or less perfectly, sooner or later, to the demands made on it by the outside forces. The Lepidoptera, I think, offer some very good illustrations of this theory, showing how similar demands made by the outside forces have been met in different ways by different species. A great many pupæ have developed hooks or spines on the dorsum, which, in various ways, aid the imagines to free themselves from the cocoon and from the pupa-shell. Dr. Chapman, speaking of the dorsal hooks on the pupa of the genus *Tischeria*, remarks that one species has "small spines uniformly over the segment." In another species these are "segregated into a central patch." In a third species they are "massing towards the anterior margin"; whilst in a fourth they are "beginning to form a posterior row" ("Brit. Lep.," vol. ii, p. 97). This shows how species of that genus have met, up till the present time, the common demand for dorsal hooks. The environment of the larvæ of those two very closely allied species, *Acronycta tridens* and *A. psi*, appears

to be very similar, but each species has apparently replied differently to the demands made upon it, so that the larvæ differ, even in the first instar, although then very much alike; and in the last instar we all know they differ widely in appearance. The environment of the imagines of both species has been, at least, so similar that they scarcely at all differ in appearance. There can be little doubt, I imagine, that the same outside forces have brought about the singular forms now assumed by the larvæ of the Cerurids, the dorsal hump and the long tails with flagelli. *Dicranura vinula* responded so that the highest point of the hump rises on the metathorax, and the flagellum is red; *Cerula bifida* and *C. furcula* replied by making the mesothorax the highest point, and their flagella are black.

*Apamea ophiogramma* is an extremely constant species. The imago varies scarcely at all. On the other hand *Apamea didyma* is one of the most variable of Noctuæ that is known. We may take hundreds at sugar in the same field and yet not get two exactly alike. Where we take the former species we shall find the latter as well, and they are evidently very closely allied, for there is a form of *A. didyma* which bears a very strong resemblance to *A. ophiogramma*. May it not be, in these two cases, that the inner forces are not quite the same in kind. The inner hereditary forces in *A. ophiogramma* may be very strong and conservative, tending to keep the insect within very strict lines, while the innate tendencies of *A. didyma* may not only allow, but may even induce, great variation. A similar but not so marked case may be cited with respect to *Xylophasia monoglypha* and *X. lithoxylea*, the former being a variable species and the latter a very constant one.

I suppose we must presume that all variation is due, in the first instance, to the influence of the external factors or outside forces, but it is not difficult to perceive that, if once variation arise, then the tendency to variation may become one of the inner forces or hereditary factors. Mr. Tutt mentions that in the wet season of 1888, many species of Lepidoptera at Deal assumed a darker colour than usual. He instances *Xylophasia monoglypha*, which at Deal is usually of the pale variegated form with an occasional ab. *obscura*, a suffused brown form; and he states that in that year this species was in greater abundance than usual, but almost all were ab. *obscura* ("Ent. Rec.," vol. i, p. 121). Taking this for our case, let us, for the sake of illustration, imagine a range of hills, one side facing the drier east and the other the

wetter west, with a colony of *Xylophasia monoglypha* on each side of the range. Then let us make use of one of the theories concerning the cause of melanochroism, and suppose that the colony on the east side will remain light in colour and that on the wetter side will become after a time very dark. If we then further imagine that the moths from the light colony by some chance interbred with dark moths from the other colony, we can easily see that an inner tendency to variation would be set up, especially if we remember another much-discussed theory—the law of Mendel. It seems necessary to suppose the existence of an innate tendency to vary when we consider such species as *Apamea didyma*, *Agrotis tritici*, *Acalla cristana*, and *Cerostoma radiatella*. All these species appear to vary excessively without any regard to local or atmosphere influences.

The degree of evolution attained by each lepidopterous insect to-day equals the sum of the responses made in every stage by all its ancestors, and by the individual itself, to the demands of those special inner and outside forces which have been working on the race ever since its existence began. Some of these forces we are aware of, but most of them are probably still unknown to us, though it seems perfectly evident that they cannot all of them be the same in each stage of lepidopterous life: and that, therefore, the effects which they produce on the insect in each stage are peculiar to that stage, and need not have any bearing on the evolution of the other stages. We may look on each stage as having its own life, its own functions, its own environment, and its own evolution.

In some way, however, it appears absolutely necessary to assume that though the evolution of one stage does not interfere with that of another, that though each stage evolves in response to stimuli, some of which work on that stage alone, some alteration of the germ-cells, or those parts of the insect which carry on the hereditary tendencies, must take place. The advance made by each individual in each stage must in some way be stored up and carried over to the next generation, otherwise each individual would have to evolve *de novo*, and no progress of the race would be made. How or where these arcana are preserved we have no knowledge; but when we have before us the minute spherical egg of *Hepialus lupulinus*, or the beautifully sculptured egg of *Pyra-meis cardui*, with its miniature Roman aqueducts guarding the micropyle, or even that microscopic speck of life, the egg of *Nepticula acetosæ*, we can, if these eggs be fertile, be sure

that in these extremely small receptacles are somehow stored up all the ancestral history, all the sagas, of the race from which each of these eggs is descended. If the egg hatch, and the insect come to maturity, it will have followed more or less closely the same path of life as did its ancestors. In the course of its development from egg to imago, it may in any one or in all of its stages make some advance useful to itself and its descendants. If this happen, then the advance, however slight, may be stored up in the egg, and so the race will continue its progress.

## ABSTRACT OF PROCEEDINGS.

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FEBRUARY 11th, 1909.

*The President*, Mr. A. SICH, F.E.S., in the Chair.

Mr. R. T. Baumann, of Chingford, was elected a member.

Mr. Tonge exhibited stereographs of the ova *in situ*, on lime twigs, of *Tiliacca citrigo*, and also of *Ruralis betulæ* on sloe.

Mr. Main exhibited a second brood specimen of *Melampias epiphron*, bred on September 20th, 1908, a very light specimen of *Stauropus fagi* from the New Forest, and a very dark form of the same species from Epping Forest.

Dr. Hodgson exhibited a specimen of *Brenthis selene* from East Sussex, with very dark smoky suffusion and rayed sub-marginal markings.

Mr. Coote exhibited a specimen of *Calymnia pyralina*, bred from a larva found on elm, N. Surrey, together with two specimens captured at sugar at the same place.

Mr. Robert Adkin exhibited a bred series of *Camptogramma fluviata*, which emerged between November 21st and December 13th, 1908. The larvæ came from Eastbourne, and the emergences were considered to be late.

Mr. Harrison reported that the results of the breeding of *Aplecta nebulosa* by Mr. Mansbridge were as follows:

*v. thompsoni* × grey form = wholly *v. robsoni*.

*v. robsoni* × grey form =  $\left\{ \begin{array}{l} 50 \text{ per cent. } \textit{robsoni}. \\ 50 \text{ per cent. grey form.} \end{array} \right.$

His own results had been:

Grey form × grey form = grey form.

*v. robsoni* × *v. robsoni* =  $\left\{ \begin{array}{l} 25 \text{ per cent. grey form.} \\ 51 \text{ per cent. } \textit{v. robsoni}. \\ 24 \text{ per cent. } \textit{v. thompsoni}. \end{array} \right.$

There remained to be done:

*v. thompsoni* × *v. robsoni*,

which should produce 50 per cent. *v. thompsoni* and 50 per cent. *v. robsoni*.

*v. thompsoni* × *v. thompsoni*,  
which should produce wholly *v. thompsoni*.

Mr. Newman exhibited several portions of the stems of *Viburnum*, and pointed out the evidence of the presence of larvæ of *Sesia andreniformis*, viz. the "caps" covering the openings from which the imagines would subsequently emerge. He had met with a considerable number of attacked stems in a shaded area among trees. It was noted that the larvæ were found in both *V. lantana* and *V. opulus*, and usually in more exposed situations; but Mr. Rayward said that he had met with evidences of the presence of the larvæ in at least two shady localities.

Mr. Tutt remarked that the ova of the species of *Ægeria* (*Sesia*) were laid anywhere on their respective food plants, even away from the woody parts, on the leaves. They were dark brown in colour. It was very remarkable that, so far as was known, the young larvæ in their first skin were hairy, and bore no resemblance to the shiny boring larvæ of the later instars. This suggested that during the first instar the larvæ were external feeders. But really what was known of them was only sufficient to express ignorance. Reliable information of the earlier stages was urgently needed.

A considerable discussion ensued.

FEBRUARY 25th, 1909.

Mr. F. J. Stone, of Clapham, was elected a member.

Dr. Hodgson exhibited a series of *Nemoria viridata*, obtained in 1906-7-8 from Lancashire and Surrey. The specimens included Linné's typical form, that usually met with, specimens of a grey green, of a blue green, and of a yellow green; some with lines very distinct, others with them very indistinct, the form ab. *concaulinca*, and various examples, of which some were irregularly and some symmetrically bleached. He showed pupæ of the same species, spun up in glass tubes among heather, having much silk in evidence. In addition he exhibited a female of *Celastrina argiolus*, a third brood specimen, in which almost all the blue was replaced by dull grey or leaden blue, together with a pupa of the same species in a glass tube, having a considerable amount of silk threads around it.

Mr. W. West (of Greenwich) exhibited one of the Society's cabinet drawers of Coleoptera, being the first portion of the collection as rearranged.

Mr. Main exhibited, for Mr. Baldock, a variety of *Euchelia jacobææ*, in which the usual pink coloration was changed to a dull yellow. It was taken in Norfolk. He also showed three fine specimens of *Papilio machowianus*, a rare species from Central Africa.

Mr. McArthur read the following notes on, and exhibited specimens of, *Anarta cordigera* from Rannoch :

“It was in the spring of 1876 that I first made my acquaintance with this pretty species in its natural haunts, but it was a very slight acquaintance that season, for I did not then know of a peculiar resting habit the imagines have, and so had to depend on the net, with very poor results. They are among the sharpest insects on the wing that I know of, and most difficult to catch. In Scotland, so far as I know, *A. cordigera* is confined to Rannoch, and there its range is limited to the south side of the loch. Even there they seem restricted to an elevation of 750 to 900 feet. Of course, individuals are met with above and below these heights, but it is very seldom. Eastward, the abutments of Shiehallion seem to stop their advance in that direction, and on the west their progress is barred by the Black Wood. The distance between these points is, roughly speaking, about eight miles, but there are breaks in between where they do not occur, the ground not being suitable for them. The sloping ground on each side of the two burns at Carrie are their headquarters. Here the bearberry (*Arctostaphylos uva-ursi*) grows in profusion, and *A. cordigera* is very fond of coming to gather the honey from the wax-like flowers. Even then they are always on the alert, flying off on the approach of anything; so one has but a poor chance of netting them. If the collector had to depend on that way of getting them they would still be rare in collections. Each spring the keepers and shepherds burn strips of the heather, and the following spring these burnt places are the favourite haunts of *A. cordigera*. By that time the black stumps of the old heath have become a dark grey, with small pieces of grey lichen still attached, making, one would think, an ideal resting-place for this species, for the stumps just match their colouring. But *A. cordigera* seems an exception to the rule, for they select the light-coloured granite rocks and stones, on which they show up in a very conspicuous manner. On a bright, sunny day *A. cordigera* is on the wing from about 10 a.m. until 3 or so in the afternoon. They then select the rocks while the sun is still shining on them, and there the courting takes place; but they are still so restless that

one cannot approach with hope of capturing them. However, after the sun has left the rock, say half an hour or so, they are quite dormant, and have to be pushed into the pill-boxes or bottle of the collector, giving him an opportunity for making a good bag. In the spring following the burning the ling is the plant to show in the burnt places, growing up in single plants with plenty of space between, and it is on this new growth that the female deposits her eggs, which are laid on the stems and leaves. When one is walking over these patches now and again *A. cordigera* will fly up, giving the impression that they have been resting on the ground, but that is not so. What they have been doing is ova-depositing on the young ling. Sunshine seems indispensable to *A. cordigera*, for without it they are powerless to fly."

Mr. Robert Adkin exhibited an *Anthrocera* supposed to be a hybrid between *A. filipendulæ* male and *A. achilleæ* female, together with examples of the two species for comparison.

The history of the specimen was, he said, as follows: For some five years past Mr. W. Renton had taken an *Anthrocera* in a restricted locality in Argyllshire, which he had regarded as a local form of *A. pilosellæ* (*purpuralis*), but which has recently been identified as *A. achilleæ*. In the same locality where this species occurs *A. filipendulæ* also is found; and he met with what appeared to be a female of the former species paired with a male of the latter. From this pairing some seventy ova were obtained, one half of which were kept with a view to feeding up the resulting larvæ in confinement, and he succeeded in rearing two imagines from them; the other half were turned out in a spot where he had seen no species of *Anthrocera*, and which appeared to be a suitable place for the larvæ to feed up. In the following June he carefully searched this place, and succeeded in finding one larva only, from which he reared the specimen now exhibited. It agrees very closely with the two bred in confinement, but is, as might be expected, slightly larger than either of them; and there appears to be no doubt whatever as to the three examples being members of the same brood.

In general appearance the supposed hybrid tends towards the characters of *A. filipendulæ*, the size and position of its six spots being practically as in that species, but the "texture" of the wings resembles that of *A. achilleæ*, while the dull, though rather deep, pink colour of the spots and the hind wings is unlike either of its parents.

It was suggested that a microscopic examination of the scales and of the genitalia might be made.

Mr. H. Moore exhibited a gynandromorphous example of *Papilio clearchus*, and contributed the following note :

“There is a group of South American butterflies, comprising a number of forms or closely allied species, commonly known as the *cleotas-phæton* series. The specimen exhibited may prove of somewhat unusual interest. It is a gynandromorph—right side male, left side female—judging by the size and shape of the wings. Compared with specimens in the National Collection (which, by the way, is incomplete), it is near *P. clearchus* (Felder), but both pairs of wings are sufficiently distinct not to be identified with any form represented there, and, so far as I can judge, do not agree with those of any of the forms recently described by Dr. Karl Jordan in Seitz’s ‘Butterflies of the World.’”

MARCH 11th, 1909.

Mr. West (Greenwich) exhibited a cabinet drawer of the Society’s type collection of Coleoptera, the second he had recently rearranged, remounting all the specimens.

Mr. South exhibited a short series of *Acidalia degeneraria* from Torquay, and contributed the following note :

“Mr. J. Walker, of Torquay, has sent me two specimens from a series of this species which he reared last September from ova deposited by a female taken in his district. He writes : ‘These are not nearly so dark as the Portland form’ ; he adds that he has taken *A. degeneraria* in one spot near Torquay each season during the past three years. Further, I understand that although he has searched other likely places in the district, he only finds the species in the one in which he first met with it.

“From eggs laid in July, larvæ hatch in about seven days, and if kept in a warm room will attain full growth and pupate by the beginning of September ; moths emerge a fortnight later. A few larvæ, however, refuse to feed up, and these usually die during the winter.

“The two Dorset specimens put in for comparison were reared in September, 1904, from Portland parents.”

Mr. Kaye exhibited a number of series of *Cosmotriche potatoaria* from various localities. The series included pale males of the female coloration from Cambs. and Norfolk ; some exceedingly dark males from Pembrokeshire, the females from the same locality also being rather dark ; from Exeter were some very large dark females of a somewhat

similar colour; some of the intermediate variegated males were from Cambs.; the Lancashire form was represented by some brick-red males. A pair from Co. Kerry showed a very rich-coloured male, with the whole of the central area of the wing a rich orange and the thorax orange, but with dark hind-wings. Various "aberrations" were also included.

A large number of drawers, boxes, and series of *Lycænid* butterflies were exhibited by Messrs. Tonge, Harrison and Main, Joy, Moore, Grosvenor, Turner, Pickett, Dr. Chapman, Dr. Hodgson, and Rev. G. Wheeler to illustrate Mr. Tutt's "Gossip about the Blue Butterflies." Mr. Tonge also exhibited photographic life-histories of the *Lycænids*, so far as he had been able to complete them, including imagines, ova, larvæ, pupæ, and details.

Mr. J. W. Tutt gave an address entitled, "A Gossip about the Blue Butterflies," of which the following is a summary:

The comprehensive group *Ruralides* consists of the "coppers, blues, and hairstreaks," of which the "blues," or *Lycænids*, form by far the largest section. Species of this sub-family are found all over the world in large numbers, and even in the palæarctic region no fewer than 122 species occur, as recorded in Staudinger's list, published in 1901.

In this work the "blues" are comprised in four very unequal genera, viz., *Lampides* with 10 species, *Chilades* with 1 (*trochilus*), *Lycæna* with 110 species, and *Cyaniris* (= *Celastrina*) with 1 (*argiolus*). Of the 10 species in *Lampides* only one (*bæticus*) belongs there, the others being quite outside the group. In *Lycæna*, comprising species as diverse in appearance, habits, structure, etc., as *argiades*, *astrarche*, and *arion*, no attempt is made at subdivision, although characters in abundance are offered by all the stages.

The subdivision of Meyrick ("Handbook") need only be referred to by saying that *argiades*, *minimus*, *semiargus* (*acis*), *astrarche*, *phlæas*, and *dispar* are placed in one genus, *Chrysophanus* (!!); and *bæticus*, *argiolus*, *coridon*, *bellargus*, *ægon*, *icarus*, and *arion* in the genus *Lycæna*. This evidently illogical and unnatural grouping is the result of classifying on only one insignificant imaginal character—"hairy" or "smooth" eyes.

The British species are, as a rule, more or less isolated and typical of well-developed groups in other parts of the palæarctic and nearctic and even tropical regions. *Celastrina*, for instance, has numerous representatives in the Indian region, as also has the genus *Everes*. In some cases our single British species is the centre of a few scattered species

forming a small natural coterie, e. g. *minimus* with *sebrus* and *lorquini*; *arion* with *arcas*, *alcon*, *euphemus*, etc.; *astrarche* with *eumedon*, *idas*, *psylorita*, etc.

As regards the distribution of our native species, *Lampides bæticus* must be looked upon as an immigrant even in the greater part of the south of Europe; *Everes argiades* and *Celastrina argiolus* are sedentary species throughout almost the whole of the palæarctic and nearctic regions, the former probably with a tendency to spread in seasons specially suitable for it; *Cupido minimus* and *Plebeius argus* (*ægon*) are spread over almost the whole continental part of the palæarctic region, the latter being represented in Japan by distinct variations as in Europe, while *Aricia astrarche* has forms spreading as far as India, and so on.

Most of the species show considerable sexual dimorphism in their coloration; the development of the legs, the distribution of the colour, and the sizes of the two sexes are also often very divergent. In most of the species much specialization of scales takes place, "androconia" (plumules or battledore scales) being present in all "blue" males, and long hair-scales, abundant in some males, are almost entirely absent in quite allied species.

As regards egg-laying, very little is known of the natural methods of the various species, although considerable advance has been made during the last few years in describing and photographing the ova of the commoner species. The length of the egg-stage of all the British species of "blues" is, however, quite well known.

The larvæ of all the species are more or less borers, and consequently the neck is exceedingly developed. Seeds, flowers, and leaves are attacked (varying with the species), and the length of larval life varies very considerably in the different species.

The stage at which hibernation takes place is not the same in all species. The larvæ of *Everes argiades* and *Cupido minimus* winter full-fed; *Polyommatus icarus*, *Cyaniris semiargus*, *Agriades bellargus*, *Lycæna arion*, and *Aricia astrarche* winter in the third larval instar; *Celastrina argiolus* and the Nomiadids (*Nomiades cyllarus* and *N. melanops*) hibernate as pupæ, and *Plebeius argus* (*ægon*) and *Agriades coridon* as ova.

The food-plants of the family are chiefly Leguminosæ, but there are many exceptions. *Celastrina argiolus* and *Lampides bæticus* have each almost thirty food-plants recorded. The Aricias are essentially *Geranium*-feeders, though *A. astrarche* also feeds on *Helianthemum*. The true Lycænids, *L. arion*,

etc., are very varied in their food-plants. *L. arion* eats thyme, *L. alcon* eats gentian, etc.

The movements of the larvæ are, as a rule, slow, and both movements and colours have a cryptic interpretation.

All the species appear to be closely attended by ants in the larval stage, and some are reported to be so in the pupal stage. The seventh abdominal segment of the larvæ of all the species has an evaginable gland—the honey-gland—and the eighth abdominal segment has two evaginable caruncles.

Exact information concerning pupation in nature, in all the species, is much wanted. It is very doubtful as to what pupæ are suspended by girth and cremastral pad. *Celastrina argiolus* and *Everes argiades* are known to possess a girth; *Cupido minimus* is supposed to have one.

As regards habits, most of the species fly mainly around low plants, although *Celastrina argiolus* frequents trees and shrubs. The males of many of the species are often observed to be exceedingly abundant, drinking at damp patches in the hotter regions of their habitat.

MARCH 25th, 1909.

Mr. A. E. Gibbs, F.E.S., of St. Albans, Mr. A. W. Buckstone, of Chiswick, and Mr. J. H. Rohde, of Reigate, were elected members.

Mr. G. B. Browne exhibited a short series of *Eubolia bipunctaria*, including forms taken at Branscombe in July, 1908, and at Dawlish, July, 1903, which were very reddish compared with the typical forms taken at Horsley in July, 1907. He also showed forms of *Agriades corydon*, taken at Reach in July and August, 1908, which had a slight reddish suffusion. Mr. Turner had seen the same kind of suffusion in specimens taken at Meiringin, Switzerland, by Mr. Harrison.

Mr. Tonge exhibited an underside of *Acronycta psi*, in which the central black spot was elongated and extended towards the base of the wing.

Mr. Baumann exhibited a very pale female of *Nyssia hispidaria* from Chingford, and a black form for comparison.

Mr. Coote exhibited the ova of the same species; also a female specimen of *Anisopteryx æscularia*.

Mr. Lucas exhibited the fungus, *Trametes rubescens*, found at Oxshott on willow, and said this was the third known British locality, the species having been found hitherto only in the New Forest, where he was the first to discover it,

and in Shropshire. It should be stated that Mr. G. Masee, F.L.S., considers *T. rubescens* to be only a form of *Dædalea confragosa*.

The remainder of the evening was devoted to the exhibition of lantern-slides.

Mr. Tonge showed slides of the ova of *Plebeius ægon*, and details of the life-history of various species of Lepidoptera.

Mr. Dennis showed a series of snow pictures taken during the recent severe weather.

Mr. West, L.D.S., showed a series of slides of the "stick" insect (*Dixippus morosus*) and its egg.

Mr. Main showed details of several life-histories, including those of *Apatura ilia*.

Mr. E. Step exhibited a series of lantern photographs showing moths at rest in the wild state. The species shown included *Stauropus fagi*, *Dianthæcia conspersa*, *Plusia pulchrina*, *Hecatera serena*, *Acidalia incanaria*, *Eupithecia venosata*, etc.

Mr. Lucas showed the following series of slides: Flowers and fruits of *Phanerogams*, mosses and fungi, New Forest views, etc.

MARCH 27th, 1909.

## REPORT OF THE SOCIETY'S VISIT TO THE ZOOLOGICAL MUSEUM, TRING.

By A. L. RAYWARD, F.E.S., and H. J. TURNER, F.E.S.

With the kind permission of the Hon. Walter Rothschild, M.P., a meeting was held at the Zoological Museum, Tring, especially to visit the galleries recently built to accommodate the enormous collection of Lepidoptera.

More than thirty members and friends attended, and Dr. Karl Jordan, the Curator, gave a most interesting and instructive demonstration of the contents of the various cabinets. Some of the members were also shown over the general museum, which contains a very fine collection of birds in addition to the other classes of animal life.

In the Insect Galleries, although many of the sections are not yet arranged, the material is grouped in families, and everything is labelled. The collection is especially rich in the *Papilionidæ*, and in particular the *Ornithoptera* are represented by series, in many cases bred, from as many localities as possible in the Malay Archipelago. The series of *O. priamus*, with its various geographical forms, golden, green,

blue, etc., were much admired, as also were the huge, quite perfect, bred series of *O. victoriae* from New Guinea. A drawer of the aberrant *Papilio antimachus*, from Africa, included a specimen of the very rarely obtained female. The polymorphic forms of *P. cenea* were well represented by series from various parts of Africa, together with the Madagascar form, *P. meriones*; a beautiful set of *O. paradisea*, a fine Malayan species with very aberrant hind wings. A very large number of the brilliantly marked S. American butterflies of the genera *Catagramma*, *Catonephele*, etc., and some of the more distinctive species of *Parnassius* were among the butterflies more or less noticeable. Among the moths some huge Saturniids were shown, of which it was stated that the larvæ, preserved specimens of which were in one of the cabinets, possessed poisonous hairs, and that pupation took place underground. The collection of hawk-moths, upon which the very fine monograph of the family was based, was pointed out, together with the giant "goat" moths of New Zealand and the huge group of the tropical representatives of the *Zygænidæ* of the N. Temperate Zone, viz. the *Chalcosidæ*. British species were not separately arranged, but long series of *Chrysophanus dispar*, with fine varieties and aberrations of the *Melitæas*, *Argynnids*, and *Vanessids*, including some very fine results of temperature experiments, were shown. Some of our members got a glimpse of many extreme aberrations of *Arctia caja*.

After some two hours had been thus spent, tea at the comfortable Rose and Crown Hotel, and a pleasant ride or walk to the station, concluded a very successful commencement of our season's supplementary arrangements.

APRIL 8th, 1909.

Mr. A. F. Hemming and Mrs. Hemming, of Horley, were elected members.

Mr. Edwards exhibited a species of crawfish (*Panulirus*) from British North Borneo.

Mr. Newman exhibited a living female of *Asteroscopus nubeculosa*, emerged that morning, after having been four years in the pupal stage. He also stated that the emergence of this species always takes place between nine and ten o'clock in the morning.

Mr. Main exhibited egg-cases, each containing one ovum, of a leaf insect (*Pulchiphyllium crurifolium*) received from

Ceylon. The species is parthenogenetic, a male being produced only very occasionally.

Mr. Turner exhibited a series of *Glyphodes sinuata*, a very beautiful and delicate Pyrale of the sub-family *Pyraustinae*. It came from the Ja River, Cameroons.

Mr. Robert Adkin read a short paper entitled "Notes on a Series of *Boarmia repandata*, with some Remarks upon the Variation and Distribution of the Species in Britain," and exhibited long series of the species in illustration of the paper (p. 1).

Mr. Turner read the report of the visit which the Society made to the Zoological Museum, Tring, on March 27th (see p. 72).

APRIL 22nd, 1909.

Mr. Tonge exhibited the remains of a female *Catocala fraxini*, taken on an old poplar trunk at Horsham, Sussex, September 3rd, 1908, by Mr. A. James, of Tooting, with some of the ova laid. The specimen was apparently a more than usually dark example.

Mr. West, of Ashted, exhibited living specimens of the larval stage of a stick insect (*Dixippus morosus*), and stated that it fed readily on privet.

Mr. Joy exhibited the pupa of *Cyclopides palæmon*. He stated that the larva hibernated full fed in mid October, making a tent among the grass. In the spring it emerged, wandered about, and at length pupated without feeding. He also referred to the larvæ of *Brenthis ephrosyne*, of which he had about eighty in the autumn. Of these some forty-five were alive on March 15th, but after the severe weather then experienced only twenty-five remained. These wandered, but would not feed, and eventually most of them died; only two had as yet pupated, and two others were about to do so.

Mr. Rayward exhibited the ova of *Polygonia c-album*, found wild. They were all at the tip of a leaf and on the upper surface. Only in one instance were there two ova on one leaf. Mr. Tonge showed a beautiful stereoscopic slide of the ova.

Mr. Tonge read a paper, "The Resting Attitudes of Insects," dealing chiefly with the position in which the wings of butterflies and moths are held, and illustrating his remarks with a large number of lantern-slides, many of them taken during the field meetings of the Society (see p. 5).

MAY 13th, 1909.

Mr. F. Coulsden, of Stoke Newington, was elected a member.

Mr. Ashdown exhibited a bred series of *Spilosoma mendica*, from a New Forest parent. There was considerable variation shown, one female example having the black spots increased in size and number, with a tendency to coalesce into transverse fasciæ.

Mr. Buckstone exhibited a specimen of *Bithys quercûs*, taken at Oxshott, July 24th, 1908, having a small light brown spot on the disc of each fore-wing, and referable to the var. *bella*.

Mr. Joy exhibited the living larva of *Hipparchia semele*, and pointed out how well it was protected, when not feeding, by the dry grass bases among which it rested.

Mr. Step gave a sketch of the "Flora of the Basingstoke Canal," based on his observations in the section lying between the Wey Navigation and Woking, and exhibited lantern-slides of all the characteristic local plants in illustration of his remarks, together with a number of views on the canal.

MAY 15th, 1909.

#### FIELD MEETING AT HOLMWOOD.

Conducted by W. J. KAYE, F.E.S.

The two or three members who formed the morning party had perhaps the better time, for, proceeding from Dorking by way of Bore Hill and the Redlands Wood, they were more or less sheltered from the gradually increasing cold wind which marred the possibilities of the afternoon, and no doubt prevented several from joining in the meeting.

Although a very promising country was traversed, practically nothing was obtained, and those attending welcomed the comfortable arrangements for tea at the hostelry on the Holmwood. Thence the party drove to Dorking, and caught an early train home.

MAY 27th, 1909.

Mr. Alex. Ramsey, of Kew, was elected a member.

Dr. Chapman exhibited two very extreme specimens, male and female, of the southern form of *Pararge egeria*, taken

this spring at Amelie les Bains, South France. They were rather large (48 and 50 mm.). The dark areas were reduced to lines or almost wanting, and the fulvous areas correspondingly enlarged, and much more conspicuous and vivid than is usual. For comparison, an ordinary southern form and the British dark form, *eğerides*, were also shown.

Mr. Edwards and Mr. Carr exhibited specimens of *Cucullia chamomillæ*, taken at Blackheath and Lee respectively.

Mr. Edwards also exhibited the larva of the stag-beetle (*Lucanus cervus*), found in the rotting wood of some old palings in the Shooter's Hill Road, Blackheath.

Mr. Smith exhibited a melanic specimen of *Tæniocampa pulverulenta (cruda)*, taken at Dover in April. It was referable to the var. *haggarti*.

Mr. Newman exhibited a very extreme melanic female of *Spilosoma fuliginosa*, bred this spring, from Sheffield. The whole of the wings were uniformly dark, except the inner margin of the hind-wings.

Mr. Sich exhibited a specimen of *Eupithecia castigata*?, taken flying over heath near Richmond, Surrey, on May 10th. The right fore-wing was crumpled, and both fore-wings were sparsely scaled on the upper side. There was a large basal patch normally scaled, and an outer marginal band of almost black scales; but the space between these was almost destitute of scales, and showed the venation perfectly distinctly. The insect appeared normal beneath. If the pupa could be found, the scales missing on the upper surface of the fore-wing of the moth might be seen adhering to the inner surface of the pupal wing-cases.

Mr. West (of Greenwich) exhibited specimens of *Cassida fastuosa*, taken by Mr. H. J. Turner at Box Hill in some numbers, on the leaves of *Inula conyza*. It is stated to be attached to ragwort, and also to be found on foxglove. But none were found on the former plant, and the latter, being shy of chalk, does not grow on the ground where the insect is found. He also showed specimens of the rare Coccinellid, *Halyzia 16-guttata*, taken by Mr. Ashby and himself in numbers, on birch, near Brockenhurst, in the middle of May.

Mr. Lucas read a paper entitled "The Scotch Fir (*Pinus sylvestris*)," and illustrated his notes with a large number of lantern-slides, many of them taken in localities well known to most of the members, with the addition of a few giving microscopical details by Mr. Noad Clark (see p. 9).

JUNE 10th, 1909.

Mr. W. J. KAYE, F.E.S., *Vice-president*, in the Chair.

Mr. Stanley Edwards exhibited specimens of a Centipede, *Scolopendra morsitans*, from Jamaica.

Mr. Newman exhibited imagines of *Dicranura bicuspis* from Tilgate Forest.

Mr. Main exhibited two larvæ of *Limenitis populi* from Saxony; also egg, cocoon, and young larvæ of *Hydrophilus piceus*, the great water beetle.

Mr. Rayward exhibited living larvæ of *Polytonia c-album* from the ova previously shown.

Mr. Tonge exhibited, on behalf of Mr. Grosvenor, ova of *Cyclopides palæmon (paniscus)*.

Mr. F. Noad Clark exhibited a dipteran, bred from larvæ voided by sheep in their excrement.

JUNE 19th, 1909.

REPORT OF FIELD RAMBLE—ASHTEAD TO MICKLEHAM.

Conducted by E. STEP.

A fair day in a period of wet and low temperatures redeemed the leader's promise that the 19th of June should be fine; and a good attendance of members testified to the popularity of the district. The route selected lay almost entirely over footpaths and bridle-tracks between Ashtead station and Headley Lane, a couple of hundred yards of the Epsom-Leatherhead road being the sole exception. From this point the way lay through the larch plantation of the Warren into Crampshaw Lane and the broad margin of rough land at its upper part. Here the broomrapes (*Orobanche*) were only just beginning to appear, though a specimen or two of *O. minor* was found more advanced. The Cinnabar moth (*Hippocrita jacobææ*) was abundant, though many of the specimens were faded. A few *Augiades sylvanus* and *Polyommatus icarus* were flying.

Crossing the cornfield we now reached the ancient Ermyn Way, that runs across the Downs from Epsom to Mickleham, and the rest of the afternoon was spent in traversing it. *Atropa belladonna* was found in flower, *Spiræa filipendula*

nearly out, and on Mickleham Downs we found numbers of the bird's-nest orchis (*Neottia nidus-avis*).

Among the Lepidoptera captured or noted were *Euclidia glyphica*, *Zonosoma linearia*, *Strenia clathrata*, *Melanippe montanata*, *Camptogramma bilineata*, *Dichorampha sequana*, *Venilia maculata*, *Asthena candidata*, *Eupithecia lariciata*, *Chloroclystis coronata*, *Phibalapteryx vitalbata*, *Cidaria russata*, *Mamestra dentina*, *Callophrys rubi*, *Epinephele ianira*, *Cænonympha pamphilus*; also larvæ of *Lithosia deplana*, and *Laspeyria flexula*.

A few Coleoptera were taken by sweeping, including *Dromius linearis*, *Oxyporus rufus*, *Priobium castaneum*, *Callidium alni*, *Grammoptera tabacicolor*, *Cistela murina*, *Magdalis armigera*, *Liparus coronatus*, etc.

I am indebted to Messrs. R. Adkin, W. J. Ashdown, J. H. Carpenter, and B. H. Smith for the material of these lists.

The ramble concluded at Burford Bridge Hotel, where a party of twenty-four members and friends sat down to tea.

JUNE 24th, 1909.

Mr. Edwards exhibited a fossil sponge, *Ventriculites impressus*, found in the Lias at Upminster, in Essex, and communicated the following note:

“In the white chalk of Sussex, Wiltshire, and Norfolk, *Ventriculites* occur in great numbers, *V. radiatus* being, perhaps, the commonest. This species frequently forms the nucleus of flints, the silica just covering it, and thus assuming its shape. The general shape of these *Ventriculites* is that of an old-fashioned wine-glass.”

Mr. Newman exhibited a freshly emerged living specimen of *Sesia andreniformis* from N. Kent, and a very curiously partially gynandromorphous specimen of *Saturnia carpinii*, in which the right side was normal male, the left fore-wing, top half male, and bottom half female, the left hind-wing male, splashed with a few female markings; antenna on the right side normal male, on the left halfway between male and female; the body large, but not quite so large as that of a normal female. It was bred in May, 1909, from a North Kent larva.

Mr. Smith exhibited living full-fed larvæ of *Pachnobia leucographa*.

Mr. Lucas exhibited photographs of plants observed at Ashted and Mickleham during the Society's Field Meeting

on June 19th. These included *Cephalanthera pallens*, *Orobanche minor*, and *Githago segetum*.

Mr. Green exhibited a number of specimens of *Leucania vitellina*, taken at sugar in East Kent, in October, 1907 and 1908.

Dr. Chapman exhibited specimens of the recently much-discussed species, *Pieris manni*, taken by him in the Eastern Pyrenees during the present spring.

Mr. Turner exhibited a number of figures of *Arctia caja* varieties; also the group photograph of the delegates and members of the Congress of the S.E. Union of Scientific Societies, held at Winchester.

Mr. Robert Adkin exhibited a specimen of a *Nonagria* from Sussex that had been named *edelsteni*, Tutt, and examples of the species commonly known as *N. neurica*, Hb. (*arundineta* Schmidt), for comparison. He called attention to the decided brown colour of the thoracic crest with its clear white apex of the former, as compared with the ashey-brown crest with its dark-brown apex in the latter species; also to the very distinct white dot and the two less well-defined dots on the disc of the wing, which did not appear in the specimens of *N. neurica*. He said it was well known that there had been a good deal of controversy as to whether the Sussex insect should be referred to *N. neurica*, Hub., and a new name found for the species that we had for many years known by that name, or whether the Sussex insect was a new species. From such evidence as had been adduced and from what he had been able to see of the few specimens of the Sussex insect that he had been able to examine he was inclined to follow Tutt's view, that we were right in regarding the insect that we had been accustomed to call *N. neurica* as Hubner's species, and that the Sussex insect was new to us and should be entitled to the name *edelsteni* that had been given to it.

Mr. E. Step read the following report he had prepared as one of the Delegates of the Society :

#### REPORT OF DELEGATES TO THE SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

The fourteenth annual Congress was held at Winchester on June 9th to 12th, and was attended by both your delegates. It appears to the writer of this report that the duties of a delegate to this Congress are three in number :

(1) To submit himself unreservedly to the hospitable designs of the local committee, his hosts.

(2) To pass a great number of votes of thanks.

(3) To report to his society what was done.

Having carried out the first duty with meekness and in the spirit of non-resistance, he performs the second with enthusiasm, but with No. 3 his troubles begin, for the work that is crowded into three and a half days might well occupy a week, and therefore requires a somewhat lengthy report. The hard work of the Congress is done by the officers of the Union and the local committee, but in spite of that the delegate has a strenuous time.

The President of the Congress was Dr. Dukinfield Scott, F.R.S., who is also President of the Linnean Society. The Mayor and Corporation of Winchester had placed the Guild-hall at our disposal, and the meetings were held in the great hall, the stage and galleries were transformed into the Congress museum, the banqueting chamber became the reception room, and an office was set apart for the general secretary; in addition, one delegates' meeting was held in the city court-room. The mayor and mayoress gave initial dignity to our proceedings by an official reception, and attended some of the later meetings.

In his Presidential Address Dr. Scott took as the main subject of his discourse the ancient flora of the Wealden formations, and dealt particularly with those primitive forms of seed-bearing plants most nearly represented by the Cycads of to-day, and which appear to bridge over the gulf between the Cryptogams and the Phanerogams.

At the business meeting next morning the Council, the treasurer, and the sectional committees gave an account of their varied activities since the previous Congress, which showed an increase of societies and members, a small but sufficient balance in hand, a successful autumnal meeting at Tring Museum, a Cryptogamic meeting at Tunbridge Wells, and a keen look-out for treasure-trove. These matters met with the approbation of the delegates, so that all the reports were accepted by them without amendment, and we adjourned to the great hall, where your esteemed President, Mr. Sich, read a paper on "Leaf-mining Insects," which the chairman characterised as a most delightful as well as valuable address, a verdict which was endorsed by the hearty applause of the audience, as well as by comments which reached the ears of your delegates later on. It should be satisfactory to you to know that the reputation of the South

London Entomological and Natural History Society was thus well maintained at the Congress.

Mr. J. F. Rayner, of Southampton, followed with an admirable paper on "Fungus-hunting in Hants," which one of your delegates had attempted partially to illustrate by exhibiting a large number of photographs of Hampshire fungi in the Congress museum.

In the evening we attended a pleasant conversazione in the memorial building of Winchester College, to which we had been invited by the genial headmaster, Dr. Burge, and where the well-kept natural history museum of the College was thrown open to us. Later we adjourned to the school to listen to a lecture by Mr. R. W. Hooley on "The Age of Reptiles in Hants and the Isle of Wight."

On Friday morning Messrs. Griffin and Lowne gave a lucid exposition and business-like demonstration of the art of "Plant Pressing and Mounting," which should result in a vast improvement of the herbarium specimens of botanists in the South-Eastern Union. Their specimens showed every external detail clearly, the retention of much of the colour of the flowers, and an absence of broken or crumpled leaves. They also made a strong appeal for the inclusion of seedlings on the sheets as completing the life-history and helping to elucidate plant affinities and evolution.

The Rev. G. M. A. Hewitt followed with a humorous discourse on "Local Lepidoptera," which was conceived in the spirit of Mark Twain, and evoked the admiration of the audience for the clever manner in which he all but succeeded in evading mention of the local Lepidoptera, and referred us to the published lists.

In the evening Mr. W. Dale read a paper entitled "Pre-historic Memorials of Hampshire," which was geological and anthropological, largely concerned with flint implements.

On Saturday morning we protested unanimously against the proposal of the Croydon Corporation to destroy the Whitgift Hospital in order to widen the road. The question of a meeting place for 1910 was left to the Council, several suggestions having been made, but further inquiries and negotiations were necessary before a decision could be arrived at. Sir Archibald Geikie and Mr. T. Parkin were added to the list of vice-presidents; six new members of the Council were elected; and Professor Ernest Gardner was elected as President for 1910. Mr. Gardner is Yates Professor of Archæology in the University of London, and is more widely known for his explorations in Greece and

Egypt, and for the good work done during the years he was Director of the British School of Archæology in Athens. Other officers were re-elected, and a small committee was appointed to organise the exchange of wild-flower seeds. This arose from the plant-pressing demonstration of Messrs. Griffin and Lowne, who had shown the necessity for including seedlings on the herbarium sheets.

Then followed a long series of votes of thanks to the numerous local friends who had been kind to us, and we thanked them fervently. This concluded the labours of the delegates, and the general meeting of Congress was resumed.

Mr. W. F. Gwinnell read a paper on "The Evolution of our Southern Rivers," in which he traced the history of most of our rivers and streams, from the Thames to the south coast, showing how they had fought among themselves for territory and tributaries, had shifted their courses and their water-sheds, and altered their volumes. The final paper was by Dr. Cavers, Professor of Biology at the Hartley University College, Southampton, on "Nature Study." It was a description of the methods adopted in that institution for the training of Nature-study teachers, and it struck the present writer that it would have been more fitly read before a congress of teachers.

So much for the Guildhall meetings. In addition we had a series of delightful visits, which—as might be expected from the locality—were almost exclusively of an archæological character. The "preliminary canter" on Wednesday afternoon, before the business meetings had commenced, was a visit to Winchester Castle, under the guidance of Sir William Portal. Winchester Castle has played a most important part in the making of English history, and Sir William claimed that its interest was only second—if it was second—to that of Westminster Hall. Not content with giving the delegates this treat, Mr. N. C. H. Nisbet, the architect to the Cathedral, then marched them off to the famous Hyde Abbey, and after describing it, led them to his own garden and regaled them with tea, afterwards taking them to the beautiful old Saxon church of Headbourne Worthy.

On Thursday afternoon forces were divided, and whilst one party went to inspect the wonderful work of underpinning the Cathedral and putting in new foundations, an outdoor party drove out to the chalk downs, where the veteran geologist, Mr. W. Whitaker, explained the formation of the local Devil's Punch-bowl, and a section showing

the junction of the upper and lower chalk was inspected. On Friday there were visits to the City Museum in the morning, Alderman Jacob acting as guide, and in the afternoon to the Hospice and Church of St. Cross, where some of the party claimed the wayfarer's dole of ale and bread. On the way back we paid a long visit to the ruins of Wolvesey Castle, whose history was told at length by Mr. Nisbet, and in the adjoining church-house, Mrs. Valpy, the wife of Canon Valpy, gave us tea. I regret to say that Canon Valpy, who was too ill to be present, died a few days later. Here, with the ruins as a background, the Congress photograph was taken, the Lord Bishop of Winchester joining the party. A copy is here this evening, and from it you will see that the South London Entomological Society was well represented, and in particular that your delegates were doing their duty in supporting your President. On Saturday afternoon one party went to Southampton, where Professor Hearnshaw conducted them to the places of interest in the town, and the Mayor gave them tea and exhibited the corporation regalia. Others preferred to stay in Winchester, and under the sympathetic and learned guidance of Dr. Burge, the headmaster, they explored the buildings, ancient and modern, of Winchester College, and were made acquainted with the principal features of its history, and the past and present routine of life of those who have enjoyed or are enjoying the noble foundation of the wise and far-seeing William of Wykeham.

In conclusion, it is only fair to point out to members of our Society that for a very trifling annual subscription to the S.E. Union, all the delights of this annual congress may be shared by them. Mr. Adkin is the treasurer to the Union, and will relieve you of all trouble in the matter; and next year you will receive a most attractive programme of the coming Congress, which, obeying the laws of evolution, is sure to be even better than that of which I have attempted to give you a very brief and altogether inadequate account.

Mr. J. W. Tutt read a paper entitled "The Darwin Commemoration—Thoughts—Species," being reminiscences and reveries induced by the re-perusal of some of the volumes of the "Entomologist's Weekly Intelligencer" of half a century ago (see "Ent. Record," 1909, pp. 181-4).

*JULY 8th, 1909.*

It was announced that a very complete collection of European and British butterflies had been presented to the

Society by Mrs. Freeman, of Tavistock, Devon. It was the collection of her late husband, Mr. F. F. Freeman, a Fellow of the Entomological Society, and contains much of the material collected by our member the late Mr. F. C. Lemann, F.E.S.

This collection is the only modern one of European butterflies available for reference in London. Even at South Kensington (British Museum) there is no collection of European species, apart from that representing the butterflies of the world. To the rapidly increasing band of students of the Palæarctic butterflies this collection will be of immense value.

Mr. Sperring exhibited a specimen of *Pararge megæra* taken at Street, in Somerset, in August, 1908, in which the whole of the usually fulvous area was of a pale straw-colour. He also showed five specimens of *Cænonympha pamphilus* from Porchester, showing five distinct shades of colour, from very pale, almost straw-colour, to a very dark dull brown (not red-brown). They were all taken on the same day.

Mr. Edwards exhibited a specimen of *Opsiphanes cyme* from Brazil.

Mr. Robert Adkin exhibited a series of *Odontopera bidentata* of Yorkshire origin, with regard to which he said that, in the spring of 1907 he received ova from a pairing between a black male and a black female of a brood that was wholly black; from these he reared a brood in 1908, which also was wholly black. It appeared from this that a black strain had been established from which all traces of light-coloured moths had been eliminated, it having bred true for two years at least in succession. Ova were obtained from the 1908 black moths, but instead of the brood reared in the present year from them being all black, nearly 25 per cent. of them were of the ordinary pale form. There was also some variation in the individuals, some of the black specimens showing no trace of the pale transverse line on the forewings, while in others it was present, and in one of them it was represented by a series of almost white dots; in one of the light specimens its place was taken by a row of small, white longitudinal dashes, giving the insect a rayed appearance. The series contained in addition a specimen of the black form in which the scales of a considerable portion of the wings were minus pigment.

Mr. B. Adkin exhibited a short series of very curious small specimens of *Cidaria suffumata*, received from N. Devon, showing much superficial resemblance to *Cidaria silaceata*, and contributed the following note:

"In 1908 the Rev. J. W. Metcalfe, of Ottery St. Mary, Devon, sent me a specimen of *Cidaria suffumata*, which differed considerably from the type, and bore a superficial resemblance in size and markings to those specimens of *C. silaceata* which have an unbroken brown band across the fore-wing. He informed me that the form was fairly plentiful in a wood in N. Devon, where it flew in company with the type. At my request he most kindly visited the wood again in 1909, and, notwithstanding bad weather, he succeeded in taking several specimens as well as the type, and favoured me with four more of the small form and two of the type. It is therefore proved that this form has occurred for two years and that it and the type fly at the same time. A suggested reason for the different races is a different food-plant of less succulent nature, as may be instanced by the two races of *Hypsipetes sordidata*, which feed on sallow and whortleberry respectively. Unfortunately, there seems no chance of investigating the matter further for the present, as my valued correspondent has no longer the same facilities for visiting the locality.

"The form differs from the type as follows :

"Expanse, 23-28 mm., instead of about 32 mm., as in the type.

"Shape of fore-wing less pointed.

"Inner white band of fore-wing straight and more regular.

"Hind-wings darker and almost without markings."

JULY. 10th, 1909.

#### FIELD MEETING IN COOMBE WOOD.

Conducted by PERCY RICHARDS.

About a dozen members and friends spent a very pleasant afternoon and evening in Coombe Wood, by kind permission of Sir Adolphus and Sir Augustus Fitz-George. The woodman, Mr. Todding, gave the members every facility for visiting the best places, and, in spite of the changeable weather, the list of insects annexed will show that Coombe Wood still yields some good things, the most interesting being *Capperia heterodactyla (teucris)*, which occurred in hundreds; a great many were taken. Another interesting species was *Scotosia betulata*, which occurred in some numbers round about the only buckthorn in Coombe Wood. A very

nice tea was served at the "Robin Hood" in Kingston Vale at 6.30, and, although the grass and undergrowth were soaked by the recent rain, members persevered until about 9.15, but unfortunately not much was done by dusking, except finding swarms of *Hepialus hectus* assembling.

In addition to the insects mentioned above, the following species of Lepidoptera were taken:

NOCTUÆ.—*Apamea nebulosa*.

PSEUDOBOMBYCES.—*Phalera bucephala*.

GEOMETRÆ.—*Acidalia aversata*, *Cabera pusaria*, *Strenia clathrata*, *Boarmia consortaria*, *Melanthia albicillata*, *Camptogramma bilineata*, *Ellopia prosapiaria*, *Phorodesma bajularia* (*pustulata*).

PYRALIDÆ.—*Scoparia ambigualis*, *S. mercurella*, *Ebulea verbascalis*, *Agrotera nemoralis*, *Endotricha flammealis*.

ALUCITIDES.—*Stenoptilia fusca* (*pterodactyla*), *Alucita pentadactyla*.

TORTRICES.—*Tortrix podana*, *T. forsterana*, *T. viridana*, *T. heparana*, *T. xylosteana*, *Pandemis* (*Tortrix*) *ribeana*, *Penthina pruinana*, *P. nigromaculana*, *Scricoris lacunana*, *Sciaphila subjectana*, *S. virgaureana*, *Hedya ocellana*, *H. dealbana*, *Dictyoptyryx læflingiana*, *Symæthis fabriciana* (*oxyacanthella*), *Xanthosetia hamana*, *Epiblema bilunana*.

TINEA.—*Coleophora lutipennella*, *C. ibipennella*, *Argyresthia retinella*, *A. gædartella*, *Mompha stephensi*, *Narycia monilifera*.

HEPIALIDES.—*Hepialus hectus*.

JULY 22nd, 1909.

Mr. Turner exhibited a series of *Cupido minimus*, taken on June 12th, at Winchester, where it was locally abundant. Two specimens were extremely small, measuring only 15 mm. in expanse of wing, while the largest specimen shown measured 23 mm. Mr. Sich said that he observed plenty of ova on the leaves of *Anthyllis vulneraria* in the same locality.

Mr. Kaye exhibited a growing plant of *Erica ciliaris*, which had come up by chance in peat used for orchids in a cool house.

Mr. Step exhibited *Creophilus maxillosus*, to which was attached a large number of living pupæ of the hymenopterous parasite, *Proctotrypes ater*, Nees. *Creophilus* and other beetles similar to it in their subterranean habit did not appear to be greatly subject to such attacks, but the paucity of examples might indicate either a real immunity, due to the difficulty

of depositing eggs in their tissues, or that the victims were unnoticed by those who turned up the soil. Mr. Priske said that Mr. Claude Morley had contributed a paper on the Hymenoptera parasitic upon Coleoptera to the "Proceedings of the Entomological Society of London."

Mr. Robert Adkin exhibited a series of *Endromis versicolor*, reared from Aviemore ova; the larvæ were fed up during the summer of 1908, and the imagines shown represented about half the brood; the remainder were still in pupæ, and no doubt would not emerge until the spring of 1910.

He also exhibited full-fed larvæ of *Nyssia zonaria*, reared from Wallasey ova, and stated that during their earlier stages they fed indiscriminately on leaves of rose, birch, and willow, but as soon as knotgrass was obtainable they appeared to prefer it, and, indeed, to thrive upon it. They had now, with the exception of some half-dozen individuals, all pupated. Referring to the ova, he said that he received two batches from Mr. T. A. Clarke, of Liverpool, who called his attention to their variation in colour. One batch was found wild, and was deposited under the sheath of a dead grass stem; these eggs were of a deep green colour, which hue they retained until the change to a lead colour just before hatching. The other batch was deposited in confinement, in a split sweet-pea stem; the eggs when received had been only recently deposited, and were of a pale yellow colour, but gradually became darker yellow, and until they had become almost orange, just before the final change to lead-colour, at no time did they assume a green coloration like those of the other batch. In neither case did they appear to harmonize with the substance on which they were deposited; indeed, being so completely hidden from sight it did not appear that harmonizing with their surroundings would be of any advantage to the species.

**BUTTERFLIES ATTACKED BY BIRDS.**—Mr. R. Adkin related the following incident: "While at breakfast this morning my attention was attracted by a continuous tapping on the roof of a small conservatory that adjoins my breakfast-room, and on looking out to ascertain the cause I discovered a white butterfly (*Pieris brassicæ*) fluttering along the inside of the roof, and on the outside three sparrows were fluttering about just over it, the noise being caused by their beaks beating upon the glass in a frantic but ineffectual attempt to reach their prey. They continued to follow and strike at the butterfly so long as it fluttered under the glass, but so soon as it passed under the wooden sill of the roof, and was

thus hidden from the view of the sparrows, they flew away, doubtless assuming that the butterfly had escaped. The house-sparrow is hardly to be regarded as an insectivorous bird, and it is, therefore, questionable whether the butterfly was being chased by the birds for food, but as to their persistent attack upon it there can be no doubt, whatever their motive may have been."

Several other members gave instances of Lepidoptera being attacked by birds, the swallow and starling being mentioned as well as the sparrow.

Mr. Percy Richards communicated the report of the Field Meeting held at Coombe Wood on July 10th (see p. 85).

Mr. Step read the report of the Field Meeting held at Mickleham on June 19th (see p. 77).

JULY 24th, 1909.

#### FIELD MEETING AT REIGATE.

Conductor : ALFRED SICH, F.E.S.

In spite of the uncertainty of the weather fourteen members were present, so that although the rain was more plentiful and more persistent than was desirable for entomological study, there were plenty of companions in adversity to make things as cheery as circumstances would allow. Several members took *Eubolia bipunctaria* on the chalk downs, and Mr. R. Adkin noted *Nola cucullatella* and *Tortrix podana*, sheltering from the weather on a fence. Mr. Lionel Adams, the well-known conchologist, was present as a welcome visitor, and pointed out a Holocene deposit at the foot of the downs which has yielded many interesting fossil remains of *Mollusca*. One or two specimens of *Helix pomatia* were seen enjoying the damp atmosphere. At 6.30 p.m. members found their way to Kearsley's tea-rooms, near the Market Place, where the inner man was regaled in shelter.

AUGUST 12th, 1909.

Mr. Dennis exhibited a specimen of the "Fuller's Teasel," *Dipsacus fullonum*, from Halstead, Essex. It is generally held to be a cultivated form of the wild *D. sylvestris*.

Mr. Baumann exhibited a reed containing pupæ of *Nonagria geminipuncta* from Lewes, and a species of ichneumon bred from the reeds.

Mr. Step exhibited a specimen of *Papilio machaon*, specially mounted between two pieces of glass for artistic purposes. He had exhibited this specimen in February, 1908, but when looking at it recently he found a living imago of *Tinea biselliella* enclosed with it. This was remarkable, as the case was perfectly secure, and he had noted no trace of the larva eighteen months ago. The President remarked that this moth takes a long time to develop from the ovum to the imago. Mr. Step also exhibited a number of photographs of entomological and botanical subjects, including one of the rare Deptford pink, *Dianthus armeria*, from Ash-tead.

AUGUST 26th, 1909.

Mr. South exhibited, on behalf of Mr. Esson, of Aberdeen, a noctuid moth taken in that district which appeared to conform to no species known, and was probably new to science. [Since named *Peucephila essoni*, Hampson (see "Trans. Entom. Soc. Lond.," 1909, p. 461, pl. xvi).]

Mr. South also exhibited an imago of *Aglais urticae*, the larva of which had been fed entirely on hop, and produced a normal specimen in every respect.

Dr. Chapman exhibited a most remarkable aberration of *Parasemia plantaginis* taken at Ferpècle, Val d'Hérens, Switzerland, on July 18th, 1909. It was rather large, measuring 38 mm. The black markings were reduced to little more than a few faint clouds, so that the moth had pale orange fore-wings and dark orange hind ones, and looked much closer in general aspect to *E. grammica* or *Diacrisia sanio* (*N. russula*), than to ordinary *P. plantaginis*. The specimen is now in the British Museum, South Kensington.

Mr. West (Greenwich) exhibited specimens of the homö-pteran, *Paramesus nervosus*, a local species taken by him at Gravesend among rushes.

Mr. Newman exhibited nearly full-fed larvæ of *Eupithecia extensaria* which had been reared from ova on southern-wood (*Artemisia abrotanum*).

He also showed a larva of *Stauropus fugi*, and pointed out the great resemblance between its obliquely furrowed brown body and the obliquely wrinkled dead leaf of beech.

Mr. F. Noad Clark exhibited a cluster of one of the bird's-nest fungi (*Cyathus striatus*), found in an old garden, apparently attached to rotting wooden bordering.

SEPTEMBER 4th, 1909.

FIELD MEETING AT WESTERHAM, KENT.

Conductor : HY. J. TURNER, F.E.S.

The morning threatened rain for the half dozen members who met in the train to form the early contingent of the meeting. On reaching Westerham the uncertainty became a certainty, for rain fell as the party began to get to the higher chalk hills above the village. A very pleasant, and probably a fruitful, collecting ground was reached, but collecting was quite out of the question, and after a lengthy wet ramble a return was made to the station to meet the afternoon party. About half a dozen more members came down, and the ramble was continued in another direction to the High Chart. It rained more or less at intervals, and scarcely any imagines were taken. A few larvæ were beaten out of the wet branches, and just when leaving the Chart to follow the path down through the park of Colonel Warde, a colony of the larvæ of *Eupithecia absinthiata* was discovered on an abundant growth of ragwort. A very comfortable tea finished a ramble on which the chief thing collected was water.

SEPTEMBER 9th, 1909.

Mr. Lucas made a series of exhibits, including the fresh-water sponge (*Spongilla fluviatilis*) from Oberwater, and Beau-lieu River, in the New Forest. Entomologically it is of interest as being the food of the genus *Sisyra* (of which there are three British species) of the order *Neuroptera*, whose larval life-history is so peculiar in some ways. Coloured photographs of the fungi, *Polyporus cuticularis*, on ash, and *Polyporus rufescens*, on heather, both from the New Forest, August, 1909; *Cordyceps ophioglossoides*, an uncommon fungus, one of the *Pyrenomycetes*, growing parasitically on the subterranean fungus, *Elaphomyces granulatus*, found at Esher, September 9th, 1909.

Mr. Main exhibited specimens of living cockroaches, which had just been discovered in the packing of sugar received from Java. The species was subsequently ascertained to be *Nauphata circumvagans*.

Mr. Sperring exhibited four specimens of *Arctia caia*, and contributed the following note :

“An experiment made with fourteen larvæ of *Arctia caia* to note what effect would be caused by the constant variation of the food-plant has shown, in this particular instance, that such of the pupæ as emerged successfully produced equal numbers of dark and light specimens, none of which can be said to be true to type. Of course, the number experimented with is far too small to obtain any sufficiently valuable evidence fit for recording at the present time, but experiments to be made on a larger scale will probably throw more light on the subject, and lead to more conclusive evidence.

“The larvæ in question were fed successively on dandelion, chickweed, hawthorn, plantain, nettle, lettuce, etc., the food-plant being changed every day. Of the fourteen larvæ in question, one died, six emerged successfully, the remaining seven failing to emerge from the pupæ, although on opening the same they were found to be perfect.

“*Specimen No. 1.*—Fore-wings light; hind-wings brick-red suffused with yellow. The dark spots are on yellow ground, and on the outer margin of the wings there are four instead of three spots.

“*Specimen No. 2.*—Fore-wings light, but with a dusky appearance; hind-wings orange; right pair of wings smaller than the left.

“*Specimen No. 3.*—Fore-wings dark; hind-wings deep salmon, the outer spots having a tendency to join together to form a band. Antennæ tipped with black; the fringes of the hind-wings blackened at different portions, and the right pair of wings *very much smaller* than the left.

“*Specimen No. 4.*—Fore-wings dark and suffused with a dusky appearance, but not so much as No. 2; the hind-wings deep brick-red, their fringes slightly blackened at different portions, but less than No. 3. Antennæ black for half the length, and the right pair of wings slightly smaller than the left.”

Mr. Turner exhibited a short series of *Rumicia phlæas* from Brasted, taken on August 28th, including a very fine example of the white aberration, var. *alba* (*schmidtii*, of authors), and pointed out that it had been shown that the true *schmidtii*, Gerh., was the pale straw or cream-coloured form. He also showed a very variable series of the beautiful Anthrocerid, *A. carniolica*, taken from a field near Gex, at the foot of the Faucille Pass, S. Juras, in company with *A. filipendulæ*, *A. achilleæ*, *Leptidia sinapis*, *Issoria lathonia*, *Argynnis aglaia*, *A. paphia*, etc., on August 11th, 1909. They were brought

to England alive, two or three in a box, and travelled extremely well.

Mr. J. P. Barrett exhibited a number of species which he had recently taken in the same restricted area as he had taken them in 1859 (fifty years ago), including *Lithosia deplana*, *Hepialus vellela*, *Aventia flexula*, *Boarmia abietaria*, and *Botys hyalinalis*. The locality was within twenty miles of London. He also showed three other species, which he had not seen there in the days of his early collecting, viz. *Argynnis adippe*, *A. aglaia*, and *Rivula sericealis*.

Mr. Goffe exhibited two colour forms of *Agriades bellargus*, a green male, and a mauve male, together with a dwarf female. The last measured only 22 mm. in expanse. They were taken at Steyning, in North Devonshire. He also exhibited a very small example of *Euchloë cardamines*, 28.5 mm. in expanse.

Mr. Prall exhibited a specimen of *Agriades coridon*, taken on Wimbledon Common this year. Mr. Goffe said that an example of this species was taken there some years ago. Mr. Gibbs reported that he had met with the species sparingly near St. Albans, at a considerable distance from the chalk-formation.

Mr. H. Moore exhibited twigs of the elm (*Ulmus suberosa*), on which were the fig-like galls caused by the Aphis, *Schizoneura lanuginosa* (Hartg.); recently collected at Larkfield, Kent. In addition to the aphides, each gall was tenanted by a wood-louse.

Mr. Sich read a report of the Field Meeting conducted by him to Reigate on July 24th (see p. 88).

Mr. Main read a paper on "Fruits," and illustrated it with a number of lantern-slides and preserved specimens (see p. 14).

SEPTEMBER 23rd, 1909.

Mr. Tonge exhibited stereographs of the ova of *Nonagria edelsteni* and of *Celastrina argiolus*.

Mr. Sperring exhibited the curious variety of *Abraxas grossulariata* figured and described in the "Ent. Record," vol. xxi, p. 197. "No yellow appears on the wings, and the pattern of the fore-wings is not symmetrical. The fore-wings are much more suffused than is usual, even in dark aberrations taken in the London district." It was captured in a garden at Charlton by Mr. Coppeard in the third week in July.

Mr. Dennis exhibited a branch of juniper, *Juniperus communis*, from Llanberis. It was of the mountain form known as var. *nana*, dwarf and recumbent in habit owing to the constant exposure to the violence of the wind. Mr. Step called attention to the fact that he had last year noted the same dwarf and recumbent habit in numerous shrubs and herbaceous plants growing on the open and exposed Dungeness peninsula. The same thing occurred in the case of furze on exposed headlands, but in this form of juniper the dwarfing produced a shortening and broadening of the leaves, which overlapped one another, and gave a yew-like character to the branches.

Mr. H. Moore exhibited several species of the genus *Heliconius* belonging to the tawny *Melinæa*-like group, including *H. ithaca* (Feld.), *H. aerotoma* (Feld.), *H. messene* (Feld.), and *H. anderida* (Hew).

Mr. Newman exhibited a very fine bred series of numerous species, including a yellow aberration of *Callimorpha dominula*, bred, from Kingsdown. Concerning the last, he mentioned that whereas last year he bred 25 per cent. of the yellow form, this year only 12½ per cent. had been produced.

Mr. West, of Ashtead, exhibited a bunch of filberts from his garden, which had been attacked in a curious manner and the kernels abstracted. It was suggested that possibly the attack had been made by a crossbill, these birds having been reported as already common in parts of Sussex, Surrey, and Hants. The holes had rough torn edges, and were certainly not the work of nuthatches or dormice.

Mr. Barrett exhibited the imagines he had bred from a species of processionary larva occurring commonly in Sicily, and making its nest among the topmost branches of the pine trees. It was afterwards ascertained to be *Cnethocampa pityocampa*. He also exhibited a number of species he had bred and taken from his garden in Brockley.

Mr. Prall exhibited dwarf specimens of *Agriades thetis* (*bellargus*) and *Polyommatus icarus*, the former 26 mm., and the latter 22 mm. in expanse. He also exhibited unusually large specimens of *Vanessa atalanta* and *Celastrina argiolus*, the former 46 mm. and the latter 32 mm. in expanse.

Mr. Joy exhibited a short series of *Cyclopides palamon*, bred from ova, originally from Lincolnshire. He also showed the hibernaculum in which the larva passes the winter.

Mr. Brown exhibited a curious form of *Cymatophora fluctuosa*, in which the basal area was very dark, the apical area white, and having a narrow white band.

Mr. Carr exhibited examples of *C. fluctuosa*, *C. duplaris*, and *Boarmia repandata*, with nice var. *conversaria* forms, all from the Wye Valley; he also showed the latter form from the New Forest, and stated that he had never obtained the dark form of this species in the latter locality.

Mr. Cowham exhibited a white specimen of *Rumia cratægata*.

Mr. Step exhibited on behalf of Mr. W. J. Lucas a specimen of the rare fungus, *Cordyceps ophioglossoides*, and its host, *Elaphomyces granulatus*, from Oxshott, and pointed out that the *Cordyceps* is a member of a genus that is specially interesting to entomologists, from the fact that several British species are known to attack Lepidopterous pupæ underground, whilst a New Zealand species produces the well-known phenomenon called the vegetable caterpillar. *C. ophioglossoides* attacks the little-known hart-truffle (*Elaphomyces granulatus*), a subterranean fungus that under the doctrine of signatures had formerly a reputation as an aphrodisiac in rustic medicine. He also showed the fungus *Rhizina inflata*, one of the *Discomycetes*, which Mr. Lucas had found on burnt ground near the Black Pond. Like *Elaphomyces*, it is parasitic on the roots of young conifers, and so destroys great numbers of seedling pines. It is very abundant this season in the pine woods on Ockham Common.

Mr. Alfred Sich exhibited specimens of *Colcophora chalcogrammella*, and read the following note:

“ I exhibit two specimens, male and female, taken *in copula* at Richmond, Surrey, on August 14th, 1909. The female laid a few eggs, and I have now five larvæ feeding. For the first few days of their existence they mined the leaves, but have now cut out minute cases. This species was first described by Zeller in 1839, but not taken in Britain till 1857, when Mr. T. Wilkinson discovered the larvæ near Scarborough. I believe the species has not been taken previously so far south in England.”

Mr. Turner read a paper entitled “ Our Authorities,” Part II, and exhibited a number of volumes of the works referred to by him (see p. 21).

OCTOBER 9th, 1909.

THE ANNUAL CRYPTOGAMIC MEETING.

Conductor : E. STEP, F.L.S.

Fine weather, following an unpromising week, again rewarded those members and friends who assembled, to the

number of twenty-five, at Oxshott on October 9th. A small party went down in the morning, and mainly devoted attention to that portion of Oxshott Heath lying to the east of the Esher Road. The afternoon researches took place to the west of that thoroughfare.

Thanks to the abundant rains and mild nights there was no lack of fungi, although but few species were added to the lists compiled at similar meetings in previous years. The find of the day fell to a visitor, Dr. Somerville Hastings, in the shape of *Nyctalis parasitica* on a decaying specimen of *Russula adusta*. A little later the same gentleman found *Cordyceps militaris* growing from a buried pupa of some noctuid moth. Mr. Lucas directed us to a mossy bank where he had previously found *Hydnum zonatum*, and where there were still a number of specimens in excellent condition.

*Collybia maculata* was, of course, in great abundance; also *Amanita rubescens*, though its congener, *A. muscarius*, was not nearly so plentiful as usual. Among other species noted were *Amanita virosa*, *Lycoperdon perlatum*, *Tremellodon gelatinosum*, *Sparassis crispa*, *Clavaria fusiformis*, *C. argillacea*, *Thelephora laciniata*, *Polystictus perennis*, *P. abietinus*, *Polyporus schweinitzii*, *P. adiposus*, *Boletus luteus*, *B. elegans*, *B. variegatus*, *B. piperatus*, *B. bovinus*, *B. scaber*, *Cantharellus cibarius*, *Lactarius turpis* (abundant), *L. quietus*, *L. cismicarius*, *Russula nigricans*, *R. emetica*, *R. alutacea*, *Hypholoma appendiculata*, *Cortinarius sanguineus*, *C. cinnamomeus*, *C. collinitis*, *C. malachius*, *Pholiota aurea*, etc.

Entomology was not forgotten, and a few moths and beetles were collected, of which lists have not been received, but we are indebted to Mr. South for the following notes of larvæ he obtained by searching the trees, etc.: *Lophopteryx camelina* (1), *Notodonta ziczac* (1), *N. dromedarius* (1), *Drepana falcataria* (several), *D. lacertinaria* (several), *Gonodontis bidentata* (2), *Bupalus piniaria* (not uncommon), *Cabera pusaria* (several, say 20), *C. exanthemata* (2 or 3), *Ephyra pendularia* (1), *Peronea hastiana* (2), *Swammerdamia heroldella*, Hübn. = *griseocapitella*, Sta. (2).

The usual tea, to which twenty-three sat down, brought a pleasant meeting to a close.

OCTOBER 14th, 1909.

Mr. F. Noad Clark exhibited specimens of various species of British "Ticks" in illustration of his paper.

Mr. H. Moore exhibited specimens of non-British species of "Ticks."

Mr. West (Ashtead) exhibited a specimen of *Vanessa io*, in which the wings on the right-hand side were noticeably smaller than those on the left. It was from Ashtead.

Mr. Tonge exhibited a tuft of the so-called "flowering lichen," *Usnea florida*, from the New Forest. These "flowers" are the sporophores, and are produced only towards the tops of the trees affected by this species of lichen. He also showed a fine series of *Sesia apiformis* obtained in Suffolk.

Dr. Hodgson exhibited short series of *Cyclopides palamon* and *Urbicola comma*, commenting on the minor variations shown, and directing attention to the dark cilia of the forewings in the latter species.

Mr. Robert Adkin exhibited ova of *Agriades thetis* (*Lycæna bellargus*), *in situ* on the undersides of leaves of *Hippocrepis comosa*, which he had seen deposited by a wild female, and read the following notes on the egg-laying of the species :

"On the morning of September 27th the sun was shining, but not brightly, owing to a haze in the air, and there was practically no wind, a combination of circumstances that I have sometimes found particularly suitable for observing the habits of butterflies. As I wandered on the lower parts of the Downs, near Eastbourne, I noticed a female *Agriades thetis* feeding upon a flower-head of knapweed (*Centaurea nigra*). As she persisted in following that occupation for some considerable time, I came to the conclusion that it was probably the precursor to egg-laying, and in this I was not mistaken. Having finished her meal, she flew some distance up the bank, which was very steep just at the spot, and then commenced to flit slowly over the herbage, apparently examining it carefully as she went, and eventually settled down upon a small, isolated plant of *Hippocrepis comosa*. I scrambled up the bank after her as quickly as I could, but on coming up with her she was getting on the move again; I therefore marked the spot and followed her, but on returning to it later I was unable to identify the particular plant on which she had rested or to find the egg, although I am convinced that one had been deposited. She was now flying in a more leisurely manner, carefully examining the herbage as she went, and I was consequently able the better to keep up with her; and soon she selected another plant of *Hippocrepis* and rested upon it. I was sufficiently near to see her protrude her abdomen, curve it slightly, and apparently deposit an egg on the underside of

a tiny leaf. I was determined to know the plant again, and so marked it by dropping my tobacco-pouch upon it, and on returning to it later had no difficulty in finding the egg in exactly the position where I had suspected it had been deposited. Again she flitted on, this time only a yard or two, when she found another little plant of *Hippocrepis*, growing on an almost perpendicular part of the bank, and rested upon it. So intent was she upon her business that I was able to take up a position within some eighteen inches of her without in the least disturbing her, and to put on some fairly powerful spectacles. I then saw her protrude her abdomen to its fullest extent, curve it slightly under one of the leaflets near the centre of the plant, and the terminal segments of her body work violently as the egg was extruded. She then flew on, and I plucked the plant, when I found two eggs side by side, but separated from each other, on the underside of the leaf, one of which must have been laid directly she settled on the plant and while I was getting into position for observation. It is, perhaps, needless to add that while I was making sure of the egg I lost sight of the butterfly. One other circumstance I should, perhaps, mention, although it may have been a mere accident: on examining the plant on which these last two eggs were laid I found a couple of small, brown ants running about, waving their antennæ, apparently in a state of great excitement, and it was with some difficulty that I drove them off; but whether the excitement was caused by the visit of the butterfly or by my plucking the plant I have no means of telling."

Mr. R. Adkin also exhibited living larvæ and pupæ of *Celastrina (Cyaniris) argiolus*, recently collected from flower-buds of ivy at Eastbourne, and called attention to the change of colour of the larva from green to deep pink that takes place shortly before fixing itself up for pupation (see "Proceedings," 1896, pp. 110-116, for further notes on life-history). In addition he showed living larvæ, pupæ, and cocoons of *Nola albulalis*, reared from ova obtained in East Sussex.

Mr. Tonge exhibited stereographs of the ova of *Agriades thetis (bellargus)* shown by Mr. Adkin.

Mr. West (Greenwich) exhibited four species of *Apion* recently collected at Deal—*A. curtisi*, *A. lavicolle*, *A. urticarium*, and *A. pomonæ*.

Mr. Joy exhibited bred specimens of *Dryas paphia* var. *valezina*, and stated that of 77 bred this year from ova obtained from a New Forest female (male unknown), 41

were typical males, 23 were typical females, and 13 were var. *valezina*. He did not succeed in obtaining a pairing among the specimens which were produced.

Mr. Step exhibited a specimen of the fungus, *Russula adusta*, on the pileus of which was growing a cluster of the rare *Nyctalis parasitica*. This was the specimen found by Dr. Hastings at the Cryptogamic meeting.

Mr. H. Moore exhibited a specimen of *Spilosoma lubricipeda* taken by him in Deptford on September 18th, possibly an example of a second brood. He also exhibited *Heliconius telesiphe* and *Colanis telesiphe*, also *Victorina stencles* and *Colanis dido*, all from S. America, as examples of convergent or Müllerian mimicry.

Mr. F. Noad-Clark read a paper entitled "A Few Stray Notes on Ticks," illustrating his remarks with a large number of lantern-slides (see p. 29).

OCTOBER 28th, 1909.

Mr. Percy Bright, of Bournemouth, and Mr. G. Bowen, B.A., of Kingston-on-Thames, were elected members.

Mr. South exhibited a series of *Hylophila prasinana*, bred, from Scarborough, and remarked on the unusual amount of brilliant red colour developed in some of the specimens.

Mr. West, of Greenwich, exhibited specimens of the Homopteron, *Idiocerus aurentulus*, from Blackheath, and stated that it had only once previously been taken in this country, and that was in Norfolk some twenty years ago, by Mr. J. Edwards, of Colesbourne.

Mr. Newman exhibited a series of *Agrotis cinerca* from Kent, Lewes, and Brighton, and pointed out the considerable difference in size between the Kentish race and the races taken in Sussex, the latter being much the smaller.

Mr. Step exhibited living examples of the freshwater mollusc, *Aplecta hypnorum*, from Ockham, Surrey, and remarked that he had exhibited specimens from the same pond sixteen or seventeen years previously, but the species was still indicated in the "Conchological Society's Census" as absent from the county. On several occasions in the interval he had sought for it in the same pond without success, but on the 23rd of the present month he dipped in his hand out of curiosity in passing and found the species so abundant that three or four dips yielded more than thirty examples of the snail. During the present summer it had been recorded by Mr. A. W. Stelfox near Tooting.

Mr. Robert Adkin exhibited a female specimen of *Ocneria dispar*, taken at rest on the trunk of an elm tree at Eastbourne, and gave the following account of its capture :

“ During the greater part of the past summer I was staying in Eastbourne, and on the evening of August 30th, when on my way home from the train, I noticed a large moth resting on the stem of one of the elm trees, with which the road, along which I was walking, was bordered. At the moment I felt some uncertainty as to what species it was referable ; it certainly looked like *Ocneria dispar*, but the situation appeared to be so unlikely for that species, and it looked so much larger than any specimens that I had seen, that I thought it must be some other species with which I was not familiar. However, I had a large pill-box with me, into which I had no difficulty in getting it, as it was in a very sleepy condition ; and on reaching home and making a thorough examination of it there was no doubt that it was referable to *O. dispar*. For several days it was kept alive in the hope that it might deposit some ova, but as it showed no signs of returning activity it was killed. The capture seems to be so unusual that I should like to make a few remarks upon it. It must now be considerably more than fifty years since *Ocneria dispar* was recorded as breeding wild in this country ; during that time at rare intervals odd specimens have been found, usually under circumstances that pointed to the conclusion that they were either escapes from the large numbers that have been continuously reared in confinement, or that they resulted from attempts that had been made to re-introduce the species ; and I am not aware of any special circumstances that would refute such conclusions in those cases. In the present instance there are some points that do not appear to be quite on all fours with them. First as to locality : Although the spot where the moth was taken is now laid out in roads bordered by houses, many of them with large gardens around them, it is really a lower slope of the chalk downs, a most unlikely spot for the species to select as a natural breeding-place, or for it to be put down by anyone with a view to its re-introduction. Then as to its size : the largest bred specimen I possess measures 63 mm. in expanse, and the larger of two that I have from the late J. Jenner Weir’s collection (said to be the ‘ old fen form ’) 67 mm., while of some half dozen of our more recent authors that I have consulted none gives the maximum size of the species as more than 67 mm., whereas this Eastbourne specimen measures just 74 mm. in expanse.

Then, again, the colour of this specimen is of a more smoky-grey tone than is usual, suggesting the possibility of its being a good deal worn, although the borders of the wings appear to be perfect. We have no knowledge, so far as I am aware, that this species is given to migration, but all circumstances considered, I am more inclined to accept that as an explanation of the specimen being found in the position where it was taken, than that it had bred wild in the neighbourhood, or had been reared in captivity and turned out. It would, however, be interesting to know whether anyone had liberated specimens near the place and time of the capture."

Mr. Adkin also exhibited specimens of *Scopula decrepitalis*, taken near Rannoch in June last.

Mr. A. W. Buckstone exhibited a lichen (*Evernia prunastri*) from Salisbury Plain. It was found growing on larch, of which there was a plantation of about an acre in extent, said to have been planted twelve years ago. Every tree appeared to be more or less covered with the lichen, and about a third of their number had died, the remainder having only the topmost branches showing green foliage. Mr. Step remarked that the lichen was not a parasite, nor was it presumably the cause of the death of the trees.

Mr. Buckstone also wished to place on record the finding of *Noctua xanthographa*, male, and *Luperina testacea*, female, in *cóp.*, at Richmond Park on September 27th, 1909. They remained paired for four days, when they were forcibly parted. *L. testacea* died within twelve hours without having deposited ova.

Mr. Sich exhibited on behalf of Mr. E. D. Green, who was unable to be present, six specimens of *Depressaria putridella*, Schiff., a species which is new to Britain. Mr. Green discovered this pretty addition to our fauna in 1906, at Whitstable. One specimen was known to the Vienna entomologists in 1776, and another was taken by Mann near that town some time previous to 1854. About 1865 the larvæ were discovered at Regensburg and afterwards in other parts of Germany, and also near Paris and in the South of France. This species has probably long been an inhabitant of Britain, but from its retiring habits has been overlooked. The early British writers mention a *putridella*, but their descriptions show their insect to have been a form of *D. yeatiana*. By his discovery Mr. Green has earned our congratulations. (See "Ent. Record," vol. xxi, p. 221, pl. xv.)

Mr. Step communicated the report of the Field Meeting held at Oxshott on October 9th (see p. 94).

Mr. R. Adkin read the report of the meeting of the delegates of societies affiliated to the British Association (see below).

Mr. Andrews read a paper on "Diptera" (see p. 34).

## BRITISH ASSOCIATION.

### CONFERENCE OF DELEGATES OF CORRESPONDING SOCIETIES.

*Reported by* ROBERT ADKIN, *October 28th, 1909.*

In accordance with the instructions of your Council, I attended the Conference of Delegates of Corresponding Societies of the British Association at Burlington House, on Monday and Tuesday, October 25th and 26th.

Upwards of forty delegates, representing societies in various parts of the country, even from so far away as Cornwall, attended.

At the commencement of the proceedings Professor A. C. Haddon, D.Sc., F.R.S., the chairman of the Conference, delivered an address to the delegates. He took for his subject "Original Surveys," work which he explained could be well undertaken by local societies. What is wanted, he suggested, is close study of limited areas, not necessarily a county, but any well-defined area; it might be a river-valley, a range of hills, a parish, or several counties. The size of the area is immaterial, so long as its boundaries are well defined. Whatever district is selected should be considered from all points of view, not merely from that of the zoologist, or the geologist, or the archæologist, and so forth, but as a whole; and the work of sectional recorders should be brought together, and the bearing of the results of the researches of the one upon that of the other carefully worked out. The photographer, he said, could be of the utmost assistance to one and all of them. Incidentally, he referred to the difficulty experienced by many local societies in interesting the majority of their members in the work that they are endeavouring to carry out. Naturalists, he said, are so because they are so born, but many others who would be willing workers are of little practical value to their societies because they do not know just what to do. It should be the desire of the councils of the societies to interest such members, when it will often be found that they are soon to

be numbered among the most useful. He also touched upon the question of the amateur, whose work, he said, was often of the utmost assistance, as he could undertake an amount of detail that was of the greatest importance, but to which the specialist could not afford to give the necessary attention. It was, however, desirable that such work should be undertaken with a definite object.

The address was followed by a paper on "National Anthropometry: its Objects, Methods, and Local Organization," by Mr. J. Gray, B.Sc., who gave a demonstration of the methods of measurement, the subjects being several of the delegates present. The paper was illustrated by a number of lantern-slides, and a discussion followed.

On Tuesday morning the business was "The Question of a Publication Fund to Aid Scientific Societies in Publishing Original Work." The subject was introduced by Professor R. Meldola, F.R.S., who explained that the present question was raised as the outcome of an application by the British Science Guild to the Postmaster-General to allow scientific papers, such as the publications of scientific societies, to pass through the post at a special rate. He mentioned that newspapers, which were largely advertisements, received very exceptional treatment as to postal facilities, whereas the publications of scientific societies received no consideration whatever, and as a consequence the cost of distribution of their publications was a very heavy tax upon their funds. The Postmaster-General was sympathetic, but said his Department could not deal with the matter. The question was, therefore, whether the Government could not be approached in some other way, with a view to gaining some assistance for scientific societies in the publication of important original papers.

Mr. John Hopkinson, F.G.S., followed, with a paper on "The Financial Position of our Local Societies." He said that he had taken at random the balance-sheets of some dozen affiliated societies, and found that in the majority of them there were either adverse balances or nearly so, and that in all cases the cause appeared to be the production of their publications. He gave details of the working of the Hertfordshire Natural History Society, and referred to the hard struggle they had to publish the "Flora of Hertfordshire," and the annual rainfall tables, this latter work being of such importance that it had been consulted by many public bodies, and even by Government itself. He thought that societies which were doing work of such importance

should not be left to impoverish their funds by their publications.

The discussion was opened by Sir Alexander Pedler, a member of the Committee who had the matter in hand, and in the course of his remarks he mentioned that in the case of one of the larger societies the cost of distribution of their publications was practically five hundred pounds per annum.

Dr. Scott, of the Chemical Society, followed, and dwelt upon the heavy strain that their publications, which could not be discontinued without permanent injury to the cause of science, were upon their finances.

The representative of the Royal Astronomical Society doubted whether a large grant might not militate against the work of the amateur, who, he contended, had done and was doing so much good and useful work. The representative of the Zoological Society feared that such a grant might lead to the undue multiplication of publications. The Rev. T. R. R. Stebbing, a member of the Committee, thought the Congress should have further details as to how the grant, if obtained, would be applied; and the representative of the Institute of Mining Engineers illustrated the difficulties attending the administration of Government grants.

Mr. W. Whitaker, F.R.S., a member of the Committee, desired to make it plain that the grant was not wanted to help insolvent local societies, but solely to assist in the publication of very important and expensive original papers.

The discussion was continued by representatives of the Manchester Geological and Mining Institute, the Manchester Geographical Society, the Ipswich Field Club, the Catford and District Natural History Society, the Manchester Microscopical Society, the Norfolk and Norwich Natural History Society, and others, many giving pertinent details of the difficulty experienced in publishing and distributing their papers and periodicals.

Dr. Longstaff, Entomological Society of London, desired to get the feeling of the meeting, and with this object proposed a resolution to the effect that it was hoped that the British Science Guild would continue their efforts to induce the Postmaster-General to treat the publications of scientific societies on the same terms as newspapers. The Rev. T. R. R. Stebbing seconded, and the resolution was carried by a small majority.

After some further discussion the Rev. Canon Bevan, member of Committee, moved a resolution to the effect that

Government be asked to increase the grant at present made to the Royal Society, and that the Royal Society be asked to administer it. This was duly seconded and discussed at some length, when Prof. Meldola proposed as an amendment that, in view of the opinions expressed during the meeting, the matter be referred back to the Corresponding Societies Committee. This was seconded in due form, and the amendment carried with but one or two dissentients.

This concluded the business of the Congress, and a vote of thanks to the Chairman, having been moved and seconded, was carried by acclamation, and the delegates separated.

NOVEMBER 11th, 1909.

Mr. Ashdown exhibited examples of the species of Lepidoptera taken by him during July in Switzerland, including *Euvanessa antiopa*, *Loweia alciphron*, var. *gordius*, *L. dorilis*, var. *montana*, *Cupido sebrus*, *Polyommatus melceger*, *P. hylas*, *P. icarus*, ab. *icarinus*, *Aricia astrarche*, var. *allous*, *Melitæa dictynna*, *Erebia stygne*, *Thecla spini*, *Papilio podalirius*, *Syntomis phegea*, *Anthocera carniolica*, *A. ephialtes*, *Lasiocampa pini*, *Setina aurita*, etc.

Mr. West (Greenwich) exhibited the very rare Homopteron, *Ulopa trivialis*, taken by him at Chipstead among grass; also, from the tamarisk at Deal, *Limotettix stactogala*, a very rare species.

Mr. Barrett exhibited specimens of *Nonagria arundineta* and its allies, and reported that the imagines of *Hybernia defoliaria* were this year in considerable abundance in the north of Surrey.

Dr. Chapman exhibited a living specimen of *Agriades thetis* (*bellargus*), second brood.

Mr. Step exhibited a group of the Discomycetous fungus, *Humaria violacea*, from Highbeech, showing the progressive stages from its first appearance to full expansion. Also two species of Myxogastres—*Lycogala epidendrum* from Oxshott, and *Arcyria clavata* from Highbeech. A fourth exhibit was *Corticium lacteum*, a resupinate species growing closely attached to laburnum bark, from Ashtead.

Mr. Andrews exhibited examples of British *Syrphida*, showing (in accordance with A. H. Thayer's theories) how the position of the darkened portion of the wing, in correlation with the light-coloured area at the base of the abdomen, helps to "break up" the general appearance of the insects when at rest.

Mr. Robert Adkin read a short paper on the earlier stages of *Nola albulalis*, which he illustrated by lantern-slides of the ovum and larva (see p. 41, Pl. XI, XII).

Mr. J. W. Kaye exhibited a series of *Spilosoma menthastri* from various British localities, those from Elgin being very darkly suffused. Some examples had only very fine dots instead of spots, while others had large, prominent, and abundant spots. One specimen had the outer marginal half of all the wings devoid of markings. The ground colour varied from white through pale buff to dark suffused.

Dr. Hodgson exhibited a specimen of *Agriades corydon*, taken at Dover on September 12th, 1909, which had white wedges on the hind-wing replacing the underside ring-spots, running from the margin to the level of the discoidal cell. The insect was also abnormal in the partial obsolescence of the eye-spots, and in the right side being slightly smaller than the left. He also showed specimens of an aberration of *A. thetis* (*bellargus*), exhibiting more or less approach to complete obsolescence of eye-spots, and two specimens having the discoidals absent from all four wings, all from Folkestone.

Mr. Newman exhibited living larvæ of *Pyrameis atalanta*, nearly full fed; they were from ova laid in June.

The following gentlemen exhibited lantern-slides:

Mr. West (Ashtead), a long series of micro-fungi.

Mr. Main, various pond animals, life-history of *Chrysopa* and *Eristalis*.

Mr. Adkin, details of life-history of *Nola albulalis*.

Mr. Tonge, many examples of insects in their resting positions.

Mr. Dennis, a long series of mosses and lichens, many from Wales.

Mr. Lucas, various botanical subjects.

NOVEMBER 25th, 1909.

#### ANNUAL EXHIBITION OF VARIETIES.

Nearly a hundred members and their friends were present, about forty of whom brought exhibits.

Mr. Robert Adkin exhibited a long series of *Amphidasys betularia*, reared from ova obtained from a pair taken *in cop.* at Lewisham on June 3rd, 1908. The male parent was of the black form = var. *doubledayaria*, the female rather a

darkly speckled form. The progeny consisted of 64 males, of which 26 were of the *doubledayaria* form, 20 resembled the female parent, and 18 were lighter; and 89 females, of which there were 44 var. *doubledayaria*, 22 dark speckled forms, and 23 lighter. Thus, in the whole brood 45·75 per cent. resembled the male parent, 27·45 per cent. resembled the female parent, and 26·8 per cent. were practically typical *A. betularia*, and much lighter than either parent.

Mr. Adkin also exhibited a variety of *Abraxas grossulariata*, in which the fore-wings were practically all black to beyond the yellow line, which was indicated by a small elongated spot on the inner margin; one from which the yellow line was absent, both reared from wild larvæ; and a richly coloured specimen of the var. *lacticolor* obtained by interbreeding.

Mr. R. South exhibited a series of aberrations of *Polyommatus (Lycæna) icarus*, female, from the North Downs (June, 1909). The sixteen female specimens of *P. icarus* exhibited had been selected from about twice that number of examples that were retained after examination in the field.

The species was fairly plentiful at Oxted and Chipstead in the early summer of the present year, and as the days in June convenient for a visit to one or other of the localities named were always dull, sometimes wet, the butterflies were easily overhauled as they rested on grass-stems or among the herbage.

In making captures for the series the idea was to select only more or less blue-coloured females that showed either well-developed orange markings, or with such markings almost or entirely absent. Not a single specimen could be found that was wholly free of orange lunules or spots; one or two, however, came near requirements in this direction. Specimens with conspicuous orange markings were not frequent, but four examples were secured that had these markings well developed.

By far the larger number of specimens inspected were brown, with more or less of the basal area of each wing blue in colour or sprinkled with blue scales. Only one example without some trace of blue was noted, and this specimen was annexed because the hind marginal marks on the left fore-wing were pale ochreous, instead of orange as on the other three wings.

Perhaps the most uncommon aberration in the series is No. 8. This is of a greyish-blue coloration. The fore-wings have four orange lunules inwardly edged with black, the

first of the series being very small; above the lunules the internervular spaces are clouded with greyish white; the outer marginal area is limited by an irregular greyish-white line. On the outer marginal area of the hind-wings, limited by a greyish-white serrated line, there are four orange lunules, as on fore-wings, and a series of black dots; the latter are almost entirely encircled with greyish white.

Strikingly in contrast with No. 8 is No. 3. This specimen is almost black in appearance; the basal half of each wing is thickly sprinkled with deep-blue scales, and there are a few orange outer marginal lunules; the black marginal spots are large, and are encircled with blue, except those under the orange lunules. No. 2 is, in a way, somewhat similar to No. 3, but here the blue colour on the fore-wings is continued along the nervules, and so cuts up the blackish ground-colour into wedge-shaped patches. In the almost wholly blue-coloured specimen—No. 7—there are blackish, cuneiform patches between the nervules on the hind-wings, and on the fore-wings the black edges of the rather obscure orange marks are slightly produced inwards, and therefore wedge-like in shape.

The other specimens have each some aberrant character in colour, or marking, or both, individualizing it from others in the series, but these do not admit of brief description.

*Luperina testacea*, Hübn., and *nickerlii*, Freyer (1848): A male specimen of *nickerlii*, obtained through Messrs. Watkins and Doncaster. This, together with another male and a female sent to Mr. Pierce, were from an old collection in Vienna, and were taken by Herr Nickerl, in the neighbourhood of Prague, about fifty years ago. A female specimen received from Hermann Rolle, of Berlin: This example, and also a male sent with it, but now with Mr. Pierce, are from Bohemia, but are paler in colour than the Prague specimens. Mr. Pierce, having made careful preparations of the genitalia, finds that *nickerlii* differs very little from *testacea*, but he is of opinion that for the present "we must continue to treat *L. nickerlii* as a separate species." The late Dr. Staudinger always regarded *nickerlii* as a Darwinian species—that is, he was not quite sure whether it was really distinct or only a local or isolated form of some other species—in this case of *L. testacea*.

*Melitæa aurinia*: Selected series from Ireland, Cumberland, S. Wales, and S. Devon. Although each of the four series shows its own peculiar range of variation, one or more specimens comprised therein incline to the characters of *artemis*, as figured by Hübner.

*Epinephele jurtina*, Hb. (*ianira*): Series of males and females, chiefly from the London district, showing aberration—(a) in ocellated spot; (b) in amount of fulvous colour; (c) in tint of the fulvous colour in the female.

*Luperina guenei*, var. *baxteri*. (Type.) Lancashire coast, 1909.

*Malacosoma neustria*, L.: A female specimen, reared July 22nd, 1909, from a solitary larva taken off a birch, at Oxshott. The general colour is pale brown, but the central band is only represented by a rather narrow bar, extending from the costa to the median nervure; this bar is dark brown, tapered towards its extremity, and is edged with whitish.

Mr. W. J. Kaye: A very remarkable series of the South American butterfly, *Heliconius doris*, including the forms *tecta*, *obscura*, *amathusia*, *cratonius*, *luminosus*, *adistomache*, *viridaria*, and an apparently unnamed form from British Guiana, with a large amount of red at the base of the fore-wing and with very narrow streaking to the hind-wing.

It was mentioned that the species throughout its range was primarily dimorphic, a red and a blue form always occurring together. But in some localities, such as on the western slope of the Andes, in Colombia, there occurred with the usual red and blue forms recurrent aberrations of both, in which the large yellow discoidal blotch was wanting. In other parts of Colombia intermediate forms between the red and blue occurred, combining the two colours. The extreme form *amathusia* was very rare, but had occurred in Central Brazil, Ecuador, and Guiana. Chiriqui, in Panama, produced special forms of the blue phase of the species in *luminosus* and *viridaria*, in which the blue was altered to a yellowish-green. The species ranged from Costa Rica to Central Brazil, but was restricted vertically to about two thousand feet.

Mr. E. Step exhibited a series of seventy photographs of fungi taken since the exhibition of 1908, chiefly from Ashstead and Oxshott, and including a small number of *Myxogastres*.

Mr. H. Moore exhibited a series of under-sides of *Melanitis leda* (Linn.), and contributed the following note:

"This is a very variable butterfly, of wide geographical range, being found from Africa, through the Indian region, to Australia. It has two well-marked seasonal forms (wet and dry), and exhibits infinite variety in the markings of the under-sides. Several of the local forms or races were formerly considered distinct species.

“Wherever found it only flies at dusk, resting during the day on the ground or amongst dead leaves.

“The specimens exhibited are from the Philippine Islands, New Britain, N. Queensland, E. and W. Africa, Andaman I., etc.”

Mr. Thos. Wm. Hall exhibited varieties of *Agriades thetis* (*bellargus*), including a fine female with splashes of the male coloration in the left fore-wing, an asymmetrical male under-side, in which the left hind-wing was practically devoid of spots, and the left fore-wing with only a few spots, the right side being normal; also some other interesting underside varieties of the same species.

Mr. A. E. Gibbs exhibited fine series of *Agriades thetis* (*bellargus*), including ab. *puncta* females and ab. *ceronus* males, from Mt. Tendre, Swiss Jura, taken in July, 1909; series of *Agriades coridon*, including ab. *syngrapha* from Wiltshire, very large males with light ground colour on the under-side from Caux, Montreux, taken in July, 1909, and a series of aberrations of the under-side, males and females, from Dover.

Mr. H. J. Turner exhibited a very perfect specimen of *Rumicia phlæas* ab. *alba* taken at Brasted, Kent, on August 28th, 1909; minute specimens of *Cupido minimus* from Winchester and Aigle, Switz.: a male under-side of *Polyommatus damon* with all the eye-spots of the fore-wing except the discoidal obsolete, from Aigle; specimens of *Lycæna arion*, var. *obscura*, taken at Zermatt, six thousand feet, on July 31st, 1909; a graduated series of the dark suffused female form of *Chrysophanus virgaureæ*, var. *zermattensis*, with specimens of var. *miegii*, males, with an incipient row of spots on the coppery upper side, from Zermatt, July and August, 1909; specimens of the dark dwarf form of *Melitæa aurinia*, var. *merope*, from the Riffelalp, eight thousand feet, August 1st, 1909; a series of *Anthrocera carniolica* and var. *hedysari*, from Gex, S. Jura, August 11th, 1909; specimens of *Apatura iris*, from St. Gingolph, Savoie, and Aigle, one of the latter having been captured with the fingers while drinking on the roadway; a confluent form of *A. achilleæ* from Gex; and a curious form of *Melitæa didyma* from Zermatt, in which many of the usually black, costal, apical, and hind-marginal spots were devoid of pigment and of a dull silvery appearance.

Mr. Leeds exhibited a specimen of *Pieris brassicæ*, in which the under-side of the hind-wings was a very distinct blue, captured in Monkswood; and a dusky variety of *Saturnia carpini*.

Mr. L. W. Newman exhibited long and varied series of numerous species, including *Noctua festiva*, var. *thulei*, Staud., all from the Shetlands, and stated that a portion of the last-named series was bred in the south of England, from ova laid by the wild captured form, pointing out that these were of quite a different form of light red. He also showed a curious specimen of a *Leucania*, taken by Mr. H. Winsler at Cranleigh, which had been named in turn *favicolor*, *pallens*, and *straminea*. This latter specimen is a yellow aberration with all the appearance of *favicolor*, and has not the veins so prominent as in *pallens*, but has the smooth appearance of *favicolor*. Both Mr. Burrows and Mr. Pierce have examined the genitalia, but cannot give a definite answer as to which species it is, beyond saying it is certainly not *straminea*.

Mr. T. H. Grosvenor exhibited a very long series of *Cano-nymphia tiphon* (*davus*) from Westmoreland, Cumberland, and Aberdeen, showing most of the forms usually occurring. The Cumberland forms are an intermediate group, although certain specimens from Westmoreland and Scotland are almost identical with them.

Messrs. A. Harrison and H. Main exhibited series of *Boarmia gemmaria*, comprising a bred series from N. Cornwall in which the ground colour is unusually pale and yellow, a bred series from Epping Forest of the usual London form for comparison, and a few aberrations from various other localities, including four melanic specimens from Dartford, Kent. They also exhibited a long series of *Melitaa aurinia* from N. Wales, for the most part bred in 1909, showing a considerable range of variation, from bright specimens similar to the Irish form to dull brick-red examples like the Kentish form.

On behalf of Mr. J. March, Mr. Harrison exhibited an aberration of *Pararge megara* with large ocelli on the under-side of the fore-wings and with the submarginal row of usually smaller ocelli on the under-side of the fore-wings remarkably enlarged and emphasized. It was taken in 1908 at Bayham Abbey, Kent.

Mrs. Hemming exhibited *Polyommatus icarus*, female, with basal and sub-median spots on the under-side of the fore-wings broadly extended away from the discoidal spots; *P. icarus*, male, of the colour of typical *Agriades thetis* (*bellargus*); well emphasized melanic aberrations of *Argynnis adippe*, *Dryas paphia*, and *Brenthis cuphrosyne*; a male *D. paphia* with brownish under-side; a *Vanessa io* with the usual blue mark-

ings replaced by violet; and a gynandromorphous *Euchloë cardamines* taken in 1908.

Mr. Percy Bright exhibited a large number of British Lepidoptera, including several exceedingly fine aberrations of *Dryas paphia*, *Argynnis aglaia*, *A. adippe*, *Brenthis cuphrosyne*, *B. selene*, *Melitæ aurinia*, and *M. athalia*. In one example of *B. cuphrosyne* the ground colour was white, and this also was the case in one specimen of *M. athalia*. Other specimens exhibiting albinism were *Aglais (Vanessa) urticae* and *Canonympha pamphilus* (a pair). Besides black or nearly black specimens of *Limnitis sibylla*, there was a melanic example of *Saturnia carpinii* (captured by the late Mr. J. A. Clark) and a melanic male specimen of *Dicranura vinula* (found on a lamp-post at Scarborough). Further exponents of melanism in Lepidoptera were one example of *Selenia illustraria* and a short series of *Boarmia repandata*. Of gynandromorphs there was one example of *Celastrina argiolus*. A number of other interesting varieties were included in this exhibit.

Among other specimens of Lepidoptera exhibited by Mr. A. W. Buckstone were a female *Euchloë cardamines* with splashes of orange colour on the under-side of the fore-wing; a dark female example of *Brenthis selene*; *Rumicia phlaeas*, ab. *schmidtii*; *Bithys quercus* ab. *bella*; a large female specimen of *Arctia caia*, the hind-wings of which were yellow; small specimens of a partial third generation of *Phragmatobia fuliginosa* reared in confinement; a bred specimen of *Euchelia jacobææ*, with melanic hind-wings; and a dark example of *Hemerophila abruptaria*, which emerged in October, instead of remaining in the pupa, as is more usually the case, until the following spring.

Mr. West, the Curator, exhibited the Society's collection of *Anthribidæ* and *Curculionidæ*, which he had recently rearranged.

Mr. Tonge exhibited a large number of stercographs of Lepidoptera.

Mr. H. M. Edelsten exhibited a bred series of *Nonagria neurica* (Hb.) (*edelsteni*), with ab. *rufescens* and ab. *fusca*; also ova and pupa *in situ*, and photographs by Mr. Main to show the life-history of the species.

Mr. G. St. Aubyn exhibited an interesting variety of *Melanippe sociata*, female, taken at Oxshott, June 14th. The broad dark band on the fore-wings is completely severed in the middle, and does not reach to the costa. The under-side is much darker than usual; there also appears to be a greenish tint over the wings.

Dr. G. C. Hodgson exhibited a long series of many forms of *Canonympha tiphon* from Rannoch, Kincardine, Aberdeen, Westmoreland, and Lancashire; and a specimen of *Pieris rapæ* with a black spot in the discal area of the hind wing.

Mr. Stanley Edwards exhibited specimens of *Caligo atreus* and *C. beltrao*, from South America.

Mr. S. W. Gadge exhibited :

*Arctia caia* : Bred from an Irish larva this year; the antennæ are black, the left one clubbed; the larva was very black and without the usual white tips to the hairs.

*Spilosoma lubricipeda* : Taken at Streatham; marked with splashes in place of the spots.

*Porthesia chrysorrhæa* : The original larvæ were taken at Ventnor in May, 1908; some of the moths bred last year had black spots on the fore-wings, and these spots show again in specimens bred this year from the same parents; in the first one two spots are seen in the centre of the fore-wings on the upper side only; in the last specimen a spot, which is much larger on the under-side, is seen on the left hind-wing.

*Melanippe fluctuata* : Bred from a larva taken in his garden at Herne Hill, the whole of the central area being light grey.

*Agrotis exclamationis* : A specimen with a very long claw to the left hind leg.

Dr. Chapman exhibited *Callophrys avis*, with specimen of the other West-European *Thestuids* *C. rubi* (var. *fervida*, from S. France) and *Thestor ballus*, also *Neolycana lunulata*, to suggest the phylogeny of the dark margins of the white spots in *C. rubi*. *Agriades coridon* from a few Spanish and other localities.

Mr. E. P. Sharp exhibited :

*Dianthæcia carpophaga* : Bred from wild pupæ collected March and April, 1909, near Eastbourne, and showing different forms occurring in this locality.

*Nonagria neurica (edelsteni)* : Bred from larvæ collected in East Sussex, June, 1909.

*Leucania l-album*, female, taken at ivy-bloom, near Eastbourne, on October 14th, 1909, and which laid ova on October 15th and 16th. These hatched on November 5th and 6th. The larvæ are at present hibernating in pieces of old reed stem, without having fed.

Mr. Barnett exhibited a confluent pink-coloured form of *Anthrocera trifolii*; a female aberration of *Ematurga atomaria* in which the submarginal dark band was obsolete; and an aberration of *Strenia clathrata* which was asymmetrical and

unusually light in colour, owing to the irregular suppression of some of the usually dark transverse lines.

Mr. Payne exhibited a melanic example of *Argynnis aglaia*, and a specimen of *Agriades coridon*, var. *syngrapha*.

Mr. E. Bedwell exhibited a variety of *Brenthis selene* taken by him at Childerditch Common, Brentwood, Essex, in 1905; specimens of *Odontoscelis dorsalis*, a species of Hemiptera-Heteroptera new to the British fauna, from near Lowestoft, in June, 1909; *Anchomenes gracilipes*, a rare species of Coleoptera taken near Lowestoft, in 1898, and the sixth or seventh known British specimen; and two examples of *Hctarius ferrugineum*, a myrmecophilus beetle lost sight of in this country for forty-six years, but taken by him at Box Hill in April last in a nest of *Lasius fuliginosus*.

Mr. R. Baumann exhibited:

A bred series of *Angerona prunaria* (banded form) from Epping Forest; a series of *Polia chi*, var. *olivacea*, bred from Middlesbro' ova; a series of *Nonagria geminipuncta*, including dark forms from pupæ taken at Lewes, in August, 1909; a series of *Gnophos obscurata*, from Lewes, including var. *mundata*; and a very dark, obscurely marked aberration of *Cuspidia megacephala*, bred from a larva taken on Hackney Downs.

Mr. J. Platt Barrett exhibited a case of Lepidoptera, containing numerous species taken in Britain for comparison with the same species or their equivalent forms taken near Messina, in Sicily, including—

*Euchloë cardamines* and *E. turritis* (?).

*Melanargia galathea* and the larger *M. iapygia*.

*Epinephele janira* and var. *fortunata* (?).

*Pararge megæra* and the large Sicilian form.

*P. egeria* and the form with very yellow ground and less dark markings; and

*Hipparchia semele* and its larger and brighter Sicilian form.

He also showed a very dark female form of *Melitæa didyma*, from Sicily, and a series of *Hadena dentina*, from Surrey, taken in 1909, showing much more variation than a series taken at various times from 1871 to 1895.

Mr. H. W. Andrews exhibited two species of Diptera:

*Chorisops tibialis*, Meig.: Light forms (typical for New Forest district), and dark forms from S.W. Ireland; and

*Microclinya polita*, L.: Typical green form and bronze variety, taken at Darenth, July 31st, 1909.

Mr. J. T. Winkworth exhibited a very large number of specimens of *Helix caperata*, showing extensive and extreme variation. They were all collected in September and October,

1909, in the area comprising that part of Surrey lying north of Walton-on-the-Hill, Headley, and Kingswood, and communicated the following note:

"In habits they seemed to dislike the heavy morning dew, and were mostly found resting up the dry stalks of plants. When found in or on stalks above long grass, with abundance of cover, the shell was generally larger than normal, but sparse herbage went, as a rule, with small shell. There was a noticeable character of shell in any one spot with a small number of general varieties—*i. e.* one bank gave a shell of a deepish yellow tone, another gave a greater number that were striped, and on another the shells were of the common type. The most remarkable came from a field of narrow-leaved plantain. When first picked up the general colour was yellow, but soon after handling they all appeared of a drabbish hue. When the mollusc was removed the original yellow was the characteristic colour.

"Did the nervous system, acting through the unusual treatment, so disperse the body-contents as to withdraw the yellow and lighter contents from immediate contact with the almost transparent and thin shell?"

"The creature is timorous, and its nervous system would be stimulated, and as 'yellow' was abundantly in evidence in the extracted body, could it not have been at first dispersed throughout the creature and adjacent to the shell? If the yellow be withdrawn into the deeper parts of the body, then the transmitted light would be less bright. This is the explanation of the phenomenon which suggests itself to me."

Mr. W. J. Lucas exhibited a box of the commoner species of European *Ascalaphi*, including the species *A. coccajus*, with var. near *leucocilius*, *A. longicornis*, *A. corsicus*, and *A. baticus*; another Neuropteran, *Osmylus chrysoptis*, with a larva of the same; and a curious female variety of *Pieris napi* from Merrow Downs, taken in July, 1909, in which the upper submarginal blotch was narrowly extended so as almost to touch the apical blotch. The two blotches were united by a narrow bar, and the lower blotch was united to the inner marginal marking, while the apical black blotch extended somewhat downwards to the next two nervures, each of which had a triangular black marking at its hind marginal termination.

Mr. Sich exhibited a series of *Depressaria putridella*, the recently introduced British species, with examples of the allied species with which it might, perhaps, be confused.

Mr. Tarbat exhibited a *Noctua* taken at the electric light

at Fareham, Hants, which, although extremely aberrant, was considered to be *Apamea lutulenta*.

Mr. Colthrup exhibited a short series of *Agriopsis aprilina*, including one in which the white of the fore-wing was replaced by green, the fringe dark grey instead of white, and the hind-wing grey-black, without any trace of white; a very pale specimen of *Miselia oxyacanthæ*; and a variety of *Scopelosoma satellitia*, in which the upper wings were very dark grey and the reniform white. All were taken this autumn in the New Forest.

Mr. C. T. Pickett exhibited his fine series of *Angerona prunaria*, the picked results of eleven years' interbreeding, containing representatives of the various strains and aberrations, with several new forms. The series comprised: Males, approaching the yellow coloration of the females; females, approaching the orange coloration of the males; males, plain orange, not freckled; females, plain yellow, not freckled; males and females, of the ab. *pickettaria*; males and females, of the ab. *pallidaria*; females, almost unicolorous chocolate; females, unusually large, with putty-coloured bands; females, with deep rich chocolate bands and rich orange-yellow central bands; males, with deep rich chocolate bands and orange central bands; females, orange-yellow, very heavily freckled; males, deep orange, very heavily freckled; male, of a rich sienna brown, with brownish orange central band; female, of a rich lemon yellow, perfectly plain; females, of banded type, with the bands broken up, forming striations on the fore-wings.

He also exhibited a large number of *Pieris napi*, the results of three years' interbreeding, starting from a Fife female given him by Mr. Harrison. The series included:

First brood: Some heavily marked females, many approaching the dark Irish forms, with under-sides of rich green veins on a yellow ground.

Second brood, by way of contrast, were extremely lightly veined; in two or three specimens the veins were almost obsolete, but the ground colour was of a rich yellow.

From Dawlish, a long series of captured examples, second brood, very large females, with nervures of hind-wings black, all the under-sides being of palest yellow, with green veins almost absent.

From Worthing, a series of second-brood specimens bred from a female nearer the typical form, including specimens with under-sides faintly veined, on whitish yellow ground. In the case were series of very large creamy females of *Pieris*

*rapæ*, males with under-sides heavily dusted, and males perfectly white, without black tips to the fore-wings, all from Dawlish.

Mr. Sperring exhibited a very long series of *Orrhodia vaccinii*, taken this autumn at Shooter's Hill, comprising most of the named forms of the species.

DECEMBER 9th, 1909.

Captain P. A. Cardew, R.A., of Wimbledon, and Mr. P. A. Tautz, of N. Audley St., were elected members.

Mr. Sich exhibited specimens of *Gelechia hermannella*, in illustration of his paper.

Mr. Turner exhibited male and female specimens of the rare moth, *Eudæmonia brachyura*, from Sierra Leone. This species is remarkable for the extreme length of the "tail" on the hind-wings.

Mr. Edwards exhibited a box of exotic Hemiptera, of which perhaps the most noticeable was a specimen of the large Heteropteron, *Macroceræa grandii*, from Tenasserim.

Mr. J. Platt-Barrett exhibited two pupæ of *Hyles euphorbia*, found by him in Sicily, and an immature specimen of the mole cricket, *Gryllotalpa vulgaris*, found by him in his bedroom in Messina.

Dr. Hodgson exhibited selected specimens of *Anthrocera trifolii*, including specimens of a very small race, 23-30 mm. in expanse, and a pale pink and grey form; specimens of *A. hippocrepidis*, with the small sixth spot not detached from the fifth, as if budding from it; and specimens of *A. filipendulæ*, pale grey and pink forms, from three localities in Sussex, Surrey, and Hants; and from the last locality a very broad bordered specimen, with the sixth spot nearly obsolete.

Mr. Barnett exhibited a dark form of *Chæimatobia boreata* from West Wickham, and of *Oporabia dilutaria* from Wimbledon.

Mr. Robert Adkin exhibited a series of *Agriades (Lycæna) coridon* females taken during September last in one small district near Eastbourne. The specimens included forms in which (a) the hind-wings only showed distinct blue scaling; (b) in which blue scaling was apparent on both fore- and hind-wings; (c) having the marginal lunules without red colour; (d) with the red strongly developed; (e) with blue crescentic markings to the lunules; (f) with white crescentic markings to the lunules; (g) dark brown undersides; (h) pale undersides; and (j) dark grey under-sides.

He also exhibited a series of *Polia chi* reared from ova deposited by a female taken by Mr. G. T. Porritt in his garden at Huddersfield. The specimens were all unusually dark, the females being of a uniform dark olivaceous grey, with black markings without any white.

Mr. Sich read a paper entitled, "Notes on *Chrysopora (Gelechia) hermannella*" (see p. 43).

JANUARY 13th, 1910.

Mr. W. J. Kaye exhibited a flower of the remarkable orchid, *Masdevallia chimara*, from the mountains of Colombia. The flower, in common with nearly all the genus, was chiefly conspicuous for its developed sepals and the great reduction of the petals. This species, however, had a comparatively large white two-lobed lip, which was freely moveable and hinged so that the wind could move it. The flower shown had tails to its sepals of just four inches, but what is the use of these tails or of the movable lip there was no record. The species occurred at an altitude of 3-4000 feet, and thus required more warmth than most other species of the genus which occurred at greater elevation.

Mr. R. South exhibited, on behalf of Mr. Hallam Moore, of Barnet, specimens of Coleoptera mounted on transparent gelatine card, which allowed of easy examination of the under-side of the insect as well as the upper. It was stated that the card only needs to be slightly moistened with warm water before putting on the specimens. The cards were to be obtained at 28, Barbican, E.C.

Mr. Robert Adkin exhibited a series of *Selenia bilunaria (illunaria)*, reared from ova obtained from a moth taken at Eastbourne on August 11th last, together with series of the ordinary spring and summer emergences for comparison. The parent moth had evidently deposited most of her ova before being taken, but a few were obtained between August 11th and 14th, which hatched on the 21st. No attempt was made to force the larvæ, indeed, it was difficult to obtain suitable food for them, and they had to make shift with some rather hard birch, of which the supply was limited. However, within a month they were all full fed, and pupated between September the 20th and 23rd, the moths emerging between October the 10th and 18th. In general appearance they followed the summer rather than the spring specimens, but in some minor details more nearly approximated to the

latter, while in size they were if anything rather above the average of the summer emergence, especially in the females.

Mr. E. Step exhibited the rare fungus *Phlebia radiata*, from Oxshott, where it occurred on dead birch. He had exhibited specimens from the same trunk in previous years, but the present specimen showed the full development of the species, which differed somewhat from earlier stages in form and colour.

Mr. W. J. Lucas exhibited the following fungi from Esher Common: *Cordyceps capitata*, on the subterranean fungus *Elaphomyces granulatus*, and *Dadalea confragosa*, on birch, both found on January 8th. He also showed photographs of *Hybernia defoliaria*, taken on January 4th and 8th.

Mr. Hy. J. Turner exhibited, on behalf of the Rev. C. R. N. Burrows, series of the four very closely related species of the genus *Hydræcia*, *H. nictitans*, *H. paludis*, *H. lucens*, and *H. crinanensis*. It was stated that from the marking, colours, and all superficial characters it was apparently impossible to separate the last species, yet an examination of the genitalia by Messrs. Burrows and Pierce showed an unmistakable differentiation. Microscopical preparations of the genitalia were also shown, as well as enlarged photographs of the same. The specimens diagnosed as *H. crinanensis* had hitherto always been taken on river banks, or at least near water, and the localities at present known for the species are Liddlebank and Newburgh in Roxburghshire, Aberfeldie, Crinan Canal, and Inverary in Sutherlandshire. He stated that Mr. Burrows particularly wished to have pointed out to him any points whereby the species might be differentiated without a microscopical investigation.

Mr. A. E. Tonge exhibited a series of *Cidaria miata*, bred *ab ovo*. The parent was taken at Chichester in October, 1908. The series of seventy-five specimens showed but a small amount of variation. A pair of *Catocala fraxini*, bred *ab ovo*. The parent was taken on a poplar trunk at Horsham, Sussex, by Mr. James, of Tooting, in 1908, as recorded in the "Entomologist." Also eight small wasps bred from a bamboo cane, standing in a Redhill garden, with an enlarged photo of the cane split open to show the cells and grubs within. The wasps were afterwards ascertained to be *Ammophila viatica* and *Odynerus parietum*.

Mr. Newman exhibited living specimens of *Pyramcis atalanta*, and contributed the following note:

"They were bred in October and November, and kept in a warm room. In captivity they are not true hibernators.

On sunny days they feed well and are very lively when placed in a sunny window. I think there is no doubt this species can be hibernated in England under unnatural conditions, and feel sure these will go through."

Mr. Hemming exhibited an aberration of *Polyommatus icarus*, female, taken at Redhill in September, 1909, in which all the submedian spots on the under-side of the forewings were closely clustered around the discoidal, except that the lowest spot was confluent with the lower basal spot. The spots on the under-side of the hind-wings were partially obsolete, but the three remaining spots were also clustered around the discoidals.

Mr. Enock showed a long series of lantern illustrations of *Gonepteryx rhamni*, *Dicranura vinula*, and *Urapteryx sambucaria*, together with a large number of slides of the delicate species of *Mymaridæ* (egg parasites).

JANUARY 27th, 1910.

## ANNUAL GENERAL MEETING.

Mr. A. SICH, *President*, in the Chair.

The first meeting, held at seven o'clock, was devoted to the business of the Society.

The Balance Sheet was read by Mr. F. Noad Clark, one of the Auditors, and was adopted by the meeting. It was a satisfactory one, showing a balance of £38 18s. 5d.

The Report of the Council (see p. xii) was read and adopted by the meeting.

The President declared the following gentlemen duly elected as Officers and Council for the Session 1910-11.

*President*.—W. J. Kaye, F.E.S.

*Vice-Presidents*.—A. Sich, F.E.S., A. E. Tonge, F.E.S.

*Treasurer*.—T. W. Hall, F.E.S.

*Librarian*.—A. W. Dods.

*Curator*.—W. West (Greenwich).

*Hon. Secretaries*.—Stanley Edwards, F.L.S., F.Z.S., F.E.S. (Corresponding); Hy. J. Turner, F.E.S. (Report).

*Council*.—R. Adkin, F.E.S., S. R. Ashby, F.E.S., E. C. Joy, F.E.S., H. Main, F.E.S., A. M. Montgomery, F.E.S. R. A. R. Priske, F.E.S., and B. H. Smith.

Mr. Sich read a letter from Mr. W. J. Kaye, the President-elect, asking him to convey to the members of the Society

his high appreciation of the honour they had done him in electing him to the Chair for the current year, and to explain to them his absence as due to his having undertaken an expedition to Southern Brazil for the spring months, in search of Lepidoptera and evidences for or against the theories of mimetic resemblance.

The President then read his Annual Address (see p. 50).

Votes of thanks were passed to the President, Treasurer, Officers and Council, and to the Auditors, for their work during the year.

#### ORDINARY MEETING.

Mr. D. R. Morford, of Upper Kennington Lane, was elected a member.

Mr. Tonge exhibited long series of *Hybernia aurantiaria*, males; *H. defoliaria*, males, and *H. pennaria*, males and females, taken in the New Forest, November 17th-19th, 1909. In spite of clear, frosty nights, these insects were abundant after dusk, and were to be found, freshly emerged and drying their wings, on the grass and dead bracken stalks.

Mr. Colthrop exhibited the same species, taken at the same time and place; also a few *Oporabia dilutaria* of four different types. In addition he showed a specimen of *Gonepteryx rhamni* found at the same time and place, hibernating among the leaves of holly. The specimen was discovered at night by the lantern, and left till the next day, when Mr. Tonge photographed it. A print of the insect *in situ* was shown by Mr. Tonge.

Mr. Edwards exhibited a fossil crinoid found at Welling, in Kent, in a piece of flint. The species belonged to the genus *Isocrinus*, and although crinoids are common in the chalk, they are rare in flint belonging to the Triassic Period.

Mr. H. J. Turner exhibited a short series of *Lemonias* (*Melitæa*) *taylori*, from Victoria, Vancouver Island, sent to him by one of our members, Mr. A. J. Croker. This species belongs to a genus which is about equally represented in both the Nearctic and Palæarctic regions. In the former there are about twenty-eight species recognised, while the latter has some thirty-one representatives. The American section of the genus, comprising some strikingly beautiful species, is sometimes separated under the generic name *Lemonias*. The

restricted area of Europe has about sixteen indigenous species, while our own islands only produce three, all of them limited to certain districts especially favourable to their continuance. He also showed another very beautiful species from the same source, *Basilarchia lorquini* a member of a group of mimics belonging to the *Nymphalidæ*. On a previous occasion Mr. Turner had exhibited another member of the genus, *B. archippus* (*disippus*), taken by Mr. Croker, at Redvers, in Saskatchewan. This is one of the "White Admirals" of America.

Mr. Barrett reported having taken *G. rhamni* in Hertfordshire, hibernating among *Euonymus*, at Christmas; and at Blean Wood, Kent, among heather, in January. It was also stated that a specimen had been seen flying at Sydenham at Christmas time.

Mr. Colthrop reported that he had two males and one female of *Orrhodia rubiginea* hibernating in an outhouse since November. The female was perfectly comatose, even in mild weather, while the males fed every night, however cold. He suggested that the vitality of the males became exhausted in many specimens, and a large proportion got killed off before the spring, with the result that many females taken in the early part of the year were found to be infertile. Mr. Newman's experience agreed with that of Mr. Colthrop.



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- 1908 PENNINGTON, F., Manning's Hill, Cranleigh, Surrey. *l*.
- 1901 PEPPER, A. W., The Horniman Museum, Forest Hill, S.E. *mi*.
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.  
*l, h, d*.
- 1888 PERKS, F. P., 22, May's Buildings, St. Martin's Lane,  
Charing Cross, W.C. *zoology, mi, pond life*.
- 1911 PHILLIPS, H. F., 58, Jedburgh Road, Plaistow, E.
- 1887 PORRITT, G. T., F.L.S., F.E.S., Elm Lea, Dalton, Hudders-  
field. *l, n*.
- 1903 PRATT, W. B., F.E.S., 10, Lion Gate Gardens, Richmond,  
Surrey. *l*.
- 1897 PREST, E. E. B., Woodstock, Sutton, Surrey. *l*.
- 1903 PRISKE, R. A. R., F.E.S., 9, Melbourne Avenue, W. Ealing,  
W. *l, m*.
- 1902 RAYWARD, A. L., F.E.S., 3, Albert Mansions, Lansdowne Road,  
Croydon, Surrey. *l*.
- 1909 RAMSAY, A., 15, Lawn Crescent, Kew Gardens. *b*.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Com-  
mon, S.W. *orn*.
- 1904 RICHARDS, P., Wellesley, Queen's Road, Kingston Hill,  
Surrey. *l*.
- 1906 RICHMOND, B. A., M.B., B.Sc., 28, Lower Road, Rotherhithe,  
S.E. *l*.

YEAR OF  
ELECTION.

- 1902 RILEY, N. D., 94, Drakefield Road, Upper Tooting, S.W. *l.*
- 1910 ROBERTSON, G. S., M.D., St. Anne's, 101, Thurlow Park Road, Dulwich, S.E. *l.*
- 1887 ROBINSON, A., B.A., 5, King's Bench Walk, Temple, E.C. *l.*
- 1894 ROBINSON, L., 4, Queen's Walk, Ealing, W. *l.*
- 1888 ROBSON, H., 9, Trump Street, E.C. *l, b.*
- 1911 ROGERS, W. A., 42, Addington Square, Camberwell, S.E.
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle.  
*l, c.*
- 1900 ROWDEN, A. O., 4, St. John's Road, Exeter. *l, b.*
- 1904 ROWLAND-BROWN, H., F.E.S., Oxhey Grove, Harrow Weald. *l.*
- 1890 ROWNTREE, J. H., Folkton Manor, Ganton, Yorks. *l.*
- 1898 RUSSELL, A., F.E.S., Wilverley, Dale Road, Purley. *l.*
- 1888 SAUZÉ, H. A., 22, Earlsthorpe Road, Sydenham, S.E. *l.*
- 1902 SCOLLIICK, A. J., F.E.S., 8, Mayfield Road, Merton Park, Wimbledon, S.W. *l.*
- 1910 SCORER, A. G., F.E.S., Hillcrest, Chilworth, Guildford. *l.*
- 1910 SHELDON, W. G., F.E.S., Youlgreave, South Croydon. *l.*
- 1898 SICH, ALF., F.E.S., *Vice-President*, Corney House, Chiswick, W. *l.*
- 1903 SMALLMAN, R. S., F.E.S., Homeside, Devonshire Place, Eastbourne. *l.*
- 1908 SMITH, B. H., B.A., Edgehill, Warlingham, Surrey. *l.*
- 1890 SMITH, WALTER, 6, Exmouth Villas, Hampton Hill, Middlesex. *l.*
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l.*
- 1882 SOUTH, R., F.E.S., 96, Drakefield Road, Upper Tooting, S.W. *l.*
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex (*Life member*). *l.*
- 1908 STAUBYN, J. S., Tregothnan, Endlesham Road, Balham, S.W. *l.*
- 1872 STEP, E., F.L.S., Oakwood House, Barnett Wood Lane, Ashtead, Surrey. *b, m, orn, cr.*
- 1909 STONE, F. J., 141, Bedford Road, Clapham, S.W. *l.*
- 1910 STONEHAM, Lieut. H. F., F.E.S., Kingswear, Streatham Road, S.W. *l.*

YEAR OF  
ELECTION.

- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, ool.*
- 1910 TAUTZ, P. H., 33, North Audley Street, W. *l.*
- 1902 TONGE, A. E., F.E.S., *Vice-President*, Aincroft, Grammar School Hill, Reigate. *l.*
- 1895 TUNALEY, HY., F.E.S., 13, Becmead Avenue, Streatham, S.W. *l. h.*
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 98, Drakefell Road, New Cross, S.E. *l, c, n, he, b.*
- 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d.*
- 1889 VINE, A. C., 45, Temple Street, Brighton, Sussex. *l.*
- 1889 WAINWRIGHT, C. J., F.E.S., 45, Handsworth Wood Road, Handsworth, Staffs. *l.*
- 1911 WAKELY, L. D., 34, Lancaster Road, Wimbledon Common, S.W. *l.*
- 1880 WALKER, J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.Z.S., F.E.S., &c., Merton Hall, Thetford, Norfolk (*Hon. member*). *l, orn.*
- 1907 WATERER, W. J., 19, Adelaide Road, Brockley, S.E. *b.*
- 1888 WEBB, S., 9, Waterloo Crescent, Dover. *l.*
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road, S.E. *l, c, he.*
- 1878 WEST, W., L.D.S., Holmwood, Barnett Wood Lane, Ashted, Surrey. *l, mi.*
- 1887 WHIFFEN, W. H., Holmwood Lodge, Laton Road, Hastings. *l.*
- 1905 WINKWORTH, J. T., 290, Burdett Road, E. *l.*
- 1910 WOOD, F. G., Whyteleaf, Maple Road, Ashted, Surrey.
- 1905 WRIGHT, J., 30, Coleman Street, Woolwich, S.E. *l.*

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Members will greatly oblige by informing the Hon. Sec. of any errors, additions, or alterations in the above Addresses and descriptions.

# THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

## BALANCE-SHEET FOR THE YEAR 1910.

### GENERAL FUND.

|                                                        | £   | s.  | d.  |                     | £                         | s.                                                       | d.  |
|--------------------------------------------------------|-----|-----|-----|---------------------|---------------------------|----------------------------------------------------------|-----|
| <i>Receipts.</i>                                       |     |     |     | <i>Expenditure.</i> |                           |                                                          |     |
| To Balance from 1909 ...                               | ... | 0   | 12  | 0                   | By Rent for one year ...  | ...                                                      | ... |
| " Subscriptions received, 94 at 7/6 ...                | ... | 35  | 5   | 0                   | " Attendance one year ... | ...                                                      | ... |
| " " " 10 " 5/- ...                                     | ... | ... | 2   | 10                  | 0                         | Postage, Stationery, and Sundries ...                    | ... |
| " " " 1 " 6/- ...                                      | ... | ... | 0   | 6                   | 0                         | Printing ...                                             | ... |
| " " " 16 " 2/6 ...                                     | ... | ... | 2   | 0                   | 0                         | Insurance ...                                            | ... |
| " Arrears of Subscriptions received ...                | ... | ... | 5   | 8                   | 6                         | Entrance Fees carried to Suspense A/c ...                | ... |
| " Subscriptions received in advance ...                | ... | ... | 2   | 15                  | 0                         | Subscription to South-East Union ...                     | ... |
| " Entrance Fees, 11 at 2/6 ...                         | ... | ... | 1   | 7                   | 6                         | Subscription to International Congress of Entomology ... | ... |
| " Donation to General Fund from Lachlan Gibb, Esq. ... | ... | ... | 5   | 5                   | 0                         | Vote to Publication Fund ...                             | ... |
| " Debit Balance... ..                                  | ... | ... | 3   | 17                  | 0                         | Vote to Library Fund ...                                 | ... |
|                                                        |     |     | £59 | 6                   | 0                         |                                                          | £59 |
|                                                        |     |     |     |                     |                           |                                                          | 6   |

### SUSPENSE ACCOUNT.

|                                         | £   | s.  | d.  |                     | £              | s.  | d.  |
|-----------------------------------------|-----|-----|-----|---------------------|----------------|-----|-----|
| <i>Receipts.</i>                        |     |     |     | <i>Expenditure.</i> |                |     |     |
| To Balance from 1909 ...                | ... | 28  | 10  | 0                   | By Balance ... | ... | ... |
| " Entrance Fees from General Fund... .. | ... | ... | 1   | 7                   | 6              |     | ... |
|                                         |     |     | £29 | 17                  | 6              |     | £29 |
|                                         |     |     |     |                     |                |     | 17  |
|                                         |     |     |     |                     |                |     | 6   |

## LIBRARY FUND.

|                              | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|------------------------------|----------------|---------------------|----------------|
| To Balance from 1909 ...     | ... 0 10 2     | ... ..              | ... 1 2 0      |
| " Fines ...                  | ... 0 2 4      | ... ..              | ... 0 10 6     |
| " Vote from General Fund ... | ... 1 0 0      | ... ..              | ... ..         |
|                              | £1 12 6        |                     | £1 12 6        |

## PUBLICATION FUND.

|                              | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|------------------------------|----------------|---------------------|----------------|
| To Balance from 1909 ...     | ... 0 16 3     | ... ..              | ... 60 19 11   |
| " Donations ...              | ... 39 19 0    | ... ..              | ... 0 0 4      |
| " Sales of "Proceedings" ... | ... 0 5 0      | ... ..              | ... ..         |
| " Vote from General Fund ... | ... 20 0 0     | ... ..              | ... ..         |
|                              | £61 0 3        |                     | £61 0 3        |

## ASSETS AND LIABILITIES.

|                                                     | <i>£ s. d.</i> | <i>Liabilities.</i>               | <i>£ s. d.</i> |
|-----------------------------------------------------|----------------|-----------------------------------|----------------|
| To Suspense Account ...                             | ... 29 17 6    | By Debit Balance General Fund ... | ... 3 17 0     |
| " Balance Library Fund ...                          | ... 0 10 6     | " Balance ...                     | ... 32 17 4    |
| " " Publication Fund ...                            | ... 0 0 4      |                                   |                |
| " Arrears of Subscriptions, £16 19s., valued at ... | ... 6 6 0      |                                   |                |
|                                                     | £36 14 4       |                                   | £36 14 4       |

Audited, examined with vouchers and found correct, *January 23rd, 1911.*  
 FRED. NOAD CLARK, } *Auditors.*  
 E. C. JOY, }

## REPORT OF THE COUNCIL, 1910.

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THE Council of the South London Entomological and Natural History Society, in presenting the Thirty-ninth Annual Report, is pleased to state that the affairs of the Society continue in a satisfactory condition.

During the year just passed fourteen new Members have been elected, and seventeen names have been deleted from the list. Of these, three have been removed by death, Messrs. H. A. McArthur, G. W. Kirkaldy, and J. W. Tutt; and fourteen have resigned or been taken off the list for non-payment of subscription.

The Membership, therefore, stands as follows: 2 Honorary, 2 Life, 6 Country, and 154 Ordinary Members, making a total of 164.

The Balance Sheet, duly audited, is printed on page x, and shows that the Society's finances are not in an unsatisfactory condition, although there is a small debit balance on the General Account.

The Meetings have been well attended throughout the year, and the Recorder, Mr. A. W. DENNIS, reports that there has been an average attendance of over thirty-three at each of the twenty-three meetings.

During the early months of the year the President-elect, Mr. W. J. Kaye, was unable to take the chair owing to his absence on an entomological tour in South America. Mr. Sich, the retiring president, kindly offered to continue his duties and preside at the meetings until Mr. Kaye's return.

On the suggestion of the President it was resolved to hold a special exhibition and discussion of the various forms of *Polyommatus icarus*. This took place on July 14th, and was a pronounced success, the announcement attracting what was probably "the finest collection of *P. icarus* ever brought together." At the Annual Special Exhibition of Varieties in November, upwards of a hundred members and their

friends were present, a number quite unprecedented. Of these, considerably over thirty brought exhibits. Most of them being of Lepidoptera, the Council hopes that in future years other orders may be more strongly represented. Again, the Society is deeply indebted to Mr. F. Noad Clark for his so kindly taking charge of the lantern on each occasion when it was used.

The following is a list of the papers read before the Society :

February 22nd.—R. ADKIN, F.E.S., “*Lepidoptera* of a London Garden.”

April 28th.—A. SICH, F.E.S., “Legs of Lepidopterous Larvæ.”

May 12th.—HY. J. TURNER, F.E.S., “A Few Days with the Butterflies of Zermatt.”

September 22nd.—A. SICH, F.E.S., “The Middlesex Home of *Clausilia biplicata*.”

October 13th.—J. PLATT BARRETT, F.E.S., “The Butterflies of Sicily” (lantern).

October 27th.—Dr. T. A. CHAPMAN, F.Z.S., F.E.S., “Insect Teratology.”

December 8th.—W. J. KAYE, F.E.S., and E. DUKINFIELD JONES, F.E.S., “An Account of a Collecting Tour through South Brazil in the early part of 1910” (lantern).

January 12th.—W. J. LUCAS, B.A., F.E.S., “Notes on the Natural Order Neuroptera” (lantern).

In addition a number of short papers and notes have been contributed by members in elucidation of exhibits.

Two meetings attracted a considerable number of members and their friends. The first, that at which Mr. J. Platt Barrett gave an account of his collecting trips in Sicily, including a very graphic and interesting description of his experiences during the terrible earthquake at Messina; and the second, that at which Mr. W. J. Kaye, supported by Mr. Dukinfield Jones, related their joint experiences during their most enjoyable and highly successful trip to South Brazil. Both these papers were lavishly illustrated by many original lantern-slides.

Most of the papers were supplemented by an abundance

of specimens; and the Council are much indebted to the respective authors for the amount of trouble they took to render their papers so interesting.

The Honorary Curator, Mr. W. WEST (Greenwich), reports that Mr. R. Adkin and Mr. Tonge were the only contributors to the reference collection of Lepidoptera during the year, and that Mr. Ashby and he (Mr. West) were the only contributors to the Coleoptera. He states that the rearrangement of the latter group is still in hand, but the most tedious portion of the work being done, he hopes to finish it during the present year. During the past year the collections have been of considerable use to members in identifying and comparing their more recent captures.

The Honorary Librarian, Mr. A. W. DODS reports that the Library still continues to be much used on meeting nights, and for the loan of books.

There have been six Field Meetings held during the year:  
May 21st.—OXSHOTT, conducted by Mr. SICH.

June 18th.—RANMORE COMMON, conducted by Mr. STEP.

July 2nd.—WESTERHAM, conducted by Mr. TURNER.

July 23rd.—OCKHAM and WISLEY, conducted by Mr. STEP.

September 10th.—BOOKHAM COMMON, conducted by Mr. STEP.

October 8th.—OXSHOTT (Fungus Foray), conducted by Mr. STEP.

The Reports of these meetings are exceptionally brief this year, mainly on account of the more or less unfavourable weather on most of the days selected, and also because the localities had been visited on several occasions in previous years, and there was little or nothing to add to the records of fauna and flora already made.

For some years past the Society has been affiliated to the South Eastern Union of Scientific Societies, and also has been a Corresponding Society attached to the British Association. In the former several members take a prominent part; Mr. R. Adkin is Treasurer, the late Mr. J. W. Tutt was Editor of the admirable yearly report, and Mr. A. Sich is on the Council. To the special annual gatherings of these Associations your Council sends delegates. To the

former Messrs. E. Step and Henry J. Turner were this year's delegates, and at the first July meeting Mr. Step read his report of the four days spent at Guildford in early June. To the latter Mr. R. Adkin was the Council's delegate, and his report was presented at the first November meeting.

The Publication Committee found it possible this year to publish the "Abstract of Proceedings" some six weeks earlier than in previous years. The volume consisted of xvi + 134 pages with 13 plates, and is one of the most attractive that the Society has produced. The Council wish to accord their hearty appreciation of the work of the Publication Committee, and also to accord their best thanks to those gentlemen who voluntarily came forward to help the Publication Fund, and whose names are printed on the inside of the cover of the "Abstract."

The following is a list of the additions to the Library, mainly by Donation and Exchange:

*Books.*

"British Lepidoptera," by J. W. TUTT, Vol. X, from Mr. STANLEY EDWARDS.

"British Lepidoptera: Moths," by WESTWOOD and HUMPHREY, Vols. I and II, from Mr. R. ADKIN.

"Ornithological Notes from South London," by Dr. POWER, from Mr. R. ADKIN.

"Transformations of Insects," by DUNCAN, from Mr. R. ADKIN.

*Periodicals, Magazines, etc.*

"Entomologist."

"Entomologist's Monthly Magazine."

"Irish Naturalist."

"Canadian Entomologist."

"Rochester Naturalist."

"Entomologisk Tidskrift."

"Bulletin de la Société Entomologique de France."

"Bulletin of the New Mexico College of Science."

"Entomological News."

"Philippine Journal of Science."

“Smithsonian Institute.”

“Essex Naturalist.”

*Reports, Transactions, Proceedings, etc.*

“Perthshire Society of Natural Science.”

“Croydon Natural History and Science Society.”

“Meeting of Delegates from the Corresponding Societies to the British Association.”

“Carlisle Natural History Society.”

“Manchester Entomological Society.”

“Lancashire and Cheshire Entomological Society.”

“Horniman Museum.”

“Proceedings of the East Kent Scientific and Natural History Society.”

“Kent and Surrey Footpaths Preservation Committee.”

“Texas Academy of Science.”

“Entomological Society of Ontario.”

“Holmesdale Natural History Society.”

“Torquay Natural History Society.”

“Yale University.”

“Connecticut Academy of Arts and Sciences.”

“Norfolk and Norwich Natural Science Society.”

“City of London Entomological Society.”

*Pamphlets, Separata, etc.*

“Annual Address to the Entomological Society, London.”

“Entomological Work of the Sugar Planters' Association of Hawaii.”

“Mammals of E. Africa.”

“Cleridæ of N. America.”

“List of Fishes found near Chicago.”

“Bolletino Lab. Zool. Portici.”

“Descriptions of New American Butterflies.”

“Memorials of Charles Darwin (Brit. Mus.).”

“Guide to Crustacea, etc. (Brit. Mus.).”

“British Vertebrata (Brit. Mus.).”

“British Basidiomycetes (Brit. Mus.).”

“Catalogue of Chalcididæ, Morley (Brit. Mus.).”

## The Lepidoptera of a London Garden.

By ROBERT ADKIN, F.E.S. *Read February 24th, 1910.*

DURING recent years a large number of local lists of Lepidoptera have been published. They generally deal with a district of considerable area, such as a county, a river valley, or some such tract of country. They also have the advantage, at any rate so far as concerns the number of species, of including the published records of very many years, and more often than not have to chronicle the disappearance of many species that were formerly to be reckoned among the regular inhabitants of the district. But it is seldom that so restricted an area as a small suburban garden has been dealt with, or that one is able, as in the present case, to start, if I may use the expression, with a practically clean slate. I should, perhaps, however, before dealing with the inhabitants of, and visitors to, my garden—for it is to this very circumscribed area that I propose to refer—give a general outline of its surroundings, and of the formation and extent of the garden itself.

Time was when Lewisham, where my garden is situated, was little more than a country village, and even within my own memory it was to be regarded as a country suburb of the great metropolis. In those days its lepidopterous fauna was by no means a poor one, as may be seen by the frequent mention of "Lewisham" as a known locality for this and that species in Stainton's "Manual," published 1857-1859. But all that is now, and for many years past has been, changed; the thickly hedged lanes and field paths that were Stainton's happy hunting grounds are now streets of houses, packed together as closely as the laws and regulations will permit. Stainton's own garden has been converted into a public recreation ground, in the midst of which still stands the house where so much of his work was done although now put to baser uses, but, happily, the name "Mountsfield," so well known to the older generation of entomologists, still figures on the notice boards placed at the gates by the London County Council, in whose care the ground is vested—a fitting memorial to the memory of so illustrious and amiable a man. The next property, at one time tenanted by Desvignes, also of some entomological fame, is occupied by a fever hospital. Beyond all this, on what was once a farm of nearly a square mile in extent, upwards of three thousand houses have been planted; then there is a railway shunting yard covering many acres, and again more houses and more houses. Thus are we shut off from any suspicion of open country; the scream of the factory whistles that disturb our early

morning slumbers, the grimy deposit with which the soot-laden air smothers all our green-stuff, bear eloquent testimony to our urban surroundings.

One of my earliest recollections is of a certain dairy farm, the only farm entered from the village proper, and which extended up over the hill to the adjacent parish of Lee. Almost before my school-days had ended this farm had become derelict, and it was not long before the hand of the builder was upon it; roads were cut and houses rapidly built over a great portion of it, but a couple of fields on the hillside facing Lewisham remained vacant for some years. Such a promising collecting opportunity as a bit of waste ground so near home was not to be missed, and we worked those fields as only youngsters can work, but they were most disappointing; *Plusia chrysitis*, it is true, was far more abundant than I have ever seen it elsewhere; *Camptogramma bilineata*, too, was to be had in any number, and *Botys ruralis* literally swarmed about the nettle patches, but we could find practically nothing else. After a time the roads were made over these fields also, houses built over the lower parts of them, and eventually the little bit of garden referred to in these notes was plotted out, and the house built just under the brow of the hill. Now, to build a house satisfactorily on a steep hillside always requires some amount of ingenuity, and the builder of this one evidently thought the simplest plan was to reduce the slope to the level by digging away the earth from the high part and depositing it upon the low; as a consequence, when I entered into possession of my garden in the winter of 1879—80, it was, from an entomological point of view, a practically sterilised bit of flat land with a steep little bank at the end of it, the whole measuring just 53 by 13 yards, out of which 14 by 12 yards is occupied by the house, and the adjoining plots had been similarly treated. Thus, we started with an absolutely barren garden in a neighbourhood that appeared to be almost as unpromising; yet it is remarkable what an amount of interest I have obtained from the species that have been noted within the four walls of that garden during those thirty years, possibly in many cases arrested on their wanderings by the favourable conditions offered them.

Having obtained possession of the ground, the next thing to be done was to lay it out. This was accomplished by turfing the centre part to form a grass-plot, with little round beds along its edges in which rose trees were planted, gravel paths were made round it, and flower beds formed between the paths and the walls, the beds being planted with more roses and a miscellaneous collection of flowering plants, *Clematis*, jessamine, honeysuckle, and sundry other creepers being arranged along the walls. The front garden was surrounded by a privet-hedge, and shrubs of *Euonymus* and the like were dotted about to take off the bareness. A summer-house also was erected at the end of the grass-plot furthest from the house, and, although not constructed with that particular object in view, it has

proved to be an exceedingly useful place in which to keep one's breeding-cages.

But the steep bank at the end of the garden was a bit of a puzzle ; to plant flowers upon its poor gravelly soil was evidently useless. I don't know whether it was simply a desire to have some of the more useful food-trees handy, or whether it was an inherent love of the woods that guided me in my ultimate decision to make it into a miniature forest. At any rate, a hunt was made for saplings : oak and birch, ash, wych elm, sallow, hawthorn, maple, plum, lime, and a sturdy young grey poplar were all appropriated and duly planted. A few brambles, a lilac or two, and a liberal supply of common sorts of ferns put a finishing touch to the whole, while dog's-mercury, a small species of willow herb and sundry other "weeds" soon came upon the scene uninvited ; some lived, some died, but of all the trees that particular grey poplar has been the most assertive. Ever since it was planted it has taken the lead of all the others, it has grown enormously, it is the bane of the gardener, its roots burst up the paths and grass plats, its catkins in spring and falling leaves in autumn keep the place in a continuous litter, and in summer the drip from its leaves is ruination to any flowers planted near it. Yet it is a delightful tree, its graceful branches, its fluttering leaves, its southing to the soft wind that comes up before the rain, all endear it to one's mind, and it supports a larger lepidopterous family than any other tree or shrub in the garden. *Amorpha populi*, *Dicranura vinula* and *Acronycta megacephala* have bred regularly in it for many years past ; a couple of *Dicranura bifida* that were found at rest near its base were ultimately traced to it, their empty cocoons being found upon its trunk in the following winter ; and although I have not actually found the larvæ upon it there can be little doubt that it is responsible for the numerous specimens of *Hedya aceriana* and *Grapholitha minutana* that are frequently taken at rest near by, while *Tachyptilia populella* feeds regularly within its rolled leaves, and in spring and autumn *Cyaniris argiolus* is wont to flit around its upper branches, its fluttering leaves apparently having some special attraction for it.

Several other of the common species also established themselves, *Camptogramma bilineata*, of course, soon put in an appearance ; *Cheimatobia brumata* is always present, and at times a positive nuisance ; *Euplexia lucipara* ravages the ferns, and is often ably assisted in its work of destruction by *Spilosoma lubricipeda* and *S. menthastri*, which also in company with *Mamestra brassicae*, *M. persicariae*, and *Hadena oleracea* sadly disfigure the geraniums in autumn. The rose trees support a numerous family of Tortrices, of which perhaps *Pardia tripunctana* is the most destructive, and still survives, although perpetual war is waged against it. Sundry dead fern-roots that occur from time to time may, perhaps, be attributable to the work of *Hepialus sylvanus* and *H. lupulinus*, both of which species have occurred sparingly but fairly regularly for many

years ; and it is possible that weak places in the grass-plot may not be altogether unconnected with the fairly regular occurrence of *Crambus geniculeus*, *C. hortuellus* and *C. culmellus*. If a plant of "genista" be turned out of the greenhouse after its spring blossoming or a broom bush be planted in the garden, where it seldom survives more than two or three years, it soon becomes tenanted by the larvæ of *Depressaria costosa*. Recently *Hyponomeuta cagnagellus* found out the *Euonymus* bushes, and considerably disfigured them by its larval webs. But as full details of the circumstances in which the various species have occurred are given in the following list, it is unnecessary that I should dwell further upon them here. In all, some one hundred and eighty odd species have been noted in the garden and house during the thirty years that I have been in possession ; those that have come to light or been found at rest in the house are included, but care has been taken to exclude any that may possibly have resulted from escapes from breeding-cages, or that have been intentionally liberated. One is a little inclined to wonder that some other generally common species have not been met with, and no doubt if a more constant watch could have been kept the list might have been considerably extended, but one cannot be always on the look-out even in one's own garden.

*Pieris brassicae*.—Fairly common ; larvæ not infrequent on nasturtium (*Tropaeolum majus*), in some years fairly abundant, notably in 1904.

*P. rapæ*.—By far the commonest butterfly ; larvæ frequent on nasturtium, and occasionally on canary creeper (*Tropaeolum peregrinum*).—This species also was abundant on the former plant in 1904.

*P. napi*.—A fairly frequent visitor. While plucking blossoms of white autumn anemone (*Anemone japonica*) on the evening of August 28th, 1904, a specimen was noted asleep on one of them, harmonizing so remarkably with its surroundings that but for the flower being gathered the insect would assuredly have been overlooked.

*Gonepteryx rhamni*.—On September 4th, 1898, an individual was seen flitting from flower to flower, apparently feeding, and was thus under observation for some minutes.

*Aglais urticae*.—An occasional visitor.

*Vanessa atalanta*.—An occasional visitor.

*Pyrameis cardui*.—Once seen, September 1st, 1883.

*Epinephele janira*.—Once seen, July 20th, 1901.

*Rumiccia phlæas*.—Once seen, September 29th, 1901.

*Polyommatus icarus*.—Once seen, June 13th, 1897.

*Ceustrina argiolus*.—Was not observed until 1901, but from that time it has been seen pretty regularly, both in spring and autumn, flitting around the poplar and other trees growing on the bank at the end of the garden, and occasionally along the Virginia creeper on the house.

*Smerinthus ocellatus*.—A specimen was taken at rest, June 5th, 1903.

*Amorpha populi*.—Frequently taken at rest since 1882, and appears to have bred regularly on the poplar since 1892.

*Dilina tilia*.—Occasionally at rest, or as larvæ, on lime tree.

*Macroglossa stellatarum*.—On July 29th, 1900, a specimen hovered for some little time along the trees on the bank, and then flew off; and on August 1st, 1904, another went through a similar performance.

*Sesia tipuliformis*.—Once at rest, July 1st, 1894.

*Nola cucullatella*.—Occasionally at rest, and has been reared from larvæ found on the whitethorn.

*Arctia caia*.—Larvæ not uncommon about the flower-beds.

*Spilosoma lubricipeda*.—Frequently at rest, and larvæ generally common, sometimes very abundant; in the autumn of 1905 they, with sundry other species, devastated the geraniums and other bedding plants. In 1891 a number of pupæ were found in the folds of a blanket that had been used as a covering for some rabbit hutches.

*S. menthastri*.—A fairly common species, but much less abundant than the foregoing.

*Hepialus humuli*.—At rare intervals a few specimens have hovered over the grass-plot in the evening.

*H. sylvinus*.—Frequently met with at rest.

*H. lupulinus*.—Frequently met with at rest.

*Zeuzera pyrina (asculi)*.—Occasionally seen flying over trees on bank.

*Orgvia antiqua*.—Constantly on the wing in autumn, and was seen as late as October 10th, 1909; the larvæ seem to have a special liking for the standard rose-trees.

*Dicranura bifida*.—A freshly emerged male was taken at rest on June 30th, 1898, and a female a few days later; in the following winter their empty cocoons were found on the stem of the poplar tree.

*D. vinula*.—Larvæ and ova have been found frequently on the poplar tree.

*Notodonta dictæa*.—A specimen was found at rest on the summer-house, August 16th, 1899.

*N. siczac*.—A larva, found on the poplar in 1882, produced a fine female in the following year.

*Phalera bucephala*.—Not often seen, but at times the larvæ strip the branches of the birch, lime, willow, and even oak trees.

*Bryophila perla*.—A few odd specimens have been taken from time to time at rest on walls.

*Acronycta psi*.—Larvæ generally present on the rose trees, but not in any great numbers; have also been taken on *Pyrus japonica*; the imago is seldom found.

*A. aceris*.—Occasionally at rest, and in 1884 a larva was found on the maple.

*A. megacephala*.—Frequently at rest since 1891, and larvæ have occurred regularly on the poplar, being most often seen hiding in the bark since 1898, but have been much more common in some years than in others.

*Leucania lithargyria*.—Once, at light.

*L. conigera*.—Has twice been found at rest.

*L. impura*.—Once, at rest.

*Hydræcia micacea*.—Once, at rest.

*Xylophasia monoglypha*.—Often disturbed from the flower-beds and occasionally at rest.

*Dipterygia scabriuscula*.—On July 14th, 1899, one came to light in house, and on 20th another.

*Luperina testacea*.—Occasionally at rest; also comes to light.

*Mamestra brassicæ*.—Frequent at rest, and larvæ generally common in autumn; sometimes abundant, notably in 1891, when those of this and the following species with *Hadena oleracea*, *Spilosoma menthastri*, *S. lubricipeda*, etc., practically demolished the geraniums, dahlias, and other bedding plants, and even attacked the Virginia creeper.

*M. persicariæ*.—Occasionally found at rest or disturbed from the flower-beds, but more often seen as larvæ in autumn.

*Apamea basilinea*.—Frequently at rest, and rarely comes to light.

*A. didyma (oculea)*.—Odd specimens have turned up from time to time, usually coming to light.

*Miana strigilis*.—Has occurred fairly regularly each year since 1889, a few each year, and with one exception have all been var. *æthiops*.

*M. fasciuncula*.—Two specimens were taken at rest, one in the house and one in the garden, in 1891.

*M. bicoloria*.—Occurs sparingly.

*Caradrina morpheus*.—Odd specimens have been taken from time to time.

*C. taraxaci (blanda)*.—Only once met with.

*C. quadripunctata*.—Once, at light.

*Agrotis puta*.—One, taken at rest.

*A. segetum*.—Once came to light in house.

*A. exclamationis*.—Fairly common; probably breeds here.

*A. corticea*.—On the morning of July 3rd, 1895, a fine specimen was taken at rest in the house, evidently having been attracted by the lights of the previous evening.

*Noctua plecta*.—One was bred June 6th, 1882, from a larva taken on the flower-beds in the previous autumn.

*N. xanthographa*.—One or two picked up almost every year.

*Triphaena ianthina*.—Occasionally taken at rest.

*T. comes*.—By no means common, but has been taken from time to time at rest or bred from larvæ.

*T. pronuba*.—One of our commonest garden moths; seems to have a habit of hiding behind larva cages, under any old newspaper or bit of sacking that may be left about, and in flower-pots; darts out from

the plants when the garden is being watered ; often comes to light in the house, and has been reared from larvæ found on the rockeries and about the Virginia creeper.

*Amphipyra pyramidea*.—One was disturbed from hiding in summer-house, and captured, August 6th, 1908.

*Mania typica*.—Occasionally taken at rest and reared from larvæ. On September 8th, 1889, about forty young gregarious larvæ were found on the underside of a geranium leaf ; they were brought into a warm room and fed upon dock leaves, producing a rather fine series of this species during the following January and February.

*M. maura*.—Rarely seen until 1904, when it became common, frequently coming to light in house, where it was pursued and, when captured, readily eaten by the cat. A few have been noted each year since.

*Teniocampa incerta*.—Once reared from a mixed lot of larvæ collected about the garden.

*T. stabilis*.—Once at rest.

*Anchocelis pistacina*.—Two or three specimens only have come under my notice.

*A. lunosa*.—One came to light in house September 12th, 1899.

*Dianthæcia capsicola*.—Larvæ occur frequently in seed-heads of *Silene inflata*, originally grown from seed, but the number of specimens reared has been comparatively small owing to the attacks of a dipterous parasite.

*D. cucubali*.—Once as above.

*Euplexia lucipara*.—Very common, both as larva and imago.

*Phlogophora meticulosa*.—Occasionally taken at rest.

*Hadena dentina*.—A few have come to light in house.

*H. trifolii (chenopodii)*.—Ditto, and found at rest in garden.

*H. oleracea*.—Fairly common, both as larva and imago.

*Gonoptera libatrix*.—One bred, November 1st, 1881, from a larva found on the poplar.

*Habrostola triplasia*.—Occasionally found at rest, and has come to light.

*Plusia gamma*.—An uncertain species, hardly seen in some years, at other times very abundant, notably in 1892, when, on May 24th, a hot day with a light south-westerly wind, it suddenly became very abundant, and continued so until June 10th, when the weather became cool and cloudy with a north-east wind, and thenceforward only an odd specimen was occasionally seen. In 1898 it was first noticed on August 12th, when a few were seen hovering about the garden flowers ; then it increased in numbers until September 11th, on which evening it was very abundant ; from that time it dwindled in numbers, the last being seen on October 2nd ; between these latter dates several had been noted resting in the corners of the ceilings in the house, and two or three were picked up dead in the garden. Again, in 1904, I find no note of the species until August 1st, when it suddenly became very common, a large, white jessamine

which occupies about half of one of the garden walls being literally full of them of an evening, but the swarm does not appear to have lasted many days.

*Catocala nupta*.—One was taken at rest on the stone-work of the front of the house July 30th, 1896.

*Zanclognatha grisealis*.—A couple were taken on the wing in 1892, and another in 1897.

*Z. tarsipennalis*.—One in 1891 and another in 1908.

*Hypena rostralis*.—Fairly common; appears to have a fancy for resting in the bathroom, no doubt with a view to hibernation in snug quarters.

*Urapteryx sambucaria*.—Often seen upon the wing, and once reared from a larva taken on a clematis.

*Rumia luteolata*.—Occasionally at rest; more often on the wing in the evening.

*Crocallis elinguararia*.—Has several times been taken at rest; and a brood was reared July, 1888, from ova found on a lilac twig in the previous year.

*Biston hirtaria*.—Frequently found at rest, and reared from larvæ taken on rose and oak. On two occasions when I have been rearing the species males have been found resting on the outsides of the breeding-cages in the morning, evidently attracted by the freshly emerged females inside.

*Amphidasys betularia*.—The only specimens seen were a typical form at rest May 31st, 1892, and a pair consisting of male var. *doubledayaria*, and female of a rather darkly speckled form taken June 3rd, 1908 ("Proc.," 1909, p. 105).

*Hemerophila abruptaria*.—Commonly found at rest; seldom comes to light.

*Boarmia repandata*.—One was taken at rest July 5th, 1889, and another July 18th, 1897.

*B. gemmaria*.—Commonly found at rest, especially under a small lean-to roof on the bank under the trees; also occasionally in the house, probably attracted there by the lights.

*Acidalia dimidiata (scutulata)*.—Once taken, July 24th, 1891.

*A. dilutaria (iuterjectaria)*.—Has occasionally been met with.

*A. virgularia (incanaria)*.—Has always been fairly common, but more so during the past few years than formerly.

*A. aversata*.—A fairly common species, the plain and banded forms occurring in about equal numbers.

*Halia vauaria*.—Occasionally at rest, but not common.

*Panagra petrararia*.—One came to light in house, June 10th, 1895.

*Abraxas grossulariata*.—Commonly found at rest, on wing at dusk, and in the house at light; and as larvæ on the *Euonymus* bushes.

*Cheimatobia brumata*.—Larvæ very common on birch, white-thorn, etc.

*Oporabia dilutata*.—One was taken at rest on garden wall, October 23rd, 1898.

*Eupithecia pulchellata*.—One came to light in house, September 6th, 1899. (Two or three others were seen on gas lamps in the neighbouring streets about the same time.)

*E. oblongata (centaureata)*.—Not infrequently found at rest.

*E. subnotata*.—Occasionally found at rest, and has come to light.

*E. vulgata*.—Fairly common.

*E. rectangulata*.—Often found at rest on the walls, and invariably of the black form.

*Hypsipetes sordidata (elutata)*.—One taken on wing July 20th, 1896.

*Melanippe sociata*.—On August 14th, 1897, one was disturbed from among the flower-beds whilst they were being watered; and on August 3rd, 1905, another was found at rest on outside of window.

*M. fluctuata*.—Common and variable.

*Anticlea badiata*.—One was taken on the wing at dusk, April 21st, 1885.

*A. nigrofasciaria (derivata)*.—Once found at rest on wall, May 6th, 1905.

*Coremia ferrugata*.—One flew out from the flower-beds whilst they were being watered, July 15th, 1905.

*Camptogramma bilineata*.—A colony appears to have established itself on the bank in 1885 and has since maintained itself there; the moths flit about under the trees each summer and rest on the wall, but seldom venture further up the garden.

*Phibalapteryx tersata*.—First noticed in 1900, since which time one or two have been seen each year.

*Aglossa pinguinalis*.—Fairly common; often at rest in house.

*Pyralis costalis*.—One at rest in bathroom, October 7th, 1906.

*P. glaucinalis*.—Once, August 29th, 1902.

*P. farinalis*.—Occasionally at rest on walls.

*Scoparia cembrae*.—One was taken flying over grass-plot, July 18th, 1901.

*S. murcurella*.—Fairly common, usually comes to light in house.

*Nomophila noctuella (hybridalis)*.—On May 30th, 1892, one was taken on the wing, and on July 31st, 1904, another; each occasion was at a time when *Plusia gamma* occurred in unusual abundance.

*Pyrausta aurata (punicealis)*.—Three specimens have been taken between 1888 and 1907.

*Endotricha flammealis*.—Since 1899 has been taken fairly often, usually coming to light through the open windows.

*Eurrhypara urticata*.—Rather common.

*Botys ruralis (verticalis)*.—Once flying at dusk, June 18th, 1891.

*Ebulea sambucalis*.—Odd examples have been taken.

*Pionea forficalis*.—Almost common.

*Platyptilia gonodactyla*.—On May 25th, 1892, one was taken on the wing, and on August 7th, 1906, one came to light.

*Mimaseoptilus pterodactylus*.—Once, on wing, July 12th, 1889.

*Pterophorus monodactylus*.—One was found in house, November 16th, 1889.

*Aciptilia pentadactyla*.—Fairly common.

*Crambus pratellus*.—The rarest of any of the Crambi that favour us; twice seen in 1902, and once in 1906.

*C. pascuellus*.—One taken in 1899, two in 1906, and another in 1907.

*C. tristellus*.—Common in 1887; odd specimens have occurred since.

*C. geniculeus*.—By far our commonest *Crambus*, first noted in 1887, but not seen again till 1898, since which year it has become decidedly common; no doubt breeds in the garden.

*C. culmellus*.—Fairly common since 1899.

*C. hortuellus*.—Frequently met with, and in 1900 was unusually common.

*Tortrix podana*.—Less common than formerly; some of the specimens are almost black.

*T. xylosteanæ*.—Odd examples have been met with from time to time.

*T. sorbiana*.—Once, June 12th, 1889.

*T. rosana*.—Not uncommon; has been reared from larvæ taken on plum tree.

*T. heparana*.—Occurs sparingly; has been reared from rose.

*T. ribeana*.—Fairly common.

*T. unifasciana*.—Very abundant, especially about the privet hedge.

*T. viridana*.—Once at rest on window of summer-house under oak tree, July 5th, 1906.

*T. forsterana*.—Several were taken between 1886 and 1890; has not been seen since.

*Peronea sponsana*.—Once at rest on summer-house, September 29th, 1906.

*P. variegana*.—Fairly common, often bred from rose, etc.

*Penthina pruinana*.—Has occurred sparingly.

*P. ochroleucana*.—Was fairly common from 1887 to 1889, and in the latter year was bred from rose.

*P. variegana (cynosbatella)*.—Sometimes rather common.

*Hedya ocellana*.—Very common.

*H. aceriana*.—Common; breeds regularly in the poplar.

*Spilonota rosæcolana*.—Once, July 12th, 1887.

*S. roborana*.—Fairly common; breeds in the rose trees.

*Pardia tripunctana*.—Much too common for the welfare of our rose crop, the larvæ seriously damaging the flower-buds. The abundance or otherwise of this and some few other species appears to depend largely upon the amount of "cleaning" that the rose trees get in spring.

*Aspiza udmanniana*.—One taken, July 24th, 1888.

*Sericoris lacunana*.—Two or three have been met with from time to time.

*Orthotania striana*.—Was fairly common from 1886 to 1899, but has been less so recently.

*Sciaphila subjectana*.—Once, July 21st, 1886; was formerly an abundant species in the neighbourhood.

*Grapholitha minutana*.—Not uncommon since 1894; probably breeds in the poplar tree.

*G. nevana*.—Once only, July 14th, 1889.

*Batodes angustiorana*.—Fitful in appearance; was common in 1899.

*Pedisca bilunana*.—Odd specimens have occurred.

*Semasia weberiana*.—Sometimes fairly common; probably breeds here.

*Carpocapsa pomonella*—Once, on July 18th, 1886.

*Euprecilia dubitana*.—One was taken at light in house, August 19th, 1898.

*Monopis (Tinea) ferruginella,*

*Trichophaga (Tinea) tapetzella,*

*Tinea fuscipunctella,*

*T. pallescentella,*

*T. cloacella,*

*Incurvaria capitella,*

} Odd specimens have occurred in house from time to time, in some cases no doubt attracted by the gas-light.

*Hyponomeuta padellus*.—At times only too common: in 1886 the whitethorn was smothered with its larval webs, and for several years after it was more or less troublesome. It was then hardly seen for a time, but in 1901 the moths were noted in some numbers, although no webs had been observed on the trees in spring.

*H. cagnagellus*.—In 1907 the *Euonymus* bushes were smothered with the larval webs, in common with those all round the neighbourhood, although neither in the garden nor, indeed, in the surrounding district had the species been previously noted ("Proc.," 1907, p. 83).

*Prays curtisellus*.—Once, at rest on garden wall.

*Plutella cruciferarum*.—Once, on wing in house.

*P. porrectella*.—Abundant in May, 1884, no doubt having bred in some plants of garden rocket (*Hesperis*), and continued more or less commonly until cultivation of the *Hesperis* was given up.

*Harpiteryx xylostella*.—Once, July 19th, 1901.

*Phibalocera quercana*.—Odd examples have been taken from time to time, and have been reared from larvæ taken on oak tree.

*Depressaria costosa*.—Whenever plants of "genista" (*Cytisus canariensis*) are put out of doors after their spring blossoming they soon become infested with the larvæ, and it has been found on broom whenever that shrub has been grown.

*Recurvaria nanella*.—Occasionally common on the trunk of the poplar; evidently strays from my neighbour's pear-trees, and seeks shelter on the rough bark of the poplar.

*Tachyptilia populella*.—Breeds regularly in the poplar tree.

*Harpella geoffrella*.—Odd specimens occur from time to time.

*Dasycera sulphurella*.—Sometimes fairly common.

*Ecophora pseudopretella*.—An all too abundant pest, infesting one's pupa-cages, devouring the pupæ, and breeding in any sort of refuse it can find, even rotten wood, dried leaves, and larvæ frass affording it sustenance. Appears to be particularly fond of flying in the shade of the trees on the bank on mild evenings, and assembles freely; a freshly emerged female in a breeding-cage will attract dozens of males. Breeding-cages appear to be infected by the females buzzing around them or over their tops, and squirting their eggs through the lino or perforated zinc, or whatever the cages may be covered with.

*Ecogenia quadripunctata*.—Rarely at light in house.

*Endrosis fenestrella*.—Another pupa-cage pest, also very frequent about house. On one occasion I had a quantity of port wine laid down for some years in the cellar of the house, sawdust being sprinkled freely about the bottles, the corks of which were found to be infested with larvæ, and the sawdust was a good deal webbed. Shortly afterwards the cellar was found to be swarming with moths of this species, the inference being that they had come from the larvæ in the corks.

*Glyphipteryx equitella*.—A solitary one, June 27th, 1886.

*Gracilaria stigmatella*.—Two bred, November 11th, 1888, from larvæ taken in rolled leaves of the willow bush.

## Notes on *Hepialus Humuli* and its Shetland Forms.

By ROBERT ADKIN, F.E.S. *Read April 14th, 1910.*

ATTENTION appears to have been first called to the remarkable forms of *Hepialus humuli*, that are now so well known to occur in Shetland, by Edward Newman, who, in a note published in February, 1865, under the heading of "Singular Geographical Race of *Hepialus humuli*," refers to a series exhibited at the January meeting of the Entomological Society by Mr. Bond, and subsequently placed in the British Museum Collection. Newman concludes his note with the remark, "Should these specimens prove anything more than a geographical race and be received as a species, I would propose for them the name of *Hepialus thulensis*" ("Entom.," vol. ii, p. 162).

In the following month, W. D. Crotch, who appears to have been a frequent visitor to Shetland, wrote under the heading "*Hepialus humuli*, var. *thulensis*," saying that four years previously he had taken a long series of these forms in Unst (Shetland), and tried at the time to create some little interest in them. He then goes on to say, "Such geographical races are of great interest, only I should be very sorry to see new names affixed when the original names marked *var.* would prevent undue multiplication of species, and indicate both a principle and a fact. The insect in question would thus stand as *H. humuli*, var. *thulensis*" ("Entom.," vol. ii, p. 176).

Dr. Knaggs, in the "Annual" for 1865, refers to the museum series, and is "inclined to consider them a climatic variety or race of our common *H. humuli*" ("Ent. Ann.," 1865, p. 98).

These notes appear to have had the desired effect of creating an interest in the Shetland forms of *H. humuli*, and further, a desire on the part of some entomologists to show that similar forms were to be found elsewhere; thus, in the following February J. O. Westwood published the translation of a letter received from M. Snellen von Vollenhoven, in which he says that "*H. humuli* was very abundant near the little lakes of Rotterdam. M. P. Snellen found near those waters a very interesting male specimen with female coloration on the upper side" ("Entom.," vol. iii, p. 27). Then in March, Albert Müller, in a note under the heading of *H. humuli*, var. *thulensis*, draws attention to an article in the "Entomological Magazine," vol. i, p. 42 (published 1832), where George Wailes in "A Catalogue of a few Insects found at Castle Eden Dean," says he has taken "specimens of *H. humulus*, with the anterior wings of a yellow tinge; and my friend Mr. Hewitson has shown me similar specimens, captured in the Orkneys this season, which have very distinct

markings on the anterior wings." Müller considers that this "establishes the fact that, besides the Shetlands, the Orkneys also possess a race of *Hepialus* of their own." He then speculates that the Hebrides would also yield a peculiar local variety, and asks whether *H. humuli* has ever been taken in Western Ireland, and if so, does it vary from the normal English type? ("Entom.," vol. iii, p. 58). This latter query was very quickly answered. Edwin Birchall, who, it will be remembered, had made a special study of the Irish Lepidoptera, said that he had "not observed any variation from the ordinary English type" in those that he had taken in the West of Ireland ("Entom.," vol. iii, p. 71). Then we have "Notes on the Lepidoptera of Orkney," by J. Trail, in which *H. humuli* is recorded as "very common," but no mention is made of any variation in the specimens ("Entom.," vol. iv, p. 197).

The matter seems then to have been forgotten for some years, until in 1880 Meek sent a collector to Shetland for the season, and he brought back with him, among other things, a long series of *H. humuli*. Jenner Weir wrote a long description of this collection, devoting a considerable portion of it to the forms of this species which he referred to as *Hepialus humuli* variety *hethlandica*, Stg. ("Entom.," vol. xiii, p. 250). Why Weir should have adopted Staudinger's name in preference to Newman's *thulensis* seems to be a mystery; and why we should continue to use it to distinguish these Shetland forms, especially after the protests of both South and Dale ("Entom.," vol. xxvi, p. 100, and vol. xxxv, p. 170), and Staudinger's correction in his 1901 catalogue (where, by-the-by, he assigns *thulensis* to Crotch, evidently considering him as the first to apply it definitely in the varietal sense, although it was clearly applied to these Shetland forms by Newman), is truly remarkable.

As to the probability of var. *thulensis* occurring elsewhere than in Shetland, we have now much more information than we had in the "sixties." Orkney, the Hebrides, remote parts of the Scottish mainland, Castle Eden Dean, and practically the whole of the rest of England and many parts of Ireland beyond those mentioned by Birchall have been well worked since those days, yet none of them appear to have produced anything at all resembling the Shetland specimens; indeed, the more we see of the species from one part of the country and another the more are we convinced of its constancy to the type, especially in the male. The old records above referred to that appear to throw some doubt upon this point must, I think, have been founded upon a misapprehension either of what the var. *thulensis* really was, or the place from which the specimens that were supposed to resemble it really came. So far as our present information goes we must conclude that var. *thulensis* occurs only in Shetland, and even there its range appears to be restricted—perhaps one of the most remarkable cases known of a strongly divergent form of a generally constant species being confined to a very limited area.

## Larval Legs.

By ALFRED SICH, F.E.S. *Read April 28th, 1910.*

THE organs of locomotion usually possessed by a lepidopterous larva are three pairs of thoracic legs, which, being the true legs of the insect, develop subsequently into the legs of the imago. Then there are four pairs of ventral prolegs and one pair of anal claspers. These, being of no use to the insect after the larval stage is over, are absent in the imago, though the scar-like marks of some of these processes are generally traceable on the ventral surface of the pupa. The ventral prolegs and the anal claspers are furnished at the apex with a more or less complete circle of small hooks called crotchets. Dr. Chapman has pointed out that the *Obtectæ* have a series of these crotchets on the inner side of the prolegs only, and the *Incompleteæ* an entire circle, so that we may take the former type as belonging generally to the *Macrolepidoptera* and the latter to the *Microlepidoptera*. The crotchets on the anal claspers are usually arranged in a horse-shoe fashion with the open end of the shoe at the posterior end of the claspers. In attempting more or less successfully to rear *Lepidoptera* from the egg, I have had some opportunities of noting how and at what stage of larval development these legs and prolegs occur in various types of larvæ. In the *Nepticulids* the larva, when newly hatched, has no legs at all, but on the venter of the meso- and metathorax there is a slightly raised ridge running transversely across the segment. In the second instar these two segments have each a pair of pad-like processes which are really not connected by a ridge, while in the fourth instar these pads are much larger, and each is furnished beneath, on the sole, with a transverse row of three tubercles, each with a long seta directed backwards. These setæ must materially aid in preventing the larva from stepping backwards. The prothorax has no pad at all, and I believe the reason is that if it had it would come in the way of the larva when thrusting out its head while feeding. In this fourth and last instar the larva also possesses at least six pairs of primitive prolegs, the extra pairs being on the second and seventh abdominal segments respectively. It is a question whether the first abdominal is or is not furnished with prolegs. My own opinion is that it does carry a pair, but that these are much less developed than the others, and are not used in progression. It may be that the ancestral *Nepticulid* had the pair in question as large as the others, but that the pad on the metathorax increasing in size did most of the work of these two segments, and that now, for want of use, the

prolegs on the first abdominal are in process of being lost. In some species of Nepticulids the primitive anal claspers are more developed and more used than in others. There are no crotchets on any of these prolegs. Thus, in the Nepticulid larva, we see no true thoracic legs at all, and yet the imago has very strong legs, and makes very active use of them.

In *Cemiostoma laburnella* we find the newly hatched larva without any legs. In the second instar the cushion-like pads appear on the meso- and metathorax, while in the third instar the larva has a small pair of pads on the prothorax, and larger pads on the other two thoracic segments; each of these pads bears a small chitinous claw. The third, fourth, fifth and sixth abdominal segments have prolegs, of which the two middle pairs are larger than the others. These two larger pairs are so strong that the larva can stand on them alone, elevating all the other segments. There are no crotchets on these prolegs. In the fourth instar the arrangement is the same, but the prolegs bear one circle of from fourteen to sixteen crotchets, while the anal claspers are well developed, and possess the usual three quarters of a circle of crotchets.

The larva of *Chrysopora hermanniella* leaves the egg already provided with three pairs of thoracic legs, but has no ventral prolegs or anal claspers. In the second instar it has developed both prolegs and claspers, but these are without crotchets. In the third instar the prolegs are larger, while in the fourth instar they are still slender, and only have a few crotchets, not a complete circle.

The few species of the genus *Coleophora*, which I have seen in the first instar, are all provided with legs, prolegs, and claspers before leaving the egg. In this genus, however, the ventral prolegs appear to be a very unstable quantity, in respect to both the number of pairs and number of crotchets. Some species have only three pairs, and others four pairs of ventral prolegs, while the number of crotchets to each leg often differs considerably, even in the same larva. I remember examining a larva of *Coleophora genista* which had a different number of crotchets to each leg, one of the legs having no crotchets at all. The weakness of the prolegs in the genus *Coleophora* is no doubt accounted for by the case-bearing habits of the larvæ. When climbing about the plants they feed on they carry the sack with them, and use only the thoracic legs as a means of progression. The anal claspers are well developed, and I believe the case is chiefly held by them, as I have elsewhere stated. I have taken many species out of their cases for a while, and found that they all crawl about with their thoracic legs, without making any use of the prolegs at all.

The only member of the *Pyralidæ* of which I know the first instar is *Scoparia muralis*. Mr. South kindly gave me eggs of this species, and I noted that the larva on hatching was provided with legs, prolegs, and claspers, and was very active.

Many Noctuid larvæ when quite young make very little use of the

first two pairs of prolegs, but the young larvæ of *Heliothis peltigera* uses all alike.

It seems rather strange that in the *Pieridæ* the larvæ are born with a complete circle of crotchets to the prolegs. *Pieris daplidice* has in the first instar a complete circle of from fourteen to sixteen crotchets. In the second instar the larva has an inner row of about a dozen crotchets and an outer row of a few smaller ones, with entire breaks between the two rows. The prolegs in the third instar carry an inner row of from sixteen to twenty crotchets, and an outer row of from three to six small ones. In the fourth instar the outer crotchets have disappeared, and there are two rows of crowded crotchets, about forty altogether, on the inner side of the foot, and just outside these there are from eighteen to twenty larger crotchets, but all towards the inner side of the leg. Unfortunately, I have no note of the crotchets in the fifth or last larval instar, but presume they would be similar to those of the fourth instar.

From such meagre facts it would not be safe to generalize at all; but it appears that in the lepidopterous larva the thoracic legs were first developed, and that when the prolegs appeared they had no crotchets, but subsequently developed a circle of them, of which the inner half only now persists in the full-fed larvæ of some of the higher forms of Lepidoptera; and lastly, that the number of crotchets per proleg is larger in the higher forms than in the lower, although they are confined to one side of the foot.

## A Few Days with the Butterflies of Zermatt.

By H. J. TURNER, F.E.S. *Read May 12th, 1910.*

IT was with many misgivings that on the morning of July 23rd, 1909, my wife and I started on our annual holiday among the butterflies of the Continent. Reports had told a by no means flattering tale of the weather: day after day, week after week, of rain or absence of sun. However, we were again fortunate, for on not one day of the three weeks we were away from home did the sun wholly hide his face, and many days were perfect from sunrise to sunset.

After a delightful week spent around the beautiful eastern end of the Lake of Geneva, on July 30th we started in the early morning from Montreux Station *en route* for Zermatt. Entering the Rhone valley at Villeneuve we soon reached the narrow bend of the river at Martigny, and sped rapidly past Sion, with its arid castle-crowned hills in mid-valley, to Visp. Here we changed to the slow mountain railway which runs up to our destination, Zermatt, with its stupendous Matterhorn, familiar enough from pictures, but as yet not previously seen by either of us.

As the train slowly ascended, the scenery became increasingly grand: romantic bridges over wild ravines, vistas of snow-capped ridges, successions of huge precipices, torrents of madly rushing glacier water—

“With the silver song of some mountain home  
In every splash of its boiling foam.”

The views I am passing round will give some idea of the beauties of Nature, through which, all too rapidly nowadays, the train takes us.

The day was a perfect one, and after a hearty meal the net was grasped; and, although it was late afternoon, we sallied forth up the quaint, narrow street of Zermatt towards the entrance of the Zmutt Thal, the valley on the northern flank of the Matterhorn. Many of the higher peaks lose their impressiveness from the close proximity of others of almost equal elevation. But the Matterhorn stands majestic and defiant in its isolated grandeur, and not a whit does close acquaintance belie its reputation as a mountain of mountains.

One does not go miles in search of butterflies at Zermatt; they thrust themselves upon one. *Parnassius apollo* is rarely out of view, as it flops unsteadily from one bunch of flowers to another—not that it cannot fly when once it is roused. Before leaving home

I made the usual "good resolution" that I would bring back none of them, but I found more than a dozen picked specimens in my envelopes. *Pararge mæra*, the near relative of our *P. megæra*, was going over; most examples were dark, and the undersides were dull, showing nothing of the beautiful soft, silvery grey of specimens sent me by Mr. Harrison from the Bernese Oberland in 1907. Only two other Satyrids were noted, *Cænonympha pamphilus* and *C. satyrion*, both considerably worn, the former species having very dusky undersides. Here occurred the only specimen of *Colias hyale* seen during the three weeks; it was a somewhat damaged male, but rather noticeable as having very large discoidals on the fore-wings, and only a mere trace of black marginal markings on the hind-wings, with a corresponding shortage of black on the fore-wings. The Brentheids were *B. amathusia* and *B. pales*, the specimens of the former species somewhat small.

A large and most beautiful bed of wild thyme and other flowers drew me from the rough path to the uncultivated boulder-strewn slopes, and during the short time the sun was in position to light the spot I revelled in the sight. Among the varied and abundant assortment, one of the most conspicuously in evidence was that brilliant "copper," "*Heodes virgaureæ*." All were in good trim, and some specimens had two or three black spots across the disc of the fore-wings (var. *mięgii*), but, as is usual in the Alps, not so pronounced as the forms Dr. Chapman has shown us from the Spanish Meseta. The females were only just emerging—not the usual copper-coloured forms with black blotches, but the var. *zermattensis*, very dusky in ground colour, with suppression of all the coppery colour. In some of the males there seemed a tendency for the black submarginal spots on the hind-wings to stand away from the black margin, instead of running into it. Numbers of *Lycæna arion* were observed, all of the dusky form, var. *obscura*. I believe that it is rarely that the type form occurs above 3000 ft. in the Alps. A very nice female of *Polyommatus icarus* was captured here. The spotting of the underside was emphasised; the discoidals on all four wings were very large; the submarginal spots were somewhat elongated; the spot nearest the inner margin was united by a wide, curved, black continuation, joining with the spot in the centre of the inner margin. At first it suggested itself as *P. escheri*; but in the field one is often apt to confuse closely allied species. *Cupido minimus* was very worn—of course, the first brood. At Winchester the English first brood was well out in mid-June. Probably at this elevation there would be no second appearance. Only one representative of a species I much wanted, *Aricia eumedon*, fell to the net; while, although numbers of *Albulina pheretes* were seen, not a specimen worth keeping could be obtained. In a short time at least a dozen species of butterflies were obtainable, and that in late afternoon, besides plenty of Heterocera; among them not the least conspicuous were several species of *Anthrocera*. Many things were neglected,

I fear, and in such glorious and majestic surroundings one must be excused for not spending the whole time in "mere" entomology. In revelling in the sun's declining rays, and in jostling each other on the flower heads, *Anthrocera lonicera* and *A. pilosella* were most persistent. The former species was abundant, but as to the prevalent form, I fear my knowledge of the species is much too limited to determine. One specimen was a very nice aberration, having the blotches united in pairs, and extended with wide bands of colour uniting the outer blotch and the double inner blotch with the double central blotch. The specimens of *A. pilosella* were small in size. Among them was an example of *A. achilleae* in very good condition. No other specimen was seen during my stay. A Geometer I took here, Mr. Prout tells me, is a female of *Larentia scripturata*.

When one is not alone entomology must not occupy every minute of the holiday. There was a call for tea, and a return was made to search the quaint single street of the village for a suitable resort. What a mixture of contrasts! Palatial, substantial hotels, humble, rough wooden huts, jewellers' emporiums, cobblers' shops, decorated refreshment houses, street stalls of all kinds, tobacconists'—where tourists of every country may find each his own especial brand—booksellers' shops, where a goodly assortment of English sixpenny novels are displayed, and numerous shops where may be obtained all the "*olla podrida*" likely to be asked for by tourist, curiosity seeker, or memento enthusiast, all jumbled together confusedly, making this spot one of the wonders of the world. Tea, English-like tea, is not always to be obtained far away from our own little island, but we eventually did find a little retired nook where they could make it, and we tea'd. The next important item in the programme of the day-long wanderer in this delightful mountain air is dinner. That over, then the after-dinner walk, the smoke, the music, the coffee, or what you like. 'Tis strange; I rarely go to a fresh place, for only a few days even, but I meet with some one I have met before, or a well-known friend unexpectedly turns up. This evening, no sooner was I comfortably seated, than a gentleman whom I knew well professionally, sat himself at the next table.

July 31st showed every sign of fair weather, so we started for a long day's ramble, having decided to follow up the Zmutt Valley for some distance till we could find a way to cross the gorge and torrent, and to return through the wooded slope on the left bank in the afternoon. Most of the early portion of the day was spent on the beautiful, sparsely wooded, mountain slope, which faced the south, looking straight on to the Schwarze and the Matterhorn. Here there was abundance of treasures, and consequently no great distance was traversed.

A favourite species of mine, *Pararge mæra*, was in numbers; one female was rather light in ground colour, but not an approach to the beautiful specimens obtainable in the Pyrenees. The undersides were also more soft and delicate than those generally met with high

up. We, who go out in late July, only meet with *Melitea phæbe* in rags, so that I merely record it. The males of *M. didyma* were abundant, but no females were taken. The specimens were somewhat small, generally uniform in marking, but very rich in colour. Apparently the species was just emerging. The undersides varied much in the lighter colouring from very white to golden. In one example the submarginal black spots were extended inwards as wedges across the white band just to touch the succeeding yellow band.

*M. parthenie* var. *varia*, the mountain form, or, as some think, a true species, was difficult to see as it flew along low down among the rough growth; some half a dozen nice specimens were captured. *M. athalia* was common in places at flower-heads, but not in its prime. Of course, *Argynnis niobe* was there in its usual numbers, mostly var. *eris*, the form without the silver underside. The males were small compared with what I have usually met, and one example had somewhat dwarfed markings. *A. aglaia* was also, as usual, in numbers, particularly in the corner near the Gorner path bridge. Somehow, one does not meet with many females of these species; possibly one captures a few as samples, and those few are male specimens that force themselves upon one. Among these two species I was delighted to capture for the first time an *Issoria latona*. What a gorgeous thing alive, and how strong. Although smaller, it strikes one as having more power of smash, bang, than either of its companion relations. *Pieris napi* var. *bryoniae* was in evidence, or rather portions of them; only one specimen was in anything like good condition, and that I saved to send to Mr. Main, but lost the post; the rest were spent and ragged, useless for ova. They were small in size compared with one or two odd ones I have from the Simplon.

A remnant of spring was met with here in a worn female *Euchloë cardamines*, certainly a species one did not expect either at so late a date or at 5600 feet up. How much alike *P. apollo* and *Aporia crategi* fly! Many of the former were certainly seen; those that came within reach of net or settling were examined, and among them a few *A. crategi* were met with. A very nice female specimen of *P. delius* was captured, but no others were found. The red-centred blotches on the fore-wings are very conspicuous in this example.

In the meadows beyond the Zmutt summer village plenty of *Colias phicomone* were flying over the recently cut grass, careering up and down in genuine *Colias* fashion; still, it was no trouble to soon get a series. A few *Brenthis euphrosyne* were taken, but going over in condition. Plenty of *B. pales* were flying about the runnels and damper sections of the uneven pasture land, showing very little sexual difference in either colour or spotting. Of course, the females were quite distinguishable by the shape of wing and the slightly lighter submarginal lunules. They were scarcely larger than the males. Of the *Erebias* a few *Erebia goante*, quite fresh, were taken.

The small race of *E. ceto* obtained last year by Dr. Chapman were met with again this year. In colour and marking they are not nearly so bright and conspicuously banded (?) as the race which occurs on the southern side of the Alps—at Fusio, for example. It goes without saying that *E. melampus* was common; in the afternoon, on the right bank of the Zmutt torrent, there were plenty among the trees and brushwood skirting the Matterhorn pathway. Much variety was easily obtainable, from specimens with distinct, well-dotted rust spots to examples having rust spots almost without easily discerned dots. Where *C. phicomone* and *B. pales* flew, there was *E. tyndarus* glittering in certain lights of the sun's rays as it twisted and oriented itself on whatever it settled. The undersides varied much from clear silvery grey to a very dusky grey on the hind-wings. A female specimen taken was of a yellowish-brown below, and quite devoid of the apical twin spot on both upper and under-side; it was a good size, and had distinctly spotted fringes. Another had the fringes as dark as the ground colour of the wing; this was a male. Last year Dr. Chapman very kindly handed me a few *Epinephele lycaon*, the close relation of our *E. jurtina*, but they were all females; this year, on the same ground, the males were common among the scattered pine-tree slopes, and one specimen had two spots on each fore-wing instead of the typical single spot. The only other Satyrid seen was a worn example of *Canonympha satyrion*. A small, bright specimen of *Adopicea flava* was met with; and several forms of what, in ignorance, I call *Hesperia alveus*, which occurred in numbers, were captured. Possibly two or three species are mixed up here. Some day, no doubt, when modern methods of investigation are concentrated on this little group, we shall have light thrown upon it; at present, to me, at all events, it is a chaos. In the bright sunny spots blues were congregated, often drinking on the path at the wet patches of irrigation origin. *Aricia astrarche* was present, of course of the var. *alpina*, the form without marginal lunules on the upper side, and much darker in ground than our English lowland form. Females of *Polyommatus escheri* were met with, but no male turned up. A worn *Aricia donzelii*, the first I had taken, was netted, but no more were seen. The species was apparently going over. A very nice female, *A. eumedon*, was taken, and a specimen of *Lycenaalcon*, a close relative of *L. arion*. The form *obscura* of the latter species was common, but mostly worn. I noted that the more worn the specimens the fewer blue scales were on them. A graduated series in amount of blue scaling was also a graduated series in freshness. Do the blue scales fall off more easily than the dark ones? This form is certainly smaller than typical English ones. *Heodes virgaureæ* was the "copper" of the day, but females were scarce; or perhaps their dull colour and more retiring habits kept them from my purview. Those that were met with were, of course, of the *zermattensis* form. One specimen only of *Chrysophanus hippothoë*, the rival "copper," occurred; in

fact, it was remarkable as the only one met with during my three weeks' holiday over much varied ground. The Anthocerids were as common as on the previous day, clustering everywhere on the flower heads. Among them I found a specimen of *Adscita geryon*. The near ally of our *Setina irrorella*, the longitudinally striped species *S. aurita*, was met with. The three species of Geometer which I casually netted, Mr. Prout tells me, are *Anaitis præformata*, a species similar in habits and appearance to our *A. plagiata*, *Lobophora sabinata*, male, and *Odesia atrata* (*cherophyllata*). This, I believe, is the sum total of what was a most delightful ramble. We found the bridge (not marked in Baedeker, by-the-bye), and felt quite safe when we were over—a rotting thing of slender larch poles with earth and gravel laid over, so frail that two at a time on it hardly showed discretion. It was a typical Swiss bridge, and its method of construction called to mind its modern development, the marvellous bridge over the Zambesi, which we all know so well from illustrations. We were soon on the Schwarzee and Matterhorn pathway, and at the joining of the ways saw the long-desired chance of a drink. We had it, a draught of delicious cold spring-water, but we paid for it: for half an hour we suffered bitterly from indigestion, or shall I say indiscretion? However, we gradually recovered, and, entomology aside, we fell more or less into the routine of the world, except that our day's captures had to be labelled and packed.

In such a year as 1909 one watched the weather in trepidation, but August 1st opened even more brilliantly than the two previous days, and we determined to go up the Riffel-alp by train, spend the morning there, go on to the Findelen hut above the Glacier, and gradually work our way down the Findelen valley, reaching Zermatt between five and six o'clock. The weather was propitious, for the day was one of the most perfect that could be desired; the scenery was grand—no words can adequately describe it. I wished that the South London Society could hold one of its out-door meetings there. What a revelation! What an education, even in only a few short hours! At 7–8000 ft. above sea-level one can stand at the foot of the Hinchcliff monument, erected in memory of a famous alpinist, and see height after height more than 12,000 ft. The Weishorn, the Rothhorn, the Gabelhorn, the mighty Matterhorn, the Breithorn, Castor and Pollux, Lyskamm, and further round the massive group of Monte Rosa, one and all draped with glaciers and snowfields, glittering in the brilliant sunshine.

This is the spot for insects. No likelihood of a stray entomologist depleting the country of its butterfly fauna. First and foremost, our old friend of the fens, *Papilio machaon*. Here he is always found careering around the high exposed mountain-tops. A *Colias* next, and plenty of them, *C. palano* and *C. phicomone*, the former with females both white and yellow. The latter very abundant, variable in size and depth of colour; one is a very small specimen, and another, a female, is unusually light. I overhauled numbers to see

if *P. callidice* were there, but no ; I expect my chance would have been 1000 ft. higher up, but that will be another time. In the hollows there were plenty of *Brenthis pales*, nearly all males, in fact only two females were met with. There seemed to be two types in size and shape. All were of the red-underside form. One specimen was particularly red, the others were dull red, with markings not clearly cut. In a few specimens the undersides of the fore-wings were somewhat unusually devoid of markings. Among the *B. pales*, flying very low and very difficult to see, were a few *Melitica aurinia* var. *merope*, the diminutive dusky form in the high mountain areas of the species whose Irish and Welsh forms are so variable and beautiful. *M. parthenie* var. *varia* was common, and one or two nice examples were taken, in which the black markings were very largely diminished in number and intensity. *Erebia mnestra* was abundant and in very good condition, mostly males, however. Dr. Chapman took this species at Binn in 1908, but those he gave me were decidedly smaller than those I took here. All the specimens had either bands or traces of bands on the hind-wings. Among them a single *E. goante* occurred. On the same ground there were also plenty of *E. tyndarus*, of which a few have more or less indistinct banding, while in many the undersides of hind-wings were very dark clouded. One specimen was var. *cecodromus*, without trace of the apical eye on either upper or under surface. Only one *M. dictynna* was taken or seen, a female with considerable amount of light area on the upper wings, but somewhat darker than usual on the lower. *Latorina orbitulus* was very common, but past its prime, in fact only two or three were selected as at all presentable. In size they are the same as some I have from Arolla, but smaller than the Berisal race. One or two specimens have the black centres to the eye-spots on the hind-wing almost obliterated. With the last species were quantities of *Vacciniina optilete*, but worn to rags. Here and there one met with *Argynnis niobe*, all somewhat small. *Cænonympha satyrion* was common, but worn, some apparently near the form known as var. *unicolor*. Their ground-colour varied much ; one was very similar to *C. pamphilus* on the upper side of the fore-wing. The darker specimens were minus the apical spot on the fore-wings on the under-side, while the lighter ones had it. A single example of *A. eumedon* was taken, a female. I did not get at the habit of this species somehow, for it only occurred in single specimens anywhere. To my surprise I took only one *E. epiphron*, and that very worn. I had hoped to meet with it in numbers. *Nemeophila plantaginis* was the only Heteroceron I noticed here. In facies and colour it was the exact facsimile of an example I took near Winchester in mid-June, while attending the Congress of the South-Eastern Union. The wild pathway towards the Findelen hut above the glacier yielded but little that was fresh. The bread-and-cheese, etc., at this lonely habitation was taken with the utmost relish, for our mountain walk in the bracing air had given us an appetite to enjoy it to the full. Lower down, among

the scattered trees and on the slopes of the Findelen valley, *Aporia crategi* was taken. *P. apollo* was noted again, a few *E. euryale*, and one specimen of *B. euphrosyne*, worn, were captured. Time was flying fast, and with a very long walk ahead but little else was noted. *Plebeius argyrognomon* was taken, and the Geometer *Larentia cæsiata*.

After many windings and "how much further's?" we came out in the Zermatt valley, below the Findelen railway bridge. Two paths! Which shall we take? Ask this lady and gentleman, sitting by the side of the rushing little torrent, and try English on them. It works: they are English. The gentleman turns questioner, and almost takes my breath away, for he asks me if I know the South London Society? Once again we find the world is very small. The lady was the daughter of our old friend Mr. West, of Ashted, with her husband. We took the alternative track, which turned out to be not a path, but we reached the village safely.

'Twas the evening of August 1st, the day of the National Fête of Switzerland, and the place was full to repletion of visitors. What a sight! In this narrow alpine street one hears all the civilised languages of the world. There were to be fireworks and music. The mountains in all directions were lit with fire; the illuminations were marvellous for a spot so remote from the ordinary run of life. The graveyard of the English church was the firework ground, and grand was the display; but your entomologist bitterly thought of the morrow. Full well he knew what a series of deafening explosions meant to him most probably. How well the Swiss play up to the foreigner! The "Marseillaise," the "Star-Spangled Banner," the "Watch by the Rhine," but first of all "God Save the King" met our ears. Unfortunately, the English anthem had lost its time, and was given at the Old Hundredth rate; to our critical ears the whole thing was spoiled. A subsequent visit to a house of "restoration" finished up this day of days, and we anxiously hoped for the morrow.

As we anticipated, the fine weather broke up, and the last two days of our stay were stormy, and one could not go far. Still, the sun did shine brilliantly after the thunder, and in ten minutes the Erebias were flying, and soon the rest appeared. Even the grass was dry in an hour, and the mud was changing fast to dust, so rapidly do changes take place in these elevated spots. A walk on the rough slopes below the entrance to the Trift Gorge in the fitful sun produces little that is fresh. Two species of Plume-moth, one or two Tortrices, a minute form of *Cupido minimus*, a female *Polyommatus escheri*, the only one obtained near Zermatt, and two species of Geometer, which Mr. Prout very kindly identified as *Acidalia flaveolaria* and *Cleogene lutearia*, were the sum total of the finds. Later in the day a walk taken along the valley from the village produced plenty of Anthrocerids, especially *A. loniceræ* and *A. hippocrepidis*.

The last day of my stay was threatening, and no long outing was

felt to be advisable, so it was spent about the village and in what had become my favourite corner, the sheltered grassy nook by the little bridge across the Matt. By dodging the showers a fair number of *Syrichthus alveus* were obtained, drinking moisture from the sunny paths, but among them only one *Powellia sao*. The Anthrocerids in plenty were closely examined, and a six-spotted specimen was found *in cõp* with a five-spotted example, probably *A. hippocrepidis* and *A. loniceræ* var. Worn *B. euphrosyne* were about, one specimen with somewhat enlarged and elongated submarginal spots. A most remarkable form of *M. didyma* was met with, in which the greater portion of the black pigment had more or less failed to develop. The usual markings were all in position, as in normal specimens, but were of a light, silvery grey. Some of the spots had a few scattered black scales, and when examined with a glass numerous scales were seen to have only the tips black. The black markings near the insertion of the wings were of the normal depth of colour, and the ground colour was about the usual depth of tint. *M. athalia* was in good condition, and I met with the very dark var. *alpina* of *Plebeius argus* (*egon*), as well as a form of *Aricia astrarche* with the var. *allous* tendency of the red spots on the upper side to disappear. *Adopæa flava* (*linea*) was very worn; and *Urbicola comma* was also noted, one very small male being taken. Of *Argiades sylvanus* two specimens were taken, both small in size, but one was unusually light in colour, while the other was a dark form. *Herbula cespitalis* was not uncommon, nor were *Odezia atrata* and *Cleogene flaveolaria*. Plenty of smaller things were in evidence, but I appear to have secured only one representative of *Sciaphila argentana*.

The afternoon early became cool, and we strolled slowly back, fixing in our minds the unparalleled scenes of vastness, magnificence, and ideal beauty, until we reached the village church.

The call of the mountains is imperative. We shall go to Zermatt again.

## The Middlesex Home of *Clausilia biplicata*.

By ALFRED SICH, F.E.S. *Read September 22nd, 1910.*

THE name of the ground was Corney, and rather over one hundred years ago the Earl of Macartney lived there. It was probably he who planted the beautiful trees and made the shrubberies. At a later date my father occupied the ground. It was a rectangular plot enclosed by four old brick walls. Almost the whole length of the north wall was covered with ivy of a luxuriant growth, which in early days I used to beat, generally accompanied by my earliest entomological field-companion, a nephew of the late J. C. Dale. I have never since seen such clouds of moths, mostly common Geometers, as we used to disturb from that venerable ivy. The east wall was also partly ivy-covered, but, owing to a line of trees and shrubs which intercepted both sunlight and rain, it was not attractive. The south wall faced the river. In front of this wall was a withy holt, containing, besides the osiers, several water-loving plants, some with golden, others with purple blossoms, such as *Caltha palustris*, *Cardamine amara*, *Lythrum salicaria*. On the other side of this lush green withy bed flowed the waters of the silver Thames. This spot was the haunt of the kingfisher, the redshank, and the sedge warbler. One could see all these because a high terrace ran behind the wall, and in one place there was a stretch of open railings.

On the terrace were Norway pines, Italian pines, with huge cones, and lilacs. On the green slopes below there were three or four tall and graceful Scots pines, and an ilex with a curious long horizontal branch, on which one could lie and dream away a whole summer afternoon. Here and there in the grass were patches of yellow bed-straw, masses of sweet-scented blossoms in their season. Further back was an immense sycamore, a deodar, and out in the long grass a veteran holly in its last days. Further back rose, perhaps, the tallest tree in the grounds, a magnificent specimen of the occidental plane, in whose branches the wood-pigeons nested. To the east of this rose a fine solitary larch. Behind these was a large spreading oriental plane, two tulip trees of great size, perhaps the largest in England, a liquid-amber, pink and white thorns, a large crab, a Spanish chestnut, another ilex, and a horse-chestnut. These trees were not all clustered together, but long stretches of grass lay between them. Between the Spanish chestnut and the crab there was a remarkable spot in the grass which, somehow, on September

afternoons seemed to catch the warmest rays of the sun. There *Pyrameis atalanta* loved to sit with outspread wings.

But the west wall and the shrubbery in front of it formed the spot of which I really meant to speak. This shrubbery was somewhat overgrown, and consisted mostly of hornbeam and lilac with a few elders, Portugal laurel, and other shrubs. Nearly the whole of the ground below the trees and bushes was over-run with ivy. The wall was ivy-covered, and in the spring bore nests of thrush, blackbird, and hedge-sparrow, but it was old, and many of the bricks, loosened by the rains and chill nights of winter, had fallen and were lying on the ground, partly hidden by the trailing ivy. Many of these bricks were moss grown, showing the general humidity of the low-lying ground, only separated from the Thames by the terrace to the south. Here, on and under these mossy bricks, lying amid the ivy beneath the trees, flourished, unknown to the world, the largest and most prosperous community of *Clausilia biplicata* in the whole of the British Isles. This shrubbery was bordered by the wall on the west and a narrow gravel path on the east. The soil was a dark mould, possibly overlying an alluvial bed. Above the ivy grew here and there a few plants of Enchanter's nightshade, but not much else. Above these rose straggling bits of elder and seedling sycamores. In other spots the lilacs made a thick covert. If one threw a stone into these bushes after dark in the May evenings, one would be answered by the challenging notes of the greater whitethroat. Higher than the lilacs the hollies reared their dark green foliage, and higher still rose the hornbeams and sycamore trees, so that the home of *Clausilia biplicata* was alike sheltered from the rough winds and heavy rains, as well as from the scorching rays of the summer sun. *Clausilia biplicata* occurred chiefly on the fallen bricks, but could also be found on the wall, and in the holes where trees had fallen and the stumps rotted away, and sometimes in the vegetable rubbish below the ivy. They were fond of getting the mouth and last whorl into a hole in the bricks, and the young specimens were generally hidden in the holes, sometimes in twos or threes. Besides shutting their doors or clausilia, as I suppose they did do, they would often spin a slight epiphragm over the mouth of the shell, which no doubt helped to fix them to the moss or brick. They are hardy little creatures, as I have found them crawling over the bricks when frost was on the ground. They varied in numbers at different times, as most things do, but were always plentiful. On the other side of the wall was a damp field with a few willows. Here *C. biplicata* also occurred, but only sparingly, at the foot of the willows and on a broken-down wall.

In this field *Arion ater*, *Helix arbustorum*, and *Carychium minimum* might be found. The true home, however, of *C. biplicata* was the shrubbery. With them on the underside of the bricks lived *Clausilia bidentata*, *Cochlicopa lubrica*, *Vallonia costata*, *Hygromia hispida*, *H. rufescens*, and, of course, *Pyramidula rotundata*. *Agriolimax agrestis*, *Vitрина pellucida*, *Vitrea crystallina*, *V. cellaria* and

*V. nitidula*, besides *Arion hortensis*, were also sharers of the shelter afforded by the trees. In later years I searched in vain for white varieties and right-handed specimens, but never found any but quite typical forms. Occasionally specimens of both *Clausilia biplicata* and *C. bidentata* would be found crawling about with the first three or four whorls of the spire missing and the opening closed by a shelly plate.

On the other side of this shrubby wall, at one spot the ivy grew in masses and bloomed well. Here, in the autumn evenings, I have taken all the common Noctuæ which frequent ivy bloom except *Scopelosoma satellitia*, *Orthosia macilenta*, and *O. rufina*.

And now comes the sad part of the tale. All this lovely spot, with its glorious trees and beautiful flowers, with its wealth of mammals, birds, moths and snails, all, all has passed away for ever. The trees were cut down, the ground levelled up, and great sheds erected where clever brains designed and horny-handed sons of toil, grappling with steel, fashioned dread engines of war, which they launched on the waters of the Thames which laved the southern boundary of the erewhile peaceful old fishing hamlet of Chiswick.

## The Butterflies of Sicily.

By J. PLATT BARRETT, F.E.S. *Read October 13th, 1910.*

GETTING out of "harness" a couple of years ago I was invited by my son to spend the winter with him and his family at Messina, in Sicily, where I arrived early in November, 1908. In order to amuse myself, I then decided to make a promiscuous collection of butterflies; the only notes that I had with me being a few taken from Miss Fountaine's paper, published in the "Entomologist" of 1897, which I found to be wonderfully accurate. There is a fascination about becoming once more a *novice*; and for a few weeks I had the delight of capturing various butterflies for the first time in Sicily. Most of them proved to agree with our British species, and I came to the conclusion that our butterflies form a good basis for a Sicilian collection. Since then I have obtained a copy of Ragusa's list of Sicilian butterflies, a total, all told, of ninety-seven species, and of this number at least fifty are included in our list, leaving only forty-seven purely Continental forms; but, as a matter of fact, when Ragusa compiled his list, he had in his collection, said to be the finest in Sicily, examples of only eighty species. A few species are in the list on the authority of various French and German collectors who have visited the island, and their occurrence requires confirmation. Unfortunately, my first little collection of two or three hundred specimens was destroyed in the disastrous earthquake of December 28th, together with all my belongings, notes included, only excepting my night attire. Everything else I had was burnt up.

Until Easter of 1909 my entomological pursuits were practically *nil*, as my son and I dwelt in a little steam yacht (the "Lorna Doone"), anchored in the harbour of Catania, where we felt safer than in a tall building. The famous Good Friday processions, which take place annually at Randazzo, attracted my son and myself, and we reached that out-of-the-world and most interesting mediæval town after dark on the previous day, by the slow Circum-Etna railway. The forenoon processions over, we took a long walk, and I was tempted to re-commence collecting when I came across some larvæ crawling about the grass on the rocky mountain side. These proved to be *Syntomis phegea*. The next day we visited Bronté (including Moniace, the lovely residence of Lord Bridport, successor to Lord Nelson), and, crossing a lava bed, I noticed a species of orange-tip flying about, which I thought was the sulphur orange-tip (*Euchloë damone*), but having no net I failed to capture a specimen. Those orange-tips haunted me. We went on to Aderno, and on Easter

Sunday we witnessed the mediæval drama, which is acted there at noon annually, called the "Devil of Aderno." In the afternoon I saw and captured my first *P. podalirius*.

After Easter, during my stay at Catania (and later on at Messina), I took long walks on alternate days. The two best localities in Catania are the Campo Santo (cemetery) and the Bellini Gardens; here what I term the "domestic" butterflies were plentiful, and we found it difficult to get away to the districts where the "wild" species occur. An entomologist will know what I mean—the feeders on cabbage and sometimes on nettle are "domestic," while those on heather, violet, heartsease, etc., are "wild"; the grass feeders being of both kinds. At Messina, on the other hand, it is easy to get amongst the "wild" species after half an-hour's walk.

I will enumerate the butterflies that I met with between Easter and the middle of June, 1909.

Perhaps the most noteworthy Sicilian butterfly is *Papilio podalirius*, which occurs from sea-level up to 4000 ft. I have not been higher. It is lovely on the wing, especially when floating on the breeze, three or four together, a favourite spot being near a tree at the top of a low hill. I cannot yet resist taking a fresh specimen.

*Papilio machaon* is commoner generally than its rival, *P. podalirius*, but is not so frequent in town gardens. I have met with both species wherever I have collected in Sicily, from April to June; and to capture half a dozen of each in one day means a red-letter day to a novice like myself. At Gravitelli, near Messina, I watched a *machaon* resting on a culm of grass, and swaying to and fro like the upturned pendulum of a clock, a movement I have not seen repeated.

Possibly the charms of the swallowtails caused me to neglect the common whites—"they can be got any time you know"—and the only specimen of *Pieris napi* that I took is labelled "Aderno, April 11th, 1909."

A few specimens of *Pieris rapæ* and of *Pieris brassicæ* were taken in the towns of Catania and Messina. I shall mention the former later on.

The Bath white, *Pieris daphidice*, naturally attracted my attention, and I found it at times quite as plentiful as any of the other whites. I took a long series; apparently one brood appeared in April, and a second (rather smaller) in June.

With an entire absence of books or entomological notes, I had to fall back upon memory, and having somehow got the idea that there was a small variety of *Euchloë cardamines* in Sicily I captured a long series promiscuously, and brought the results home, some from the Plain of Catania (say Thames Bank), others from the Cemetery (say Nunhead), others from Misterbianco (say Highgate), others from Ongnino (say Greenwich), and others from Cibali (say Hampstead); and to my great surprise, when the series was all set out, I had plenty of male *E. cardamines*, but only *one* female specimen. The remaining specimens without orange-tips turned out to be

*Euchloe belia*, sometimes called var. *ausonia*, quite a novelty to me. I captured some small male *E. cardamines*, which may be var. *turritis*, but the only difference that I can see is merely one of size.

We left Catania in the middle of May, and took up our residence at Messina, at Villa Erasmo, with a lovely garden, and an acetylene lamp out of doors, which attracted many moths, beetles, and other insects. The mountain nearest is 3570 ft. high (Monte Antennamare), and in a pine wood about 2000 ft. up I met with the weak-flying *Leptidia sinapis*. The next day we had a tropical downpour of rain, which completely drowned them out.

One of the commonest Sicilian butterflies is *Colias edusa*. It is practically ubiquitous throughout the year, males, of course, predominating. A fresh brood appears in June; and I took a lovely specimen of var. *helice* on Monte Cicci, near Messina, about 2000 ft. up.

The type brimstone, *Gonepteryx rhamni*, is said to occur in Sicily, but I have not seen it, nor has Ragusa. *G. cleopatra* is oftener seen than caught, as it is a rapid flier. I and a friend captured a pair between us at the Cemetery, Messina, May 31st.

The *Vanessidæ* are not nearly so conspicuous in Sicily as in the south of England. I took one specimen of *Aglais urticae*, fresh out, May 15th, on the Plain of Catania; one specimen of *Eugonia polychloros*, fresh out, June 12th, on Monte Cicci; and a series of *Pyrameis atalanta*, which is common all the year round, even in December and January, when it frequents the rosemary blossoms at sea level. Later in the year it flies about the stunted trees on the summits of the lower hills. Another very common species is *Pyrameis cardui*, in all waste places, and it is generally very much worn. Similarly, it is difficult to get a decent specimen of *Polygonia egea*, which loves to sun itself on the walls adjoining the torrent beds. I managed to get one fair specimen, on Monte Cicci, June 18th; others I threw away.

While staying in the cultivated district of Catania I met with only one specimen of the fritillaries—*Melitæa cinxia*, May 19th, at Cibali, and failed to discover its headquarters. In the wild and uncultivated country near Messina, where violets and heartsease grow in greater abundance than I have seen elsewhere, some fritillaries abound, *Melitæa didyma* being, perhaps, the commonest, with its occasional var. *meridionalis*; but it is run very closely in numbers by *Melitæa athalia*, which seems to be generally distributed. The larger fritillaries appear to prefer the higher mountains, though later in the summer worn specimens descend to the valleys. On Monte Cicci, at an elevation of 2000 ft., I captured a lovely fresh specimen of *Dryas pandora* (enough to take one's breath away), June 12th; also two equally beautiful specimens of *Issoria lathona* June 8th, together with a series of *Argynnis niobe* var. *eris*. An afternoon with these fritillaries is a delightful experience.

I was not successful with the marbled whites. I missed a great

many specimens, and only captured three. Two of these proved to be *Melanargia japygia*, an insect always in a hurry, Cattarati, June 2nd; and the third a species in less hurry—*Melanargia galatea*, var. *procida*. The climate of Sicily has a beneficial effect upon certain butterflies, notably upon the grayling, *Hipparchia semele*, a much handsomer form than our English one. I captured half a dozen fresh specimens near Messina, in middle June, when a still handsomer species, *Hipparchia statilinus*, was just coming out in the same locality. The wall-butterfly, *Pararge megera*, is also common, but, curiously, I missed the equally common *Pararge egeria*, and only captured two specimens, representing the two broods, one at Misterbianco in April, and the second at Messina in June; both are of the southern form. The meadow-brown *Epinephele jurtina* is an improved form (var. *hispulla*) which runs var. *fortunata* closely. In place of our *E. tithonus*, said also to occur in Sicily, I met with *Epinephele ida* on Monte Cicci: four specimens in June. Neglect on my part caused my series of *Canyonympha pamphilus* to consist of four specimens, as this species is as common in Sicily as in England.

On June 12th I captured a couple of specimens of the curious *Libythea celtis*, which pleased me immensely. Unfortunately, in moving about I lost one of them.

At the end of April, at Misterbianco, *Callophrys (Thecla) rubi* was out, and I secured a couple. In June, near Messina, *Nordmannia (Thecla) ilicis* was just coming out, and I captured a specimen. The only copper butterfly taken was *Rumicia phloas*, a very ragged lot of specimens. The spring brood is bright; the summer brood supplying the var. *eleus*.

The "blues" form an interesting family in Sicily; some species swarm on the mountain slopes near Messina, and get worn very quickly. In November, 1908, I got a few specimens of *Lampides bœticus*, near Messina, which were cremated after the earthquake, and I saw no more until June, 1909, when I got two specimens at Gravitelli. Other blues include *Cyaniris semiargus* (our *acis*), three at Gravitelli and two at Monte Cicci in June; *Polyommatus icarus*, common everywhere on the hills, generally much worn; *Celastrina argiolus*, two specimens captured near Messina, many more seen. *Glaucopsyche cyllarus* is a beautiful species when fresh, and is fairly common; I took nine specimens near Catania. *Aricia astrarche*, also common in Catania and Messina; *Plebeius argus (agon)*, two battered specimens on Monte Cicci, in June; and *Scolitantides baton*, four poor specimens on Monte Cicci in June. The skippers were represented by seven species. The grizzled skipper, *Hesperia (Syrichtus) malva*, was out at Gravitelli on May 25th, when I secured a specimen. The most striking of this family is *Gegenes nostradamus*. I found it resting in the sunshine, on walls and sandy cliffs, in November, 1908, near Messina, flying off when disturbed like a small humming-bird moth. The specimens I took then shared the same fate as *L. bœticus*, mentioned above, but the

species re-appeared in May and June, when I caught a couple. I got one shabby specimen of *Adopæa flava* (*thaumas*), and two very large examples of *Augiades sylvanus* on Monte Cicci in June. *Thymelicus actæon* appeared common at Gravitelli, June 1st to 10th; in addition I captured two specimens of *Erynnis alcaæ* at Cibali in May, and six specimens of *E. althæa* in May and June. My captures (taken promiscuously) of butterflies in Sicily in 1909 totalled up to fifty out of a possible ninety-seven; but I was not content. I had visions of a sulphur orange-tip, also of the Sicilian marbled white (*M. pherusa*), and in April of this year (1910) I made plans to visit special localities for special species. On the outward journey to Sicily I planned to stop at (1) Domodossola, (2) somewhere in Tuscany, and (3) at Palmi in Calabria, on the off-chance of getting that lovely orange-tip which I had seen at Bronté. At Domodossola my plan was wrecked by my luggage being lost temporarily, and instead of a butterfly hunt for eight hours in the glorious sunshine I got one hour, when I saw, but did not capture, three butterflies—*A. urticae*, *C. edusa*, and *G. rhamnii*.

In Tuscany I was in luck. By chance I detrained (April 18th) at a little station at Piteccio, near the watershed of the Appenines, at 5 a.m. Trouble with my luggage almost wrecked my day again, but I surmounted the difficulty, got an early breakfast at the tiny village a mile away, and the promise of a light porter. I was in a lovely valley. I followed the stream up the hill, through a wood, and when the sun gained power I found butterflies galore, the climax being reached when I saw *P. podalirius* and *Eurvanessa antiopa* at play. They parted company; I caught the first, but it was half an hour before I had another chance at the *antiopa*. Then it settled on a low branch of an oak in the sunshine, and I made no mistake. The Queen of Spain fritillary, *I. latona*, was just out, rather small specimens, but in fine condition, and the wood white, *L. sinapis*, was plentiful near the stream. More *P. podalirius* and *E. antiopa* appeared, but were not easy to catch; others less difficult were *E. polychloros*, *P. rapæ*, *P. napi*, *P. megera*, *P. egeria* (southern form), *C. rubi*, *G. cyllarus*, etc. At dusk I left Piteccio for Florence, quite content and happy. Such a pleasant, enjoyable day does not occur too often.

My stop at Palmi proved fairly successful. I climbed up to the top of Monte Elia, where I got a magnificent view of Sicily, including Mount Etna, and met with all the smaller species of butterflies mentioned above, but no sulphur orange-tip. Still, I had Mount Etna to re-visit and was hopeful. I arrived at Messina on April 23rd, 1910, and, the weather being only moderately suitable, I spent the rest of that month close home. True, I climbed Monte Antennamare, 3575 feet, and found, right on the summit, during intervals of sunshine, that the Queen of Spain fritillary, *I. latona*, was common; also, that on the lesser mountain—Monte Cicci, 2000 feet high—it was equally plentiful. Clouds limited the number of specimens

captured. A week later I went to Palermo to spend the week-end (April 29th to May 4th), and the weather was sufficiently atrocious to try the patience of the most ardent entomologist. The object of my search was the Sicilian marbled-white (*Melanargia pherusa*), and I only possessed Miss Fountaine's notes to assist me in my search.

In Italy the visitor is told that the pronunciation of the language is quite simple, every letter being pronounced, and as *c* is pronounced like our *ch*, I learnt quickly that Monte Cicci, near Messina, is known as M. *Cheeche*. The Palermo locality is spelt a little differently, M. Cuccio, and my efforts to pronounce this failed entirely, until a happy thought struck me, and pointing to a high hill in front of me, the top entirely covered with rocks, I asked a native the name of it, and he replied Monte "*Goche*." After much time spent in fixing the locality I waited for improved weather conditions; the gale (a sirocco) blew day after day, and the rain at times fell from the dull clouds in torrents. On my third visit to the mountain (Tuesday, May 3rd), however, the sun shone for a few minutes, and a specimen of *M. pherusa* was tempted out of its hiding-place, but only to be blown out of reach by the strong wind. Early on the following morning I reached the village of Bocca di Falco, which lies near the foot of Monte Cuccio, and a terrific thunderstorm reached there at the same time, rendering the main street, otherwise the donkey-track, a rushing torrent bed. In the afternoon I visited the *pherusa* ground, and the gale still blowing I waited for the clouds to roll by. About 4 p.m. there was a little rift, the sun shone for a few minutes; out came three or four specimens of the desired marbled-white, and though much blown about, I managed to capture one damaged specimen, and then the clouds obscured the sun. Once more I had a "happy thought," simply to search the grass-stems; and before dusk came on I had secured *three* specimens, apparently fresh out. I returned to Messina content with four specimens—the result of a week-end of six days under unfavourable circumstances. Fortunately, I was able to re-visit Palermo a fortnight later, for another week-end, and though I was told that the "sirocco" would prevent my getting a single specimen, I managed to secure a full series by searching the grass stems. The sun shone during one of the two days that I spent on Monte Cuccio, and I found it much harder work and less profitable to catch the species on the steep slope, when flying, than to search for them on the grass-stems.

In the meantime I had not forgotten my plan to go in search of the sulphur orange-tip on the slopes of Mount Etna, which I persisted in carrying out, in spite of warnings that I was too late. I had to wait until May 24th for an opportunity to leave Messina, and on arriving at Giarre, the junction for the Circum-Etna Railway, a tropical rain-storm was in progress. Crossing from one station to the other, only a few yards, some ladies with big hats and ostrich feathers were so drenched that they looked like drowned rats; how-

ever, they monopolised the first-class compartment of our composite carriage in which to disrobe and dry their outer garments. I altered my itinerary, and did not stop at Linguaglossa, where the filberts grow, but went on to Randazzo, a journey of twenty-six miles, which occupied four hours in the slowest of slow trains. The rain had ceased when I reached Randazzo, but the roads were filled with puddles, and the herbage was soaked. I picked my way along paths in order to find good collecting ground, but was not quite successful, though before dusk the clouds passed over and small coppers and little blues began to fly about. I then went to my hotel, where I met with a true Sicilian welcome, having stayed there at Easter, 1909.

I was up early on the following morning; the sun was really bright, and snow-capped Etna rose above me in all its majestic beauty. I took a different road, lane and cinder path, from those of yesterday, and fortunately struck an ancient lava bed with wild flowers growing abundantly in the patches between the rocks; and, to my great delight, almost the first butterfly that I captured was a female orange-tip, which I have since learnt is *Euchloë damone*. The males were quite lovely, and led me a fine dance among the loose rocks, my shins suffering very severely until I learnt to exercise care—*experientia docet*. On climbing higher up the mountain slope a surprise awaited me. *Thais polyxena* var. *cassandra* was quite a novelty, somewhat resembling a moth, and flying quietly, almost close to the ground, when disturbed. Next I took a favourite species of mine, *Aporia crategi*, apparently far away from hawthorn. An attempt is being made to name the Sicilian form var. *augusta*. Then that lovely fritillary *Dryas pandora* appeared, and attempted to “sneak off,” as is its habit. I had to hurry up, for clouds quickly gathered, and by noon rain fell and spoiled the rest of the day. On the day following I had a similar experience—bright morning, rainy afternoon; and the weather becoming unsettled I returned to Messina, rejoicing that I had secured my “sulphur orange-tip” and numerous common species, such as *M. cinxia*, *E. cardamines*, blues, etc.

After my visit to Mount Etna I paid attention to the marbled white butterflies. I searched for *M. japygia* in the locality where I took two specimens in 1909. Probably I was too early, as I failed to get it, and later on I was otherwise engaged. Then I was able to go to Syracuse on three separate occasions to look for Zeller's *M. galatea*, which he named var. *syracusana*. He took it in 1842, and I was assured that it is not there now. At my third visit I got three rather damaged specimens, and I made a note for future use that while my train was stopping at the roadside station of Megara Iblea—nearly twenty miles from Syracuse—a brood of marbled whites, which may or may not be var. *syracusana*, hovered about the train and almost invaded the compartment in which I sat. At Messina the form of *M. galatea* is always dark and is known as var. *procida*. In 1909 I took one specimen only, but in 1910, by

frequent visits to Gravitelli, I discovered its habits and captured a long series.

The vicinity of Calabria attracted me early in June, and I spent three days in that practically unknown entomological district in search of the local marbled white, *Melanargia arge*. It is a lovely country, with extensive forests and beautiful valleys, with running streams, while the high mountain (Montalto, 6500 ft.) makes the gradients very steep. I was not lucky with *M. arge* (I only brought home three specimens), though I saw it in four separate localities. I hope to repeat my visits to those localities, and to secure the advantage of a horse or mule to carry me over the first half of the journey, as the walk both ways is too fatiguing.

The month of June is the best month for butterflies in Sicily, for although Syracuse and other places on the southern shores are then dried up, the mountains on the north are in their prime. True, I obtained some lovely specimens of *Hipparchia statilinus* at Syracuse on June 13th, as they settled on the stone walls and took shelter from a wind, which brought a sandstorm with it, but that good fortune was exceptional. On my way back from Syracuse, I captured, on the plain of Catania (June 14th), also taking shelter under pine trees from the wind, several fresh examples of *Satyrus circe*, one of the most striking of Sicilian butterflies. On the following day (June 15th) an entomological friend went with me to the favourite slopes at Randazzo, where *E. damone*, female, was met with singly, also *D. pandora*. *Limnitis camilla* was flying up and down the glade of an oak wood. The number of species occurring on the mountain side was in marked contrast to those seen at Syracuse and near Catania on previous days, and included *Aporia crataegi*, nearly a month after its first appearance, and other spring butterflies, more or less worn—generally more so.

*N. ilicis* was fresh out in numbers in the oak wood. *Lowia alciphron*, var. *gordius*, *R. phlwas*, var. *elcus*, and *L. dorilis* represented the Sicilian copper butterflies, and the blues were in full force. *Pararge mera* also appeared, and I paid some attention to the small white butterflies high up the mountain away from the cabbage gardens, as the specimens may belong to the variety or species named *Pieris manni*; certainly, the mountain specimens when placed side by side with other small whites captured almost at sea-level, where cabbages abound, differ in colour and slightly in the shape of the fore-wings.

As June advances the heat becomes very great in the middle of the day at Messina, and I found it even worse in Calabria, especially at Reggio, where that grand emperor butterfly, *Charaxes jasius*, was scattered about the lemon gardens. In a whole day I saw from a dozen to a score of specimens, but failed to capture one, as they generally fly just out of reach, and the gardens are enclosed.

My last day's collecting in Sicily was Wednesday, June 22nd, and it proved to be one of the most profitable during my stay. There

was a gentle breeze blowing, which tempered the heat of the sun. I got up early, took my lunch, a full flask, and some lemons—as water is obtainable more than half-way up the mountains, while restaurants are missing. The special object of my search was *Libythea celtis*. Butterflies were in abundance, but no *celtis* appeared. The top of Monte Cicci is a favourite spot for the larger butterflies, and flying round the topmost tree was a grand specimen of *Charaxes jasius*, which I secured; also a couple of *S. circe*, which repeatedly settled on the topmost trunk to sun themselves. On the eastern slope of the mountain *C. semiargus* was in full force, but having been out two or three weeks was not at its best. On the northern slopes *Argynnis niobe*, var. *eris*, was also well out; but on this date the western slope, which was sheltered from the wind, provided the most sport. Here the three species, *S. circe*, *H. statilinus*, and *H. semele* (the lovely Sicilian form) were jostling one another in all directions, mixed up with the commoner *P. egeria*, *P. megæra*, and *P. mæra* (worn), and a few specimens of *E. ida*, together with most attractive-looking females of *E. jurtina* (var. *hispulla*). Blues and skippers were also in abundance, *Augiades sylvanus* seeming to be larger than our English form. After I had reached home I discovered that amongst *A. niobe* I had netted two specimens of *A. adippe*; also with the small fritillaries, I had taken *Brenthis euphrosyne* in poor condition. Besides these errors made on the spot, I found that the June examples of what I took at first sight to be *P. egea* were in reality *P. c-album*; and with *A. flava* (*thaumas*), both at Monte Cicci and Gravitelli, I had got the more slender species with dark tips to the antennæ, known as *A. lineola*. One other species, and I have finished my butterflies. Somehow I overlooked, until setting my specimens, that I had an example of *Nisoniades tages*, taken at Gravitelli on June 3rd.

At present I am not sure that my specimens of the *Melitææ* and of the blues are all properly named; and it is possible that I possess two or three more species than I have set down; but, anyhow, I have sixty-five Sicilian butterflies out of the ninety-seven species given by Ragusa, which leaves me thirty-two species to search for on a future visit.

The unexpected death of my elder sister caused a sudden end to my holiday in Sicily. After my glorious day on Monte Cicci (June 22nd) I packed up and started for home by the midnight train, and travelled through to Yorkshire in seventy hours—record time.

## On Insect Teratology (Remarks to Introduce a Discussion on "Teratological Specimens").

By T. A. CHAPMAN, M.D., F.Z.S., F.E.S. *Read October 27th,*  
1910.

IT so happens that since this discussion was proposed I have met with two specimens well worth describing, so that I am able to add them as items to this paper, giving it a value I had no hope of when I first found myself committed to it. These are Mr. Burrows' very remarkable example of *Acronycta tridens* (Pl. II), and one of *Latorina orbitulus*, affording a little more of the history of diminutive wings than we usually obtain with such specimens (Pl. I).

The subject of "teratological specimens" is a vast one, but I assume, rightly or wrongly, that the specimens are chiefly to be those of Insecta, and more particularly Lepidoptera.

What is a "teratological specimen"? There seems to be a necessity for this periphrasis, as the simple term "monster," literally "something remarkable," has gradually come to mean something remarkable merely for size, probably because, I suppose, size is the quality that most easily strikes our attention.

"Monstrosity" is now in use in the sense of a teratological specimen, but strictly speaking monstrosity is a quality, not a thing. "Malformation" is perhaps as useful a word as we have, now that "monster" has an ambiguous meaning.

When we come to the actual definition of a teratological specimen or malformation, we find the difficulty of doing so arises from the want of a very definite line, separating it on the one side from a variety or aberration and on the other from a result of injury.

A malformation is the result of development taking place in an irregular way, and therefore, as a rule, for purposes of definition we may say it always arises from some interference with the germ-plasm, preventing its normal progress. A monstrosity differs from a variety in this, that a variety might be the normal form of a possible, closely allied, species; a monstrosity seems very unlikely to be normal for any species.

As regards injury, it is probable that all malformations are, in fact, caused by some injury, *i. e.* they all originate in the germ-plasm, which develops abnormally, owing to some external interference. By this, I mean more than an abstract proposition that germ-plasm in normal circumstances will develop normally, but that there is evidence that actual injury produces monsters, as, for instance, M. Daresté's experiments on the eggs of the domestic fowl.

I would make here a distinction that is of some importance ; an interference or injury that affects the germ-plasm and makes it develop abnormally produces a monstrosity, but if it only prevents it at some late stage or other from completing its development, the result is not usually regarded as a monstrosity. For instance, the deformed feet of Chinese ladies are hardly to be called teratological, nor the oblique skulls which some tribes do, or used to, produce by pressure.

Similarly, to come to our Lepidoptera, a leg with two tarsi is teratological, but a wing misshapen, or with a hole in it, or wanting a portion, due to some mechanical interference with the pupa, is strictly not teratological.

Of course, when we come to an actual specimen, unless we know more of its history than we usually do, it is only possible to say tentatively that the deformity of wing is the result of intrinsically abnormal development ; or, on the other hand, of some interference with development.

We must, however, admit that this way of looking at the matter is really a question of where we are to draw the line. If many genuine teratological examples are due to mechanical (or other) interference at an early embryonic stage, do the results of such interference cease to be teratological at a later stage ? and when ? A butterfly breaks its wings : we do not regard the result as teratological. After emerging from the pupa it fails to expand them properly : we call it a "cripple" and not a teratological specimen. Perhaps the line should be drawn here, but I incline to go one stage further back, and regard damage to the wings after the moult to pupa as being simply an injury and not teratological.

In the Vertebrata no small proportion of monstrosities described belong to the class of double monsters, *i. e.* there is one individual, with the whole or some portion of another attached to it, by a bifurcation of the vertebral axis, or in some other way, a malformation dating from the very earliest trace of the embryo on the germinal layer in the ovum. A consideration of these need not detain us, for the only record of such a malformation in insects I have met with is of a *Chironomus* larva with two heads, but with the segments behind uniting, so that from the third abdominal segment backwards there is only one body ("Stett. Zeit.," 1873, p. 452).

Of insect monsters that unquestionably date from the earliest embryonic period, I know of very few. One of the most remarkable of these was the specimen of *Anthidium manicatum*, described in "Proc. Ent. Soc. Lond.," 1907, p. lxi, by the Rev. F. D. Morice, in which, in the closing of the visceral cavity, the ends of opposite sides of the segments did not meet their fellows, but joined the next in order, so that the abdomen is not segmented, strictly speaking, but the plates form a continuous spiral from the third abdominal segment to the last.

In the Natural History Museum are two or three Hymenoptera

with a similar misalignment of opposite segments, but only affecting two or three segments in the region of the umbilical vesicle. In the "Tijdschrift Ent.," vol. xliii, p. 24, a beetle (*Stenocorus fasciatus*) is figured by Richard Scholz, which is probably an example of the same condition.

I have a pupa of *Hastula hyerana* that is possibly of the same origin, or it may be the result of some injury to the dorsum of the larva at this special point (Pl. I, fig. 4).

The specimen of *Prionus californicus*, described and figured "Trans. Amer. Ent. Soc.," 1880, with all legs and three palpi bifid, must unquestionably also be the result of some peculiarity of the germ-plasm in the earlier embryonic stage.

A longicorn, with two duplicated legs, was exhibited at the Entomological Society of France by M. H. Donckier on May 8th, 1901, believed to be the only instance of two legs being so affected in one specimen.

Two legs being affected in the same individual is extremely rare; I have not found the record of any other besides the two mentioned by Bateson, the *Prionus californicus* above noted and a *Prionus coriarius*; in the latter case the duplication was identical in each limb; this, with the fact that all three cases are in longicorns, suggests a congenital origin rather than a regenerative one. One supposes, but it is not stated, that in M. Donckier's specimen the two limbs had identical forms.

There are various instances of Lepidoptera with irregularly formed wings that are unquestionably congenital, and even in some degree hereditary. Some of these cases might, no doubt, be fairly regarded as examples of "mutation," or at least of a distinct tendency to set up a new race by "discontinuous variation." One of the most remarkable of these is that of *Lymantria dispar*. The first record of this curious hereditary malformation that I can find is in the "Entomologist," vol. xi, 1878, p. 170, accompanied by a figure; it says: "Mr. Enock bred, in the year 1867, upwards of 800 males and females of this species, and nearly all had the underwings notched, as seen in the illustration." The figure shows a large section of the hind wings wanting; the notch extends from the costa near its end to near the end of the discal cell and then meets the hind margin about its middle; it is rounded, but merits the term "notch," there being rather an angle at its deepest point. Mr. Enock tells me that the race had been "bred in for years, but I never before had any with the corners out of the wings; I asked the donor of the eggs, who had bred *dispar* for at least ten years, if he had ever had such a deformed lot? He replied, 'Never.'"

The next appearance of this form that I can trace was in the hands of Mr. R. Adkin, who writes: "Eight pupæ were given to me in July, 1876, by Mr. Bliss (since dead), and from these I reared moths, which I believe were not crippled, and from their eggs I reared about ninety moths in the following year, and the note I have

against them is 'many females crippled.' I take it that the crippling was confined to the females, and the form of the crippling, as far as my memory goes (and it is only memory), is that they had misshapen wings, *i. e.* pieces out of them. Their origin was doubtful, and they had probably been inbred many times."

The figure of Mr. Enock's specimen is of a male. A third instance of this malformation occurred in the experience of Mr. E. R. Bankes, and the specimens (all?) are in the British Museum; they are females. Mr. Bankes tells me that he "reared, July 11th to 23rd, 1904, thirty *dispar*, among which were 'several' with the curiously malformed hind-wings; the rest were quite normal." They had been inbred at least several years, and Mr. Bankes has ascertained nothing more definite than that the original moths came from "America."

Fernald and Forbush, in their large volume on this species, make no reference to such a malformation occurring, so it cannot be common in "America." Mr. Bankes' specimens have a smaller sector wanting than shown in the figure of Mr. Enock's specimen: it is more apical, and has a margin that is approximately an arc of a circle (no angular notching).

I seem to have some recollection of having seen somewhere else a figure of this form of *L. dispar*, but if so, I have not been able to find it again.

Another example of such "mutation"-like variation is in a brood of *Pterostoma palpina* of which Mr. L. W. Newman has given me a specimen. All this brood had very short broad wings. I suggest the varietal name *brevipennis* by which it may be called. As compared with an ordinary specimen taken at random, my specimen has a fore-wing of 15 mm. from base to apex as against normal 25 mm., with a width from apex to tornus of 12 mm. against 14 mm.; the hind margin is very upright instead of the normal very oblique line, due to the difference in length of the costa and hind margin being much less than usual.

It often happens that particular broods of some species bred present several examples of anomalous wing forms; but unfortunately these are usually cast aside as not being "good specimens," and remain unnoticed and unrecorded. As a recent occurrence, Mr. Tonge has, amongst a number of *H. dominula*, bred this year, not a few with irregular and asymmetrical wing forms, but several with symmetrical abnormal wing forms that can hardly be other than congenital, as is probably the case with Mr. Willsden's specimen of *T. crepuscularia*, figured in "Proc. S. Lond. Ent. Soc.," 1906, p. 41.

There can, however, unfortunately, be no doubt that, where any definite history is wanting, it is impossible to assert at what period of development the malformation arose, whether it was congenital, *i. e.* from an early embryonic state, or from some later stage. Under this doubt come many of the specimens I show you; but there are several where a wing is reduced in size and not otherwise deformed, by interference with the pupa. For example, a specimen of *Libythea*

*cellis* has a shortened wing due to an antenna having fallen over it at pupation. In itself this wing is on all fours with the *P. palpina* already referred to. As a rule, one may perhaps assume that where the alteration is symmetrical, affecting both sides, it is congenital, but this will not hold good always, as, for example, in symmetrical results of undue pressure by the girth in *Papilionide*, etc.

By a very instructive examination which Mr. Bateson makes of the morphology of duplicated appendages, he proves that in a large proportion of cases the relationship of the extra parts is of a definite character, e. g. if a limb has three parallel tarsi, each of these is like its neighbour, but its neighbour reversed as if seen in a mirror. The exceptions are, however, rather numerous. This peculiar law as to reduplicated parts does not seem to throw any light on the question as to whether such developments are congenital or a result of regeneration, but is probably connected with the view of germ-plasm I have accepted, viz. that until it begins to develop, it is not specially ear-marked, but takes its line of progress by reference to its surroundings.

My own opinion is that a very large proportion of malformations of antennæ, palpi, legs and wings in Lepidoptera (and other insects) is the result of regeneration taking place in an abnormal manner.

Bateson refers to Roesel's opinion that malformations of claws of *Crustacea* were due to injury, with or without regeneration, and notes that others have held this view; he says there is no ground for this opinion, and that it further happens that the whole of an injured limb is usually thrown off in *Crustacea*, so that injury to the claws cannot cause such abnormalities. I know too little about *Crustacea* to discuss this profitably, but I may suggest that the germ-plasm of the regenerative centre might be injured, or the new limb might suffer from injuries, the result of the old limb being thrown off.

Lepidoptera, however, are on a somewhat different horizon, and there is some evidence that such malformations originate in faulty regeneration. Apart from any evidence, it is pertinent to note that a regenerated limb is developed *de novo* from germinal material, and must be quite as liable to malformation as any other limb, but more particularly the reserved germinal material has a somewhat different history from that which primarily developed into the limb, and, if one may so express it, it has had less experience in the business, and is thus more likely to yield to disturbing influences. A very important point is also that the germinal matter of the regenerative centre is very apt itself to suffer when the accident, whatever it may be, happens—to suffer mechanically, chemically, or in both ways; what is especially to be considered is that it may be divided into several portions, which may not reunite, but each undergo development apart from its fellows. The not very rare cases of lizards with double or even triple tails are, I believe, admitted to be the result of an anomaly of regeneration, and appear to me to be on all fours with the great majority of cases of reduplicated appendages in insects.

I gather that in 1900 (Prof.?) Gustav Tornier advanced a hypothesis as to supernumerary parts of legs and antennæ in beetles (I have only seen the *resumé* of his paper in the "Zoologisches Centralblatt"). So far as I grasp his view, it is that these additional parts are the result of a wound. He supposes that when the appendage is wounded the regeneration centre that is reached may produce, as an outgrowth from the wound as it heals, the additional joints: two wounds may produce two new sets, and so on. To this hypothesis I am quite willing to agree as possibly giving the explanation of some instances, but he does not say anything of the complete removal of the limb (or a portion of it) and the regeneration of a new limb, with, upon occasions, superfluous joints; he seems to regard the double (or treble) appendages as being the original limb with an outgrowth. The more usual cause, in my opinion, is somewhat different. A portion of a limb is, say, bitten off by some enemy, and it is regenerated; most usually the limb is replaced, so that no result of the injury is apparent. When, however, the injury takes place at a late date in the life-history, and there is no time for the segmented limb to reach its full size, a limb of reduced dimensions results. Sometimes it is deformed, and more rarely it is duplicated or triplicated; these results are due to the germinal material reserved for regeneration being damaged or divided at the time of the injury.

In the Lepidoptera, if a leg or antenna be amputated—and the wings come largely under the same rule—the part is grown afresh. This does not occur all at once, and the progress made in the interval is revealed at each following moult; a leg amputated in a very young larva is renewed so that the imago shows no difference from a normal specimen, but if the injury is later then the new limb is smaller than its fellow. A limb so reduced in size can hardly be called teratological; it is a normal development from normal germ-plasm, the germ-plasm reserved from which to develop again lost parts. The same must be essentially true of the wings.

In the Lepidoptera we are much more familiar with the absence of a wing, or its being of small size, than with the same phenomenon when it affects the legs. This is certainly not because the wings are more liable to such defects, but, no doubt, because practically all the wings of every Lepidopteron preserved are scrutinised, whilst the legs of not one in ten thousand, or perhaps one hundred thousand, are looked at, the fore-legs in some degree excepted.

There can be little doubt that such cases are generally the normal results of regeneration, and are not, therefore, teratological, but it is nevertheless indisputable that unless we have the life-history of the specimen it cannot be asserted in any particular case that the deficiency is not teratological, has nothing to do with amputation and regeneration, but dates from some defect of the original germ-plasm of the individual.

This is still more the case when we come to such things as reduplicated or triplicated appendages. It is impossible to say

in the case of any specimen with history unknown that the malformation is the result of an error in the regenerative process, and that it is not a vagary of the primary embryonic material. I believe I am not wrong in saying that the latter hypothesis is the one almost universally adopted. My own belief is that it is comparatively rarely that these reduplications date from the original embryonic origin of the individual, and that in the great majority of cases they are the results of errors in regeneration. The normal result of regeneration is the reproduction of the lost part, of normal size if time allows, diminished in size if not, the struggle being to produce all the normal structure by the time the imaginal state is reached, after which, of course, nothing can be done. This statement is broadly true, notwithstanding well-proved facts to the contrary, as, for example, that certain Crustaceans cannot re-develop an eye and its stalk, but replace it by an antenna, due probably to the eye containing offsets from the central nervous system, not capable of being replaced from embryonic cells peripherally preserved for purposes of regeneration; or, again, the less easily comprehensible case of *Blattidæ* that reproduce the tarsus with one joint missing.

Such exceptions present in their particular cases the normal process of regeneration, and not only cannot be regarded as teratological, but leave unaffected the general principle that regeneration results in the appearance of no damage having been sustained or any alteration having occurred.

I made certain experiments in 1899 on the legs of *Lymantria dispar*, some of which are reported in the "Ent. Rec." for 1900. I made a much larger number of more complete experiments on the same species a year or two after, but I have never reported any of these, entirely—I think, I must confess, from sheer laziness.

These experiments, as bearing on the present portion of our discussion, showed that when the injury was not too great, and occurred early enough in the larval life, it was the rule for the imago to show very little trace of the injury, but in some cases there was some deformity, and in two or three this deformity took the form of a tendency to duplication of a portion of the limb. One other observation is here of importance: in rearing together a considerable number of larvæ, in fact a brood of *T. pronuba*, I was rather surprised to find that nearly all were without portions of, generally, several of their legs; in one or two all the legs were affected; they had obviously, in the crowded state in which I had kept them, bitten each other to this extent. The legs of the imagines, however, showed no very appreciable defects. I have once or twice found wild larvæ with damages to their legs. The point I wish to make here is that, as a natural occurrence, larvæ no doubt often have partial amputations of their limbs, and that in regeneration a by no means inappreciable percentage develop duplicated limbs—certainly quite enough to account for the number of such malformations as

are met with without having to postulate that they originate in the germinal material in the ovum.

As bearing on the value of the three duplications in my *L. dispar* experiments, it may be noted that though the number of described, or at least recorded, specimens of teratological interest is very great, a very large proportion of these refer to the legs of beetles and a good many to their antennæ. Amongst Lepidoptera a good many antennal anomalies are recorded, but almost the only one of leg malformation is Mr. Bacot's specimen of *C. nupta* (described "Trans. Ent. Soc. Lond.," 1907).

Of Lepidopterous antennæ a curious one is a specimen of *Olene philodia* with four antennæ, figured in "Psyche," vol. xi, but no definite details are given. Another instance is recorded by M. Oberthür ("Bull. Ent. Soc. Fr.," 1900, p. 53) a case of two antennæ on the right side of a specimen of *Doleschallia amboinensis*, one above the other, the upper slightly smaller than the lower normal one.

Mr. Pickett's specimen of *Anthrocera filipendule*, with the right antenna gradually dividing into two, so that the basal half is single, though it terminates in two clubs, is a remarkable specimen, in so far that there is not, so far as I have searched, any record of a parallel specimen in Lepidoptera, though something very similar occurs in Coleoptera. On its own merits I should be inclined to believe this to be of congenital origin, but some disorder of the right upper wing may point to injury and regeneration.

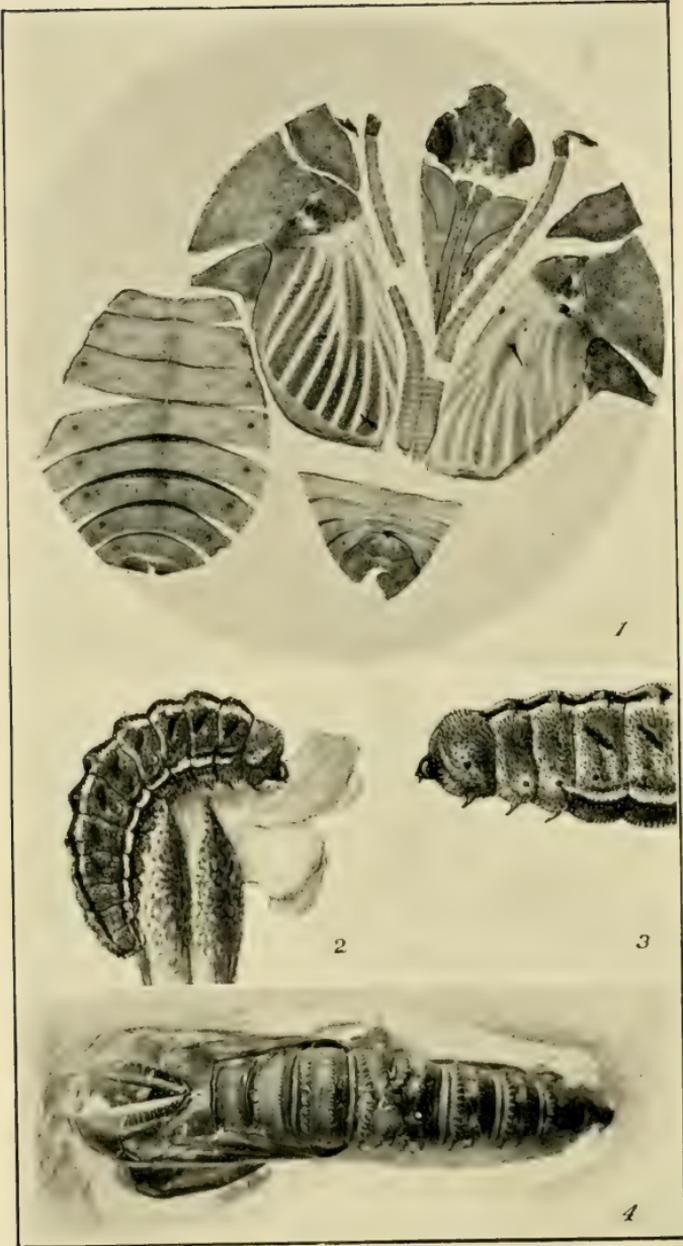
Poujade notes ("Bull. Ent. Soc. Fr.," 1899, p. 44) an abnormal antenna in a *Cordulegaster*, only remarkable in that the antennæ of dragonflies, being so small, are not often critically examined, and such records are, therefore, otherwise almost wanting. The various defects we find in wings may be attributed, firstly, to a malformation *ab initio*, as for instance, no doubt, the *L. dispar* already referred to; and very similar to these are specimens of *Lasiocampa quercus* v. *callune* of Mr. Tutt's and an *Epinephile jurtina* of mine. This want of a sector of wing is not uncommon. The most remarkable instance of this wing deformity is a specimen of *Saturnia pyri* figured by Aigner-Abafi in the "Illust. Zeitschr.," vol. v, p. 99.

No doubt very similar appearances may result from interference with the pupa, and some of Mr. Tutt's *Zygenide* rather suggest such an explanation.

Of specimens malformed from pupal damage, we probably have examples in most of those with indented hind margins, such as Mr. Tutt's *Hipparchia arethusa*, *Celerio galii*, several *Zygenide*, *Polyommatus icarus*, *Erebia melampus*, and *Agriades coridon*, my examples of *Doritis apollina* and *Smerinthus ocellatus*, and two of Dr. Hodgson's *A. thetis*. If the other is so, it is unusually symmetrical, and suggests a possibly congenital origin.

Most of the other specimens of wing deformity shown are probably of larval origin, the result of injury to the imaginal discs of the wings





*Lattiorina orbitulus* and *Hastula hyerana*.

#### EXPLANATION OF PLATE I.

- FIG. 1.—*Lattiorina orbitulus*; pupal skin of abnormal specimen spread out, showing left wing smaller, and of weaker structure than right (photo, F. N. Clark).  $\times 6$ .
- FIG. 2.—*L. orbitulus*; normal larva feeding.  $\times 4$ .
- FIG. 3.—*L. orbitulus*; larva of abnormal specimen, showing want of oblique markings on second and third thoracic segments, and presence of spiracle-like points over wing centres more enlarged. (Figs. 2 and 3 photographed by A. E. Tonge, from drawings by E. C. Knight.)
- FIG. 4.—Pupa case of *Hastula hyerana*,  $\times 5$ , showing segments four and five of abdomen fused dorsally. (Photo by A. E. Tonge.)



at some larval instar, though without any definite history it is impossible to assert that any particular specimen has not a congenital origin.

Even my specimen of *Latorina orbitulus* may be so. I take it up at the last larval instar, when obviously something was wrong with the wing centres of the left side. In the imago the left wings are small, but not otherwise seriously abnormal. It is difficult to believe, had this been of congenital origin, that such definite appearances would have been seen in the larva, or that the pupal wing cover would have been of weak texture, as well as small.

This example of *L. orbitulus* is a very ordinary one as regards the imago, viz. the left wings are both markedly smaller than the right; the other defects of the specimen are due to leaving it to die and dry up in a small box before pinning and setting it. Its interest consists in my having a drawing of the larva in the last instar, which shows that the ordinary markings are wanting over the site of these wings, and that the wings themselves are in evidence as minute, spiracle-like scars, not proving, but rendering it highly probable, that some injury in an earlier instar had destroyed some dermis with portions of the wing discs. The pupa shows the left wings smaller than the right ones and of weaker texture (Pl. I, figs. 1-3).

All these cases may be interpreted by a reference to my experiments and Herr Meisenheimer's on *L. dispar*, which show that according to the damage done to the wing centres, so one may have complete regeneration, or total absence of the wing, with any intermediate condition.

Three of the *L. dispar* so experimented on are exhibited; they show the effect on a hind-wing of interfering with the germinal discs in the larva by means of a needle. Herr Meisenheimer's experiments were more numerous and effective, as he completely and partially destroyed the centre with an electric cautery.

I exhibit specimens of various species that show absence of a wing, reduction in size, with little other effect, reduction in size with alteration and simplification of markings, washed out, ragged, and otherwise altered and twisted wings. My specimen of *Vanessa urticae*, with one minute hind-wing, suggests that it does not belong to this group, but is a case of one wing failing to expand at all, a rarer occurrence than the other deformities we have here, but a closer examination shows that it is really a fully expanded minute wing.

The presumption in all these specimens is that regeneration, incomplete from the late date or extensive character of the injury, is the *vera causa*.

A further malformation of wings is that of extra wings. These take many forms, in fact no two specimens seem to be exactly the same—a strong circumstance in favour of their resulting from regeneration after injury. They are very rare, certainly not 1 per cent. of the other wing malformations we have just been considering; and, therefore, their frequency is of a similar order of magnitude amongst

regenerations of wings that duplication appears to present amongst regenerations of legs.

As varieties of these extra wings we have what is regarded as the original wing, either quite normal, or altered in some way; the additional wing may be above it, below it, in front or behind it, and may have various degrees of development, or there may be a third wing. The extra wing or wings may be separate or connected with the original wing. The most remarkable instance of this sort I have seen was Mr. Main's *Arctia caja*, which I may briefly describe as having three hind-wings, laid on each other like three sheets of paper, but with a common costa.

A specimen of *Strenia clathrata* shown has an alulet arising from the end of the cell of the right hind-wing beneath; the wing itself is reduced in size, and apart from the alulet suggests that it is a regenerated wing.

Mr. Pickett's *Ematurga atomaria*, with additional wings, is a very typical example of this rare deformity. In considering the effects of injury of the legs and of the wings in the larval state, it is of some importance to remember that the legs of the larva become the legs of the imago, and are external and functional, whilst the wings are internal, and remain in quasi-embryonic condition.

There are various described malformations, usually in Coleoptera, of head, thorax, or elytra, that can only be grouped as being almost certainly the result of injury in early stages; one of the most curious of these is perhaps a malformation in a beetle, *Mecinus pyraster*, Hbst., described and figured in the "Bull. Ent. Soc. Fr.," 1903, p. 88, by M. H. Gadeau de Kerville. In this specimen the dorsum of the prothorax may be described as wanting, so that the head appears sunk in the back of the prothorax, the anterior and posterior margins of which meet dorsally. One supposes this must have arisen by the destruction of this portion of the insect in the larval stages, probably a late larval stage. The remarkable point is that the insect should survive such an injury and reach the imaginal stage; no doubt in a vast majority of cases such an injury would be fatal. In fact, in all instances of this sort, we may be sure that were the injury not so usually fatal the malformations would be much more frequent than they are.

There are a good many cases reported of anomalous malformations that might be described as the right organs growing in the wrong places (or times), or the right places growing wrong organs. To these would belong such cases as a pupa growing larval jaws ("Trans. Ent. Soc.," 1907, p. 173), or larvæ assuming pupal characters ("E. M. M.," vol. xxxii, p. 54), or larvæ possessing (minute) wings, not very rare in Psychids, and of which I have met with an example.

As examples I may note that Mr. W. M. Wheeler describes and figures in "Psyche," xi, an extraordinary antenna—extraordinary because it is not the antenna of the species affected—growing out of the coxa of a Dipteron.

Woodward ("Ent.," 1896, p. 334) records hind legs of *Nemeophila plantaginis* replaced by miniature wings; no further details are given.

A remarkable specimen is described by M. Clement ("Bull. Ent. Soc. Fr.," 1898, p. 268) of a specimen of *Mimas tilie*, which presented the caudal horn in the pupal and imaginal states. Details of these structures are not afforded, but sufficient is reported in text and figure to make it fairly certain that these were respectively pupal and imaginal structures, and not a mere retention of an actual larval structure, as is the case in the frequently noted instances of pupæ and imagines with larval heads. Nor, again, is it related to the frequent instances of pupæ of *Sphingidae* showing prominent horns in the positions of the larval horn, or of the prolegs, or claspers.

In 1886 Frivaldszky recorded a longicorn (*Cerambyx scopolii*) with both antennæ on one side of the head. I have not seen the original record, so cannot say how far it has anything in common with the following.

McLachlan's remarkable case of a dragonfly having two fore-wings on one side and only the hind-wing on the other ("E. M. M.," 1896, p. 83) ought to repay further study if the specimen is available. One surmises that, as a result of some injury in an early larval instar, the imaginal disc of the right fore-wing was detached from its natural connections, and dislocated to the opposite side in apposition with the imaginal disc of the wing of that side. That so elaborate a surgical operation should happen to take place by the attack of some larva of a water-beetle or other predaceous enemy with which ponds and streams abound, and from which the dragonfly just managed to escape with its life, is quite conceivable, though survival after so severe a surgical operation must be very rare. It would follow that it would illustrate also a quality of germinal matter to which many circumstances point.

This is, that germinal material is not ear-marked by its own qualities and structure, but by its position; a certain portion of germinal matter either in the fully segmented egg or later might develop into, say, a right wing, or a left leg, or any other structure, but having happened to be situated in relation to other germinal masses in the place where, say, a right wing has to appear, its development occurs accordingly. In the case before us, the imaginal disc of the right fore-wing was ear-marked to be a wing, but its change of position occurred in time for it to develop into a left instead of a right wing. McLachlan's account implies that it is a left wing, and not a right one on the left side, but a close examination of the specimen is desirable to decide this and other points.

It is remarkable how frequent this species of malformation is in the Anthrocerids (*Zygæna*, *Chalcosia*), the recorded instances being vastly in excess of the proportion due to their numbers, wings growing instead of legs, hind-wings replaced by fore-wings, etc. The group ought to be worth a careful examination by way of experiments on the larvæ.

Mr. Capper's *Zygæna*, described by Barrett ("E. M. M.," 1895 p. 219), with a fore-wing instead of a hind-wing, has the abnormality on the left side, as Tutt has observed to be usual as to wing abnormalities in this group.

This would be an example of *homovosis*, which I take to be, not an abnormal development of the right thing, but a normal development of the wrong thing, resulting from an amnesia on the part of the germ-plasm of its proper action that I have outlined in referring to Mr. McLachlan's cross-winged dragonfly.

A specimen of *Anthrocera trifolii*, figured by Mr. South in the "Entomologist" for September, 1894, may be instructive from this point of view. The specimen appears to have no appendages on the metathorax except one wing, which is a fore-wing, instead of a hind-wing as it ought to be. I say *may be* instructive in this connection, since so far as we know, the missing legs may be the intermediate, or the posterior pair, and if the latter, have not improbably been purposely removed from the specimen. If they were the posterior legs, then their absence from the same segment as the missing left hind-wing would imply some extensive injury to the larva completely destroying these legs, including their centres of regeneration and the left wing disc. The right hind-wing disc would then be left without some of its best data for orientation, without its normal environment, and free to develop irregularly, and the tendency, apart from compulsion otherwise, of germinal material to develop into a fore- rather than into a hind-wing, would assert itself.

This prepotence of fore-wing tendency is seen in the many instances in which the hind-wing has fore-wing markings, of which a magnificent instance in *Erebia goante*, as well as a less pronounced specimen of the same species, was lost in a memorable catastrophe that happened to the collections of Mr. Tutt and myself made in the Val d'Anniviers in 1899 (though these specimens were more notable in having underside markings on the upper surface).

Hind-wing markings on the fore-wing must be much rarer: I cannot remember seeing or hearing of one.

I am indebted to the Rev. C. R. N. Burrows for the opportunity of examining and describing a teratological specimen of surpassing interest. It is one that has not hitherto, so far as I know, been met with, or, indeed, has anything at all similar been recorded. It cannot, therefore, be classified with any of the other malformations I have referred to (Pl. II).

It is a specimen of *Acronycta tridens*, a male, in which all the genital appendages are in the interior of the abdomen instead of in their usual situation. The terminal segments of the specimen consist of the girdle or ring of the ninth segment, precisely as seen in a normal specimen, except that the saccus looks larger than usual, owing to the two sides of the ring, where the clasps are usually attached, falling together in the middle line. The tenth segment



## EXPLANATION OF PLATE II.

FIG. 1.—Mr. Burrows' specimen of *Acronycta tridens*.  $\times 5$ .

FIG. 2.—Extremity,  $\times 16$ , to be compared with fig. 4, showing the normal appendages. Fig. 2 has only the basal ring, *i. e.* the tegumen and uncus. The remainder of Fig. 4 is represented in Mr. Burrows' specimen by the portions shown in Fig. 3 ( $\times 16$ ), where, though coiled together, they can all be made out, excepting the spiculated eversible membrane, which seems to be badly developed rather than absent. Fig. 3 also shows the two cups that probably are the male pupal tubercles. These seem quite different structures from certain very remarkable dark bodies that Mr. Pierce finds in the abdomina of some species, but whose nature is not yet determined. (Photos by F. N. Clark.)



Malformation in *Acronycta tridens*. 1. Specimen,  $\times 5$ . 2. Extremity,  $\times 16$ . 3. Interior position,  $\times 16$ . 4. Lateral view of normal appendages for comparison.



also is as in a normal specimen, consisting of the uncus, and the anal tube, with its dorsal chitinous line.

The ring of the ninth segment seems to consist of all its normal parts, but its two sides especially, as already noted, towards the saccus are somewhat collapsed towards each other, due to the absence of the clasps, and of the ædœagus and its accompaniments.

These parts exist entirely separately, and with no apparent connection with the exterior, in the fifth and sixth abdominal segments. That they are in these particular segments is possibly not a point to which importance should be attached, as they have all the appearance of lying free in the abdominal cavity, and may, in preparing the specimen, have altered their position appreciably. However, that is their position. They are not, of course, spread out as in normal

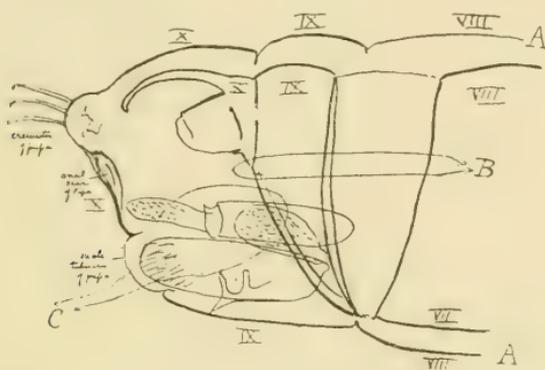


Diagram to show parts in normal relation to each other and to the pupal skin. A. Pupal skin. B. Parts external in specimen. C. Parts internal in specimen.

appendages displayed when mounted by Mr. Burrows, being within the abdominal walls and softened by maceration; they are somewhat twisted together, but not so as to make it otherwise than probable, in fact almost certain, that they are in fairly natural relations to each other. There are the two clasps, the ædœagus with its supports, but its eversible membrane (vesica), armed with its usual darts, etc., does not appear to be fully developed. There are, moreover, two curious dark hemispheres, which cost some study before their nature became apparent. They are the two eminences that in the male pupa mark the site of the genital appendages. These must have been absent from their proper position in the pupa just as the developed appendages are absent from their proper site in the imago.

I think this fairly describes the condition present in this specimen, but reference to the photographs of the preparation will probably assist in understanding its peculiarities.

How did such a curious malformation come to occur? And what may we learn from it?

A first and more simple conclusion it points to is one we might have arrived at before, and in fact knew, even if we did not definitely state it, and that is, that the male appendages strictly are those existing interiorly in this specimen, and that those that it presents externally are the normal elements of the ninth and tenth segments, modified, the ninth to support the true appendages, but not really part of them, the tenth also modified to form the uncus, an adjuvant to the appendages proper, but again not part of them. They may be called ancillary appendages, in a similar sense only to that in which the term might be applied to the antennæ and intermediate legs in *Odynerus spinipes*, or to the dilated tarsal joints of some Dytiscids.

How did these parts come to occupy such an interior situation? All the authorities I have been able to consult agree that the clasps are derived from the ectoderm of the ninth abdominal segment, but in none of them do I find such detailed research devoted to them as to the ducts and other unquestionably internal parts, and I have met with no clear account of their first appearance, and the conclusion arrived at seems to have been reached in a rather perfunctory manner.

The strongest fact in support of the view that they are dermal structures is that they possess hairs (in the Lepidoptera). It is, however, to be doubted whether this can be regarded as at all conclusive; whatever their real origin, they have been external (in the imago) for so long that one would expect them to have acquired some dermal characters, whatever their true origin may be.

In this specimen there can be no doubt that there is retained by these parts a situation that is normal to them at some earlier stage in their development. They come from the interior, and at pupation assume an external position by the extrusion of the two rounded eminences characteristic of the male pupa. These pupal covers of the mature structures are here internal.

It seems impossible to avoid this conclusion, a conclusion that postulates a different history of the development of these organs from that at present accepted, accepted, however, on an apparently inadequate basis of observed facts.

These organs, then, are at one period of their development internal structures, and they can be so, it would seem, in one of two ways. One of these would make their origin similar to that of the wings, an invagination of the derma of the ninth abdominal segment at an early period, remaining until the period of pupation as an "imaginal disc," then to come to the surface again.

If this were the case, one would expect to find instances of the wings not again reaching the surface, but being developed in the thoracic interior. I am not aware that any of the frequent cases of moths with one wing wanting have ever been found to have it in the

interior. It will be said it never has been looked for, and that may be the explanation ; but one would expect in any case in which it occurred to have some deformity of the thoracic segment affected that would have suggested closer examination.

The other theory of the origin of these parts that would explain this specimen is that they have a truly internal origin, that they are developed as a portion of the ducts, etc., and have no relations with the surface, till at the pupal stage they reach it. The difficulty in this explanation is the dermal structure of the surfaces of the clasps.

Whatever the true explanation may be, it is obvious that more accurate observations on the development of these parts require to be undertaken.

The male tubercles of the ninth abdominal segment of the pupa present a feature that is probably of importance in dealing with the questions raised by Mr. Burrows' specimen. They are separated from the rest of the ninth segment by a suture, and we may compare this suture with the lines of delimitation of the pupal wings, which are certainly dermal structures (superficially, at least), which have returned to the surface after an internal existence due to invagination. Where the wings impinge against the antennæ or abdominal segments there is a very marked suture, very marked because we have here two structures in contact, which are not, however, continuous, as two adjacent segments are, but merely in apposition ; but if we examine the place when they are in structural continuity with the mesothorax (or metathorax) we can only approximately say where the junction is, but find that there is no trace whatever of a suture. The continuous suture round the male tubercles appears to prove that they are not portions of the segment returned to the surface.

I have assumed that the male tubercles represent the clasps. I think this is generally agreed, but a certain amount of further proof is afforded by the specimen before us, as we see in it one of the clasps just escaped from, or rather, perhaps, still slightly involved in, one of the hemispherical cups.

I have been assuming, as it is very usual to do, that these tubercles are in the ninth abdominal segment, but it is more than doubtful whether this is so ; their posterior borders are in contact with the tenth segment, and their real position is not in the ninth segment, but between it and the tenth—a more probable place for an interior structure to reach the surface than actually through the continuous surface of the segment itself. It fully accords also with the fact that the structures it represents are in the imago along the posterior border of the ninth segment, *i. e.* between the two segments.

## An Entomological Trip to South Brazil.

By W. J. KAYE, F.E.S. *Read December 8th, 1910.*

WE left Liverpool on January 27th with the thermometer registering 28° F. On the following morning, when off the Scilly Islands, the temperature had risen to 42° F., but even at Lisbon, six days out, there was still a suspicion of coolness in the air, and it was not till we got to St. Vincent that we felt the hot glow of the sun. By the time we reached Rio we had enough warmth and to spare. With the thermometer at 86° F. on the shady side of the street, it was quite warm enough on the sunny side for the chilliest of mortals. We spent the greater part of February 16th, the day of our arrival, in the town of Rio, and towards evening went by the electric tramway to the Internacional Hotel, some 800 ft. up on the Corcovado. Here we spent a week in exploring the hill-sides, and occasionally went down to the Botanical Gardens.

Quite the feature of these gardens is the fine avenue of palms. The trees are about 150 years old, and are a great height, with large handsome trusses of foliage on top. Quite a number of small epiphytal Bromelias have taken up their abode on the trunks of these trees. About the only butterfly that interested us in the garden was *Papilio ascanius*. Lepidoptera were decidedly scarce, but late one afternoon we saw a fair number of this very fine and local butterfly. The gardens are close to the sea, and are fringed with a swamp. Here the larvæ of *P. ascanius* feed on a species of *Aristolochia*. The butterflies during the day are very wary, and fly, as a rule, high up amongst the trees fringing the swamps; but towards evening they fly lower, preparatory to taking up their resting quarters on the lower branches of the trees. The gardens being at sea-level, and shut in with high hills, butterfly collecting is very hot work. Night collecting at the arc-light outside the hotel was of an exciting description. The trouble, however, was that there were too many entomologists present, as, amongst others, the manageress of the hotel was a keen collector of moths. With a division of spoils, however, the result was quite satisfactory. The species taken included *Sphingidæ*: *Protambulyx astygonus*, *Callionma nomius*, *Xylophanes porcus*, *Callionma thorates*, and *Hemeroptanes ornatus*. *Saturniidæ*: *Dysdæmonia pluto*, *Micrattacus nanus*. *Ceratocampidæ*: *Adelocephala gucuída*, *Adelocephala invalida*. *Notodontidæ*: *Pentobesa xylinoides*, *Calle-dema plusia*, *Notoplusia clara*, *Rhuda endymion*, and several fine species of *Cossidæ*, *Megalopygidæ*, *Limacodidæ*, *Thyrididæ*, *Lasiocampidæ*, and *Psychidæ*.



Looking down the Serra, from Alto da Serra, São Paulo Railway.

*Photo. by E. Dukinfield Jones.*

*Anland & Son, Imbr.*



On February 22nd we left to go by train to Saõ Paulo, an eleven hours' journey by train, over a line that is in very bad repair. The dust is at times terrible; it pervades everything, and it is usual for people to travel in special dust-coats. These, however, do not prevent dust from getting into your ears, eyes, and mouth, and one is glad to arrive at Saõ Paulo after a very uncomfortable day. We remained at Saõ Paulo for four days, making daily excursions on the Saõ Paulo railway to the Alto da Serra station, or to the Cantareira Waterworks, some eight or nine miles distant, by steam tramway. The Alto da Serra we worked more thoroughly later on, as we found it was a fine locality. Near the Cantareira Waterworks we found *Morpho hercules* in the greatest abundance. Comparatively few other species were on the wing, and it was some time before we accounted for any of the dark green *Morpho*. We at last secured a poor specimen, and then having killed it, by holding it between the forefinger and thumb on the underside and waving the wings backwards and forwards, we utilised it as a decoy, and attracted many specimens to fly down towards it. Sometimes we counted as many as seventeen specimens flying together. We had no difficulty later in securing as many specimens as we wanted. This method of decoying did not answer with *Morpho achillana* at the same place. But that species was not nearly so abundant, and was going over.

On February 26th we went by the Saõ Paulo line to Riberaõ Pires to reconnoitre; but the place did not offer sufficient attractions, and that same evening we pushed on to Santos, making our way across the bay in a launch, and by the miniature steam tramway to Guaruja.

To arrive at Guaruja at night for the first time is something quite out of the common. A tiny train consisting of one open carriage travels over a very narrow gauge through dark forest for half an hour, and suddenly one comes out in front of a large hotel with electric arc-lights outside, and everything inside done for your comfort. We found the hotel all but empty, it being the hot season, but the collecting was of the most exciting character. Entomologically we found we were in an exceptionally rich district, and we had some exciting work netting *Syntomidae*, especially off the flowers of a pink-flowered *Ageratum*. We took *Napata eucyane* (plentifully), *Saurita tenuis*, *Trichura dixanthia*, *Trichura grandis* (nov.), *Tipulodes ima*, *Cosmosoma elegans*, *Amycles dolosa*, *Mesolasia paula* (common), besides many others, some of which are new to science.

We were greatly interested in watching species of the genera *Dycladia* and *Correbia* flying with a Lycid beetle, the flight being wonderfully modified, and like that of the beetle. *Trichura dixanthia* and *Trichura grandis* we watched at different times, wondering if they really were moths. The habits of these two species of *Trichura* were remarkable. They flew from leaf to leaf, and when alighted quivered their wings as many wasps do, and moved their bodies backwards and forwards in a most curious way. They affected the glades of

the forest much more than the other *Syntomidae* we took in the same district.

For those who want them there are a large number of orchids to be obtained in the surrounding hills, or in the swampy places along the coast. I gathered *Oncidium sarcodes*, *Cattleya leopoldi* and *C. intermedia*, *Miltonia regnelli*, *M. spectabilis*, and other less known species. Although we were not favoured with a good night at the electric lights, we learned that sometimes the hotel was besieged with moths. It is true that on one of the nights we were there it was impossible to hope for anything in a deluge of rain. Mr. Dukinfield Jones, just before he left for home in May, took some exceedingly fine species at the lights, including the wonderful *Amaxia chaon*. But what we lost at light at Guaruja we made up for later on at the Alto da Serra.

We left on March 2nd, crossed over to Santos, and took the train to the station on the summit of the Serra, called Alto da Serra. Here we were most kindly put up by the Superintendent of the Serra section of the line, Mr. Van Haut. Our new centre was 2600 feet above the sea, and was surrounded with an amphitheatre of hills covered with virgin forest. The station and yard are lit with arc lights, and the sight of those lamps on the first evening of our visit, I think, neither Mr. Jones nor I shall ever forget. Moths were flying round the lamps in countless thousands. A small Pyralid, *Sylepta pactolalis*, formed a large proportion of the huge swarms, but there were representatives, sometimes in numbers, of most of the families of the *Heterocera*. We secured many fine *Sphingidae*, including *Hyloicus justitiae*, *Xylophanes xylobotes*, *Calliomma nomius*, *Xylophanes schausi*, *Xylophanes titana*, etc.

*Notodontidae*: Including *Farigia musara*, *Hapigia smerinthoides*, and *Chliara cræsus*.

*Noctuidae*: Including *Palindia ilyrias*, *Palindia micca*, *Calydia metalligora*, *Ophideres columbina*, *Letis specularis*, and the giant *Erebus strix*.

*Arctiidae*: *Automolis reducta*, *Melese peruviana*, *Elysius superba*, and *Psychophasma erosa*.

*Geometridae*: Including *Meticulodes spongiata*, *Oxydia ombrosa*, *Blechnoma parcipuncta*, and very many others. I made my first acquaintance with the very abnormal Pyralid, *Myelobius murina*, which has the build of a stout Sphingid, and measures five inches across the expanded wings. It was sometimes quite a nuisance, flopping about amongst the rarer and more delicate species.

During the day we worked chiefly along the Mogy das Cruzes road. We saw *Papilio dardanus*, but could not often get near it. Mr. Jones took one female only. Large numbers of *Syntomidae* were again in evidence, this time frequenting a species of *Ageratum* with white blossoms. The most conspicuous and beautiful species were *Coreura atavia* and *Agyrta dux*, which were quite common. Neither of us took the former species for a Syntomid at

the time, so unlike in flight and general appearance did it appear. Mr. Jones discovered a truly wonderful species of Syntomid of the genus *Pseudosphex*, which turns out to be new, flying with the little vespid wasp, *Meganthopus cassununga*. The resemblance between these two is one of the closest and most remarkable of all the Syntomid cases of mimicry.

The forest on both sides of the road, or rather, mule track, is very fine, and we were at the right season for seeing the *Melastoma* trees in all their glory, covered with white and mauve flowers. The blossoms open white, and gradually change to mauve as they mature. I noticed a good deal of fuchsia growing in the undergrowth, and occasionally we saw trees of *Cassia* one mass of yellow flowers. Near habitations we saw some fine examples of the silk-cotton tree, or *Bombax lades*, with brilliant pink blossoms. The slopes of the Serra, as seen from the Saõ Paulo railway, are magnificent. The mountain sides are densely covered with tangled vegetation. But the railway, a British-owned one, does not help the lepidopterist directly by providing specimens. The sides of the track are so well looked after and kept free from growth that one obtained nothing by walking down the line. Very different, indeed, are some of the Brazilian-owned lines, which afford a happy hunting-ground for the entomologist.

While at the "Alto" we collected all day, and well into the night, and altogether got a wonderful lot of insects. The climate, however, was rather depressing and exceedingly damp. Clouds roll up the Serra and envelop the little settlement of Alto da Serra almost every afternoon, and apart from the discomfort of the mist it is difficult to dry one's specimens.

On March 7th we bade adieu to our kind host, took an early train to Saõ Paulo, there fitted out with sundry necessaries, and the same afternoon took train for Itararé. We spent a sleepless night in the train, notwithstanding the fact that we had booked two berths in the "dormitorio." But this Brazilian dormitorio was not the exact equivalent of our luxurious sleeping-cars. Nevertheless, we were both much surprised to hear that such accommodation existed in any form. We arrived at Itararé at 5.40 a.m., and our first impressions of this out-of-the-way little town were not encouraging. Everything was dilapidated and badly kept, and the sole conveyance at the station was more suitable for a museum than for service over a vile road. Itararé is right away from the forest region, in the midst of the vast campos or prairies. The climate is very fine, but Lepidoptera are decidedly scarce. We found *Catagramma sorana* in fair numbers and in perfect condition. *Eunica bechina* was also common but badly worn. It was at Itararé that I saw the one and only wild mammal while in Brazil. In one of the small, scattered bits of woodland I disturbed a coati, and had a good view of this interesting animal in its native state. At the little hotel where we stayed a tame coati was kept chained up. The proprietor of the house also had an orchid, *Oncidium pretextum*,

which was described by Mr. Jones many years ago, growing in an old tin box.

After two days we pushed on to Castro, some seven hours by train almost due south. Here Mr. Bickerstaph, an American missionary, and his wife met us, and most kindly put us up at their house. Mr. Jones, as many of you know, lived here eleven years, and discovered a large number of new and interesting moths. Castro is a most charming spot, is 2900 feet above the sea, and has a climate that is absolutely ideal. It is in the heart of the Parana campos. These campos contain small patches of wood or coppices, but to the north west of the town of Castro the woods have been of considerable extent. Unfortunately, with the ever-spreading civilization and consequent cultivation, large tracts of these woods have been cleared for the growing of Indian corn. There are still considerable areas left, but the collecting is not what it was when Mr. Jones was here previously. It is a matter of degree only. We had been spoilt at Guaruja and the Alto de Serra. We made daily visits to some of Mr. Jones' old haunts, and usually got some nice insects. *Eunica margarita* was common along the railway, and the large day-flying Saturniid, *Heliconisa pagensteckeri*, also frequented the line where it traversed a swamp. Some very fine *Erycinide* were obtained, including the remarkable long-tailed *Syrmatia dorilas*, *Panara thisbe*, *Charis theodora*, *Emesis fatimella*, and many others.

At the house of Mr. Bickerstaph a fine female specimen of the interesting *Dynastor napoleon* was found. The larva of this species feeds on a large epiphytal *Bromelia*. Mr. Jones pointed out to me a tree covered with large Bromelias where he had taken many larvæ in previous years. Very few lepidopterous larvæ are known to feed on epiphytal plants, but it is likely that in S. America, where these plants are so abundant, many larvæ may yet be discovered.

On March 21st Mr. Jones, Mr. Bickerstaph and myself started on a little expedition to Tibagy, nearly fifty miles west of Castro. We moved off at 8 o'clock, and our caravan consisted of a small two-wheeled cart with the greater part of the baggage, drawn by a pony, and two larger ponies (called horses in Brazil), with Mexican saddles, and the usual coverings of blankets, etc. We took it in turns to ride in the cart, sometimes singly and sometimes two at a time. When two were in the cart, one of our horses, being riderless, had to be manœuvred between the cart in front and the horse behind, upon which most of the time I was mounted. Generally at starting, and particularly on the first morning, when about two miles from Castro, the riderless horse gave us cause for some anxiety. He would career off, kicking madly in the air, and in time kicked saddle, blankets and all the paraphernalia into the road. This happened several times before Mr. Bickerstaph, who knew the peculiarity of his own horses, decided to ride the truculent "Nellinha." We had no further trouble with 13 st. on her back. The first twelve miles had to be covered at a walking pace, and, in fact, walking is the

usual mode of progression owing to the execrably bad road, which is no more than a track. At mid-day we halted at the foot of the Serra, twelve miles from Castro. This was a wonderful place for butterflies, but we could not linger as we had a long way to go to get shelter for the night. We had covered the worst length of road, with huge cart-ruts formed by the ox waggons, and with a sharp ridge between the ruts which in some places looked like the watershed of a miniature mountain range. Driving a light two-wheeled cart with a single horse on the top of the ridge is not, therefore, an easy matter, and there are some extra choice places where there is more than a spice of danger. From the top of the Serra there is a boundless expanse of country to be seen. In the immediate neighbourhood are numberless ant-heaps, which look exactly like the manure heaps one sees at home, placed at regular intervals in the fields for distributing later over the soil. The ant-heaps look very dark brown or black, and show up plainly on the grassy campo. I remember after we had travelled some distance beyond the Serra our horses suddenly gave a bit of a spurt. I noticed some upright sticks by the edge of a bit of wood, and I learnt that horses can see these remnants of a camp a long way off, and generally put on a spurt, thinking that their day's work is over.

We put up at the Fazenda called "Boa Vista" and it is difficult to realise the isolation of this house, a single building miles away from anywhere. The view from the front of the house is romantic in the extreme, with a great cañon in the distance. Away to the left of the Fazenda is a wonderful view over the valley of the Tibagy and the valley of the Ivahy beyond. The whole country appears to be uninhabited, and in point of fact is all but so. These great gorges, or cañons, are extremely picturesque, and are clothed up the steep sides with vegetation. At Guartela there is a particularly fine gorge. At Itararé there is a similar phenomenon of a river washing through its soft sandstone bed, only there, the sandstone being softer below the surface than on top, the water has carved for itself a deep, broad passage below the surface so that the river is quite invisible, unless you get close to it and look down vertically. On the surface there appears to be a shallow river bed with a narrow chasm in the middle, through which the river has disappeared. While we were halting at the little *sítio* at Guartelá there were several mules inside the enclosure that interested us much by possessing circular stripes round the lower part of the leg, reminding one of the marking of the zebras. The character was no doubt a throw-back to a distant ancestor.

We arrived at the primitive little town of Tibagy early in the afternoon of the 22nd. The river Tibagy has to be crossed first, as the little settlement is on the west side. To accomplish this there is a ferry, consisting of a raft fixed to a wire rope stretched across the river, which is worked backwards and forwards by the current. Bigg Wither, in his fascinating book, "Pioneering in South Brazil,"

well describes this ferry, and although written over thirty years ago, this ferry and town are exactly as described then. We found that at the banks of the river at each end of the ferry, where people and horses wait to be taken across the stream, were wonderful spots for butterflies. The wet sand was perfectly alive with *Catagramma* and *Callicore* species. It was here that we found *Catagramma hydaspes* for the first time. Close by *Anæa otrere* was flying about some dead bushes and settling thereon. The wings were folded in the peculiar *Anæa* fashion, showing a large space between fore- and hind-wings. In a sandy lane alongside the river we found butterflies plentiful, and took some fresh Erycinids such as *Mesene phareus* and *M. sagaris*, bright-red little butterflies that were exceedingly active in the sunshine, and by no means easy to catch. The red colour is most conspicuous when these insects are flying. Many of the commoner butterflies, such as *Catopsilia*, *Adelpha*, and *Eunica margarita*, were in swarms whenever we came upon a damp spot. The following day spent in the woods was rather disappointing considering the journey we had undertaken. We took plenty of *Itona ilione*, *Methona themisto*, *Dircenna dero*, and *Hypoleria adasa*. The woods we had chosen to work were too dark for most species, but on the margin we took some nice *Erycinidæ*, including the two red species already mentioned. Ithominids of nearly all species that have developed transparency are usually found in rather dark woods, where few other species are to be met with. They do, however, visit flowers in the open, at least in the early morning, as we found later on at Fernandes Pinheiro.

The next day we left Tibagy and headed once more for Castro. As previously, we broke the journey at Boa Vista. Here we made a meal of beans and rice, which I did not find very satisfying after a whole day's ride. Having got this over we turned *in*, or rather *on*, to our beds, for they were but mattresses. The following morning, after a small cup of black coffee, we left at eight in a heavy mist, which did not clear off for quite two hours; but at 11.30 we arrived at the foot of the Serra in brilliant sunshine and partook of a breakfast that we were more than ready for. Beans and bread, as far as I recollect, formed the principal items of our meal, washed down with the inevitable black coffee. For my part breakfast was quickly done with, as the wood at the foot of the Serra was full of butterflies, and principal amongst them was *Morpho thamyris*, which was simply swarming. It was one of those rare sights that does not often present itself, even if one is prepared to travel thousands of miles to witness it. Here was a wood literally alive with these exquisitely beautiful butterflies, and in addition there were: *Epiphile nigrina*, *Chlorippe cherubina*, *Callicore eluina*, *Callicore candrena*, *Dismorphia themesia*, *Dynamine mæon*, *Dynamine athemon*, *Dismorphia melia*, *Anæa arginussa*, and many others. Orchids were growing commonly in the denser portions of the wood, but they were principally species of *Maxillaria*, and small-flowered *Oncidium*. Unfortunately, we

could not linger in this entomological fairyland long, for Mr. Jones was beginning to get badly knocked up with the strenuous life we had been leading; moreover, we had to return to Castro that same evening, for another good reason was that we had no more food. We arrived back in Castro as the sun was setting, but only after an episode that made me fear for the safety of my two companions, for the small cart in which they were riding completely turned over soon after we had left the Serra. Providentially no bones were broken, and we completed our journey without further incident. It was altogether a trip that will not soon be forgotten. We spent another three or four days with our kind friends Mr. and Mrs. Bickerstaph and thoroughly appreciated the home comforts that they provided us with. The house is about a mile from Castro on high campo land, and for perfect freedom in a glorious climate it would be hard to beat our erstwhile home in campo surroundings.

On March 29th we organised a little camping expedition to Villa Velha. We made up a party of eight, including the driver of the "carrossa," and commenced our progress by taking train to Ponta Grossa.

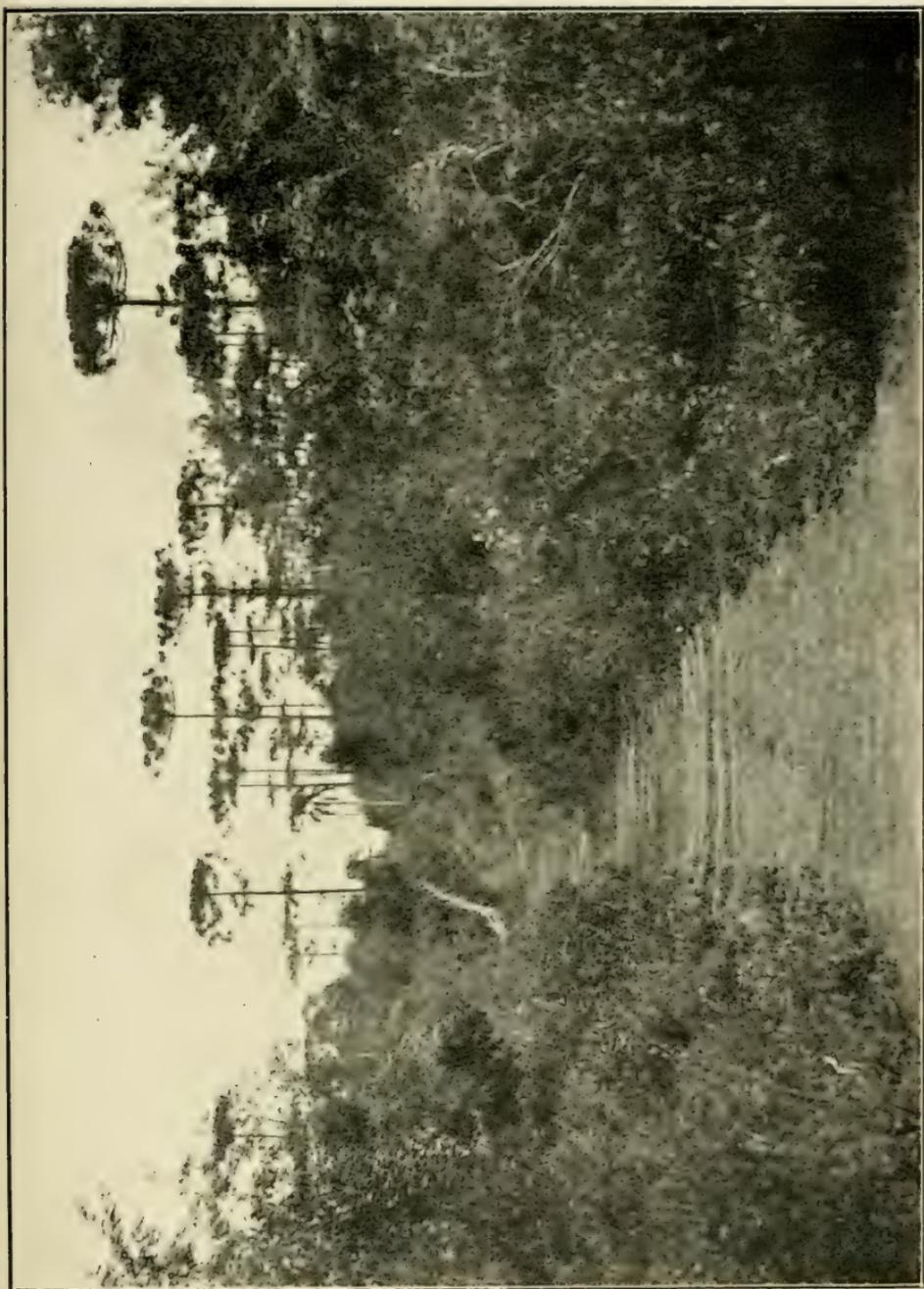
A springless four-wheeled covered waggon was engaged at Ponta Grossa, and in this we bumped and jolted for about five hours over the rough campo, and arrived at 7 p.m. in the dark, approximately near, as we thought, to the rock formation. We could not find running water for some time, but with the aid of Mr. Jones's acetylene lamp we at last found a tiny spring. We were on the slope of a hill, and it was not an ideal place for our tents. We, however, cut some tent-poles, and very quickly had our tent pitched and a fire burning. That night we men slept in the tent, the two ladies occupied the cart, and the driver slept under the cart. The next morning, which was deliciously crisp and invigorating, we struck our camp, and moved away some two miles to a more suitable spot, and one nearer to Villa Velha. I was surprised there were not more butterflies on this long-grass-covered campo. Except for a small *Euptychia*, a Satyrinid, and one or two small Lycenids, I saw no Lepidoptera till we got down to the shelter of a bit of wood. I found a most beautiful flower in the form of the scarlet gentian, a species with a long, stout stalk and large red flower. We came down to the edge of a small river, fringed with wood, and pitched both our tents in a most delightful spot. It was with difficulty we found a way over the stream, but we at last hit on a natural bridge formed by a fallen tree. The branches had grown perpendicularly to the trunk, and a previous traveller had placed a pole along the young growth to form a hand-rail. Once across the stream it was half an hour's steady walk to reach the rocks, although in the clear air and dazzling sunlight it did not appear to be more than ten minutes' walk.

Villa Velha is a remarkable mass of soft sandstone rock, which has weathered into most fantastic shapes. The rain falling on the top, and beating against the sides, washes out the softer

strata, and in time forms deep ravines or street-like passages in the rock. When wandering through these passages, the impression is almost irresistible that one is in a very old deserted town, or the ruins of some ancient castle. The walls (if we may so term them) of many of the "streets" were covered with orchids. *Oncidium flexuosum*, *Oncidium unicorne*, *Bifrenaria harrisonii*, *Sophronitis rosea*, *Maxillaria picta*, besides many others, were in abundance. None of these species was in flower, but old flower-spikes on the *Oncidium flexuosum* showed they had recently blossomed profusely. Right on the top of the rock in one place was a magnificent mass of *Epidendrum ellipticum*, which was a blaze of bright pink flowers. We hardly saw any Lepidoptera. One fine large Hesperid was the best of a very small showing. The whole district is not a suitable-looking one for butterflies, there being too little variety of vegetation. Slight frost, also, must occur not infrequently in this exposed and elevated situation of over 3000 feet. Actual observation would be exceedingly interesting, for it is almost certain that here there are epiphytal orchids which have to withstand a little frost.

The night following our visit to these remarkable rocks it rained hard, and for a while we felt the fine rain in our faces as we lay in our tents. A few moments of heavy rain soon soaked our tent material, and we had no more sprinklings inside. The morning broke very fine, but our three horses, which had not been tied up, had vanished. The driver of the cart went off early to search for them, and eventually found them at the previous night's camping ground, about two miles away. From Villa Velha we journeyed back over the campo to Ponta Grossa, a small town built on the highest ground in Parana, about 3100 ft. high. Here we slept the night, and the next day we broke up our party.

Mr. Jones and myself took train to Fernandes Pinheiro, which is four hours' distant from Ponta Grossa. About two hours after leaving the latter place one penetrates the forest country. The campo does not abruptly end and the forest region begin, but there is a very gradual transition. The *Araucaria brasiliensis*, which largely constitutes the forest, is to be noticed, at first sparsely dotted about the campo, with not a vestige of undergrowth. Then a little scattered undergrowth appears between the trees, and later the forest gets denser with varied growths, including large tree-ferns. The railway, which has only just been opened, passes through an absolutely new country. Traffic is at present limited to three trains a week only, and each train consists of but two passenger coaches. Fernandes Pinheiro is the stopping-place for breakfast on the day's journey to Uniaõ da Victoria. There is a small restaurant, kept by an Italian, just outside the station. We found everything thoroughly satisfactory, though necessarily primitive, and collecting such as would make any lepidopterist's heart glad. The *Erycinidæ* and *Syntomidæ*, frequenting a creeper in flower from 7.30 to 10.30, formed perhaps the most exciting and interesting part of our collecting. A lane close to our



Fernandes Pinheiro—a fine collecting locality.

Photo. by E. Dukerfeld Jones.

Atwood & Son, Inc.



quarters we found a perfect Eldorado. *Zeonis licursis* was abundant, and a joy to watch. The flight of this Erycinid is very different from that of the great majority of the *Erycinidæ*, and its method of alighting with wings half open, ready for flight, made it look like a small Papilionid. We found that we broke off a good many of the tails at first, until we thought of the plan of never netting the species tail on, but always with the head towards the net. After this we each secured a good series in the finest condition. *Panara* n. sp. (?) near *thysbe*, *Limnas xenia*, *Emesis fatimella*, *Eurygona euphæa*, were also common. The *Syntomidæ* were usually the earliest to arrive. *Callopepla inachia* was usually present by the time we got on the ground, and was generally joined by *Cyanopepla orbona* and *Napata castra*. After breakfast we usually went off in another direction, and had the delight of seeing *Morpho æga* and *M. thamyris* flying in the sunshine. These insects, and, indeed, all species of *Morpho*, we found did not fly till after 11 o'clock, when the sun was hot. Both the two species mentioned, as well as *M. anaxibia*, have larvæ that feed on the "taquara," or native bamboo. It so happened that this year (1910) the taquaras hereabout were all in seed, and thousands of plants were dead—as always happens after the tree has borne a heavy quantity of fruit. Such a state of things is said to happen only about once in twenty-five to thirty years, and then the rats, with an abundance of food, suddenly increase enormously in numbers. At Iraty, some nine or ten miles from Fernandes, there was a regular plague of rats. It would be interesting to know what becomes of the three species of *Morpho* when the food-plant suddenly gives out. If there is no alternative food-plant these insects must periodically become all but exterminated over large areas of country. These particular species of *Morpho*, strange as it may seem, have, in the pupal state, to endure temperatures the very reverse of tropical. In the open campo Mr. Jones occasionally recorded minima at night of 10° degrees below freezing. It must follow, therefore, that in the scattered patches of woodland, temperatures in the neighbourhood of freezing-point have to be occasionally endured.

At Fernandes we found *M. epistrophis* was beginning to go over. This is a tree-feeding species. *Epiphile nigrina*, *Callicore candrena*, *C. eluina*, *Anæa*, *Dynamine myrrhina* and *D. mæon* were quite abundant in the forest glades. The path to Iraty we found particularly good, and one where we saw some magnificent cardinal birds sitting in the trees overhead.

Fernandes is a local centre for the collection of the "Maté" or Paraguayan tea. The tree grows wild, and in plenty, in the forest, and paths have been cut through the woods in all directions to reach these trees. The boughs are cut and dried in an oven or over a fire in the case of the peasants, and then the leaves and twigs are chopped up and used just like ordinary tea. The flavour is not at all like tea, but has a smokiness, to which one becomes very soon

accustomed when there is nothing better to be got. All these paths are frequented by varying numbers of Lepidoptera, and a maté tea district should always appeal to a lepidopterist. The forest is principally of *Araucaria braziliensis*. This kind of forest, of which there are hundreds of square miles, is peculiar to the State of Parana. The cone of the Araucaria is very large and heavy, weighing about three pounds. Walking in these forests at the time the cones are ready to drop involves considerable danger, for a weight of three pounds dropping from a height of sixty feet is sufficient to kill a man. Each tree bears comparatively little fruit, which contains large seeds or "nuts," which are not bad to eat.

A remarkable plant that we saw a good deal of was the "old man's beard" *Bromelia*. This growth looks exactly like cobwebs or lichen hanging from the trees. It is a remarkable growth quite unlike the great majority of Bromelias, which grow very like young pineapples. The plant is an epiphyte and is not parasitic, but grows just like an orchid, living on air and moisture. Sometimes, when this *Bromelia* is very abundant, the landscape in the distance looks as if it were enveloped in mist. I must mention one other botanical item of interest—the tree fern. Growing amongst the Araucarias there is a varying proportion of these beautiful plants. On the tree ferns, just below the base of the fronds, there was growing one of the most interesting and difficult of all orchids to cultivate, *Zygopetalum maxillare*. I found a number of these plants, and one was in flower. The sepals and petals are green with chocolate spots, and the lip a beautiful blue. The creeping rhizome of the plant clings so tenaciously to the stem of the tree fern that it is almost impossible to remove it without breaking it.

We remained at Fernandes till April 6th, and enjoyed magnificent collecting. We then travelled another seven hours on the ramshackle railway to Uniaõ da Victoria. We were unfortunate with our accommodation, and had to put up at a very low-grade establishment, and the weather was, for a change, exceedingly wet. The collecting was disappointing, after making all allowances for the weather, and the collecting ground was not very accessible. To get to the woods meant crossing the wide Iguassu in a dug-out canoe, with a good long walk in addition. We did get, however, some fresh *Erycinidæ* and some local *Phyciodes* that we had not seen before. This was the only place, also, where we found the beautiful *Cybdelis phæsyle*. These latter, with the *Phyciodes*, were hovering and settling on the wet sand in a lane about a mile from Victoria. *Pyrameis braziliensis* was also quite common. We were not at all satisfied with our surroundings. Uniaõ da Victoria is a wretched, squalid place, and its inhabitants are not all above suspicion. The people believe there is to be a great future for their town, and buildings are being simply thrown up. There may be a great future for the place, but it is likely that it is still a long way off. We contemplated going by the little steamer to Porta Amazonas at the

confluence with the Rio Negro. The craft takes a week to cover the eighty or ninety miles, but at Porto Amazonas there is a small branch of the Parana railway connecting with Ponta Grossa ; however, the thoughts of a week with such inhabitants as we had already sampled made us decide on facing the monotonous seven hours' railway journey back through the forest country to Fernandes Pinheiro.

The railway does not traverse a level mile, and is built in a series of curves the whole way. It has been constructed as cheaply as possible, and there are places where one is doubtful if the train will keep on the metals. It creaks and groans round the sharp curves, and about once in an hour you stop at a small station. These little stations are in the midst of fresh emigrant communities. Many of the houses or huts look just like a large box with a corrugated iron top. The hurry to erect these shelters has been so great that frequently one sees various lengths of timber projecting from the side of a dwelling, the builder not even taking the trouble to saw off the projecting ends. The stoppages at these settlements in the midst of the forest were always interesting, except when the driver or guard of the train met an old acquaintance, and then we had to wait until they were ready, because they do not study punctuality—at least on the down journey. Returning to Ponta Grossa there is more attention paid, because the manager of the company almost invariably meets the train. In fact all Ponta Grossa turns out to meet the train. It is one of the things that relieve the monotony of their lives.

We arrived back at Fernandes Pinheiro, and were thankful to get back to a little less wild existence, where there was good, and even exciting, collecting almost outside the door. We actually found an even better collecting ground than before—a sort of field all overgrown with white *Ageratum*, where *Syntomide* were exceedingly numerous in the early morning. There can be no doubt that the members of this interesting family feed chiefly, if not exclusively, in the early hours of the morning, almost before the mist is dissipated by the rising sun. Up till the very last minute at Fernandes we were busy with Lepidoptera and orchids.

On April 12th I parted company with my good friend, Mr. Jones, who was to follow me home by a later mail, and I came on to Ponta Grossa *en route* for Castro, with a break of another couple of days at this quiet but beautiful place. São Paulo and Santos were reached on the 15th, and Guarujá was again sought. I did not find the collecting so good as two months previously, but Mr. Jones, who followed a fortnight later, found even more things about than when we were collecting here together at the end of February. There can be no possible doubt that Guarujá is a most wonderful locality for a naturalist. I have yet to tell you that during the whole trip we enjoyed magnificent weather, with but three wet days, and that for general interest and enjoyment, quite apart from the absorbing entomology, we found our South Brazilian trip the consummation of one's desire.

## The Natural Order of Insects—Neuroptera.

By W. J. LUCAS, B.A., F.E.S. *Read January 12th, 1911.*

WHEN, in the second half of the eighteenth century, Linnæus, by the publication of his "Systema Naturæ," rescued the world of Nature from the state of chaos which then existed, and drew up the army of living things, known at the time, in ranks or "orders" (natural ones as he intended them to be), one of the six devoted to the insects was styled NEUROPTERA—the "nerve-winged."

As every naturalist knows now, however, Nature does not lend herself well to sharp divisions of this kind, as, indeed, might be expected if the Theory of Evolution means anything at all. Consequently, it is no way surprising that one of Linnæus' natural orders should perforce have to be a kind of *omnium gatherum* of all such insects as could not be easily classed—these constituted the Neuroptera. Not, of course, that Linnæus necessarily looked upon the matter in this light—but such is really the state of the case; and this being so, it is not surprising that there is a difficulty in finding points in which all his Neuroptera agree, or, on the other hand, such as will separate them satisfactorily from all members of his other natural orders. In other words, it is barely possible to frame a definition of the order Neuroptera *in lato sensu*. Yet this state of things continued for a long time.

Possibly, it was out of respect for Linnæus that no change was made; or perhaps the difficulty involved in making a satisfactory change prevented a change being made at all; or it may be that the cause must be sought in the fact that these insects have been much overlooked—by naturalists to a very considerable extent, and by collectors to an even greater one. The Neuroptera constitute, in fact, one of the so-called "neglected" orders.

Subdivision of the Neuroptera had, of course, to be made by those who were working at them: and at last the bolder spirits began to carry further what had been partially done for some considerable time—viz. to definitely split up this incongruous group of insects into the orders of which it is naturally composed. I should say that the Odonata (dragonflies) and Trichoptera (caddis-flies) had often been granted ordinate rank before the rest of the groups of the Neuroptera had been considered worthy of such distinction. I do not intend, however, to go fully into this matter, and shall refer to three schemes of division only, all of fairly recent date.

In 1885 Brauer proposed seventeen orders of insects, the NEUROPTERA being divided into—

- (a) EPHEMERIDÆ (mayflies).
- (b) ODONATA (dragonflies).
- (c) PLECOPTERA (stoneflies, etc.).
- (d) CORRODENTIA (termites, etc.).
- (e) NEUROPTERA (lacewings, etc.).
- (f) PANORPATÆ (scorpion-flies, etc.).
- (g) TRICHOPTERA (caddis-flies).

In 1886 Packard proposed sixteen orders, the NEUROPTERA being broken up into—

- (a) PLATYPTERA (termites, etc.).
- (b) ODONATA.
- (c) PLECTOPTERA (mayflies).
- (d) NEUROPTERA.
- (e) MECAPTERA (scorpion-flies, etc.).
- (f) TRICHOPTERA.

In 1889 Dr. D. Sharp brought forward a scheme at the International Congress of Zoology at Cambridge, which afterwards appeared in the "Encyclopædia Britannica," and has been adopted in Professor Sedgwick's "Student's Text-Book of Zoology." This scheme will be found in nearly the same form in an article by Dr. Sharp in the "Entomologist," vol. xlii, 1909, p. 270, and is the system now used in the general index to that periodical. It will be noticed that this disintegration of the Neuroptera of Linnæus follows somewhat closely the lines suggested by Brauer. It is as follows :

- (a) MALLOPHAGA (bird-lice).
- (b) PLECOPTERA (stoneflies, etc.).
- (c) PSOCOPTERA (book-lice, etc.).
- (d) EMBIOPTERA.
- (e) ISOPTERA (termites, etc.).
- (f) EPHEMEROPTERA (mayflies).
- (g) PARANEUROPTERA, or ODONATA (dragonflies).
- (h) NEUROPTERA\* [=PLANIPENNIA] (lacewings, etc.).
- (i) TRICHOPTERA (caddis-flies).

This arrangement, having been accepted at Cambridge, where Prof. Sedgwick (now Professor of Zoology at the Imperial College, South Kensington) then was, it has the sanction of authority in various ways ; and *we* might do worse than boldly accept it also. I might go farther and say it is a duty entomologists owe to their science, that they should work with some definite idea as to the lie of the land they are investigating.

It is in this restricted sense, of course, that I am using the term Neuroptera, and with this understanding I give the following diagnosis of the order :

*Carnivorous insects with mandibulate (biting) mouth ; antennæ*

\* With some entomologists there is a question as to whether the mouth-parts of *Panorpa* in the imago and larva are sufficiently different to justify a separate order being formed for them. I have not thought well to separate them from the Neuroptera.

conspicuous, and as a rule long, with but few exceptions possessing four membranous wings with many cross-nerves; wings arising by invaginations of the hypodermis, and for some time remaining tucked within the body. Metamorphosis complete, the pupa leaving, or partly leaving, the cocoon or other shelter before disclosing the imago.

Even when thus restricted the Neuroptera display much diversity of form and habits, and the various families often succeed rather well in hiding their relationships to one another. The families are :

- |                          |                            |
|--------------------------|----------------------------|
| 1. <i>Sialidæ</i> .      | 6. <i>Mantispidæ</i> .     |
| 2. <i>Raphidiidæ</i> .   | 7. <i>Hemerobiidæ</i> .    |
| 3. <i>Myrmeleonidæ</i> . | 8. <i>Chrysopidæ</i> .     |
| 4. <i>Ascalaphidæ</i> .  | 9. <i>Coniopterygidæ</i> . |
| 5. <i>Nemopteridæ</i> .  | 10. <i>Panorpidæ</i> .     |

In some of these the family likeness is very pronounced, but in others it is not so, and considerable further sub-division is necessary before we arrive at genera and species.

#### I. SIALIDÆ.

In Britain we have two representatives of this family, the very common alder or orl fly (*Sialis lutaria*) (Pl. V, fig. 1), and a congener (*S. fuliginosa*), which is much less frequent, and with difficulty distinguished from it. Everyone has seen the former of these dusky insects about May, either resting with wings arched over its back, or flying with a slow, heavy flight. Its brown egg-batches, containing a very large number of eggs, placed on the vegetation by the margin of the water, are interesting, and so is the carnivorous larva which may be dredged from the rubbish at the bottom of streams and ponds. This larva has seven pairs of jointed appendages on the ventral surface of the abdomen, which act as gills for breathing, with which also the creature swims. When full grown the larva forms a cell in the bank before changing into the pupa. This is lively, but without leaving the cell becomes an imago, whose life in the upper air lasts but a few days. While *S. lutaria* is everywhere common, *S. fuliginosa*, its darker and perhaps later relative, seems to be scarce, though it may have been overlooked to some extent. It has been taken at Rannoch in Scotland, and in the southern part of the island in Dorset, near Box Hill and near Haslemere at least.

Only a few species are contained in the genus *Sialis*, which belongs to the Palearctic and Nearctic regions, though, strangely enough, it occurs again in Chili. In the family Sialidæ are also found the genera *Chauliodes* and *Corydalis*, which consist of large insects very unlike *Sialis* in appearance, though they have a very similar life-history.

#### 2. RAPHIDIIDÆ.

Though the species are fairly numerous, two genera only comprise the family Raphidiidæ, *Raphidia* and *Inocellia*, both found in

Palearctic and Nearctic regions only. Their characteristics are the long neck in pupa and imago, the habit in the larva of wriggling backwards when alarmed, and the long ovipositor of the female, which is folded along the back in the pupal stage. I have found by experience that the larva of a British species of *Raphidia* will live for a long time without food, though it shrivels a great deal. The larvæ are carnivorous, and appear to feed on insects that live in decaying timber, where the larvæ themselves find their home. Just before disclosing the imago, the pupa, which is without a cocoon, runs about, in this respect differing from the pupa of *Sialis*, which becomes an imago within its cell.

All the British examples of the family belong to the genus *Raphidia*. They are four in number. The largest—*R. notata*—is fairly common in suitable places, and so apparently is *R. maculicollis* (Pl. V, figs. 2, 2a). *R. xanthostigma* seems to be scarce, and *R. cognata* very scarce. The last three are in appearance very similar to one another. Though there is no cocoon which needs opening, the pupa of *Raphidia* possesses a pair of powerful jaws, which clearly might have been used for that purpose, as, indeed, is the case with the next family. It appears as though these insects have given up making a cocoon, while still retaining the means of opening it—the jaws being, therefore, vestigial.

Now follow seven families which agree in one respect at least. They all possess a suctorial mouth in the larva, while it is of the biting type in the imago. The larval type of mouth is due to a special modification of the mandibles, whereas, in the Lepidoptera, for instance, in which order the sucking mouth is found in the imago, the modification is in another direction.

### 3. MYRMELEONIDÆ.

This family is entirely unrepresented in Britain, although one species extends as far north as Southern Sweden. *Myrmeleon formicarius* (Pl. V, fig. 3), which is found near Paris, is the species with whose life-history Reaumur has made us so well acquainted, especially as regards the pitfall in the form of an inverted cone in the sand, which the larvæ prepare for the capture of small living animals on which they prey. Ants were supposed to be most often captured I presume, whence the whole family are known as ant-lions. A couple kept in captivity for some months, however, would not touch ants, nor did they make satisfactory pitfalls; but perhaps I did not provide suitable conditions under which they might work. When not fasting during the winter months they seemed to prefer small caterpillars for food. One of these made a spherical cocoon of sand and liquid silk from which the pupa partly emerged before producing the imago. More than 300 species are known, amongst which there is much variation in size and appearance. Apparently it is only

members of the genus *Myrmeleon* that have been found to make these pitfalls.

#### 4. ASCALAPHIDÆ.

It is most unfortunate that such handsome insects as the *Ascalaphide* are unrepresented with us, especially as, again, one of the finest species, *Ascalaphus longicornis* (Pl. V, fig. 4), extends its range as far north as Paris. They are predaceous insects, catching their prey much as the dragonflies do. In fact, if it were not for the antennæ they might well be taken for members of the Odonata. Their life-history should repay further study. The larvæ are much like those of the ant-lions, but they do not walk backwards as do those of the latter, nor do they make pitfalls; instead, they lurk under stones and so forth, waiting for their prey. There is a considerable number of genera and species, and many of the imagines have finely coloured wings with very conspicuous markings. The family has recently been monographed by Dr. H. W. Van der Weele.

#### 5. NEMOPTERIDÆ.

Like the last two families the Nemopteridæ (Pl. VI, fig. 5) have no British representatives, nor, indeed, do they extend into Central Europe, five species only belonging to the European fauna at all. According to the monograph of the family published by Navas only last year, there are in all but forty-four species distributed amongst twelve genera. So far as yet ascertained these insects are almost entirely confined to the Old World, there being besides one species in South America and three in Australia. At present little seems to be known of the life-history of the *Nemopteride*. Their great peculiarity consists in the strange modification of the hind-wings, which resemble long tails and probably act as balancers. The imagines flit gracefully round bushes in open spots.

#### 6. MANTISPIDÆ.

Yet one more family, the Mantispidæ, has no British representative. The members of it are more at home in warmer climates, although a few species are found in the south of Europe, one of them being *Mantispa styriaca* (Pl. VI, fig. 6). The great peculiarity of the family is the enormous development of the forelegs, which become a kind of trap for catching prey. They much resemble the forelegs of certain Orthoptera, the praying-insects or mantids; so it is not surprising that these insects were once classed with the Orthoptera. The eggs of *M. styriaca*, whose life-cycle has been worked out by Brauer, are at the end of slender stalks, as is the case with the well-known eggs of the species of *Chrysopa*. The larva emerges in the autumn, and then hibernates for quite half a year without food.



EXPLANATION OF PLATE V.

- FIG. 1.—*Sialis lutaria* (alder fly), ♀. × 2.  
FIG. 2.—*Raphidia notata* (snake fly), ♀. Nat. size.  
FIG. 2a.—*R. maculicollis*, ♀.  
FIG. 3.—*Myrmeleon formicarius* (ant lion). Nat. size.  
FIG. 4.—*Ascalaphus longicornis*, ♀. Nat. size.

PLATE V.



1



2



2a



3



4

Neuroptera.



It soon feeds up, and then becomes a pupa inside the larva-skin, in a cocoon within the egg-case of a spider. The pupa breaks through, and becomes free of these various envelopes before disclosing the imago.

### 7. HEMEROBIIDÆ.

This family is a large and important one, consisting of several fairly distinct sub-families.

(i) The *Dilarinæ* contain no British species. The males have pectinated antennæ and the females a long ovipositor. They otherwise much resemble the sub-family *Hemerobiinæ*. Navas, of Saragossa, has recently monographed them.

(ii) The *Nymphidinæ* are Australian insects resembling ant-lions, but having no knob to their antennæ.

(iii) The *Osmylinæ*, which perhaps should be sub-divided, are represented in Britain by five insects: *Osmylus chrysops* (Pl. VI, fig. 7), *Sisyra fuscata*, *S. dalii*, *S. terminatis*, and *Psectra diptera*. *O. chrysops* has three simple eyes on the top of its head. The larva is aquatic or semi-aquatic, and catches its prey near the margin of the water. It hibernates, and the next year, when full-fed, spins a cocoon of sand and silk, within which it becomes a pupa. *S. fuscata*, and probably the other species of *Sisyra*, feed on the fresh-water sponge, *Ephydatia fluviatilis*, which is so well adapted for food that the larva has no posterior orifice to its alimentary canal. The extremely rare little insect, *Psectra diptera*, has vestiges only of hind-wings in the male, though they are fully developed in the female.

(iv) The *Hemerobiinæ* contain no fewer than twenty-two British species in four genera: *Hemerobius pellucidus*, *H. elegans*, *H. inconspicuus*, *H. micans*, *H. nitidulus*, *H. humuli*, *H. lutescens*, *H. marginatus*, *H. orotypus*, *H. nervosus*, *H. subnebulosus*, *H. mortoni*, *H. stigma*, *H. limbatellus*, *H. pini*, *H. atrifrons*, *H. concinnus* (Pl. VI, fig. 7a), *H. quadrifasciatus*; *Micromus paganus*, *M. variegatus*, *M. angulatus*; *Megalomus hirtus*, and *Drepanepteryx phalænoides*. They are usually rather small insects with closely netted brownish wings; the antennæ are moniliform. So far as known the usual food of the larvæ is *Aphides*. They spin a small silken cocoon, from which the pupa emerges before turning into an imago. *Hemerobius stigma* may be found as an imago all the year round in the Esher fir-woods, in Surrey. The rare *Drepanepteryx phalænoides* much resembles in appearance the moth *Drepana lacertinaria*. It is further moth-like in that it has an apparatus for hooking together the fore- and hind-wings. In this last respect *Megalomus hirtus* somewhat resembles it.

### 8. CHRYSOPIDÆ.

In this family, again, there is a fair number of British species, which pass under the names of golden-eyes (a very suitable one),

stink-flies, which is not always true, and green lacewings, though the two members of the genus *Nothochrysa* are brown. Our species are fifteen: *Chrysopa vittata*, *C. flava*, *C. alba*, *C. flavifrons*, *C. tenella*, *C. vulgaris*, *C. septempunctata*, *C. prasina*, *C. ventralis*, *C. abbreviata*, *C. phyllochroma*, *C. dorsalis* (discovered as British at Oxshott a few years ago), *C. perla* (Pl. VI, fig. 8); *Nothochrysa fulviceps*, and *N. capitata*. They are most important insects, being in general *Aphis*-feeders, and luckily are plentiful. The eggs are placed at the extremity of long stalks. Though the genus *Chrysopa* contains so many British species, it is not very difficult to distinguish them by means of a table given by McLachlan in his monograph of the PLANIPENNIA, published in the "Trans. Ent. Soc. Lond.," 1868. Most of the species of the Hemeroibiidæ, on the other hand, must be determined by means of the genitalia.

#### 9. CONIOPTERYGIDÆ.

Apparently we have three species in Britain of these minute neuropterous insects, which are very distinct from other members of the order in that they possess powdery wings. Our three species are *Coniopteryx psociformis* (Pl. VI, fig. 9), *C. aleyrodiformis*, and *C. lactea*. An Austrian species, *Aleuropteryx lutea*, is known to feed on scale insects.

#### 10. PANORPIDÆ.

This is a small family of about ten genera, three—*Panorpa*, *Bittacus*, and *Boreus*—being represented in Europe. The British species are *Panorpa communis*, *P. cognata*, *P. germanica* (Pl. VI, fig. 10); and *Boreus hyemalis*. The first and third are common, the second and fourth scarce. Most members of the family have an elongated beak; in the genus *Panorpa* the males have a scorpion-like extremity to their body; *B. hyemalis* (Pl. VI, fig. 10a) is a small wingless insect, with the power of jumping, found in moss during the winter. *Bittacus tipularius*, which much resembles a "daddy-long-legs," should occur in Britain, but apparently does not. In this family the mouth is mandibulate, and not modified to form a sucking organ; the members of the family are carnivorous, but the larvæ do not seem to attack living creatures. The Panorpidæ form a more distinct group than the other families of the Neuroptera, and are consequently by some given ordinate rank under the name of MECAPTERA.

In what ways and for what reasons can I recommend the Neuroptera as worthy of attention by members of this Society? In the first place, we (or most of us at any rate) are no longer beginners in entomology, and might therefore like to tread on ground which is not the common highway of everybody. To such the Neuroptera



EXPLANATION OF PLATE VI.

- FIG. 5.—*Nemoptera sinuata*.  $\times \frac{3}{7}$ .  
FIG. 6.—*Mantispa styriaca*, Digne. Nat. size.  
FIG. 7.—*Osmylus chrysops*, New Forest. Nat. size.  
FIG. 7a.—*Hemerobius concinnus* (brown lacewing), Surrey.  $\times 2$ .  
FIG. 8.—*Chrysopa perla* (green lacewing, or golden eye), Surrey.  $\times 2$ .  
FIG. 9.—*Coniopteryx psociformis* (after Curtis). Much magnified.  
FIG. 10.—*Panorpa germanica* (scorpion fly), ♀, typical form; and an almost immaculate form. Nat. size.  
FIG. 10a.—*Boreus hyemalis*, ♀.  $\times 2\cdot4$ .



Neuroptera.



may be pointed out as leading to "fresh woods and pastures new." Again, at present the life-history of very few of our fifty-six species has been worked out, that is, scarcely any have been bred from the egg to the imago; consequently the egg, larva, or pupa has in many cases perhaps never been seen. Further, to man and his concerns, not a single one is either dangerous or harmful as far as we know. Nay, most, if not all, are actually beneficial, the food of so many species being *Aphides* and scale-insects—scourges of vegetable life.

May I hope that henceforth the term "NEUROPTERA" may be applied in the modern sense, and that next season members of this Society will give a little attention to this interesting order? If each one present were to thoroughly work out one species, the Neuroptera of Britain would be better known perhaps than even the Lepidoptera or the Coleoptera are at the present time!

## Notes on the Glow-worm (*Lampyris noctiluca*).

By R. A. R. PRISKE, F.E.S., and H. MAIN, B.Sc., F.E.S. *Read  
January 12th, 1911.*

THE glow-worm is probably a familiar object to all, as its bright light on a warm evening in June or July is so frequently to be seen in many parts of the country.

If on a "sugaring" expedition we take advantage of our lantern to turn its rays on the place where we have seen the light of one of these insects, we shall be able to note that it is not resting flat on the ground, but has climbed up some twig or stem, and is curving its abdomen so that the light, which proceeds chiefly from the ventral part of the sixth and seventh segments, can have an uninterrupted course. This position can be seen in Pl. VII, figs. 1 and 2, and also the light area in the region of the luminous organ. This latter consists of special cells well supplied with air-tubes and nerves, and the light is caused by some substance secreted by these cells.

Of course the glow-worm is not a worm at all, but the female of the beetle *Lampyris noctiluca*. She is quite wingless, but the male (Pl. VII, figs. 3 and 4) has ample wings, and may often be found attracted by light.

The head of the male can be retracted below the thoracic plate, but on commencing to walk the insect pushes it out, and it is then seen to be occupied chiefly by the two large compound eyes (Pl. VII, figs. 5 and 6). The female can also withdraw her head below the thoracic plate. Her eyes, however, occupy only a small area of the head.

The great brilliancy of the female, together with the large eyes of the male, would lead one to conclude that the use of the light was for the purpose of attracting the male. It has been suggested by some naturalists that this is not the only use for the light, because it is also found to a small extent in the male, and the ova, larvæ, and pupæ are distinctly luminous; but there are instances in other animals of organs present in the male and immature forms which are only functional in the mature female.

A number of glow-worms taken last July were kept in various boxes, and eggs were laid freely by some of the insects. Only those eggs, however, which were kept in a moist atmosphere survived, the others soon shrivelling up. The eggs (Pl. VIII, fig. 1) were spherical, and did not appear to show any structural markings. Those laid in the dry boxes adhered to the surface on which they rested, but those



EXPLANATION OF PLATE VII.

THE GLOW-WORM (*Lamproloma noctiluca*, L.).

FIG. 1.—Female on twig, showing her light, dorsal view.

FIG. 2.—Female on twig, showing her light, lateral view.

FIG. 3.—Male, head retracted, dorsal view.

FIG. 4.—Male, head retracted, ventral view.

FIG. 5.—Male, head protruded, dorsal view.

FIG. 6.—Male, head protruded, ventral view.

All  $\times 2$  diam.

PLATE VII.



3



4



5



6



1



2

The Glow-worm.



in the damp boxes remained quite free. The eggs were distinctly and continuously luminous. Just before they hatched the segments of the young larvæ could be seen through the transparent egg-shells. Laid during the third week of July the eggs commenced to hatch on August 28th.

The newly emerged larvæ (Pl. VIII, fig. 2) were quite light in colour, but within twenty-four hours they assumed the usual dark tint which they retain through their larval existence. The little creatures fed readily on slugs and snails and grew rather quickly at first, but after October they ceased to feed. They were kept in a cold room, and have remained pretty stationary till the present time, January, 1911.

At the same time that the ova hatched, a larva, apparently full grown, was found under a stone at Lewes. This larva continued feeding until November, when it became quite sluggish and has remained so till the present time.

In April, 1910, another larva was found, also apparently full grown. It fed readily on snails and slugs. From contact with these it frequently got soiled with mucus, and gave one a good opportunity for observing how it cleaned itself. The segments of the abdomen are very flexible. From the hinder end is protruded a whitish organ consisting of a number of slender filaments. These spread out when applied to any part of the body, forming a brush, which is drawn over any portion of the integument and removes the mucus. The head was usually kept retracted as seen in Pl. VIII, fig. 3, unless the insect was feeding. About May 20th the larva, instead of resting in its usual position, lay on its side, partly curled up (Pl. VIII, fig. 4).

On May 23rd the pupa was disclosed, and was then seen to be that of a male (Pl. VIII, fig. 5). It rested in a position corresponding to that of the larva awaiting pupation, and displayed little or no activity. Even when turned on its back to examine its ventral surface (Pl. VIII, fig. 6) it exhibited no resentment. The pupa was quite light in colour at first, but gradually darkened. When the larva was lying on its side it showed a distinctly luminous area corresponding roughly in position to that in the female, but smaller in extent. The pupa displayed a similar luminous area. The light was not constant, but at times was quite brilliant, or, again, was quite extinguished. The emergence of the pupa was not observed. The empty larval skin, however (Pl. VIII, fig. 7) shows that it does not take place through a split down the dorsal median line, as in many other beetles, but by means of lateral splits in the thoracic region.

Early on the morning of June 6th the beetle was found newly emerged from the pupa. The abdomen was longer than the elytra, and the wings were not properly folded away (Pl. VIII, fig. 8). When again seen in the evening it had become mature. It was very restless, so after vain attempts to photograph it alive it was sacrificed for the purpose of obtaining the figures (Pl. VII, figs. 3 to 6).

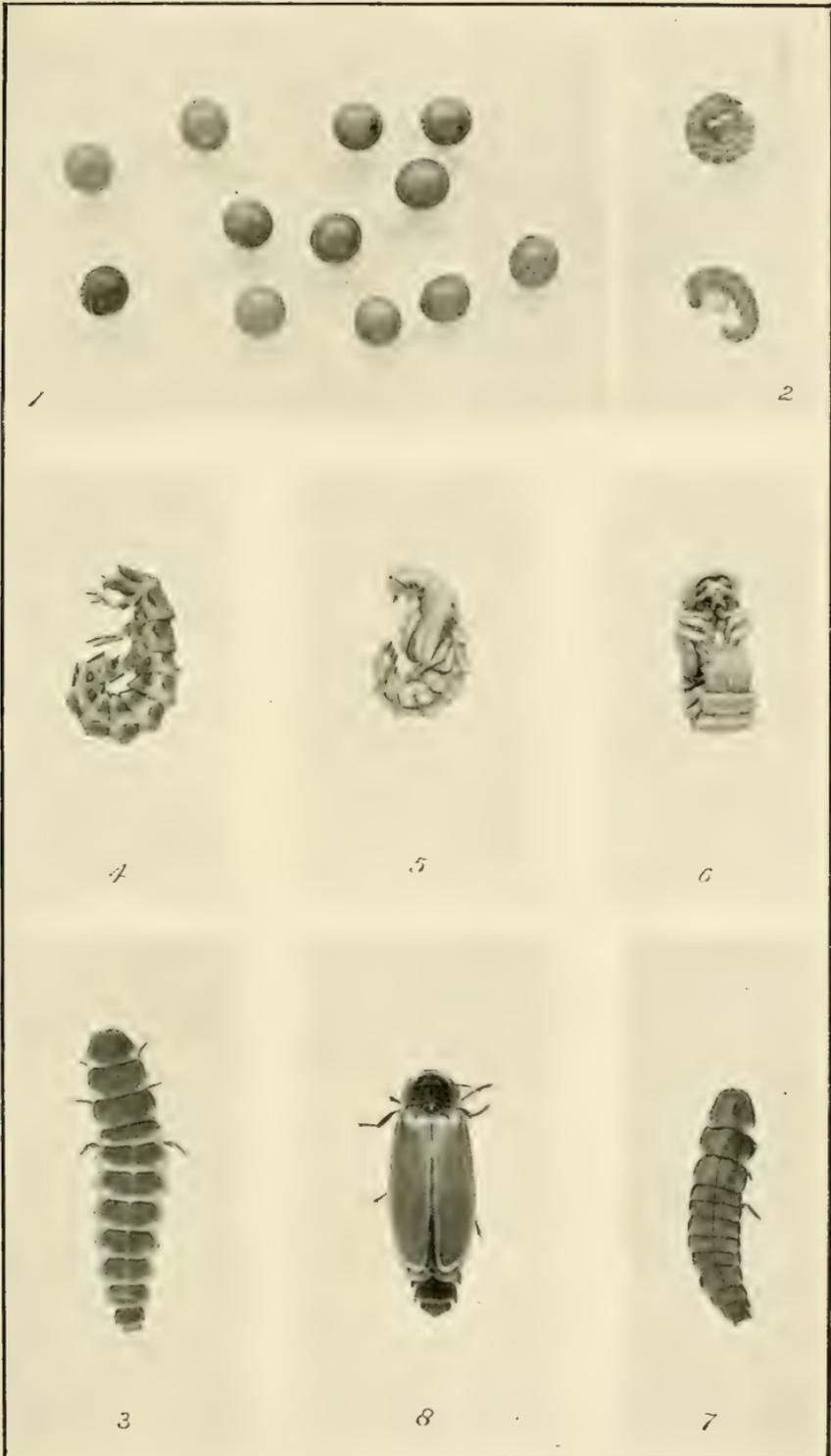
We have not yet definitely ascertained the duration of the larval stage, but it appears from the material we have obtained that the larva lives through two winters. We hope to rear the small larvæ now in hand, and get further material for more detailed descriptions and observations, and also the opportunity for seeing and photographing the pupa of the female.



EXPLANATION OF PLATE VIII.

THE GLOW-WORM (*Lampyris noctiluca*, L.).

- FIG. 1.—Ova,  $\times 5$ .  
FIG. 2.—Larvæ just hatched,  $\times 5$ .  
FIG. 3.—Larva, adult,  $\times 2$ .  
FIG. 4.—Larva awaiting pupation,  $\times 2$ .  
FIG. 5.—Pupa, male, lateral view,  $\times 2$ .  
FIG. 6.—Pupa, male, ventral view,  $\times 2$ .  
FIG. 7.—Empty larval skin,  $\times 2$ .  
FIG. 8.—Male, just emerged,  $\times 2$ .



The Glow-worm.

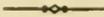


## ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History  
Society.

By W. J. KAYE, F.E.S.

*Read January 26th, 1911.*

WHEN you did me the honour to elect me your president last January, I had some misgivings as to whether I should be able to accept the honour, as I had arranged to leave England for a few months' tour in South Brazil. You were, however, kind enough to grant me leave of absence, and to keep the post open for me, and now, although only in fact an eight months' president, I have no alternative but to deliver an address. To Mr. Sich, who presided at the meetings in my absence, I owe a special debt of gratitude, which it gives me much pleasure to openly acknowledge.

Opinions vary as to what should be included, and what excluded, in the annual address. The work of our Society, however, must always come in for our first consideration. The reports of the Treasurer and Council are fairly satisfactory, notwithstanding the apparent, but actually unreal, shrinkage in the number of our members. The average attendance is better than ever it has been, and stands at the high figure of 34, which surely, if it does anything, points to the interest taken in the meetings. A large membership is not everything in a society, but a large attendance is a very satisfactory feature, and if we had even a smaller member-

ship I should regard a rising attendance as wholly to counter-balance a shrinking membership—a state of affairs that, fortunately, we need not anticipate.

We published a volume of 149 pages for the past year, which is about the average size of our "Proceedings," but there are also no fewer than thirteen plates dispersed through the letterpress. Plates, provided they are good, always add greatly to the value of printed matter. That the plates are good I think everybody will agree, and we are largely indebted to those members, who are so skilful with their cameras, for providing the first-rate negatives for reproduction. Let us hope this feature of the "Proceedings" for 1909-1910 will continue. Previous to this year we never had more than five plates, which was the number for 1908, but in many earlier issues there was not a single one.

The Society must have felt very gratified during the past year at the large representation it has had on the Council of the Entomological Society of London. No fewer than six out of the ten members of council were active members of our own Society, while we could also claim a vice-president, Mr. Rowland-Brown, as one of us.

The year has not been a very satisfactory one as regards our field meetings. That the meetings were spoilt by the weather—a matter over which we, unfortunately, have no control—is true to a very large extent. I fear, however, that there are some who hold the idea that one can obtain more in the way of sport by a private pilgrimage to the haunts of this or that rarity. This may be true, but the field meeting, if it does anything, brings one into closer contact with kindred spirits, with whom an exchange of views is sometimes of the greatest benefit to both parties. To those who hold the former view I would say, "Do not always look upon the field meeting as only a day for collecting, and altogether a failure if you have not taken anything that you wanted as a desideratum for your collection." There is always something to be learnt, even from our commonest species, and it frequently happens that we acquire pieces of information regarding this or that species when we least expect it. If we are really and deeply interested in nature study we can say with the immortal Shakespeare: "Age cannot wither, nor custom stale, her infinite variety."

I hope in the coming season that our out-of-door meetings will be supported in the way they deserve, and that meteorology will harmonize better with entomology.

As the years roll by, entomologists, whose names we have

valued and whose faces it has been a pleasure to see, one by one go to swell the great majority. The past year has removed some well-known men from among us.

We have hardly had time to recover from the shock of the sad news of little more than a fortnight ago, when we learnt that we had lost one of the most able entomologists of the day in Mr. J. W. Tutt. He became a member of this Society in 1886, was president in 1898, and would have been president of the Entomological Society of London this year had he lived. With the passing of Mr. Tutt one of the most remarkable figures in entomology is severed from us. It is doubtful if any man ever did more to raise the status of our favourite science, and certainly no man ever did more for British entomology. Like very many great men, at the commencement of his career he had many opponents, but as the years passed by he became understood, and the advanced lines of his work, and the deeply earnest view he took of the scientific side of entomology, at last commanded the enthusiasm and admiration of nearly everybody. He will be sadly missed at our meetings, where we could always rely on him to speak with that authority, born of a great fund of knowledge, that is given to few of us. The great work of his life was "A Natural History of the British Lepidoptera," the first volume of which appeared in 1899. People were simply amazed when this first volume appeared; there had been no work to compare with it in the scientific handling of the material, while for general comprehensiveness it was quite exhaustive. Five volumes have been published of the moths and three of the butterflies, the last of which was issued this year. With each succeeding volume Mr. Tutt seemed to go deeper and deeper into his subject, and Volume X, the last published, treating on the "blues," reveals the man at the summit of his power. It would take too long to even mention all the books and papers Mr. Tutt has published. "The British Noctuæ and their Varieties," in four volumes, published in 1891-2, is perhaps his second best known work, and is still the standard work on the British Noctuæ. In 1890 he started the monthly magazine known as the "Entomologist's Record and Journal of Variation," and throughout has acted as its editor. He wrote articles for, I believe, every number, and some of the more important of these were continued through several issues, such as "Migration and Dispersal of Insects," and "Melanochroism in British Lepidoptera." He also wrote some delightful popular books on natural history, such as "Random Recollections of Wood-

land, Fen, and Hill," and "Woodside, Burnside, Hillside, and Marsh."

Edward Saunders, F.R.S., died on February 6th at the age of 61 years. He was one of the pillars of entomological science. His special studies were the Hymenoptera and Hemiptera, of which large groups he had been acknowledged as one of the first authorities of the day for some years past. He also studied the Coleoptera, more particularly earlier in life, and in the very first volume of the "Entomologists' Monthly Magazine" (1864) there is a note on Coleoptera from his pen. On several occasions at the Entomological Society of London his name was proposed for the Presidency, but he was always compelled to forego the honour through delicate health.

George Carter Bignell died on March 1st at the advanced age of close on 84 years. To those who had come in contact with Mr. Bignell there was an irresistible feeling of a great personality. He was a first-rate all-round naturalist, and had at different times put his whole energy into the study of many different groups of insects, besides spiders and land and freshwater shells. In July, 1893, it was my pleasure to meet and collect with the late Mr. Bignell and the late Major Still in the sheltered valleys under Dartmoor, close to Tavistock. Almost every larva, almost every insect, of whatever order, Mr. Bignell seemed to know. Unfortunately, the legacy left to science is exceedingly small, and Mr. Bignell's vast knowledge for the greater part perished with him.

George Willis Kirkaldy died, as the result of an accident, on February 2nd. He joined the Society in 1900, and although not a regular *habitué*, it was not because of any flagging interest, but because he wanted the time, which was only too limited, for his omnivorous study and work. He was but 37 years of age at the time of his decease, but in that short life he had done an immense amount of original work and research in the order Hemiptera. But for his unfortunate riding accident he would doubtless have risen to great eminence as a Hemipterist. As it is, we have his "Synonymic notes on Aquatic Rhynchota" and "A Guide to the Study of British Waterbugs," which ran through very many numbers of the "Entomologist" up till the year 1906; besides many other less important contributions. At the time of his death Kirkaldy was engaged on a catalogue of the Hemiptera; one volume had been published, a second was in the press, and the third well in hand.

Harry McArthur died on February 8th, after a long and painful illness, that was at length found to be cancer, at the age of 54. He became a member of this Society in 1890, and was well known as a professional collector of great ability. He had collected in the Highlands of Scotland, the Hebrides, Orkney and Shetland, as well as in Kashmir and the Malay Peninsula. He almost invariably made good collections, often in spite of great difficulty, and was a naturalist in the true sense of the term.

#### NEURATION OF LEPIDOPTERA.

The subject that I have chosen for my address to you this evening is the neuration of the Lepidoptera, with some thoughts as to its classificatory value. As far back as 1843, when Herrich-Schäffer began his great work on the "Schmetterlinge von Europa," we find characters of neuration freely used. The families, as they are in turn separately treated, are diagnosed very fully by neuration. There was, however, no scheme of treatment; and ten years later (1853), when Lederer, in the "Vorhandlungen zoologisch-botanischen Vereins in Wien," gave a paper extending to more than 100 pages on the *Geometridæ* (called here *Geometroidæ*) we find a great advance. He divided the *Geometroidæ* into four groups, and used neurational characters for the many genera described. Following Lederer came Heinemann in 1859, who commenced publishing his "Schmetterlinge Deutschlands." On the first few pages of this work there are figures of the wings of Lepidoptera, showing the veins, with numbers running from the base towards the costa. This is one of the earliest, if not actually the first, definite figured schemes for numbering the veins. On pages 13-15 there is an elaborate systematic key to the families, based very largely on neuration. Heinemann differentiated thirty-four families. Besides separating the families he largely used neuration for the defining of his genera. Heinemann was influenced largely by Herrich-Schäffer, to whom he refers in his work. He, however, used many more characters than the latter, and made a very great advance, though he did not come up to the high level of Lederer in his Geometrid paper, but as a comprehensive view of the Lepidoptera it was far in front of Herrich-Schäffer. Snellen, in his important work, "De Vlinder van Nederland," commenced in 1867 and finished in 1882, gave a great

impetus to the study of the neuriation. His work from beginning to end is very largely based on neurational characters. He gave an admirable table of the families, and his characters of the genera were diagnosed in a way that had not been done before. Snellen also extended his work to the exotics; and while workers at these have almost continually used neuriation, workers at the Palæartic species have very often practically ignored these valuable characters. It is to Snellen we owe the really systematic use of neuriation for classification. Present-day workers have largely followed him, and although Snellen, like his predecessors, made many errors, he undoubtedly gave us the foundation of our present complicated system. It is interesting to note that while Heinemann gave us thirty-four families of the Lepidoptera, Snellen only diagnosed twenty-five.

After Snellen came Meyrick, who, in the "Transactions of the Linnæan Society of New South Wales" (1878), published the first of his many papers on the Micro-Lepidoptera of Australia. This paper on the *Crambites* treated these small moths as they had never been treated previously, and in fact all through the succeeding years of the same publication similar papers gave evidence of the same admirable handling of the smaller insects. In 1882 we have a key to the family *Tortricidæ*, built up almost entirely on the neuriation. In the year following he gave a similar key for the *Ecophoridæ*. In 1887 we have the first part of his revision of the Australian Lepidoptera, commencing with the *Sesiidæ*, and following with the *Arctiidæ*, *Hypsidæ*, *Syntomidæ*, and *Zyganidæ*. All these are, in turn, completely diagnosed by neuriation. In 1891 the revision was continued with the *Hydriomenidæ* of the *Geometrina*; in 1893 we had the *Tineidæ*.

In 1892 Hampson published the first volume of the "Moths of India." There is no table of the families given, or any reasons assigned why any family should have precedence or affinity with any other. From a classificatory point of view the work is disappointing. Then in 1895 Meyrick published his famous "Handbook of the British Lepidoptera." This came as a bolt from the blue to the vast majority of British Lepidopterists; who had never previously had any work on such lines. The work called forth an enormous amount of comment, the greater part of it of an unfavourable character. There was no good reason for discarding the work of generations of entomologists, and throwing over all the facts of life-history that had been

gleaned during the previous hundred years. Yet, this is what we were asked to do. Such species as *Camptogramma bilineata*, *Thera variata*, *Emmelesia unifasciata*, and *Anticlea badiata*, had been proved to belong to separate genera; yet we find them all lumped back with another thirty-five species into the one genus *Hydriomena*. Again, we find the *Hydriomenidæ* made a separate and distinct family from *Sterrhidæ*, which contains such proved closely related species as those of the genus *Acidalia*. Neuration to afford useful characters must be corroborated where possible by facts of the life-history of the species. If the grouping by neuration is different from the grouping by life-histories there is something wrong with our work. Meyrick's "Handbook," notwithstanding the faults of a one-sided view, marked the greatest advance that had been made by a study of the veins. For the first time we have a working basis established, for we find in the introduction an answer given to the question, Which are the older, and which are the more recent genera? The three following laws are postulated:

(1) No new organ can be produced except as a modification of some previously existing structure.

(2) A lost organ cannot be regained.

(3) A rudimentary organ is very rarely re-developed.

As Meyrick truly remarks, monstrosities appear to offer an exception to law, but monstrosities are not reproduced,\* and do not enter into a progressive or retrogressive development of a species. The outcome of the laws is that the genera and families with the fewest number of veins are the most highly specialized, and those with the greatest number are the most generalized. On these grounds Meyrick made out the *Arctiidæ* to be the most highly specialized family of the British Lepidoptera. From 1878 till the present day the name of Meyrick stands out as the great exponent of the use of neurational characters.

Hampson, in his "Moths of India," placed the *Saturniidæ* first without giving any reason for so doing. The *Saturniidæ* have this peculiarity, however: that in certain genera, particularly in *Attacus*, the cell of both fore- and hind-wing is open, a character that is very general in the highest family of the *Rhopalocera*, the *Nymphalidæ*. Hampson, in his later work, the "Lepidoptera Phalænæ," the first volume of

\* The breeding of many hermaphrodites from a single batch of eggs by Mr. A. Harrison appears to contradict this statement. But such cases are so excessively rare as hardly to be reckoned as a phenomenon of Nature, and hermaphroditism, although a phase of monstrosity, is something special.

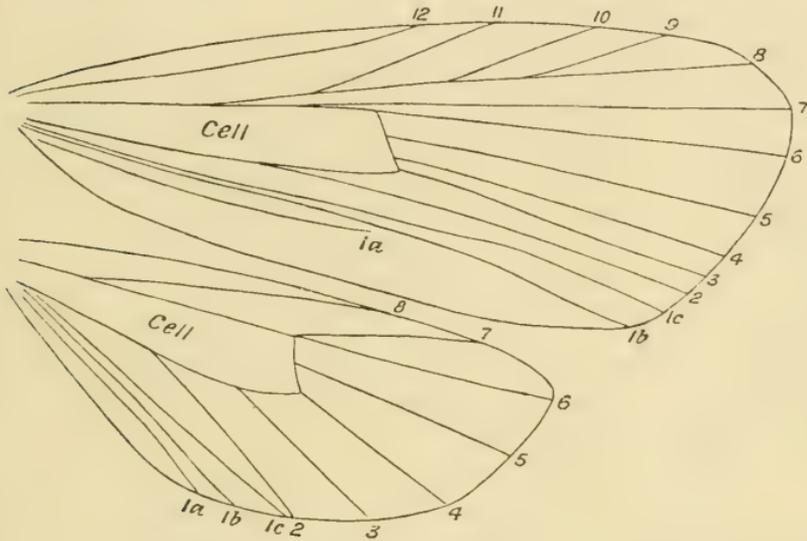
which was published in 1898, followed Meyrick, and working on his basis made the *Arctiida* with the closely allied *Syntomida* the most highly specialized families, the latter being really but highly developed Arctiids. The two tables of phylogeny, or schemes of descent, as given by Meyrick, and later by Hampson, are with slight differences substantially the same. Most unfortunately, in this respect of phylogeny both are, and must be, hopelessly wrong by being based on one character only.

We have in Hampson's table *Sphingida* developed from *Notodontida*, and *Lymantriida* and *Noctuida* developed from *Sphingida*; families with flat eggs, with a micropyle at one end, and upright eggs with the micropyle at the top, alternately giving place to one another. This manifestly could not be true in the case of such an immutable character as the egg, and entomologists have refused to accept such a scheme of phylogeny from the one-character neurulation. But this matter of phylogeny only needed adjustment; the facts are still facts, only our interpretation of them now is different. Some of the more palpable errors in Hampson's and Meyrick's works have made many condemn the system of neurulation as unreliable. That which was bad has largely overshadowed that which was good. British entomologists who knew most of the life-histories of their species were in a position to severely criticize the "Handbook," and could afford to do without it so far as classifying their material was concerned; and I think it is largely owing to this reason that we find comparatively few British entomologists who have taken the trouble to give neurulation the study it deserves. Workers at less well known species have been compelled to rely on imaginal characters in the absence of life-histories.

Before discussing the neurulation details of any species or groups, it will be as well to say a word about the naming or numbering of the veins. The newer method is that of naming the veins, or rather the principal veins, and calling the subsidiary veins branches 1, 2, or 3, as the case may be, of those veins. There are by this method costal, subcostal, radial, median, and submedian veins. The costal vein alone is always singly represented. The subcostal can have as many as five branches. The radial veins are usually three in number, but sometimes two or even only one. The median has two branches, and the submedian can have one, two, or three veins. By the older method each vein has a number, the fore-wing having twelve hypothetical veins and the hind-wing eight hypothetical veins.

The veins are numbered from the base to the costa, and compared with the former method they work out as follows. For the fore-wing:

- Veins *I a*, *I b*, *I c* = submedian veins.  
 „ 2 and 3 = median veins.  
 „ 4, 5, 6 = radial veins.  
 „ 7, 8, 9, 10, 11 = subcostal veins.  
 Vein 12 = costal vein.



Hypothetical diagram of completely veined fore- and hind-wing.

For the hind-wing the same holds good for the first three veins; but 7, and what is called the cross-vein when present = subcostals, and 8 = costal.

There is something to be said in favour as well as disfavour for either method. If one could be always absolutely sure, when certain veins are missing, what the remaining veins were, the numbering method would be the simpler. Speaking generally, it undoubtedly is easier to say, for instance, vein 7 than the fifth subcostal vein. But it can happen that any of the subcostals, or even all the subcostals, may be wanting in the hind-wing, and one at least is not infrequently absent in the fore-wing. It becomes then much easier to say that there are only, say, three subcostal veins, than to more or less hazard a guess as to which veins are actually present.

It has been argued that neuration is of no greater value than any other character. But I think this is untenable,

as there is no other complex structure which can present such a variety of phases in some directions, and which is, at the same time, so constant in others. The *Papilionidæ*, as an instance, divide off from the *Pieridæ* by the absence in the former, and the presence in the latter, of vein 1a in the hind-wing. What other character of any kind is there which can be used for such a differentiation? Yet within the *Pieridæ* there is great variation in the other veins; while in the *Papilionidæ* there is a great uniformity.

Neuration, in the first place, is a complex structural character, and it has a second value in that it is a more or less invisible structure, and therefore not liable to be affected by external influences. In some few genera of butterflies it is considerably more marked and visible, such as in *Morpho*, *Lycorea* and *Papilio*, and, of course, in all those species that have developed transparent or semi-transparent wings. It is worthy of note that in the most transparent group of insects, the *Ithomiinæ*, there is, perhaps, more variation in the neuration than in any other family. In this remarkable South American group the species are all sexually dimorphic in their neuration; and even in the same sex of the same species there is often a considerable variation in the veining.

On the other hand, the *Sphingidæ* are remarkably constant, and do not offer characters for generic subdivision, or even for sub-family subdivision. Neurational variation is very different within the different families. For instance, the *Noctuidæ*, *Notodontidæ*, *Lycanidæ*, and *Papilionidæ* are all very constant in their neuration, while the *Syntomidæ*, *Arctidæ*, *Geometridæ*, *Bombycidæ*, and *Saturniidæ* are vastly more variable. Some characters are so constant as to be of family or sub-family value in certain groups, while the same characters in another group vary to such an extent as to be only of generic value. The constancy of the position of vein 5 of the hind-wing in the *Noctuidæ* is such as to make it one of the characters in diagnosing the family, but this same vein in the *Ithomiinæ* varies to an enormous extent; so also, and to a hardly less extent, in the *Geometridæ*. Vein 8 of the hind-wing in such families as *Sphingidæ*, *Notodontidæ*, *Arctidæ*, *Bombycidæ*, *Hypsidæ*, *Eupterotidæ*, and others, is extremely constant in position, and quite of family value, but in the *Ithomiinæ* it is very variable in both position and strength, and could not be used as a family character. In a large number of families the position of vein 8 of the hind-wing is, however, most constant, and, in conjunction with

supplementary characters, is of great value in determining the family to which a given insect belongs. Certain veins are subject to a great amount of variation, while others remain most constant. There is vastly more variation in the neuration of the hind-wing than in the fore-wing; and this may be due either to variable ways of folding the hind-wing, or to a varied value as a means to flight, and, perhaps, may sometimes be the outcome of both.

The most constant veins of the fore-wing are: Vein 2, which hardly varies at all; vein 12, which scarcely varies in position, except in the *Satyridæ*, where its position is of family value; while vein 5 and vein 1 *a*, *b*, or *c* only vary between one family and another, except in the *Syntomidæ*, where either one, two, or three of these basal veins can be present. In the hind-wing vein 2 is, again, hardly a variant at all, and in *Ægeriidæ* vein 8 and 1 *a*, *b*, or *c* only vary between one family and another; only in the *Syntomidæ* is vein 8 absent, and this is a family characteristic of the group. All the other veins are subject to much more variation in strength and in position. Vein 5 of the hind-wing is in many families extremely variable, and is sometimes very weak or represented by a fold, or even absent altogether. It is significant that what we call vein 5 of fore-wing is very constant, while what we call vein 5 of hind-wing is very variable. Within the limits of families we very rarely find veins missing, with the exception of the very variable vein 5 of the hind-wing. In the family *Syntomidæ*, which is quite abnormal in the amount of variation the species present, any of the veins 2, 3, 4, 5, or 7 may be absent in the hind-wing. In some genera there are not more than five veins present, veins 4 and 7 being absent from a number of genera, as well as vein 8 being wanting, which is common to all the species.

How is it that all this variation in the neuration has arisen? Two insects can appear to be almost identical, such as in very many of the wonderfully close resemblances we know of in mimicry, yet the neuration is always different. With varying habits and varying flight we get varying neuration. It cannot, of course, be argued that the flight and habits are as varied as the neuration is, and conversely there are, doubtless, cases where two insects of different neurational structure have the same flight.

These statements are made only so far as our limited sense of appreciation of such a difficult subject as flight goes. We are only able to appreciate what are probably consider-

able differences in this respect. With this reservation, notwithstanding, we are able to note frequently considerable differences in flight and habits in flight within the limits even of a single family, and it is significant that we are able to find considerable differences in the neuration of the organs of flight, the wings.

This theory is well supported by looking at the family *Geometridæ* which contains species with a great variety of habits—species that are of robust build, species that are of slender build, species that fly largely at twilight, species that dart about in the bright sunshine, and species that fly late at night. Even among our British geometrid species there is a vast difference in habit between *Ourapteryx sambucaria*, *Nyssia zonaria*, *Acidalia aversata*, *Fidonia atomaria*, and *Boarmia roboraria*. There is also a considerable difference in the neuration of these species. Compare the fore-wing of *Acidalia aversata* with that of *Nyssia zonaria*. Vein 3 is in quite a different position, being in the former from long before the end of the cell, and in the latter from the angle of the cell. Again, veins 10 and 11 are quite different in the two species. So with *Ourapteryx sambucaria* and *Fidonia atomaria* there is a considerable difference in the neuration. *Ourapteryx* has lost vein 10, while *Fidonia* retains it. The habits of these geometrids are all different, and the mode of flight is equally varied. Contrast the members of the family *Sphingidæ*, whose habits are very much the same: they are all pretty nearly constant to a more or less uniform arrangement of the nervures. There are but very few exceptional cases, like the genus *Cephonodes*,\* with a very short cell to the hind-wing, and *Daphnusa* with Sc<sup>2</sup> (= vein 7) and R<sub>1</sub> (= vein 6) on a long stalk; even this latter case is only a small variation and a frequent one in other groups. The remarkable constancy of the neuration has prevented all authors from finding generic characters from this structure. But, all the same, this constancy is of very great value as a family character, and it is scarcely possible to mistake any member of this family as belonging to any other group, although the general build and outline of some of the species have departed very considerably from the typical build and appearance of the family.

Take, again, the butterfly family *Pieridæ*. How varying are the different species in their habits! *Colias edusa* and *Colias hyale*, as well as all other species of the genus, have a strong and exceptionally powerful flight. *Euchloë cardamines*

\* *Vide* Rothschild and Jordan, "Review of *Sphingidæ*," p. lxix.

and its congeners have a much less powerful flight, while *Leucophasia sinapis* and its allies fly along lazily almost like slow-flying geometrid moths. Compare the neuration in these species. It is very considerably different. *Colias* has vein 10 absent and 11 present. *Euchloë* has both present. *Leucophasia* has them present, but they are in a totally different position and are stalked with 6, 7, and 8, and all given off beyond the cell. In all these, as well as in all other Pierines, there is, however, a constant character, and that is, that all have two submedian veins to the hind-wing. Here there is at least one character to diagnose the family with. They, also, all have the forelegs fully developed in both sexes: so this, in conjunction with the neuration character, can be used in defining and diagnosing the family. How valuable such characters are one only appreciates in dealing with foreign species which have not the remotest resemblance to any of the Pierines of which we know the life-history, perhaps, in its entirety. The remarkable South American genera, *Percute* and *Archonias*, in all the species, and *Dismorphia* in many of its mimetic species, would have been impossible of location without relying on these constant characters.

There are some families which are comparatively limited in extent, and there are some that have very few species, and one even but a single representative as in *Endromida*, which has as sole representative *Dimorpha versicolora*. *Notodontida*, *Zyganida*, and the wholly exotic *Ceratocampida*, *Eupterodida*, and *Megalopygida* are small limited families: and, as far as we know them, the habits of the species within these different families are very uniform. The *Notodontida* contains species that fly only at night, or at dusk, and the *Zyganida* contains species that only fly in the bright sunshine; and the flight is almost invariably a slow, buzzing flight. These families, as well as the other exotic families named, show very little variation within the limits of these groups, but for that very reason the characteristics of the family are of the utmost use in diagnosing a species, which, perhaps, has the characters of one of these families, and beyond which we know absolutely nothing.

Another very limited family is the *Drepanida*. But in this family, even in Britain, we have species with very different habits of flight. *Cilix spinula* has a very feeble and slow flight, but the species of the genus *Drepana*, such as *D. binaria* and *D. cultraria*, are very different, and fly briskly, the latter even in the hot afternoon sunshine. Compare

these two genera, *Cilix* and *Drepana*, in neuration; there are many conspicuous differences. Vein 8 of the hind-wing in *Cilix* anastomoses, or is coincident with 7 for the greater part of its length; only at the base and on the costal margin is it separate. In *Drepana* vein 8 is distinct throughout, although it approaches 7 near the middle. Again, vein 6 of hind-wing in *Cilix* commences close to 7, but is separate. In *Drepana* vein 6 is out of 7. The cell of *Cilix* is also considerably longer than in *Drepana*. It might be wondered if it were possible to have neurational characters that held good among all the species of the group. There are, however, some constant characters. The hind-wing has no pre-costal spur to vein 8, and vein 1*a* is either absent or not reaching the tornus,\* and if a supposed species of *Drepanidæ* has not these two characters it would be very doubtful, indeed, if it would ever be proved to be so, even with a full knowledge of its life-history.

The *Noctuidæ* have rather a remarkably constant neuration in spite of the variability of many of their numbers as regards habit. They have been separated into two large divisions—those that have vein 5 of hind-wing arising separate from 4, and those that have vein 5 arising with 4, or near the corner of the cell. These two large divisions have been known by the names of *Trifinæ* and *Quadrifinæ*. These names, however, are most misleading, as meaning those species that have a median with three branches and those with four branches, for many quadrifid species are not really four-branched. The division is probably sound if we retain all those species that have vein 5 arising from nearer 4 than from the middle of the discocellular vein as one division. We find that all the day-flying species, such as *Euclidia mi* and *E. glyphica*, *Bankia argentula*, *Erastria fasciana*, *Toxocampa pastinum* (which is only a partial day-flyer), *Anarta myrtilli*, etc., have the vein 5 of the hind-wing arising nearer 4 than from the centre of the cross vein, going to show that here, also, the altered habit of day-flying with the attendant alterations in the actual flight is largely correlated with an altered neuration. Those species of *Noctuidæ* that fold their wings very closely together usually belong to the trifid section with vein 5 from the centre of the cross vein. In a very large number of species this vein is so reduced as to be present only as a fold of the membrane, without having the true function of a vein. Although vein 5 of the hind-wing varies so considerably in

\* *Vide* Hampson, "Cat. Phalænæ," i, p. 18.

both function and position, vein 5 of the fore-wing is so constant as to be of great utility in diagnosing a noctuid species. Vein 5 of the fore-wing is always nearer 4 than 6. It is never from the centre of the discocellular, and never from the upper portion of it. If this vein were from the middle of the discocellular, one would suspect the species to belong to the *Notodontidæ*, and if it were from the upper portion of the discocellular, and nearer vein 6 than the middle, one would suspect the insect as, perhaps, a geometrid, as that is a very constant character of the latter family: only in such aberrant species as *Macaria notata*, *M. liturata*, *Venilia maculata* is it from the middle of the discocellular. The fore-wing is much more stable in its structure than the hind-wing, and several characters, such as those mentioned, have never yet been proved to be wrong by a complete knowledge of the life-history. The neuration of the fore-wing does, however, vary, and sometimes considerably, within the family.

In the *Geometridæ* there are many species that form a simple areole or small secondary cell, such as *Acidalia aversata*, *Cataclysmæ virgata*, and the species of the large genus *Eupithecia*, or, as we should now call it, *Tephroclystia*. Others have a double areole, such as in the genera *Melanippe*, *Emmelesia*, *Cidaria*, etc. But a much larger number have no areole at all. In many families the fore-wing remains constant, while the hind-wing varies enormously. The *Syntomidæ* and *Arctiidæ* vary very little in the fore-wing, while the hind-wing is excessively variable. Many species of these two families have, accompanying a very modified neuration, a very specialized outline of wing. Unfortunately, where the variation is greatest, such as among many exotic forms, we have least information of habits. But while in Brazil this year I was astonished at the entirely altered habits of the different *Syntomidæ* taken. The flight of *Trichura*, for instance, was not in the least like the flight of any other species of Syntomids that I had previously seen, but was like that of the fossorial wasps, which are never absent in the tropics of the New World. Again, the gaudy *Corcira atavia* was not suspected of being a Syntomid: its broader wings and slow flight were the very antithesis of the quick motion of *Trichura dixanthia*, or *Trichura grandis*. One might almost mention such cases by the score. Species of *Syntomidæ* may be like wasps, bees, flies, beetles, bugs, and even like butterflies, and if these groups in themselves have different modes of flight, how exceedingly variable must the *Syntomidæ* be, which embrace a large selection of

the variability of many of these different orders? And what of the neuration of the *Syntomida*? There is hardly a family which can compare for variability in this respect. The discoidal cell may be large or small, normal veins may be missing, or they may vary their position to a remarkable degree.

I will mention but one or two further cases of species that are well known to all of you. Take the species of *Argynnis*—*paphia*, *adippe*, or *aglaia*: they have a strong, powerful flight. The two *Brenthis* species, *euphrosyne* and *selene*, although from the size of the insects they necessarily have less power, are still species with much the same flight. These two genera have the same neuration. But compare the flight and neuration of the species of *Melitæa*. The flight is markedly different and is not nearly so rapid, and the neuration has differences in both fore- and hind-wing. The hind-wing has lost the discocellular, and the cell is open, as against a closed cell in *Argynnis*. Exactly the same difference is to be found in the hind-wing between such genera as *Vanessa* with the species *urticæ*, *polychloros*, and *io*, *Polygonia c-album*, and *Pyrameis cardui* on the one hand, and *Limenitis sibylla* on the other. Robustness of build, and strength of the actual veins themselves, unquestionably account in some measure for some of the differences in flight. *Limenitis sibylla* and *Apatura iris* are not at all alike in their habits or strength of flight, and there is this important neuration difference between them, namely, that *L. sibylla* has only the cell of the hind-wing open, whereas the cell of both fore- and hind-wing in *A. iris* is open. This structural difference alone would in all probability have been attended by some difference in flight, but with the added difference in build the disparity is greatly accentuated.

I have been at some pains to show that flight is to a large extent correlated with the neuration of the wing, and that when we are able to appreciate differences in flight there is an accompanying difference in neuration. Nearly all the veins of the wings (but particularly the hind-wing) are able to undergo modification in strength, or position, or even both. Some veins are much more variable than others. Vein 5 of the hind-wing is probably the least stable part of the structure, whereas vein 8 is exactly the reverse. In the fore-wing vein 5 is most constant, while 7, 8, 9, 10 are variable. It must be manifest from the nature of the structure that for the delimitation of genera without an appeal to other biological characters it is not absolutely reliable. Species having

exactly the same neuration may mean only that they have exactly the same flight, and there may be often other characters which show that there are grounds for separating species into different genera. If, however, one were dealing with foreign species, of which we knew absolutely nothing as to life-histories, we should be justified in accepting genera, which would be but temporary, subject to conformation of the life-histories; for we could not wait 500 years to get the life-histories of all the similarly veined species to settle the position they held one with another. But if the genera by neuration are problematical, the families, as defined by the more constant veins in conjunction with other imaginal structures, such as the presence or absence of the proboscis or of the frenulum and the structure of the antennæ, are on a sound and workable basis. To the student of exotic Lepidoptera with unknown life-histories, classification by neuration has brought order where comparatively recently there was absolute chaos. It is now possible to say to what family any given species belongs with more or less certainty, and within many of the families small variation of the veins, in conjunction with other structural differences, can be utilized at the least for genera for the time being. But we must always be ready to adjust our groupings and general classification as the life-histories become known. And in the meantime we can sift and analyze the vast amount of work and the knowledge already gleaned from the wonderful world of entomology.

#### LIST OF WORKS CONSULTED.

- ROTHSCHILD AND JORDAN.—“Revision of the Lepidopterous Family *Sphingidæ*.”  
 ROTHSCHILD AND JORDAN.—“Novitates Zoologicæ.”  
 MEYRICK.—“Handbook of British Lepidoptera.”  
 HAMPSON.—“Fauna of British India.”  
 MEYRICK.—“Transactions of the Academy of Science of New Zealand.”  
 HAMPSON.—“Catalogue of the *Lepidoptera Phalaenæ*,” 1898-1910.  
 LEDERER.—“Wiener Entomologische Monatschrift,” No. 186.  
 HERRICH-SCHÄFFER.—“Schmetterlinge von Europa,” 1843-56.  
 SNELLEN.—“De Vlinder van Nederland,” 1867-82.  
 HEINEMANN.—“Schmetterlinge Deutschlands,” 1859-77.  
 MEYRICK.—“Trans. Linn. Soc. N.S.W.,” 1878-1910.  
 LEDERER.—“Verhandlungen zoologisch-botanische Vereins.”

## ABSTRACT OF PROCEEDINGS.

FEBRUARY 10th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

THE deaths of two members, Mr. Kirkaldy and Mr. McArthur, were announced.

Mr. Robert Adkin exhibited a short series of *Nola albulalis* reared from East Sussex ova. The ova hatched August 5th, 1909; the larvæ were fed upon wild raspberry, pupated at the end of September, and the moths appeared between October 31st and November 7th of the same year, thus, in confinement, producing a second generation (see "Proceedings," 1909-10, p. 41).

Mr. T. W. Hall exhibited the two-horned seed-vessels of a species of *Martynia* from South Africa, which, according to Lord Avebury and Dr. Livingstone, are most formidable to the larger wild animals, attaching themselves to the skins of lions and buffaloes during their rolling about the dry plains. They are said even to cause the death of lions when they become attached to the mouth or nostrils. During the attachment the seed-vessel splits open, and the seeds drop out and are thus distributed over a large area.

Mr. Hy. J. Turner exhibited a very brilliant species of the *Lycænidæ*, *Danis taygetes*, from Brisbane, given him by Dr. T. P. Lucas, who, previous to his going to Australia some thirty years ago, was a member of the Society. The species was very markedly sexually dimorphic.

Mr. J. P. Barrett exhibited a box of conspicuous insects of various orders from near Messina, Sicily, including a mole cricket, of which specimens were continually met with in unexpected places, even indoors; large beetles, often seen on flowers and attracted by light; ant lions, etc. He also showed a specimen of *Pieris brassica*, which he had observed apparently fastened down to a flower head, but which had been captured and damaged by a species of *Mantis*.

Mr. Coote exhibited two specimens of *Hybernia defoliaria* from Surrey, one a rich, dark form, and the other a finely banded example.

Mr. Dennis exhibited a branch of *Pinus sylvestris* with an abnormal growth, "witches' broom." Mr. Step said that it was caused by the fungus *Peridermium elatinum*.

Mr. Moore exhibited a representative series from various parts of the world of the chief groups of noxious blood-sucking flies, injurious to man and his domestic animals, and now recognised as of great economic importance as prejudicial to the health and welfare of the colonists and dwellers in those countries where they are found. Popularly known and detested as "forest flies" in northern climes, where they are annoying rather than hurtful, in the tropics many of them are now known to be the chief agents in conveying various fatal diseases. Amongst the specimens shown were: *Glossina* sp.? an undetermined species from Lake Chad; *G. palpalis*, which is responsible for the spread of the dreaded sleeping-sickness; *Tabanus africanus* (Gray), also from Lake Chad, a handsome fly found over the greater part of Africa, but only recently recorded from N. Nigeria, whose bite is reported to be fatal to horses over the whole area of its distribution; *T. autumnalis*, the moose fly of Newfoundland, and *Chrysops sepulchralis*, the caribou fly, which not only influence the movements of the deer in Newfoundland, but are also particularly offensive to anglers and sportsmen there; and *Pangonia marginella* from the Adriatic, a near relative of the camel fly, which regulates the migrations of the camel breeders and their herds in North Africa. Microscopical preparations of the mouth parts were also shown.

Mr. W. West (Ashtead) exhibited a specimen of the "silver-fish" insect, *Lepisma saccharina*, which had existed two months without food. It was remarked how destructive a creature it was, books and papers often being considerably damaged by its presence. He also exhibited the scales of this primitive insect under the microscope.

Numerous very fine exhibits of microscopical slides were shown by members. Among the more striking objects seen were the beautiful slide of diatoms of Mr. F. N. Clarke, radulae of molluscs by Mr. Priske, pollen of various plants, the curious "fans" of a dipterous larva, polyzoa, foraminifera, beautiful colonies of *Volvox globator*, etc., by other members.

Mr. R. Adkin showed under a Zeiss binocular sundry small Lepidoptera, including *Euchromia arbutella*, *Hypermeccia*

*augustana*, *Argyresthia brochella*, etc., the large field obtainable by this instrument rendering it particularly suitable for the examination of such species.

FEBRUARY 24th, 1910.

Mr. ALFRED SICH, F.E.S., *Vice-President*, in the Chair.

Dr. G. S. Robertson, of Dulwich, was elected a member.

Dr. Chapman exhibited a bred specimen of *Callophrys avis*, and pointed out that it differed from the nearly related *C. rubi* in being somewhat larger and in lacking the white line on the face and the silvery lines around the eyes, as well as in its life-history (see "Trans. Ent. Soc. Lond.," 1910, pp. 85-106, pls. 14-43).

Mr. Barnett exhibited a long series of *Hybernia aurantiaria*, taken in West Wickham Wood, where it was very abundant in November, 1909.

Captain Cardew exhibited several gynandromorphs, including *Dryas paphia*, in which the right side and two-thirds of the left hind-wing were female, the remainder of the left side male, a peculiar feature being the fact that the line of demarcation between the sexes lies in the space between two nervures. The specimen was taken by him in the New Forest in 1893, and was exhibited by Mr. C. G. Barrett at the Entomological Society of London in the same year ("Entom.," xxvi, p. 329). *Amorpha populi*, exactly divided, the left side, including wings, legs, and antenna, being male, and the corresponding parts on the right female. Bred from a Dover larva, 1909 ("Entom.," xlii). *Agrotis puta*, exactly divided, the left side male, right side female; antennæ corresponding ("Entom.," xli, p. 229).

Mr. A. Russell exhibited a strikingly aberrant form of *Polyommatus icarus* from Reigate, where it was captured on May 22nd, 1909. The underside of the right side wings had the submarginal spots elongated to broad striæ, while the left side had normal markings.

Mr. Sperring exhibited *Agrotis agathina* from Chislehurst, and also a very smoky bred specimen of *Arctia villica*.

Mr. R. Adkin exhibited a series of *Peronia permutana*, reared from Sussex larvæ. He said that on a former occasion he had exhibited a specimen of this species reared from a larva taken on the coast near Beachy Head, where for many years the species had been known to occur sparingly



PLATE IX.



FIG. 2.—*Agrion puella* captured by *Drosera intermedia*.



FIG. 1.—Abnormal catkins of *Corylus avellana*.

Photos. by E. Steph.

("Proceedings," 1908, p. 79). He now learned from his friend and fellow member, Mr. A. C. Vine, that the species occurred somewhat more plentifully in the Brighton district, in a locality some four or five miles inland, when Mr. Vine first met with it about ten years ago. He thought this was interesting, as the species was usually regarded as quite a coast insect; it was also satisfactory to know that the Sussex record rested on a more solid foundation than the occasional specimens taken near Beachy Head. He also mentioned that his former statement, that the Sussex specimens were paler than those from Wallasey, appeared hardly to be justified, now that longer series were available for comparison; for although an isolated specimen might be paler, when a number from each locality were placed side by side it was seen that there was little difference as a whole between them.

Mr. Step exhibited two teratological specimens of hazel catkins (*Corylus avellana*) from Ashtead. The first example had started from the end of a twig as a single male catkin; but at the distance of half an inch from its base it had given origin to no fewer than twenty-five other catkins of various lengths, but all much shorter than the parent catkin, which continued to a total length of an inch and a half. This was found by a young girl in a neighbouring wood; and its arrival had caused his son to search the bushes on the parental estate, with the result that a somewhat similar specimen was found. In this second example fifteen separate catkins had started in a bunch from the terminal point of a twig. It is possible that such examples are of frequent occurrence; but he could not remember to have seen one previously, and he found no mention of them by any of the authorities whose works he had consulted. Several catkin clusters showing a tendency in the same direction were afterwards observed, but nothing sufficiently marked to be worth gathering (Pl. IX, fig. 1).

Mr. Alderson exhibited a large collection of butterflies taken by him in a six weeks' holiday in the Rhone Valley, between May 16th and June 25th of last year. In spite of the somewhat indifferent weather very fine series were obtained, the number of species represented being over one hundred. Among the more noticeable series and forms were numerous *Plebius argyrognomon*, with excess of blue in the females, from St. Triphon; *P. zephyrus* v. *lycidas* from the Simplon; *Melitaa deione* var. *berisalensis* from Martigny and Salquenen; various races of *M. parthenie*; fine *Chrysophanus alciphron* ab. *midas* from Vernayaz; a female *Pieris napi* with

a very heavily marked inner margin; a race of *Nemeobius lucina* much larger than is ever taken in England; specimens of *Parnassius mnemosyne*, a species which was fairly common; a series of *Brenthis daphne*; an extremely dark aberration of *Colias phicomone*, male; *Melitæa phæbe* in fine condition; *M. dictynna*, some very bright and large; a fine range of shades of *Agriades thetis* (*bellargus*) with a beautiful ab. *hyacinthus*; somewhat large *Aglais urticae*; *Cyaniris semiargus* with some very curious shades of colour in the males; a few *Issoria lathonia* and worn *Euvanessa antiopa*; a series of the beautiful and varied *Anthrocera carniolica*, etc.

Mr. R. Adkin read a paper entitled "The Lepidoptera of a London Garden" (see p. 1).

MARCH 10th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. West (Greenwich) exhibited two more drawers of the Society's collection, which he had just re-arranged and re-mounted.

Mr. J. P. Barrett exhibited specimens of *Nyssia hispidaria* taken on February 27th, and stated that he had taken the species forty years ago in the same locality, Richmond Park. He also exhibited *Eupithecia pumilata*, taken at New Cross, together with specimens of *Phigalia pedaria* and *Hybernia leucophæaria*, taken in Richmond Park. He noted that of the last-named species about one third of those seen at the time were cripples, possibly owing to the prevalence of high wind at the period of their emergence.

Mr. Lucas exhibited a photograph of an earwig new to science taken in the Liverpool Docks. Only one specimen had been observed, and it had been named *Odontopsalis lewisi*.

Commenting upon the effects of the recent mild weather, Mr. R. Adkin said that a plant of green hellebore (*Helleborus viridis*), that had been growing in his garden at Lewisham for many years, had fully expanded blossoms on February 19th, whereas last year, although the buds were fully formed by the end of that month, the blossoms did not expand until the beginning of April. Also, that on March 5th *Biston hirtaria* emerged in an outdoor breeding cage, and on the 6th *Endromis versicolor* appeared in an adjoining one. The dates on which the earliest examples of these species had emerged under similar circumstances on such occasions as

he had reared them during the past thirty years were: *B. hirtaria*, April 10th, 1909; April 8th, 1896; April 5th, 1892; and April 3rd, 1880. *E. versicolor*, April 9th, 1909; April 9, 1892; March 22nd, 1890; March 30th, 1889; April 3rd, 1886; April 19th, 1885. A reference to the weather reports of the four weeks ending respectively February 12th to March 5th of the present year showed that the maximum shade temperatures week by week ranged between  $54^{\circ}$  and  $42^{\circ}$  F.;  $56^{\circ}$  and  $46^{\circ}$ ;  $51^{\circ}$  and  $48^{\circ}$ ;  $57^{\circ}$  and  $45^{\circ}$ ; and the minima between  $50^{\circ}$  and  $30^{\circ}$ ;  $45^{\circ}$  and  $33^{\circ}$ ;  $44^{\circ}$  and  $36^{\circ}$ ; and  $41^{\circ}$  and  $33^{\circ}$ ; and the rainfalls were 0.40, 0.65, 1.23, and 0.15 in. But perhaps the most important factor was the unusual amount of sunshine, the total in the first week under notice being nine hours, or two hours in excess of the average; in the second 20.1 hours, or about two and a half times as much as the average; in the third week 16.8 hours, or seven hours above the average; and in the week ending March 5th, 38.4 hours, or practically three times the amount of the average. No doubt the combination of the moisture caused by the rainfall and the excessive amount of sunshine was, he considered, the immediate cause of these early emergences.

Mr. L. W. Newman exhibited a very interesting series of *Anthroccera hippocrepidis* taken in one small field near Bristol by Mr. Smallcombe and his son, June 2nd to 4th, 1908, including the rare black var. *chrysanthemi*, a yellow variety, a very fine pink form, and a red form with yellowish-pink spots; and from the same field a confluent form of *A. loniceræ*, in which the outer and central spots were blotched together, but not united to the basal spots. He also showed a pair of *A. meliloti* from the New Forest with confluent spots. With regard to the three larvæ of *Abraxas grossulariata*, which pupated as a second brood in October and November, 1908, he wished to report that the pupæ, which had been kept out of doors all the winter, were still alive. He believed that this was the first record of this species passing the winter as a pupa.

The remainder of the evening was devoted to the exhibition of lantern-slides by Messrs. Tonge, West (Ashted), Lucas, Dennis, and Edwards.

Mr. Tonge exhibited slides illustrative of further examples of the resting attitudes of insects.

Mr. West exhibited numerous slides of crystals obtained from solutions.

Mr. Lucas exhibited slides of rare plants from the New Forest, and of details of insect structure.

Mr. Dennis exhibited a long series of slides of various species of galls.

Mr. Edwards exhibited slides illustrating the natural history and structure of the cockroach.

MARCH 24th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. A. Sich exhibited three specimens of *Coleophora troglodytella*, bred from larvæ collected by Mr. H. Leonard Sich at Bepton, Sussex, off *Achillea millefolium*, in 1907. They fed up well on this plant, in June, burrowing into the fine segments of the leaves, thus differing much in habit from *Coleophora argentula*, which is more commonly found on *Achillea* and feeds in autumn on the seeds. He also showed specimens of the larva of, most probably, *Borkhausenia pseudospretella*, found that day in mignonette seeds, in a potting shed, Chiswick.

Mr. Robert Adkin exhibited bred and captured series of *Tæniocampa gothica* from the Shetland and Orkney Islands and various localities on the Scottish mainland. Among those from Orkney, Inverness, Rannoch, and Forres were specimens showing various tones of colour, from light greyish-brown to a rich dark reddish-brown, and from which the "Gothic mark" was practically absent; indeed, in these specimens, the whole of the markings were nearly obsolete. These, he said, were the forms that for many years had done duty for var. *gothicina*, H.S., but, as Tutt had already pointed out ("Brit. Noc.," vol. ii, p. 150), this was quite wrong. Herrich-Schäffer, in his differentiation of *gothica* and *gothicina*, says (vol. ii, p. 196), "*Gothica*—inter stigmata ambo macula quadrata nigerrima"; and "*Gothiciana*, inter stigmata ambo macula quadrata ferruginea," which clearly implies that the difference between the two forms is that the quadrate mark between the stigmata (the Gothic mark) is black in *gothica* and rust-coloured in *gothicina*. If we turn to his figures of the latter (pl. xxvi, figs. 125, 126) we find an insect, as, perhaps, is often the case, a little overdrawn, but unmistakably showing the quadrate mark between the stigmata distinct and reddish-brown in colour. Occasionally one sees a specimen among the Scotch examples of *T. gothica* that fits both the description and figures; indeed, among the series exhibited from Rannoch there is one, but it

appears to be rather an uncommon form. Staudinger's diagnosis of *gothicina*, H.S.—“Smaller, with less markings, almost unicolorous”—certainly does not appear to agree with Herrich-Schäffer's description or figures, but perhaps it has led to that name being applied to the more or less unicolorous forms that occur not uncommonly in the Rannoch district, and are also more rarely met with in some of the other Scottish localities.

Captain Cardew exhibited a bred series of *Pachnobia leucographa* from Dover, all very dark in coloration, a series of *T. gothica* bred from *v. gothicina* parents, all of the typical form, and three specimens of *Phigalia pedaria*, from Wimbledon. One, taken on January 2nd, was worn; the other two, taken on March 18th, were in good condition.

Mr. J. Platt Barrett reported that he had seen *Brephos parthenias* and *Gonepteryx rhamni* in the woods around London; and said, respecting the last exhibit, that in his experience *P. pedaria* was much greener in tint if the emergence took place in moist weather than if the weather were dry.

APRIL 14th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. W. J. Ashdown exhibited about 120 species of Coleoptera taken in Switzerland during July, 1909, including: *Staphylinus fossor*, *Anomala frischeri*, *Luciola italica*, *Homalilus suturalis*, *Eros aurora*, *Tornoxia biguttata*, *Trichodes albearius*, *T. apiarius*, *Haplocnemus nigricornis*, *Anocodes ustulata*, *Cteniopus sulphureus*, *Endomychus coccineus*, *Spondylis buprestoides*, *Strangalia attenuata*, *Hylotrupes bajulus*, four species of *Pachyta*, *Oberea linearis*, *Molorchus minor*, *Pidonia lurida*, *Hispa atra*, etc.

Mr. Dennis exhibited a series of photographs of British Lichens.

Mr. Hy. J. Turner exhibited a number of species of Lepidoptera sent to him from Redvers, Saskatchewan, and Victoria, Vancouver Island, by Mr. A. J. Croker, and commented on their general British-like appearance. The species were *Argynnis bremnerii*, *Polygonia marsyas*, *Notolophus badia*, *Cænonympha elko*, *Malacosoma pluvialis*, *M. disstria*, and *Petrophora defensaria* from the latter locality, with *A. aphrodite* (*cypris*), *Eurymus curytheme*, *Epidemia helloides*, *Thanaos persius*, *Chorizagrotis introferens*, *Paragrotis divergens*, and

*Mamestra negussa*, from the former place. It was difficult to distinguish several of these species from allied species taken in Great Britain. He also showed the cases with living larvæ of a species of *Coleophora* feeding on the seeds of a *Dianthus*, sent from Hyères by Dr. Chapman.

Mr. L. W. Newman exhibited larvæ and pupæ of *Dryas paphia* which had been forced in a hot-house. The first pupa was formed twenty-eight days after the forcing commenced. He also showed larvæ and pupæ of *Melitæa athalia*, which had been put early under forcing conditions, as well as larvæ of *Argynnis adippe*, *A. aglaia*, *M. cinxia*, and *Agriades coridon*. The last two species were practically all full fed, but the *A. adippe* and *A. aglaia* would not respond to the forcing treatment.

Mr. Coote exhibited a short series of *Nyssia hispidaria*, which he had bred from ova laid by a female taken at Richmond in 1909.

Mr. A. Sich exhibited our two species of the genus *Adela*, each with entire yellow fasciæ: *Adela crassella*, Scop. (*sulzella*, Schiff.), in expanse about 12 mm. The yellow fascia is nearer the centre of wing. Veins 8 and 9 of fore-wings are separate. *Adela degeerella*, L., measures about 18 mm., and the yellow fascia is much beyond the centre of wing. Veins 8 and 9 of the fore-wings are stalked.

Mr. Robert Adkin exhibited a long series of *Hepialus humuli*, var. *thulensis*, Newman, = var. *hethlandica*, Staudinger, from Shetland, together with series of *H. humuli* from Orkney, Hebrides, Ireland, and sundry English localities, all of the latter being typical specimens for comparison; and read a short paper (p. 13).

APRIL 28th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. W. West (Greenwich) exhibited a large store-box, containing numerous rare and interesting species, taken mainly by himself forty or fifty years ago, many of the specimens being of local interest to entomologists of south-east London. Among them were *Euchloë cardamines*, the first butterfly taken by himself, in April, 1860, in Kidbrooke Lane, Blackheath; four examples of *Pieris daphidice*, taken by some Deptford woodcutters, at Folkestone, in the "sixties"; two specimens of *Colias edusa* and v. *helice*, from

the Brockley railway banks; *C. hyale*, from the same place; very diminutive forms of *Vanessa io*, *Agriades coridon*, and *Aglais urtica*, taken during an extremely dry season; and four diminutive *E. cardamines*, taken in the following spring; *Agrias convolvuli*, taken at rest on the trunk of a chestnut tree, in Greenwich Park, in 1869, while Mr. West was sheltering from a storm; *Hippotion celeriò*, found on a machine in Messrs. Penn's iron foundry, Greenwich, in 1865; *Sesia stellatarum*, taken at Blackheath, where it used to be common; *Ægeria cynipiformis*, taken from elms in Greenwich Park; *Æ. culiciformis*, from Darenth; *Æ. myopæformis*, from Greenwich apple trees; *Æ. chrysidiformis*, from Folkestone; *Æ. ichneumoniformis*, from Lee; a very pale xanthic example of *A. urtica* taken in 1875; specimens of *Deiopeia pulchella*, taken in 1862 at St. Margaret's Bay by some Deptford workmen; a specimen of *Spilosoma urtica*, taken by him in 1880, on his door-step in Greenwich; and a salmon-pink example of *Anthrocera filipendula*, taken in Burnt Ash Lane, in 1870.

Mr. R. Adkin again exhibited the supposed hybrid *Anthrocera filipendula* × *achillea*, and read the following note:

"It may be remembered that early in last year I exhibited a specimen of an *Anthrocera*, which had been sent to me by Mr. W. Renton, of Morven, as resulting from a pairing that he had observed between a male *A. filipendula* and a female *A. achillea* ('Proceedings,' 1909, p. 67). Considerable doubt was expressed at the time as to the possibility of a hybrid between these two species, and on a subsequent occasion Mr. Tutt mentioned that, although cross-pairing was not uncommon between some of the Continental Anthrocerids, it had not, in his experience, produced hybrids. I, therefore, thought it very desirable that the genitalia of the specimen should be examined, as it is known that in the case of hybrids these organs are greatly affected. Mr. F. N. Pierce very kindly undertook this examination for me, and his report is as follows: 'I have no hesitation in saying it (the supposed hybrid) is a true *filipendula* in every respect. The points of difference are very great in the two species, and the 'hybrid' agrees in every respect with *filipendula*, and in no point with *achillea*.' He then goes on to say that he has examined the genitalia of a number of known hybrids, and that the signs of hybridization in them are not only well marked but unmistakable; and that, therefore, this specimen cannot be a hybrid. In these circumstances we have no alternative but to accept the very distinct evidence

of the genitalia, and to regard the specimen as a form of *A. filipendulæ*; and seeing that it was the female parent that was supposed to be *A. achilleæ* we can only suppose that Mr. Renton must have been mistaken in its identity. In this connection I may mention that he subsequently sent me two other specimens he had captured, which resembled the supposed hybrid fairly closely. He considered these could not be *A. filipendulæ* on account of certain details of appearance, which he pointed out. I have carefully examined these specimens, and have not the slightest doubt that they are nothing more than a form of *A. filipendulæ*; and in this opinion I am confirmed by others to whom I have shown them. It is, therefore, quite conceivable that a possibly worn individual of this form was the female that he found paired, and that he was thus led into the error of supposing it to be a cross-pairing that he had witnessed. It is also obvious that, this being the case, the two specimens bred in confinement, which were sold at Stevens' rooms on October 27th, 1908, as hybrid *A. achilleæ* × *filipendulæ*, are probably but forms of the latter species; perhaps, whoever now has these specimens in his possession, may feel sufficiently interested to have their genitalia examined, and the question of their identity thus finally set at rest."

Mr. Hy. J. Turner exhibited a large number of *Diptera*, *Hymenoptera*, *Ichneumonida*, and a few *Coleoptera* just received from Waroona, W. Australia, and one of the two boxes in which they, with many specimens of *Lepidoptera*, 138 in all, had been packed, to show the ingenious method of manipulating a discarded cigar box for entomological purposes.

Mr. A. Sperring exhibited four specimens of *Amphydasis strataria* (all females). These four specimens differ very widely from the type, especially specimen No. 1, and were bred from a wild male and a bred female from Chislehurst. Of some thirty larvæ only five perfect specimens resulted—one male and four females, none of which could be considered as typical. There were also many cripples. He noted that in the specimens exhibited the bands are, in all cases, very dark, ranging from black to deep brown, instead of pale mauve or lilac, as is usual. Specimen No. 1 exhibits the widest divergence from type specimens. Specimen No. 4 is the lightest of the whole number bred, either perfect or crippled, practically the whole of the latter being equivalent to specimens Nos. 1 and 2.

Mr. A. Sich read a paper entitled the "Legs of Lepidopterous Larvæ" (p. 15).

MAY 12th, 1910.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. Lyle, of Brockenhurst, was elected a member.

Mr. A. E. Tonge exhibited a series of twenty *Melitæa aurinia*, taken near Verney Junction, Bucks, by Mr. J. Mathison, of Winslow, about the year 1890, but apparently since that date the species has become extinct in that locality.

Mr. Ashdown exhibited a variety of *Asphalia flavicornis*, in which the costa was unusually light, and there was a dark blotch in the disc of the wing about midway between the costa and the hind margin. It was taken at Mickleham, in March, 1910.

Mr. Stanley Edwards exhibited a number of species of the genus *Parnassius*, including *P. transiens*, *P. mnemosyne*, *P. insignis*, *P. orleansi*, *P. imperator*, *P. gracialis*, *P. hardwickii*, *P. delius*, *P. apollo*, *P. phæbus*, *P. smintheus*. It was noted how much the Japanese *P. citrinarius* (*glacialis*) was superficially like *Aporia cratægi*.

Mr. Coulson exhibited an extremely pale buff example of *Phigalia pedaria*, taken in Epping Forest.

Mr. Hy. J. Turner exhibited about fifty species of butterflies, met with by him at Zermatt in early August, 1909, in more or less abundance; and read a paper on the exhibit, entitled "A Few Days with the Butterflies of Zermatt" (p. 18).

MAY 21st, 1910.

#### FIELD MEETING AT OXSHOTT.

*Conductors*: W. J. LUCAS, B.A., and A. SICH, F.E.S.

The first field meeting of the year is always one to look forward to; it is the opening of the out-door campaign of the Society. Although many of the members have passed the days of earliest youth, yet "hope springs eternal in the human breast," and we all expect, as every new summer season arrives, to gain new entomological experience, to add new species to our collections, and to renew acquaintance with the various species we have met with on previous occasions. Twenty members, animated by these or kindred

hopes, or by the longing for a walk in the country with pleasant companions, assembled on Oxshott Heath. After some discussion on the damp state of some of the paths, it was decided to take the oft-trodden route to the Black Pond. Although insects were not conspicuously abundant, and no rarities were captured, most of the entomologists took something back with them, and the botanists found various interesting plants. A pair of *Lithocolletis stettinensis* occurred on an alder trunk, and a specimen of the less common *L. heegeriella* was also taken.

Mr. F. B. Carr has kindly furnished me with a list of his captures, from which I take the following :

*Euchlœ cardamines*, *Gonapteryx rhamni* and ova, *Drepana lacertula*, *Anarta myrtilli*, *Tephrosia punctularia* (abundant), *Cidaria silaccata*, *Scodiona belgiaria*, and twelve others. Among the larvæ he secured were those of *Cleocerys viminalis*, *Cymatophora flavicornis*, *Chesias spartiata*, *Phycis betulae*, and many others.

After the ramble the members took tea at Wigmore's Refreshment Rooms, and so brought a pleasant outing to the wonted conclusion.

MAY 26th, 1910.

Mr. W. J. KAYE, F.E.S., *President*, in the Chair.

Mr. Stanley Edwards exhibited a specimen of the fungus *Polyporus schweinitzii*, from St. Margaret's Bay. Mr. Step remarked on the destructiveness of this species to pine trees, and stated that it was of comparatively recent introduction to this country. Mr. Edwards also exhibited a specimen of *Sepultaria coronaria*, a species of the *Peziza* group, subterranean at first but becoming partly exposed. It is found in spring under trees.

Mr. Newman exhibited males and females of an *Agriades* from the collection of the late Mr. Sabine, which were supposed to be natural hybrids of *A. coridon* × *A. thetis* (*bellargus*), and stated that almost exactly similar examples had been taken last year on the ground where Mr. Sabine collected his specimens. He also showed ova of *Sesia andreniformis*, deposited at the bottom of a chip-box, and tucked well into crevices, which appeared to point to the female in nature selecting crevices of bark in which to lay them. [These ova, which were brown in colour, afterwards proved to be infertile.]

Mrs. Hemming exhibited a gynandromorphous example of *Celustrina argiolus*, taken by her in Surrey, on May 10th, 1910. The left side was female and the right side male.

Mr. Edwards exhibited a number of species of *Satyridæ* of the genera *Taygetis* and *Melanitis*. The former, which is confined to the American continent, show noticeable variation in the undersides. *Melanitis* is found in the Indian, Malayan, Australian, and African regions. The extreme variation shown by the undersides of the widely distributed and common *Melanitis leda* was very remarkable.

*A correction.*—Mr. R. Adkin again exhibited the specimen of a *Boarmia* referred to, in his "Stray Notes on the Variation and Distribution of *Boarmia repandata* in Britain," as a unicolorous smoky-black specimen sent from Delamere, and probably referable to *B. gemmaria* ("Proceedings," 1909, p. 3); together with short series of melanic forms of *B. repandata* from Lancashire and Yorkshire, and of *B. gemmaria* from Kent for comparison, and read the following note:

"The specimen referred to in my notes as coming from Delamere, I now hear from my friend and fellow member, Mr. Mansbridge, to whose kindness I am indebted for it, really came from Knowsley, Lancashire, and not from Delamere as stated; it is a captured specimen and not in very good condition, and, therefore, difficult to differentiate. Mr. Mansbridge, on reading my notes, expressed his opinion that I was wrong in regarding it as a form of *B. gemmaria*, and he had not the slightest doubt that it should be referred to *B. repandata*; and, with a view to convincing me, he very kindly sent me the series of specimens bred from Knowsley parents now exhibited. They are by far the darkest specimens I have seen of any *Boarmia*, yet, being in perfect condition, it is not difficult to trace in them the usual markings of *B. repandata*; moreover, as Mr. Mansbridge points out, the pectinations of the male antennæ are proportionately much shorter in that species than in *B. gemmaria*, a character which certainly holds good in this case. I think, therefore, we must accept the Knowsley series as a very remarkable form of *B. repandata*, and as the specimen in question is undoubtedly one of the same race, that also must be regarded as a form of *B. repandata*, not of *B. gemmaria* as originally stated."

*Butterflies attacked by birds.*—Mr. Robert Adkin mentioned that his son had reported to him that on May 20th, while walking on the road towards Beachy Head at Eastbourne, a small

bird, somewhat like a stone-chat, but of rather slighter build, flew out from some bushes, seized a white butterfly, which he believed to be *Pieris brassicæ*, in its beak, dropped with it to the ground with the evident purpose of securing a firmer hold, and then flew off with it to the bushes, apparently to its nest. He had no doubt that in this case the butterfly was taken by the bird with the object of food, either for itself, or more probably for its young.

Mr. Step, on behalf of Mr. West, of Ashtead, exhibited a number of specimens of *Testacella haliotideæ*, the carnivorous slug, which he (Mr. West) had found in numbers in a corner of his garden, together with several eggs of the species. The specimens were noted as being somewhat pale in colour. Attention was called to the eggs, which are one sixth of an inch in length, with an opaque elastic envelope, and are more or less spindle-shaped.

Dr. Hodgson exhibited numerous specimens of *Celastrina argiolus*, bred from ova and larvæ obtained in August and September, 1909. One female emerged in 1909; one apparent female had male wings of pale grey-blue, with very light margins; two females and two males were of an exceptionally pale bright grey-blue.

JUNE 9th, 1910.

Mr. Edwards exhibited a store-box of American *Pierinæ*, amongst which might be mentioned *Catopsilia cubale*, with its two forms of female; and *C. hilaria*, the male of which has paint-brush-like scent organs on the fore-wings.

Captain Cardew exhibited a short series of *Epione advenaria*, including an unicolorous aberration, taken near Godalming.

Dr. Hodgson exhibited the resultant imagines of a brood of *Pieris napi*, from ova laid by a female captured in May, 1909 (first emergence). The larvæ were fed on *Hesperis matronalis*. Fifteen imagines (eleven males and four females) emerged in July and August, 1909, all being normal except one. The rest of the pupæ laid over the winter, producing in May, 1910, eleven males, twelve females, and four cripples; and twelve pupæ died, mostly in the cold period at the beginning of May, when the imagines were ready to emerge. Several of these were more or less abnormal. One female was very lightly marked on the upper side, being almost identical with the average male examples. The discal markings of the female were practically obsolete, a few

scales only representing them on the underside. Two other female specimens approached this form very closely. The rest of the female specimens were not unusually well marked for the locality. The upper sides of the males were about the average, but one male had a complete, very delicate, black margin to the fore-wings. The undersides of this sex were about the average in depth of colour, with a tendency to be lightly marked. The undersides of the females were from average to extremely lightly marked. One specimen was the most lightly marked specimen bred at any time, or even captured, of either emergence.

Mr. Harrison reported that, by assembling with a female *Amphidasys betularia* at Woodford, he had obtained no fewer than twenty-one males, of which fourteen were the v. *double-dayaria* form.

JUNE 23rd, 1910.

Mr. Ashdown exhibited a specimen of *Ægeria culiciformis*, taken at rest on an alder stump in the New Forest, in May; also specimens of the rare Coleopteron, *Anthaxia nitidula*, taken in June in the same locality.

Mr. Newman exhibited a very long bred series of *Ematurga atomaria*, from ova laid by a melanic female crossed with a typical male, which showed a large proportion of specimens of the melanic form, the major number being females. He stated that the larvæ are very easy to rear, and feed readily on knotgrass, but must be provided with plenty of heather to hibernate amongst. In one case 103 larvæ produced 103 imagines.

Mr. West (Greenwich) exhibited a number of species captured by him during the Field Meeting at Ranmore Common on June 18th, including *Cryptocephalus coryli*, *C. moræi*, *Heptaulacus villosus*, *Polydrusus micans*, *Cionus thapsus*, etc., among the Coleoptera; and developed and undeveloped forms of *Stiroma affinis*, *S. albomarginata* (developed forms rare), *Philænus exclamationis*, *Deltocephalus abdominalis*, *Liburnia (Delphacinus) mesomela*, etc., among the Hemiptera.

Mr. Robert Adkin exhibited series of *Endromis versicolor* and *Biston hirtaria*, reared during the spring of the present year, from ova received from Aviemore in 1908, thus having remained over a second year in pupæ. With regard to the *E. versicolor*, he said that some three dozen pupated in the summer of 1908, and from these seven males and five females emerged in the spring of 1909; while of the seventeen speci-

mens reared in 1910, four only were males, twelve females, and one, although following the male form in all other respects, had the right antenna distinctly female. Of the *B. hirtaria* a much larger number were fed up in 1908, but the emergences were ten only in 1909, viz. four males and six females, and in 1910 thirteen, viz. five males and eight females. Of the first-mentioned species a few, and of the latter a large proportion, of the pupæ were still lying over, and might perhaps produce imagines when spring again came round. The female from which the *hirtaria* ova were obtained was of a "golden" form, but the offspring so far showed no marked variation from the type.

Mr. Sich exhibited a golden, silky cocoon he had found on *Hippocrepis comosa*, growing on Ranmore Common, and which had produced a beetle. The beetle, which was recognised as a species of *Apion*, began to consume its cradle immediately after emergence.

Mr. F. Cowham exhibited a female *Nyssia zonaria*, showing a tendency towards the male characters. The wings were much larger than usual, and the antennæ were slightly pectinated.

Mr. Stanley Edwards exhibited a number of large specimens of Coleoptera, including *Oxynopterus audainii* (gynandromorph) from N. Borneo; *Rhamnus lancifer*, *R. mimas*, and *Psalidognathus friendii* from S. America, *Paraglenca fortunei* from China, *Ceratorhina morgani* and *C. quadrimaculata* from W. Africa.

Mr. F. Noad Clark exhibited a series of photographs taken by him during the meeting at Ranmore Common. He reported that *Egeria tipuliformis* was common in his garden at Wembley, and that a female assembled numerous males from about half-past one to two o'clock. The male flight was from mid-day to five in the afternoon.

Mr. F. B. Carr, on behalf of himself and the Rev. F. M. B. Carr, exhibited a collection of insects taken in the Wye Valley, Monmouthshire, from July 11th to August 14th, 1909, but chiefly during the first fortnight, including *Leucophasia sinapis*, *Argynnis adippe* and *A. paphia*; *Polygonia calbum*, first brood, var. *hutchinsoni*, a series; second brood, a series taken at end of July; *Vanessa io*, *Pararge egeria* and *P. megæra*, *Satyrus semele*, *Chattendenia w-album* and *Bithys quercus*; *Nudaria mundana*, a long series; *Lithosia lurideola* and *L. complana*, *Hepialus sylvinus*, and *H. hectus*; *Lophopteryx camelina*, dark; *Notodonta dictæoides*; *Cymatophora fluctuosa*, long series in fine condition; *Cerigo matura*; *Miana*

*arcuosa*; *Cleoceris viminalis*, dark forms; *Plusia iota*, *P. pulchrina*, and *P. chrysis*; *Angerona prunaria*, plain and banded; *Boarmia repandata*, dark vars. and var. *conversaria*, *Gnophos obscuraria*, rather paler and larger than the New Forest form; *Geometra papilionaria*, a series in fine condition; *Ephyra omicronaria*, *Asthenes luteata*, *A. blomeri*, *A. sylvata*; *Acidalia imitaria*, *Timandra amataria*, *Macaria notata*; *Halia rauraria*, *Minoa murinata*, *Abraxas sylvata* (*ulmata*), *Larentia didymata* (dark form), *Emmelesia decolorata*, *Eupithecia debiliata*, *Hypsipetes sordidata*, dark forms; *Melanthia bicolorata* and *M. albicillata*, *Coremia quadrifasciaria*; *Cidaria picata*, long series in fine condition, *Cidaria immanata* and *C. prunata*. *Myelophila cribrum*, *Botys hyalinialis* and *B. fuscalis*. *Ebulca crocealis* and *E. sambucalis*. Nothing was taken at sugar.

JULY 2nd, 1910.

#### FIELD MEETING AT WESTERHAM.

Conductor: HY. J. TURNER, F.E.S.

Although the Society have met at Westerham on several previous occasions, the sand area has always been the field selected and never the chalk slopes. It was decided on this day to visit the new area, which, to one or two individuals who had gone over the ground a week before, offered very attractive possibilities. Sanguine expectations, however, were damped—considerably damped—by the thunderous downpour which met the extremely few members who defied the threatening elements. Cocoons of *Anthrocera filipendula*, and  $H_2O$ , were perhaps the only abundant things obtained in any quantity.

JULY 14th, 1910.

Mr. A. G. Scorer, of Chilworth, was elected a member.

A special exhibition was made of the various forms of *Polyommatus icarus*, of which the following is a summary.

Dr. Hodgson's specimens included a male in which the orange spots on the underside of the hind-wings were replaced by black, a female with a streak of blue on the outer margin of one hind-wing underside, another specimen with a streak of blue on the inner margin of the underside of the fore-wing, a male with a crescent mark on the inner margin of the

fore-wing underside, a female upperside with the orange scaling running into the second quarter of the fore-wings, two female specimens with an orange streak near the discoidals of the fore-wings, two female specimens without trace of orange on the upper sides, one female specimen with the whitish discoidal spots on the fore-wings not centred with black, and numerous females more or less completely suffused with blue.

Mr. W. J. Kaye exhibited a series of *Polyommatus icarus* showing some very extreme forms of the female. A specimen from Worcester Park, taken in 1893, had the ground colour even a brighter blue than that of normal males. Another female from the same place was of a mauve-blue shade. One specimen from West Horsley had wedge-shaped white spots on the upper side of the hind-wings. An example from the New Forest was exceptionally large, with very bold marginal spots. An underside was shown with confluent markings on the inner margin of the fore-wings. Another, not quite symmetrical, specimen had confluent markings at the anal angle of the hind-wings; it was taken at Sandown.

Mr. R. Adkin's exhibit included series from Orkney, Hebrides, and various parts of the Scottish mainland; Ireland; the Isle of Man; Scilly Isles; North Wales, and the north and south of England. Taken as a whole, the individuals comprising the Orcadian, Hebridian and Irish series were larger and more robust than any of the others, and in that respect showed a marked contrast with those from the south of England; the females were fully as large as the males, and showed a preponderance of strongly blue-marked specimens with the red submarginal spots unusually large. In regard to individual variation, three males were of a *hylas* colour, one of them having been taken in Kincardineshire, one at Boxhill, Surrey, and one at Eastbourne, Sussex, the two latter being somewhat undersized. A female captured at Keston, Kent, was of a very pale blue colour. Among the undersides were many variations of the number and arrangement of the spots, the most frequent being a running together of those near the inner margin of the fore-wings into a horseshoe-like mark. The series also included a gynandromorphous specimen taken by the late Mr. Wellman, on Wandsworth Common, in 1860.

Mr. Hy. J. Turner's specimens included females with much blue suffusion; females without traces of blue; females with whitish streaks and markings; females with very bright, well-developed, orange submarginal patches on all the wings;

females with the same, only on the hind-wings; females with only a trace of these patches; females from Sligo, large, brilliantly blue, suffused with unusually large orange patches; an extremely small male, measuring only 23 mm.; a few undersides showing—(1) degrees of the union of the inner marginal blotches on the fore-wing; (2) suppression of all eye-spots on the hind-wings; (3) enlargement and elongation of the submarginal ocellations on the fore-wings, etc.

Mr. Hemming's specimens included a male, with its colour approaching that of *Agriades thetis* (*bellargus*); a female, with strong marginal striation on the under-side; a dwarf male with crescents and spots on the underside of the fore-wings much displaced, taken on June 22nd, 1910, in Sussex; one male with a well-developed series of marginal black spots on the lower wings; and on behalf of Mr. A. Hemming a striking female aberration, taken near Redhill, on September 15th, 1909, in which all the submedian spots on the under-side of the fore-wings are closely clustered around the discoidal, except that the lowest spot is confluent with the lower basal spot, while on the underside of the hind-wings the spots are partially obsolete, but those that remain, two submedian and one basal, are also clustered around the discoidal.

Mr. B. W. Adkin exhibited a selection of specimens from Scotland, the Hebrides, Ireland, the Isles of Scilly, North Cornwall, Devon, Kent, Sussex, and the Isle of Wight. Among them a *hylas* blue male from the Hebrides, of very large size, and a tiny dwarf female from the Isle of Wight were perhaps the most noticeable. The specimens from the Isles of Scilly were selected from a large number, and Mr. Adkin spoke of the race as of rather small size, the males very ordinary, and the females rather pale blue, with orange markings well developed.

Mr. E. C. Joy exhibited a drawer of specimens arranged as spring and summer emergences, and stated that the former were, on the average decidedly larger and finer than the latter.

Mr. C. P. Pickett exhibited a long series containing males, varying from steel blue to *adonis*-like blue; undersides, an absolute var. *obsoleta*, and several forms near *striata*; females, from the dingy type to a long series of blue forms varying from violet to a *Morpho*-like blue; one blue female with a distinctly marked marginal black band; and a series from North Wales much larger than our south of England forms.

In summing up the results of his recent work on the species, and the conclusions emphasised by the exhibits before him, Mr. Tutt stated that *P. icarus* extended from the western shores of Europe right away to the Amur district. In the latter area, however, it was extremely rare, and did not extend into Japan. Its southern limit was the Himalayas. Throughout this vast territory it did not attain anywhere so great a range of variation as in the British Islands, although it was possible, with isolated specimens from the Continent, to match most of the forms met with more or less frequently in these islands. Probably, the races existing about the west coasts of both Scotland and Ireland showed the most extreme variation; next in order were those from the north Himalayas; after them came North Africa and Madeira as productive of considerable range of forms. In Germany it was generally recorded that, although the occurrence of blue females was by no means common, it almost invariably happened in the case of spring-brood examples. Similarly, the opinion was the same in the British Islands, but strange to say, his own experience was at variance with this. His most strikingly blue forms were autumn-caught specimens, and he had found the blue females more prevalent in the later broods. The most brilliant races of males and of blue females were characteristic of the western portions of Ireland and Scotland, with which those from Scandinavia were comparable. Nowhere else throughout the range of the species-distribution did such striking forms occur in any abundance, although every form could apparently be found in each locality, but only sporadically as a rare aberration. The Germans practically did not know our British races. In fact it was in the British Islands alone that the species reached its extreme beauty and variability. On the north-western slopes of the Himalayas some very beautiful, silky *hylas*-like forms were to be met with, as also were a race comparable to *P. eros*, with which species *P. icarus* often flew. The few specimens up to the present time taken in Amurland were extremely similar to the typical English form, but those found on the Afghan borders had the undersides very pale indeed, with the spots much reduced in size and number. Only in Western France were there any *escheri*-like *P. icarus* at all comparable to those remarkably beautiful series from the west of Ireland, Scotland, and Scandinavia. One other race required mention, the *celina* one, occurring in Sicily, Algeria, Morocco, etc., a smaller race, with very strongly marked seasonal dimorphism, the

spring forms with most beautifully blue females, the summer specimens uniformly brown. In conclusion, he was delighted with the evening's exhibition, and realised that no finer collection could have been got together in any part of Europe than that in the hands of the various members of the South London Society.

Mr. Robert Adkin exhibited a series of *Clastrina argiolus* reared from larvæ taken at Eastbourne in September last; one of the females had the black border much reduced, hardly extending beyond the middle of the outer margin of the fore-wings, and the row of marginal black spots usual on the hind-wings was absent.

Mr. Sich exhibited specimens of *Prays curtisellus* including *v. rustica* from Westerham, one of the few insects it was possible to capture during the almost incessant storm on the occasion of the Society's Field Meeting on July 2nd.

Mr. Pickett exhibited a fine series of forms of *Angerona prunaria*, bred this year, including a number of extreme forms of the variety *pickettaria*. They were a selection from some 900 specimens bred, and the offspring of twelve years of interbreeding and crossing from an original Raindeen Wood male and a Chingford female. The males were particularly rich in the orange coloration, and some were very heavily freckled. The females were a richly banded race, with a strong tendency for the male coloration to predominate. A striking new form was bred this year, in which the marginal band, so perfect in *v. pickettaria*, was divided into two bands. The race was stronger than ever this year and some of the largest specimens obtained were among them. The exhibit was a selection from nearly a thousand bred from the pairings of five female 1909 specimens.

Mr. Step read the report of the delegates to the 1910 Annual Congress of the S.E. Union of Scientific Societies, held at Guildford, June 8th to June 11th.

#### REPORT OF DELEGATES TO THE ANNUAL CONGRESS OF THE SOUTH EASTERN UNION OF SCIENTIFIC SOCIETIES.

By E. STEP, F.L.S.

The meeting of the South-Eastern Union at Guildford, June 8th to 11th, must be pronounced another success, in spite of rather unfavourable weather. Members and delegates gathered together in the Borough and County Halls

to meet members of the local Committee, under whose guidance they began a perambulation of the ancient town, visiting some of the most noteworthy of its old buildings. These included the Angel Hotel, where there are some fine specimens of Elizabethan woodwork—remains of the old inn—and St. Mary's Church, where the chancel is higher than the nave, and the floor slopes from east to west. From the church the party proceeded to the remains of the Castle, built upon an artificial chalk mound. Here the members were joined by the Mayor and other prominent townsmen, with whom they adjourned to the Town Hall, on the way to Abbott's Hospital, the finely preserved example of one of the best periods of English architecture, which forms so striking a feature of the High Street. This interesting building was thoroughly explored, even the jealously guarded muniment room being thrown open to inspection, together with some of its choicest treasures. Here the usual Congress photograph was taken in the courtyard. Holy Trinity Church and the Royal Grammar School complete the list of places visited during this full afternoon, the party being led throughout by Mr. Ralph Nevill, F.S.A., the well-known and genial archæologist, who took the greatest interest in the entire proceedings of the Congress, and helped materially to its success.

In the evening the Mayor received us at the County and Borough Hall, which was our headquarters throughout the visit, and after an hour spent in social intercourse under the genial influences of music and refreshments, we adjourned to the castle grounds, which had been tastefully decorated and illuminated, and where the principal portion of Guildford's population was gathered in our honour. So passed the first day.

On Thursday we bent our energies seriously to work, with a meeting of the Council at 9.30 and a gathering of delegates at 10.15, when the officers and committees rendered satisfactory accounts of their stewardship. At the general meeting which followed, Mr. Henry Bury, F.G.S., gave a most interesting lantern lecture on the "Relations of the River Wey to the Blackwater and the Arun," showing how these rivers had fought for territory in the Farnham and Hindhead districts, and how the Arun had stolen some of the Wey's contributory streams. Mr. E. A. Martin followed with a further contribution on "Dew-ponds," in continuation of the papers on that subject he has read at previous meetings. From his experiments it appeared clear that the

old idea that these ponds are replenished by dew is erroneous; heavy mists and rain are the only agencies adding to their contents.

For the afternoon two excursions had been arranged—one, of a geological character, to the Puttenham sand-caves, the other, botanical, to the region of the Cutmill ponds. A large party started in brakes and motor-cars, but when ascending the Hog's Back we were treated to a cloud-burst and a violent thunderstorm, which drenched the lightly clad, and caused a portion of the party to return to Guildford. The hardier spirits pushed on to Puttenham Heath. The Cutmill district was impossible, but under brighter skies we had a pleasant ramble on the heath, which was investigated botanically.

In the evening we had an address from our President, Prof. E. A. Gardner, who dealt with some aspects of "Evolution in Art," but as I was unable to hear a single connected sentence I should be unable to vouch for the fact but for a later perusal of the lecture in print.

On Friday morning the Council met at ten, and your delegates, being free for an hour, devoted it to an examination of the Congress Museum, which, as usual, was filled with interesting exhibits in many branches of Nature and Art. At eleven we were treated to a paper by Mr. J. G. N. Clift, the Hon. Secretary of the British Archæological Association, on "The Pilgrims' Way between Farnham and Albury"—another subject of great local interest, but which was greatly marred by the speaker's trick of dropping his voice almost to a whisper for the second half of every sentence, so that the conclusion had mostly to be guessed from the context. In this district there are two claimants to the title of Pilgrims' Way—that along the ridge of the Hog's Back, and another that follows the lower sand ridge south of the chalk and touches a series of villages on its way. The claims of each were set forth, but the lecturer would not commit himself to a casting vote. A most interesting discussion followed, regrettably terminated by the exigencies of the time-table, but sufficient was said to make holes in the theories of Grant Allen and Hilaire Belloc on the supposed "tin road." This was followed by an address by Dr. Wm. Martin, who dealt with the "Interpretation of the Maps of the Sixteenth and Seventeenth Centuries."

The afternoon was a crowded and enjoyable one, the weather was more propitious, and a lengthy procession set out for Loseley Manor, where 130 of us gathered in the fine

Elizabethan hall to listen to a most lucid and interesting address by Mr. H. E. Malden on the associations of the house, its carvings, pictures, and past owners and guests. Then we proceeded to Compton, where we had a discourse in the Norman church of St. Nicholas from Mr. P. M. Johnston; and afterwards some inspected the Watts' Gallery, whilst others visited the ornate mortuary chapel. Again boarding our conveyances, we drove through beautiful lanes to Piccard's Rough, where Mr. and Mrs. H. A. Powell hospitably received us. A brief ramble in the magnificent gardens was a tantalisingly enjoyable experience; but our steeds were champing their bits, and the day's programme was not exhausted. We bowled home along the lower Pilgrims' Way, and hurried through our dinners that we might be back at the hall in time to hear Mr. Tutt's discourse, with the aid of the lantern, on "Colour in Insects."

On Saturday morning we had our final delegates' meeting at 9.45, when we enthusiastically thanked our kind hosts and hostesses, and all who were concerned in making the Congress of 1910 a most enjoyable event. We then fixed upon St. Albans as the scene of the 1911 meeting, and elected Sir David Gill, late Astronomer Royal at the Cape, as President. Next we presented a silver rose-bowl to our retiring Secretary, and a silver card-case to Mrs. Bullen, as slight acknowledgments of their great work for the Union. Here I have to confess that your delegates were guilty of a lapse from the line of conduct they should have followed. The room had got stuffy, and they were tired of long sitting; so at the conclusion of the presentations, instead of waiting as they should have done to hear the papers, they explored the chalk caverns that run for some distance under the lower part of the town, and afterwards walked out to the garden of rock-plants and alpiners at St. Catherine's. After lunch, too, instead of going to Godalming to inspect the modern Charterhouse, they explored the lower Pilgrim's Way between Guildford and Compton, of which they had caught a seductive glimpse on the previous day; afterward returning by the upper route along the Hog's Back.

For the sake of completeness it may be added that the missed papers were—one dealing with "Waves in Sand and Snow" by Dr. Vaughan Cornish, and another on the "Extinction of Cryptogamous Plants" by Mr. A. R. Horwood, based on reports received from various parts of the United Kingdom.

The Congress ended officially in the afternoon, but the

local committee arranged a supplementary treat for the townsfolk in the shape of an evening lecture on "Aquatic Autocrats and Fairies," by our friend Mr. F. Enock.

JULY 28th, 1910.

Mr. F. W. Wood, of Ashtead, and Mr. P. Humm, of Streatham, were elected members.

Mr. Dennis exhibited a photograph of a lichen new to science, recently found at Horsley, and described as *Gongylia viridis* (see "Journal of Botany," February, 1911).

Mr. Main exhibited the larvæ and luminous ova of the glow-worm, *Lampyrus noctiluca*.

Mr. Clark (on behalf of Mr. Gadge) exhibited a specimen of a species of mite found on an example of *Melanargia galatca*, taken at Ventnor. It was considered to belong to the genus *Trembidium*. Mr. Step said that he had found mites on most of the butterflies he had met with at Beachy Head.

Mr. B. H. Smith reported finding larvæ of *Cucullia verbasci* feeding on *Buddlea variabilis*.

Mr. Sich reported having found a larva of *Zeuzera pyrina* (*asculi*) attacking jessamine; and also stated that he had taken a mite from a specimen of *Gelechia tenebrosa*.

Mr. Step exhibited *Calla palustris*, a marsh plant of Europe and North America, which has become naturalized in the large pond at Wisley. It is the only species of the genus, the so-called *Calla*, or arum-lily, of conservatories being a *Richardia*. A member of the family *Aracea*, the form of its leaves and the arrangement of its simple flowers on a spadix, at once suggest an affinity with our cuckoo-pint (*Arum maculatum*). In *Calla*, however, the spathe only for a short time forms a protection to the flowers, soon turning back and curving downwards so as to exhibit its pure white inner surface to insects flying over it, and thus constituting at once an attraction and an alighting platform. In *Arum* the unisexual flowers are arranged around the lower portion of the central spadix or "pintle" in distinct whorls, those of the female whorls maturing before the males. In *Calla* the flowers form an ovoid cluster at the summit of the spadix, the upper part consisting entirely of a dense crowd of stamens. The other flowers are all bisexual, consisting of a green ampulliform pistil with a simple purple stigma, surrounded by a ring of stamens, which have stout white filaments and

yellowish anthers. The pistils mature before the anthers, which do not all shed their pollen at once—an arrangement that ensures cross-pollination. There are neither petals nor sepals. The situation of growth makes it difficult to observe the insect agents by which this is effected; but analogy would lead one to suppose they are flies. It is said that the flowers give off the odour of decaying matter, which also points to flies as the pollinators.

Mr. Step was not aware of the circumstances under which this continental plant was introduced to Boldremere, but to his knowledge it had flourished there for twenty years; and its healthy condition suggests that it might be used generally for ornamental waters in this country.

AUGUST. 11th, 1910.

Mr. Carr exhibited ova of *Acidalia straminata*, laid on heather from Oxshott.

Mr. Sich exhibited some catkins of willow (*Salix aurita*) which he had met with during the past week at Chiswick.

Mr. Rayward exhibited a specimen of *Adopaa flava* (*linea*) which he had met with in a moribund condition from being attacked by no less than twenty-one specimens of a mite. He also exhibited the shells of the ova of *Geometra vernaria* and *Phorodesma smaragdaria*, for comparison of the methods of deposition. In the former case the ova were deposited stacked in a pile, while in the latter they were laid either singly or one or two side by side. The larvæ of *P. smaragdaria* immediately on emergence commence to cover themselves with *débris*, and appear to bite and masticate pieces of the food-plant, which they apparently cover with saliva ejected from the mouth, and then attach them to the tubercles. It was found difficult to remove this *débris* from the tubercles with a brush.

Mr. West (of Greenwich) exhibited several species of Coleoptera and Hemiptera, which he had met with recently, attacked by a species of mite. He stated that it was by no means an uncommon occurrence.

Mr. R. Adkin, for Mr. Lachlan Gibb (of Montreal), exhibited a number of "white" butterflies from Canada; they consisted of a series of the Canadian native "white" (*Pieris oleracea*), a series of the introduced *Pieris rapæ*, and three specimens taken near Lost River on May 28th last, which Mr. Gibb thought might, perhaps, prove to be a new species. The notes sent with the specimens were as follows:

“In this part of Canada we have only one native white butterfly, viz. *P. oleracea*, which is found always in woods or wooded lands, though it is somewhat fond of flying along the roads in these woods.

“*Pieris rapæ* is very common over here, having been imported some sixty years back, and its habits here are just the same as in England. *P. oleracea* appears to be getting much scarcer near here, and the collectors put it down to *P. rapæ* driving it out, but I cannot see how this can be, as their habits, food, etc., are so dissimilar. The flight of *P. oleracea* is weakish, but stronger than that of the English *Leptidia sinapis*.

“The three Lost River specimens I cannot make out. I took them this spring around Fraser Lake, Lost River, about 1200 feet above sea-level. Around this lake, farms, clearings, and woods alternate, and the species (?) seems to prefer the grassy lands to the more wooded places. Are they a cross between *P. oleracea* and *P. rapæ*? They seem to be very like the English *P. napi*, but that species is not known in this district.

“Notice the black body and quick stopping of black shading on the wings of *P. oleracea*, whereas, in the Lost River specimens, the body and shading is greyish, and much more suffused on the wings, with distinct spots in the female; it also seems a more robust insect than *P. oleracea*.

“When I took *P. oleracea* and the Lost River specimens *P. rapæ* was not on the wing, but about three weeks later a friend took *P. rapæ*, which then appeared fresh, and also *P. oleracea*, which were mostly worn.”

Mr. Hy. J. Turner exhibited a number of cases of a Coleophorid feeding on the seeds of wild sweet-william (*Dianthus barbatus*), sent to him from Hyères by Dr. Chapman, and a short series of the imagines bred from them. It was afterwards ascertained to be *Coleophora dianthi*. He also exhibited the nest of a species of wasp, *Polistes* sp. (?), found in August of 1909 at Zermatt, attached to a twig of Alpine rose (*Rhododendron ferrugineum*); and stated that at Grindelwald this year he had met with a very similar nest attached to a natural rock used as a monument in the churchyard. It was in full sunlight, of precisely the same tint as the stone, very inconspicuous, and its inhabitants were actively at work.

Captain Cardew exhibited a very fine example of the confluent form of *Anthrocera vicia* (*meliloti*), which has been called v. *confusa*. It was taken in the New Forest, in July last, when the species was in some numbers. He also

reported that a female *Geometra papilionaria*, recently taken by him, preferred to deposit her ova on the outside of the perforated zinc of the cage and in a chip box rather than on the birch twigs provided for her.

Mr. A. E. Gibbs exhibited a series of *Epinephele jurtina*, var. *fortunata*, Alph., taken in Algeria in May and June, 1910, and contributed the following note: "This form is somewhat similar to the well-known southern var. *hispulla*, Hüb., but is a finer insect. It is larger, and in the female the extension of the fulvous colouring on the upper side is much more pronounced. The basal area of the hind-wing beneath is darker, throwing into prominence the light sub-marginal band, which on its inner side is edged with orange. The male, as seen in the cabinet, does not do justice to the living insect, which has a most beautiful golden gloss on its fore-wings. *Fortunata* appears to be the usual form in Algeria, for I found it in most of the localities I visited. I first met with it at Hammam R'irha, in the Atlas, on May 27th; then at Saida, May 28th; Oran, May 30th; Tlemçen, May 31st, June 1st and 2nd; and Lalla Maghnia, June 3rd, 4th, and 5th. This variety of *E. jurtina* was first described by Alphéraky in 1896 from specimens from the Canary Islands. It is also said to occur in the south of Portugal."

Mr. Gibbs also exhibited specimens of *Melanargia lucasi* Rbr., from Saida in the Oranaise. He said: "This is the *M. galatea*, var. *mauritanica*, of Oberthür. Authorities differ as to whether it deserves specific rank. Staudinger considers it a good species, but I am inclined to think it is simply the varietal form of *M. galatea*, which is found on the Southern side of the Mediterranean. It has a very close resemblance to the *M. galatea* of northern and central Europe, but is larger, and the transverse band on the underside of the hind-wing is rather broader. The specimens shown are two of the three I beat out of the grass by the riverside at Saida on a wet and windy day; and I have no doubt that, had the weather been more favourable, I should have secured a longer series, for I believe it is a common Algerian insect. Saida was the most southern point I visited, and the species was apparently only just coming out. Two specimens of *M. galatea*, from Éclepens, are shown for comparison."

He also exhibited living specimens of *Melitæa didyma*, and *M. athalia* (?), from larvæ taken on *Plantago lanceolata*, at Vernet-les-Bains, in the middle of May last.

Mr. Stanley Edwards exhibited a box of *Satyridæ* from various localities, among them being a nice series of the sexually dimorphic species *Heteronympha merope*, including a specimen largely suffused with black.

Mr. Enock exhibited living male and female *Mymaridæ* just bred by him from Richmond Park. Among them were examples of the very minute and beautiful battledore-wing fly (*Mymar pulchellum*).

AUGUST 25th, 1910.

Mr. R. Adkin exhibited a series of *Syrichthus malva*, taken near Eastbourne on May 22nd last. The morning of that day, he said, was very fine and sunny, and the species was flying freely; but about noon the sky suddenly clouded over, and the butterflies at once disappeared. On searching the herbage, however, in the hope of finding some odd species that might be resting upon it, he detected, after going over the ground several times, a specimen of *S. malva* resting on a flower-head of salad burnet. A more careful examination revealed the fact that quite a number of them were so resting, but their chequered wings, outspread and slightly bent down, much in the position of those of an ordinary set specimen, assimilated so closely with the flowers of the ribwort (*Plantago lanceolata*), which was blossoming abundantly all around the plants on which the insect was resting, as to make its detection exceedingly difficult.

Mr. West (Greenwich) exhibited a series of *Typhlocyba cruenta*, a species of Homoptera hitherto only taken at Woking by the late Mr. Saunders, from sycamore. Mr. West's specimens were obtained by him at Ranmore and Box Hill in August. He also exhibited specimens of *Oncotylus viridiflavus*, from Ranmore.

Mr. Newman exhibited a specimen of *Odontoptera bidentata*, intermediate in marking, the fore-wings dark with a light central area of considerable size, while the hind-wings were light with a wide dark marginal border: a female specimen of *Bithys quercus*, in which the fore-wings were blotched with adonis-blue instead of the usual purplish-blue; two bred specimens of *Argynnis paphia* var. *valesina*, somewhat intermediate in tint; a female specimen of *Euchloë cardamines*, having a streak of bright yellow scaling on the disc of the left fore-wing; and another specimen in which the greenish marbling on the underside approached that of *E. belia*, while on the upper side there was an unusual amount of suffusion

of black at the basal areas of the wings, and the hind-wings had a series of large marginal dark blotches; a partially gynandromorphous example of *Amorpha populi*, mostly male in character, but with the left antenna female, and with asymmetrical wings; also a curious bred specimen of *Pseudoterpna pruinata* (*cytisaria*), in which the transverse band of the fore-wing was dark bordered on the inner and outer sides, and where the veins crossed this border they were marked out by deep black scaling.

Mr. W. J. Kaye exhibited a long series of *Morpho cytheris* (*thamyris*) collected by him at Castro, Parana, South Brazil. The species was a weak flier, and would be rapidly exterminated with much persecution. Unlike many species of *Morpho* it did not fly high and strongly. The female was precisely like the male, and was not rare. The larva fed on tacuari, the native "bamboo" (*Mabea*), which is really a species of *Crotoneæ*. In certain localities where this plant was abundant the butterfly was plentiful, and it was a most wonderful sight to see a large number of these beautiful insects in the bright sunshine.

Dr. Chapman exhibited specimens of *Anthrocera filipendulæ* of a rich bronze or brassy coloration; also three specimens of *Picris rapæ*, taken in July, 1910, at Hospenthal (Switzerland), where it is single-brooded and of large size (54-60 mm.), and for comparison the largest specimen taken in April, 1910, on the Riviera, where it is double (or more) brooded. This specimen is 50 mm.; the ordinary range is 45-48 mm. One specimen was 40 mm.

Mr. Sich exhibited a specimen of *Aventula flexula*, taken at Wisley during the field meeting on July 23rd; a short series of *Colcophora albicosta* taken at Sheen; also cocoon and imago of *Nepticula centifoliella*.

SEPTEMBER 8th, 1910.

Mr. ALFRED SICH, F.E.S., *Vice-President*, in the Chair.

Mr. J. Platt Barrett exhibited *Hyles euphorbiæ*, bred from larvæ obtained in Sicily, and also a large number of reeds from which the larvæ and pupæ of *Nonagria arundinis* (*typhæ*) had been extracted by birds. He reported that he had found larvæ this autumn to be generally scarce everywhere, except in our suburban gardens.

Mr. S. R. Ashby exhibited a series of *Anomala frischi* taken

in the New Forest in July last, consisting of both the type form and the blue-green variety, a form which, although regularly occurring, had as yet received no varietal name.

The variety was by far the commoner form met with, the proportion being three of the variety to one of the type.

Mr. West (Greenwich) exhibited a short series of the rare Homopteron, *Oliarius leporinus*, taken by him on July 8th at Holmsley in the New Forest.

Mr. Newman exhibited a curious example of *Euchelia jacobææ*, with the red markings united and continuous all round the fore-wings; a series of *Amorpha populi*, showing great variation, including a pink-tinged specimen with a green band, a specimen without trace of markings, and an extremely red example; also a long series of *Spilosoma fuliginosa*, bred in August from ova obtained in June, from Aberdeen parents. The specimens of the last species were much larger and redder than is usual in the southern form; and fully 90 per cent. of the brood had emerged already.

Mr. Step exhibited, on behalf of Mr. E. B. Bishop, a living cluster of *Drosera intermedia*, found near the Cutmill ponds in West Surrey. By the combined efforts of several leaves the dragonfly, *Agrion puella*, had been captured, and was still in the grip of the plant. The insect was already dead when noticed by Mr. Bishop. It was remarkable that so large and comparatively powerful an insect should be successfully held by the glands of the plant (Pl. IX, fig. 2).

Dr. Hodgson exhibited a gynandromorphous example of *Brenthis cuphrosyne*, taken by him in Ashdown Forest. The right side was male and the left side female.

Mr. Sich exhibited the egg-shells of the upright ova of *Colcophora niveicostella*, on thyme; cases containing larvæ of *Colcophora paripennella*, to compare with cases containing larvæ of what may be *C. potentillæ*. The cases of the *C. paripennella* lie flat on the leaves, but those of *C. potentillæ* stand off at an angle. Both cases and larvæ are very similar in the two species. He also showed mines of the larvæ of *Cemistoma scitella*, on hawthorn, now abundant at Ealing.

Dr. Chapman showed a series of slides illustrating various, chiefly structural, points in relation to the "blues," especially *P. argus*, *A. coridon*, and *A. thetis*. The larvæ at various stages, characteristic hairs, honey-glands, etc. Pupal structure, such as the curious pockets in *P. argus* (and others), between segments 4 and 5 of the abdomen, to receive the ends of legs, antennæ, etc. The male appendages, to illustrate the characteristic form in the Plebeiid.

A series of specimens of the teeth at the end of the clasp of *P. argus*, and also of a number of allied species, showing the great variation of these parts in *P. argus*, and yet always with characters that made them clearly *P. argus*, and quite impossible to confound with the other species, whose variation might be equally great, but examples were not available to illustrate this. The specimens were all pressed quite flat, so as to be perfectly comparable.

SEPTEMBER 22nd, 1910.

Dr. Chapman exhibited a bred series of the summer brood of *Agriades coridon*, from the Riviera, together with a few examples of the first (May and April) brood. The summer brood emerged in August. It was stated that the Riviera was practically the only area where this species was double-brooded (see "Trans. Ent. Soc. Lond.," 1910, p. xlvii).

Mr. West, of Ashtead, exhibited a bred series of *Malacosoma neustria*, including very light and very dark specimens of both sexes. It was remarked that occasionally a whole brood would produce dark examples, but that, usually, both very dark and very light forms were well represented.

Mr. Andrews exhibited a short series of the Dipteron, *Pegomyia setaria*, taken at Chattenden, June 18th, 1910; and also of *Isopogon brevirostris*, taken at Shoreham, Kent, July 30th, 1910.

Mr. Newman exhibited a specimen of *Celastrina argiolus*, female, in which the black border was unusually wide and the fringe spotted; an example of *Pachnobia hyperborea (alpina)*, in which a radial section of the hind-wing had the richly coloured and variable markings of the fore-wing, the fringe being exceptionally well reproduced; an orange form of *Arctia caja*, with only a few dark markings on the fore-wing, forming an imperfect fascia; several varieties of *Angerona prunaria*, including one very uniform in colour, and another beautifully marbled, and having a wide fascia on the fore-wings only; a very dark male of *Adopæa flava (lincola)*, and another with xanthic discal patches on all the four wings; a very dark *Lasiocampa quercus* v. *calluna*. A further exhibit was a most extraordinary aberration of *Abraxas grossulariata* of the ab. *lacticolor* form, extremely pale, with but few diminutive dark markings, somewhat black on the costa, a few black dots on the fringe, and several scattered faint

yellow clouds. It was stated that the last seven of the brood to emerge were all fine aberrations, while the others had been very normal in marking.

Mr. W. J. Kaye exhibited for Mr. Percy Richards a specimen of the genus *Zanclognatha*, which was intermediate in markings and build between *Z. grisalis* and *Z. tarsipennalis*. It agreed with no hitherto known species in facies. The markings were a combination of those of the two above-named species with a general leaning to the character of both. It was subsequently generally considered to be an abnormal form of the former species.

Mr. Step exhibited galls of *Cynips kollari*, collected at Bookham Common, on the occasion of the field meeting on September 10th. Several of these were noteworthy on account of their departure from the usual true spherical form of this species, the aberration consisting of a whorl of conical elevations round the summit. In this respect they closely agree with a much larger gall from the south of France which Dr. Chapman had given him, and which was now exhibited for comparison. The latter was afterwards found to be the gall of *C. quercus-toza*, and had been found on box (*Buxus*).

Mr. Sich exhibited specimens of the rare mollusc, *Clausilia biplicata*, from Chiswick.

Mr. Turner exhibited a number of species of the family *Geometridæ* sent to him from Waroona, Western Australia, and on which Mr. Prout subsequently communicated the following notes:

“GEOMETRIDÆ from Waroona, Swan River, Western Australia.

“Collected by G. F. BERTHOUD.

“Sub-fam. ŒNOCHROMINÆ (a very prevalent sub-family in Australia, hardly represented in Europe).

“*Xenogenes* (?) *eustrotiodes*, Prout, ‘Gen. Ins. Sub-fam. Œnochr.’, p. 13.—A nice male of this very interesting and pretty little species, dated October 20th, 1907. Mr. Berthoud was the discoverer of the species, and Waroona is at present the only known locality. The glossy scaling and even the pattern suggest some of the small Noctuids, especially of the genus *Eustrotia*.

“*Adeixis inostentata*, Walk.—Three males.

“*Dichromodes strophiodes*, Lower.—Two males; apparently a rather local species, though known from several localities.

“*D. anelictis*, Meyrick.—One male rather worn, labelled ‘II.’ You took it for a form of the preceding, but it is quite distinct, and a well-known species. The interruptions of the median band at the principal veins are characteristic of the species.

“*D. orthotis*, Meyr.—One female, November 16th, 1897; *D. ioneuira*, Meyr.; one female, November 12th, 1909; two pretty and interesting species, only known from the west of Australia.

“*Nearcha aridaria*, Walk.—One male, and probably one female. The strong sexual dimorphism in the genus, and the general similarity among the females, renders the correct determination of the latter difficult without actual observation in the field. The males of several of the species, including *aridaria*, have some curious tufts of hair on the underside of the hind-wings.

“*N. staurotis*, Meyr. (?).—One male, labelled ‘77A,’ which I take to be a fine large form of this western species. You gave me a nice series of more typical size in the previous lot.

“*N. recisa*, Prout, ‘Gen. Ins., Œn.,’ p. 30 (?).—One male, October 11th, 1907. I described *N. recisa*, from Bridgetown, W.A., in the collection of Mr. G. Lyell, of Gisborne. I believe this specimen is a dingy ab. of the same, but it is very like an overgrown *staurotis*, and I do not know of any structural characters to separate the two.

“*Taxeotis exsectaria*, Walker, var. *eugenesfera*, Prout ined. seven, those which are dated having been taken in October, 1907. The form is much larger and finer than typical *exsectaria* from the east of the continent, and this series fully confirms my suspicion that it is a local race at the least; *exsectaria* is the only known *Taxeotis* with a bright ferruginous head.

“*T. inconcisata*, Walk. (?).—Two males in beautiful condition; almost certainly a rather light form of this widely distributed species.

#### “Sub-fam. ACIDALIINÆ.

“*Acidalia optivata*, Walker.—Two males; one is an ab. with the (usually distinct) black discal dots almost obsolete. The species is very like *A. ochroleucata* H.S., of Europe, etc., but the male has the hind tibia *even more* swollen, and the hind tarsus extremely short.

“ Sub-fam. LARENTIINÆ.

“ ‘*Hydriomena subochraria*, Doubleday.—A pair, smaller and paler than my series from Victoria, etc. Is one of the few Australian species which occur also in New Zealand. This and the following (*pace* Meyrick!) can hardly be really related to the European *Hydriomena*.

“ ‘*H. uncinata* Guenée.—Seven males, three females—an interesting series of this *very* variable species, always recognisable by its peculiar shape, the costa of fore-wing being *strongly* curved near apex, the apex itself subfalcate. You sorted them into four or five forms, according to colour, width of central band, strength of black dots on the veins, etc. The females are generally broader-banded than the males.

“ ‘*Xanthorhœ subidaria*, Guenée.—Three males. Another variable species, combining in many respects the aspect of its European congeners *X. ferrugata* and *X. munitata*.

“ Sub-fam. BOARMIINÆ.

“ ‘*Trochistis lithodora*, Meyrick.—One male.”

Mr. Sich read a paper entitled, “The Middlesex Home of *Clausilia biplicata*,” being a description of the old garden and its lepidopterous products at Chiswick, where his early years were spent (p. 27).

OCTOBER 13th, 1910.

Mr. W. West, of Greenwich, exhibited a short series of the Homopteron *Limotettix stictogala*, beaten from tamarisk, at Deal, at the end of September, and stated that the species was apparently extending round the east coast.

Mr. Tonge exhibited photographs of the imagines of *Vanessa io* and *Pyramis atalanta* at rest, and of the young larvæ of *Celastrina argiolus* attacking buds of the ivy.

Mr. Newman exhibited three melanic specimens of *Bryophila perla* from Folkestone; a specimen of *Anthrocera trifolii* in which the pink-red markings were suffused over the whole of the wings with the exception of a margin of black all round; an example of *Spilosoma menthastri* with numerous spots joined up by lines, and approaching the form *walkeri*; several varieties of *Abraxas grossulariata*, including one in which the black markings were largely wanting, especially

on the disc of the fore-wing; two in which the yellow markings were extended and greatly predominating over the diminished darker markings; and a very dark example with many of the black markings enlarged and run together.

Mr. Robert Adkin exhibited a series of *Cossus ligniperda*, taken at Lewisham in June last. He said that it would, perhaps, be remembered that, some nine years ago, he exhibited a similar series, and read a short paper on the pupation of the species ("Proceedings," 1900, p. 1). The specimens now exhibited were, with one exception, taken on the same dwarf fence as the earlier examples, just on the inner side of which, and within a couple of feet of it, grew the poplar trees in which the larvæ had fed, originally some half dozen in number, but now reduced by the attentions of this species to two and a dead stump some two feet high. The moths were collected between 6 and 7 o'clock in the evening, as they rested on the fence, drying their wings; and as a rule within a foot of the empty pupæ skins they had just vacated. These were generally protruding from the light, friable, earthy rubbish that had collected between the staves of the fence and the skirting board, but in one case from a round hole near the bottom of one of the staves, and in another from the skirting, the larva in each case evidently having bored nearly through the wood before pupation. The one exception referred to above is that of a moth taken at a distance of upwards of ninety yards from any tree where the larva was likely to have fed. I have not the least doubt that it had fed up in the same poplars as the others; that in starting its wanderings on quitting the tree, it travelled to the end of the fence about the foot of which the others pupated, where its only choice was between the asphalt foot-path and a brick wall; that it continued its way along the foot of the wall to its end, where it encountered another fence. From the soft earth collected in the corner between this wall and the fence the pupa skin was protruding, the moth sitting with wings still limp a foot or so above it.

Mr. Hy. J. Turner exhibited living specimens of *Lyonetia clerckella*, bred from cocoons found at Oxshott during the Society's Field Meeting on October 8th. The larva makes a tortuous mine in the leaf of birch, which it abandons when ready to pupate. The cocoon is made of pure white silk, suspended among numerous threads stretched between the sides of a wrinkle on the lower surface of the same or some other leaf. An empty cocoon was also shown. One of the imagines was ab. *arella*, a specimen of a nearly uniform

bronze colour, instead of the typical silvery white with a few bronze markings near the apex. *Clerckella* is the commoner of the two species of *Lyonetia* indigenous to Great Britain. The larva is found in leaves of hawthorn, apple, cherry, etc., as well as birch. Staudinger gives three other species as natives of the Palæarctic area, all from Europe; and Meyrick notes that the genus is represented in Australia. Dyar mentions six other species from different parts of the United States.

Mr. H. Moore exhibited a variety of *Limnas chrysippus*, form *alcippus*, from Northern Nigeria, in which the minute white dot at the end of the cell in the fore-wings is duplicated and much enlarged; also the ab. *alcippina* (Auriv.) of *Acrea encedon*, L., from the same locality.

Mr. H. Main exhibited the larva of the European ant-lion (*Myrmecleon formicarius*), the nearly full-grown larva of the glow-worm (*Lampyrus noctiluca*) feeding upon snails, and the newly hatched larvæ of the same coleopteron.

Dr. Hodgson exhibited a specimen of *Callophrys rubi*, with xanthic areas on all the wings; another example with the underside of a strong bluish-green shade; a female specimen of *Nemobius lucina*, in which the yellow area was much increased with a corresponding decrease of the black markings; another example, a male in which the reverse variation (decrease of the yellow and increase of the black) was most marked; another specimen in which one of the yellow median bands on the underside of the hind-wings was replaced by black; and two specimens of *Anthrocera trifolii*, one a black form, the only one obtained this year, and the other a bred specimen with extreme red suffusion of wings.

Mr. Rayward exhibited a spray of *Erica cinerea* with ova of *Plebeius argus* (*ægon*) laid in nature.

Mr. W. J. Kaye exhibited a selection of butterflies taken by him in S.E. Brazil, in the early part of this year (1910). He intimated that these were a fair sample of what one met with on a trip to this part of Brazil. The species selected were purposely not specially rare insects. They included six species of *Morpho*. *M. anaxibia* was over in Parana by early March; *M. menelaus*, fresh at Santos in early April; *M. hercules*, very abundant locally near São Paulo in late February and early March; *M. laërtes*, abundant throughout the autumn, *i. e.* February and March into April; *M. aga*, met with rather sparingly in the State of São Paulo, but abundantly in Parana in late March; and *M. cytheris*, in abundance in the latter part of March in various parts of Parana. *Papilio*

*ascanius* was taken in the Botanical Gardens at Rio in the middle of February. Five species of *Heliconius* were shown: *H. narceæ*, *H. silvana robigus*, *H. besckei*, *H. phyllis*, and *H. sara apscudes*. Of *Catagramma* there were *C. sorana* from Itarari, taken on March 9th, and *C. hydaspes*. Of the allied genus *Callicore*, *C. candrena* and *C. eluina*, both found in abundance at Tibagy, in late March. A number of *Erycinidæ* were shown, including *Zeonia licursis*, *Syrmatia dorilas*, *Mescne sagaris*, *M. phareus*, *Stalachtis susanna*, and *Balotis melanis*. The Ithomiine, *Mechanitis lysimnia*, was shown with the Pierine, *Dismorphia astyoche*, these two insects having been caught on the same *Ageratum* flowers, April 14th, at Castro. Mr. Kaye remarked that he was not greatly struck with the resemblance of these two insects on the wing. The flight was certainly similar, the Pierine being completely disguised in this respect, but there was no difficulty in discriminating between the two by the colours. Seen on the mauve-coloured flowers, the two insects do not bear any resemblance to one another, as the Pierine disclosed a whitish underside, and the Ithomiine one similar to its upperside.

Mr. A. Sich exhibited two specimens of *Monopis weaverella*, Scott, and two of *Monopis rusticella*, Hb., and read the following note: "*M. weaverella* has long been in collections under the name of *spilotella*, but Mr. Bankes has now shown ('E.M.M.,' 1910, p. 221) that *spilotella*, Tgstr., is a *Blabophanes*, and that our *spilotella* is a *Monopis*. It was named by the late Mr. John Scott, in 1858, *Tinca weaverella*. It has been taken in Scotland, Hereford, Sussex, Dorset, and Hampshire." He also exhibited the winter hibernaculum of *Hyponomeuta cagnatellus*, Hb., and said: "This hibernaculum is composed of the upper portions of the ova, which are laid one partly over another like the tiles of a roof. The larvæ hatch in September and October, and pass the winter under this cover. The young larvæ, on hatching, eat a very slight depression in the bark, and spin a delicate covering of silk beneath the egg-shells, under which they hibernate."

Mr. J. Platt-Barrett exhibited a large collection of butterflies taken by him in Sicily and Calabria during the spring and early summer of the last two years, and read a paper entitled "The Butterflies of Sicily" (see p. 30). He afterwards exhibited a number of lantern-slides consisting of views of the various parts of the country in which he collected, and a series of views of Messina before and after the terrible earth-

quake, of which he and his son were two of the few survivors.

OCTOBER 27th, 1910.

Mr. H. Moore exhibited several teratological specimens, including *Arctia caia*, in which all the wings were shortened, giving the appearance of comparative broadness, with a large concavity in the hind margin of the hind-wings; *Papilio clearchus*, with aberrant markings of the right fore-wing; *Delias deione*, with left fore-wing imperfectly developed in size; *Hypolimnas*, sp., ? with a small right hind-wing; and *Prioneris thestylis*, with the right fore-wing dwarfed.

Mr. Sich exhibited an *Eupithecia* sp. in which the right fore-wing was imperfect; and a dwarfed specimen of *Colias edusa*, in which the fore-wings had a strong concavity in the hind margin.

Mr. R. South exhibited series of (1) *Coremia unidentaria*, Haworth. Thirty-four specimens reared from eggs laid by a purplish-red banded female (also shown) captured at Tilgate, Sussex, on May 27th, 1910. About fifty ova were deposited between date of capture and the 29th of the month, when the specimen, being still in excellent condition, was killed and set. Larvæ commenced to hatch out on June 5th, and to pupate June 28th. All had gone down on July 12th. Three males appeared on July 19th, and all the imagines, thirty-four in number, were out before the end of that month. Sixteen specimens (seven males and nine females) have the purplish-red band of the female parent; seventeen (six males and eleven females) are black-banded as in typical *unidentaria*, and one female has the band purplish-black.

(2) *Acidalia aversata*, reared from ova deposited by a female ab. *spoliata*, taken at Wallington, Surrey, in August, 1909. Owing to losses from various causes during and after hibernation, only sixteen larvæ were seen alive at the beginning of April. Between May 17th and June 7th, 1910, fourteen moths appeared in the breeding-cage; twelve of these were shown, the others were crippled. Nine of the specimens were of the typical banded form, and only five of the plain female parent form. Curiously, the first specimen to emerge (May 19th) is ochreous in ground colour, and the band is purplish-brown; all the others, both banded and plain, are of the typical bone or whitey-brown ground colour. A pair of the banded form emerged on June 7th, and the female laid a nice batch of eggs (about eighty).

(3) *Boarmia gemmaria*, Brahm.—A long series of specimens reared from ova deposited by a female of the *perfumaria*, Newman, form. The female parent was taken from a fence in Woodcote Road, Wallington, July, 1909. Larvæ were fed on willow before hibernation, but during the winter and afterwards ivy was the only pabulum. On March 27th, 1910, when removed to a more roomy cage, there were about eighty larvæ alive, and these ranged from half an inch to one and a quarter inches in length. Pupation commenced on May 19th; the first imago, a male, emerged on June 25th; the last, a female, on August 10th. The total number of moths that came up during the period of about six weeks was sixty-three, of which only eighteen were of the male sex. All the specimens are of the *perfumaria* coloration, but some of them are more or less thickly sprinkled with ochreous scales.

(4) *Boarmia abietaria*, Hübn.—A selection of specimens reared from larvæ beaten from Scots-pine in the New Forest. Twenty-two imagines in all were reared from twenty-five larvæ. The majority of the larvæ were only about half grown when obtained, but these, and also those more mature, completed their growth on birch and willow. Five of the larvæ had the ground colour distinctly greenish, and the markings black.

(5) *Pionea (Scopula) lutealis*, Hübn.—A series from Bishop Auckland, Durham, with specimens from southern counties for comparison. The former are larger in size and more strongly marked; the general colour is whiter.

Mr. Kaye exhibited a specimen of the Natal Sphingid *Theretra orpheus*, the larva of which is known to feed on a species of orchid.

Mr. Edwards exhibited the fungi, *Stilbum erythrocephalum* on rabbits' dung, from Pett's Wood, and *Poria vaporaria* on wood; he also showed teratological examples of *Triphæna pronuba* and *Dryas paphia*, the former with the right fore-wing dwarfed, and the latter with the left fore-wing aberrant in shape and size.

Mr. R. Adkin exhibited a number of teratological examples, including:

*Odonestis pctatoria*, females.—Bred 1892. The cage in which the pupæ were kept was infested by larvæ of a Tineid, which, perhaps, accounts for the irregular shape of the wings. But it will be noted that although portions of the margin of the wings appear to be missing, the fringes are continued round those portions.

*Argynnis aglaja*, female.—Left fore-wing less than normal size. Captured at Eastbourne, August 7th, 1891.

*Argynnis aglaja*, male.—Right hind-wing greatly reduced in size and imperfectly pigmented. Captured at Brighton July 14th, 1903.

*Amphidasys betularia*, female.—Left fore-wing angulated, left hind-wing somewhat reduced in size. Bred, Lewisham, 1909.

*Psilura monacha*, female.—Right hind-wing missing. Bred New Forest, 1888. The insect emerged from pupa in this condition.

*Agriades coridon*, female.—Captured, Eastbourne, 1909. The left wing is split from near the base to close to the hind margin, but the margin is not severed. A mark on the right fore-wing is in a similar position, suggesting a damage received while in pupa.

*A. bellargus*, female.—Captured, Eastbourne, 1909. Margin of right fore-wing indented, but the fringe is complete round the indentation; the dark marks in the fringe are, however, fewer than on the corresponding perfect wing.

*Melitæa artemis*, female.—Bred 1909. Left fore-wing dwarfed, somewhat angulated, and imperfectly pigmented.

*Boarmia gemmaria*, female.—Bred 1909. Right fore- and hind-wings shortened.

*Triphæna comes*, male.—Bred 1896. Both fore-wings with squared hind margins.

*Tæniocampa opima*, female.—Bred 1909. Both hind-wings greatly reduced in size.

*Zygæna lonicrææ*.—Captured, Chattenden, 1892. Right fore-wing imperfectly developed. The left fore-wing has confluent spots.

*Z. achilleæ*.—Both fore-wings club-shaped. Captured, Morven, 1908.

Dr. Chapman exhibited a large number of teratological specimens of Lepidoptera, lent him by Mr. Tutt, Mr. Pickett, Dr. Hodgson, and others, to illustrate his paper, together with microscopic preparation, plates, and excerpts from various Society transactions, and the work "Coleoptères anormaux," by Mr. Bourgeois, of Rouen.

He then read his paper, "On Insect Teratology" (see p. 39).

NOVEMBER 10th, 1910.

Mr. W. G. Sheldon, of Croydon; Lieut. H. T. Stoneham, of Streatham; Mr. A. J. Lawrence, of New Oxford Street;

and Mr. B. S. Curwen, of Richmond, were elected members.

Dr. Hodgson exhibited numerous selected specimens of *Agriades coridon*, including two partially gynandromorphous forms, and two females with bluish spots on the upper sides of hind-wings, forming a median band exactly reproducing that of the underside. The rest of the females showed slightly blue-scaled forms, typical of those which were extremely prevalent in all the localities visited, amounting in one locality to over two thirds of those seen. Among the males shown were some greyish-blue forms seen in numbers in all the localities visited, more or less markedly dull. Among the aberrations shown were ab. *antico-obsolata*, ab. *discreta-blomcrata*, an almost black male, and several variations of ab. *suffusa*. The examples were from Dover and Clandon in 1906 and 1904 respectively, and from Sussex, Surrey, and Herts in 1910.

Mr. J. Platt-Barrett exhibited a short series of bred specimens of *Vanessa io*, from Brockley, with a greasy appearance caused by the mal-development of the scales; and a specimen of *Arctia villica* of the second brood, from Sicily, bred on November 1st.

Mr. Robert Adkin exhibited a series of *Lithosiacaniola*, reared from ova, and read the following note on his experiences in feeding them up: "On August 7th I received from the Rev. J. E. Tarbat some ova of this species, which had been deposited on July 30th-31st by moths that he had captured in Devonshire a day or two previously. On August 9th they hatched in the early morning, and, as I was leaving home for the day, I threw into their box a few pieces of *Lotus corniculatus*. On my return in the evening I found the larvæ very restless, and apparently not taking to the *Lotus* at all. I therefore obtained some lichen-covered hawthorn twigs, which I put into a glass-topped metal box, and turned the larvæ together with the *Lotus* in with them. They remained without further attention, except for the occasional addition of a fresh piece of lichen-covered twig and pieces of *Lotus* and knotgrass (*Polygonum aviculare*), until September 18th, when it was found necessary to turn them out on account of the box showing signs of mould. On an examination of the food being made, distinct signs of their having fed were discernible on the knotgrass, some of the *Lotus* flowers had been nibbled, and there was little doubt that the lichen also had received some attention. The larvæ had increased in size, though they were still quite small. On October 24th,

it appearing desirable to make arrangements for their hibernation, the larvæ were transferred to a small glass cylinder cage, fitted at top and bottom into zinc sockets, the rims of which were finely perforated, thorough ventilation of the cage being thus secured. I should, perhaps, add that it was kept throughout the winter out of doors, but protected from rain, etc. In the cage a framework of lichen-covered twigs was built up, and, both *Lotus* and knotgrass having failed, the leaves and flowers of a small hawkweed-like plant (*Crepis virens*, I believe) were loosely sprinkled over it, and the larvæ turned into the cage on them. During the winter a few freshly gathered leaves and dried flowers of the *Crepis*, slightly moistened, were added from time to time, at intervals of from two to four weeks, the moisture in the air being sufficient to keep them in soft condition between whiles. During exceptionally mild weather, notably at the end of December and in February, the larvæ were seen to be moving about, and were apparently feeding. On May 1st they were turned out, when very distinct evidences of their having nibbled the *Crepis* during the winter were visible. They were then put into a larger cage, and supplied with lichen-covered sticks and lettuce leaves; which latter they appeared to prefer when somewhat withered. The sticks, having been cut the previous autumn, and therefore having dried, were soaked in water before being given to the larvæ, which appeared to make the lichen on them quite eatable; occasionally a flower of dandelion was also given them, and appeared to be nibbled, but their chief attention was paid to the lichen and the lettuce. Towards the end of May they began to grow more rapidly than they had previously grown; but it was not until mid-July that they began to pupate, making their loose cocoons either among the rubbish on the surface of the earth, or in the corners of the cage; and the moths emerged between August 8th and 31st.

“If we are to believe our text-books, there is an assumption that this species, having once taken to any one food-plant, will refuse to feed upon any other (*vide* Barrett, “*Lepidop. of Brit. Isles*,” vol. ii, p. 220), but my own experience in feeding these larvæ up from the egg leads me to think that, on the contrary, had they been restricted to any one of the food-plants that they fed upon, to the exclusion of all the others, the chances of success with them would have been very small, and that for the well-being of this, like so many other hibernating species, a variety of diet is essential.”

Mr. L. W. Newman exhibited a varied series of *Agriades*

*thetis*, females, from Folkestone, taken in 1910, and a very interesting example which he supposed to be a natural hybrid between *A. coridon*, male, and *Polyommatus icarus*, female, or *A. thetis*, male, and *P. icarus*, female (see "Ent.," vol. xlv, p. 4, fig. in text).

He also showed a fine male *Grapta (Polygonia) c-album*, with the whole of the ground colour yellow, one of eleven specimens he and others had bred from the same batch of ova. The parents were quite normal var. *hutchinsoni*, and the grandparents also quite typical. His own larvæ were fed on elm, and sleeved out on a growing tree. The first batch of pupæ were cut off the tree, and produced two yellow varieties. The remaining larvæ were fed up in a hot-house, as they were so late, and food was getting scarce. These last produced four yellow examples. The undersides of all the yellow varieties were a trifle darker than those of the typical forms bred from the same brood.

Mr. Hy. J. Turner exhibited a teratological specimen of *Danaïd limniacæ*, in which the left fore-wing was diminished in size, with a large indentation in the hind margin, reaching nearly half the length of the wing, and partly ciliated.

Mr. Buckstone exhibited a box of teratological specimens, including *Epione advenaria*, *Orgyia antiqua*, *Cupido minima*, *Nyssia hispidaria*, *Hadena pisi*, and *Anchocelis pistacina*, with left hind-wing dwarfed or missing; *Vanessa atalanta*, with all the wings abnormally broad; and *Panagra petrarum* and *Agrotis tritici*, with a sinus in the wing-margin fully fringed.

Mr. R. Adkin read the report of the conference of delegates of the corresponding societies of the British Association (see below).

The remainder of the evening was devoted to the exhibition of lantern-slides by the following members:

Mr. Lucas, *Herminium monorchis*, eggs of nightjar, etc.

Mr. Dennis, studies of willow, dog-rose, sweet-briar, bryony, daffodils, lesser teasel, water forget-me-not, etc.

Mr. West, a series showing the development of the frog.

Mr. Tonge, instantaneous photographs of butterflies in the field, stages of development of *Gonepteryx rhamni*, etc.

Mr. Main, pupa of pine ladybird, *Anatis ocellata*, larva of *Cassida equestris*, pupa cases of *Cionus scrophulariæ* on figwort, a series showing the emergence of *Agrion puella*, etc.

## BRITISH ASSOCIATION.

## CONFERENCE OF DELEGATES OF CORRESPONDING SOCIETIES.

*Reported by* ROBERT ADKIN, *November 10th, 1910.*

The eightieth annual meeting of the British Association was held in Sheffield from August 31st to September 7th last, and during the meeting two Conferences of Delegates of Corresponding Societies were held, namely, on the afternoons of Thursday, September 1st, and Tuesday, September 6th, the former under the chairmanship of the President of the Conference, Dr. Tempest Anderson, D.Sc., F.G.S., the latter being presided over by the Vice-Chairman, Prof. P. F. Kendall, M.Sc., F.G.S.

The proceedings were opened on Thursday by Dr. Anderson, who read his Presidential Address to the Delegates of the Corresponding Societies, in which he gave an account of his invention for projecting opaque objects by direct light on a lantern screen. As illustrating the results to be obtained by the apparatus, he showed, among other objects, a live beetle, engravings, polished marbles, butterflies, a watch, etc., all of which were brilliantly reproduced upon the screen in natural colours. The illuminant used was an arc electric light, but the objects were preserved from any damage by heat by the insertion of a water-trough.

Mr. Balfour Browne, of Belfast, brought forward his ideas of recording biological captures on a definite plan, and the subject was discussed at some length, the Conference ultimately deciding that the Committee of Recommendations be asked to consider the advisability of appointing a committee to deal with the subject.

On Tuesday, Mr. Wilton, of Liverpool, brought forward the question of "Heavy Motor Traffic and its Effect on the Adjoining Tracts," and it was discussed at considerable length, many instances being given of great damage directly attributable to the dust caused by such traffic, of fishes being destroyed by the leakage of petrol being washed into streams, and of the beauty of the country roads being destroyed for the benefit of the motors. Mr. Priestley, of Bristol, predicted that the result of motor dust would be that plants that have long hairs would survive, and that all others would be destroyed near main roads. Many sug-

gestions were made as to the more suitable materials for the making of the roads, and as to the amount of camber that is desirable in their construction.

Prof. Kendall then spoke of the prohibitive price charged by Government for coloured geological maps, which stultified the work of the Geological Survey, because no one would buy the maps. Prof. Watts said the result now in England is, that the people have to be educated with American maps, and thus learn not the English geological interpretation of Nature, but that of the U.S.A. The Geological Society had taken up the question, but so far without result.

The Conference was then brought to a close.

If I may add a postscript, I would call the attention of members to Prof. G. C. Bourne's Presidential Address to Section D (Zoology), in which he discusses the various aspects of the science of morphology. I hope later on to be able to place the full report of the meetings in the library, and would strongly advise members to read this address. It is already printed in "Nature" of September 22nd, 1910.

NOVEMBER 24th, 1910.

#### THE ANNUAL EXHIBITION OF VARIETIES.

Mr. J. Platt Barrett exhibited long series illustrating—

(1) The variation of *Melanargia pherusa* in Sicily. (a) ? Type with five rings on each hind-wing; (b) rings decreasing in size and becoming spots and blotches; (c) no rings or spots—only small blotches attached to sub-marginal line; (d) ab. *plesaura*—without rings, spots or blotches on hind-wings; one extreme specimen had also partly lost the sub-marginal line and the spot near the anal angle of the upper wing.

(2) The local variation of *M. galathea*. (a) Messina, very dark, v. *procida*; (b) Mount Etna—less dark; (c) Syracuse—ditto; (d) Monte Cicci—v. *procida*.

He also exhibited (3) dark specimens of *Vanessa io*, bred 1910, and suggested as a possible cause that the larvæ were fed near the junction of two geological strata.

Mr. Robert Adkin exhibited a series of *Polyommatus icarus*, from Eastbourne, including strongly blue-scaled females of the spring and autumn emergences of the present year, the latter varying in tone of the blue colour between dull lilac-blue and bright "bellargus" blue; one entirely without blue

scaling, but with unusually large, red, marginal spots; female undersides with the red lunules bright, large, and somewhat elongated, and a male in which they were small and pale yellow; also an underside aberration, of which the following is a description:—ashy-grey at the base, fading to pure white at the outer margins. Fore-wings, the upper of the two basal spots indicated by a minute dot, the lower absent; the discoidal spot is distinct; of the outer row of spots (usually six) the four median are present, and are slightly elongated towards the black sub-marginal crescents, which are normal, and the red lunules bright and somewhat contracted, leaving the white margins unusually broad; these are intersected by the strongly marked wing-rays, thus giving the appearance of a marginal row of white quadrate marks. Hind-wings: discoidals rather faintly marked, the outer row of black spots very small, and the margins as in fore-wings. Fringes of all wings pearly white. The specimen is a female with slightly blue upper-side, and was captured on August 7th, 1910.

He also showed a short series of hybrid *Nyssia zonaria* male  $\times$  *Biston hirtaria* female. The males are in size about midway between that of the two species, and the markings of each are well represented in the hybrids. The female is interesting in that it shows an attempt to produce the two forms of female, the almost apterous and the fully winged, the result being a monstrosity with a ringed body like *N. zonaria*, and four long, narrow, mis-shapen wings, hairy as in *N. zonaria*, but very dark in colour, in that respect more nearly resembling *B. hirtaria*. The specimens were reared by Mr. J. W. H. Harrison in the spring of the present year.

Mr. A. E. Tonge exhibited a fine series of *Cosmotriche potatoria*, bred from larvæ collected near Deal in 1910, including some extremely dark, smoky, suffused specimens; a remarkable variety of *Brenthis cuphrosyne* from Polegate, 1910, in which the ground colour was pale chocolate-brown above and below; a series of *Boarmia repandata*, including v. *conversaria*, bred from New Forest larvæ; varieties of *Agrotis exclamationis*, from Southwold and Reigate, including specimens in which the usual heart and dart markings were replaced by a black blotch; three of these were taken on three successive evenings; a series of photographs of eggs of Lepidoptera enlarged 30 diams.

Dr. T. A. Chapman exhibited a long series of examples of *Pararge egeria* from Britain, Pyrénées Orientales, S.W. France, N.W. Spain, and the Riviera, to show the range of

variation in the relative amounts of the dark and light area, the extremely light southern examples being very noticeable.

Messrs. A. Harrison and H. Main exhibited long series of *Boarmia repandata*, and contributed the following notes :

“Several series were bred this year.

“(1) From ova deposited by a female taken near Huddersfield. This series varies from a mottled-grey form to almost black. There is very little brown colour in any of these specimens. The submarginal white line in all four wings is distinct in the whole series.

“(2) From Sligo parents; all much paler than typical English specimens.

“(3) From the neighbourhood of Liverpool, bred from selected melanic parents; all that were bred were of the form shown. The submarginal white line so perceptible in the Huddersfield specimens has almost disappeared.

“(4) From Delamere Forest; bred from three larvæ collected in the spring. Two are of the dark greyish-brown form characteristic of the locality, and the third is similar to the more melanic of the Huddersfield series. This is the only black specimen we have obtained from Delamere Forest, though we have heard of others having been taken there.

“(5) From Merionethshire, North Wales; bred from *v. conversaria*, male; type female. A considerable number of the larvæ were sent away to several friends, and we have not yet heard from them what proportion of *v. conversaria* and type they obtained; from those we kept we bred about 50 per cent. of each form.

“(6) From South Devon; from selected parents, both *v. conversaria*. The ground colour is very much darker than in the North Wales series. Only a small number were bred, viz. ten *v. conversaria* and four not *v. conversaria*, or 71·5 per cent. and 28·5 per cent. respectively.

“(7) From near Doncaster: from larvæ collected in the spring. These insects are somewhat similar to those from Huddersfield.”

Mr. Hugh Main, on behalf of Mr. A. Göttmann, exhibited a series of forms of various species of Vanessids, from near the River Deneshkina, in the province of Yenesei, Siberia, in the Arctic Circle, including *Euwanessa antiopa*, var. *artemis*, the form with light margin much reduced and thickly powdered with black, the blue spots enlarged and hastate in shape; and var. *hygiaa*, the form with extremely broad, light border

and the blue patches obsolete; *Vanessa io*, var. *belisaria*, the form with complete confluence of the dark costal blotches, and extreme dullness and obsolescence of the ocellus of the hind-wing; *Aglais urticae*, var. *ichneusoides*, the form with complete confluence of the two outer costal blotches, and hind-wings entirely shaded with black; and v. *atrebutensis*, from Stiermark, Austria, with absence of discal spots and blue lunules of fore-wing, and almost black hind-wings.

Mr. W. Schmassmann, on behalf of himself and Mr. G. Talbot, exhibited numerous specimens of the above species, produced by experiments under extremes of temperature, to compare with those exhibited by Mr. Göttmann, and contributed the following note: "The Siberian specimen of *E. antiopa*, var. *hygiæa*, has also been produced as a low temperature form. It is recorded as occurring sporadically in nature. The specimens shown of *A. urticae*, also Siberian, seem to be var. *ichneusoides*. This variety is also got as a low-temperature form, of which I show one specimen with a few others approaching it. We also exhibit forms either approaching or identical with *A. urticae*, var. *urticoides*, var. *polaris*, var. *connexa*, from Japan, and a few having the dull and washed-out appearance of var. *caschmirensis*. We include a high-temperature form resembling the Corsican variety v. *ichnusa*, the two spots in the middle of the fore-wing having nearly disappeared. There are also a few specimens with fore-wings practically devoid of scales. Of *Pyrameis atalanta* we show a series of low-temperature forms, together with a high-temperature specimen."

Mr. W. J. Lucas exhibited the so-called English trap-door spider, *Atypus affinis*, and its silken tube, with another tube occupied by the beetle, *Pterostychus madidus*, taken in the New Forest, August, 1910. A very large stick-insect with beautiful wings, and a large spider, from Toowoomba, Queensland. On behalf of Patrol-Leader S. F. Irwin, one of the fifteen boy-scouts who accompanied Sir R. Baden-Powell to Canada, some butterflies taken on the trip: A few clouded yellows and fritillaries, with *Vanessa antiopa* caught at Cochrane, Alberta; and specimens of *Colias philodice* and *Anosia plexippus*, taken in the exhibition grounds, Toronto.

Mr. H. M. Edelsten exhibited a fine bred series of *Dianthæcia luteago*, var. *barrettii*, from Devon; a series of *Tapinostola extrema*, four of them bred, from Northants; *Tapinostola hellmanni*, bred, from Wicken Fen; *Leucania l-album*, bred (vide "Entomologist," xliii, p. 313); a var. of *Meliana flammæa*, from Horning, and type for comparison.

Captain P. A. Cardew exhibited a new aberration of *Cænobia rufa*, taken in Norfolk this year, with ab. *fusca* for comparison. Its distinguishing character was that it was considerably darker than Bankes' ab. *fusca*.

He also exhibited a fine example of *Anthrocera viciæ* (*meliloti*), ab. *confusa*, taken in the New Forest this year, and the following aberrations: *Melanthia albicillata*, with the apical and basal blotches very much enlarged, and nearly meeting on the costa; *Fidonia carbonaria*, an extremely light form and an extremely dark one, both from Rannoch; *Epione advenaria*, a unicolorous male, with unspotted fringe and small in size; and *Ematurga atomaria*, a light straw-coloured male, with obsolete transverse lines, taken at Dover.

Mr. Scorer exhibited several variable forms of *Mimas tilix*; a specimen of *Euchelia jacobææ*, in which the costal streak was joined to the first outer marginal blotch, and another specimen of a very pale salmon colour; a *Grammesia trilinea*, in which the outer of the two transverse lines across the disc of the fore-wings was strongly elbowed, and then continued to the inner margin, closely approached to the inner line; and four specimens of *Euchloë cardamines*, a male with very large discal black spots, a female ditto, a male with very small discal black spots, and a female with very lightly marked fore-wings.

Mr. Percy Bright exhibited a large number of very fine aberrations of British Lepidoptera, including:

*Abraxas grossulariata*, a long series of forty-one very striking forms, ranging from almost unicolorous white to forms with fore-wings almost entirely black, and a bred specimen without scales.

*Triphæna fimbria*, a specimen with the usually yellow discal and basal areas of the hind-wings, of a beautiful pale cream colour. It was captured in the Warren at Folkestone.

*Eubolia bipunctaria*, an extraordinary melanic specimen, and an extremely pale specimen.

*Ematurga atomaria*, a short series of melanic and extremely pale specimens, with a gynandromorphous example bred by Mr. Newman.

*Agriades thetis*, a very fine female specimen, extremely blue, with strongly marked orange-spots; two males without black marks on the fringes, and specimens with streaked or banded undersides.

*Polyommatus icarus*, female, with large and strongly marked orange blotches on the fore-wing, from Portland, and a specimen with typical *icarus* undersides, but *adonis*-blue on

the upper side without marked fringes; suggested as a hybrid.

*Odontoptera bidentata*, a melanic specimen with hind-wings banded black.

*Pseudoterpna pruinata (cytisaria)*, a striking aberration, with black bands across all the wings.

*Vanessa c-album*, a short series, including five specimens bred from the Wye Valley, of a pale straw ground, one with unusually large, black blotches on the fore-wings, and hind-wings suffused with black, and another with markings greatly reduced.

*Pieris napi*, an example in which the outer margins of the wings were tinged with black.

*Euchloë cardamines*, a specimen in which the green colouring of the underside of the hind-wings was much emphasised; and *Pachnobia hyperborea (alpina)*, in which the fore-wing markings were reproduced over a wedge-shaped area of the hind-wings.

On behalf of Mr. W. Yates, of St. Anne's-on-Sea, Mr. South exhibited a series of *Luperina guenei*, taken on the Lancashire coast this year, concerning which he read the following note:—"Most of the specimens are more or less of the typical coloration, but this shows up most distinctly in No. 13 of the series. Black markings are more pronounced than normal in No. 2, especially as regards streaks on the basal extremities of the median and submedian nervures, and the bar between the ante- and post-medial lines. In No. 15 the general colour of the fore-wings is greyish, but of a darker tint than I have seen in any other specimen. No 14 is of the pale grey form—ab. *baxteri*."

"In size, the specimens vary from 42 mm. (No. 1) to 32 mm. (Nos. 7, 8, 9) in expanse. The four dark specimens (Nos. 3-6) were supposed by Mr. Yates to be "melanic forms" of *L. guenei*, but they are really dark examples of *L. testacea*. To enable anyone to compare the markings of the two species, I have added a varied series of *L. testacea*. It will be noted that not only is the submarginal line differently formed in each species, but that the area beyond the line is darker than the general colour in *L. testacea*, and uniform with the rest of the wing (or sometimes paler) in *L. guenei*. Then, again, the hind-wings of *L. guenei* are white in both sexes, and always whiter and more silky than in the male of *L. testacea*; the hind wings of the female of the last-named species almost invariably have a soiled appearance."

Mr. South also exhibited a series of seven specimens of

*Phibalapteryx lapidata*, reared from ova (Glasgow). The larvæ, which hatched in March, were fed on *Clematis jackmanni*, pupated during May, and the moths emerged in September. The insect assumes a very "pug"-like attitude when at rest; and when freshly emerged the coloration seemed to be of a darker brown than it is now.

*Oria (Synia) muscolosa*, Hb.—Three specimens taken in the Salisbury district during August, 1909, by Mr. H. Haynes.

*Crocallis elinguaris*, ab.—The fore-wings of a uniform pale reddish-brown colour; the discal mark as usual, but the transverse lines pale and indistinct.

The Rev. F. D. Morice exhibited a collection of Palæarctic Hymenoptera, and gave an interesting account of the characteristics and habits of the various groups and most attractive species. The selection included about 300 of the most conspicuous and handsome European and Mediterranean species among the sawflies, chrysidids, ants, fossorial wasps, and *Diploptera* (true wasps). A very few specimens were shown from other groups (*Cynipidæ*, etc.).

Mr. H. W. Andrews exhibited a unicolorous grey form of the Dipteron *Prosenia sybarita*, F., taken in Beesfield Valley, N. Kent, July 30th, 1910, and lacking the usual yellow abdominal markings, with typical forms for comparison.

Mr. West, of Ashted, exhibited an album containing a large collection of photographs of micro-fungi.

Mr. Stanley Edwards exhibited the following species from West Africa (Old Calabar, Ashanti, etc.), nearly all of which are noticeable as having very strongly developed sexual dimorphism: *Cymothoë theodota*, *C. amilius*, *C. sangaris*, *C. theobene*, *C. cænis*, and *Euryphene arcadius*.

Mr. W. West, of Greenwich, exhibited his collection of Homoptera, including many rare and local species.

Mr. Masters exhibited a specimen of *Pyrameis atalanta*, taken some years ago in Jersey, a remarkable aberration, in which the colour was blotched and confused in a most unusual manner, comparable only with some of the extreme forms produced in recent temperature experiments with the species.

Mr. Blenkarn exhibited a specimen of the genus *Ephyra*, and contributed the following note: "On October 20th last I took from a shop window, under one of the arc lamps in Beckenham High Street, a specimen of an *Ephyra*, which I could not then recognise. I have since shown it to Mr. Newman, who is of the opinion it is a variety of the second generation of *Ephyra linearia*."

The Rev. J. E. Tarbat exhibited four specimens of a light

form of *Nemcophila plantaginis*, from South Hants, with black markings somewhat reduced, especially in the basal area. Also a very dark form from Witherslack.

Mr. W. G. Sheldon exhibited fine series of the European species of the genera *Apatura*, *Limenitis*, and *Neptis*, taken by himself, chiefly in Hungary, Switzerland, and France.

Mr. H. Page sent for exhibition two very fine series of *Polyommatus escheri* and *Cænonympha dorus*, from Abriès and Digne respectively, taken by Mrs. Page and himself in July and August of the present year.

Mr. D. J. Rice exhibited an abnormal clutch of robins' eggs. They were eight in number, unusually large, and of a very pale uniform coloration without the usual mottling, except one or two inky-looking marks on some of them.

Mr. L. W. Newman exhibited a long varied series of *Ennomos autumnaria* (*alniaria*), showing how by in-breeding the fine rich colour and heavy speckles of the wild form gradually get paler and the spots less, producing a washed-out appearance. He also included a fine series of the melanic form. Specimens of hybrid *Smerinthus populi*, female, × *ocellatus*, male, bred in October, 1910, from a brood which pupated in July and August, 1910; one specimen showed hardly any ocelli, and another was the rare female form. A large number of beautifully executed hand-paintings, by Messrs. B. E. Jupp and W. Crocker, of the finest aberrations and varieties bred by himself during the past four years.

On behalf of Mr. Alec. Marshall, of Bexley, Mr. Newman exhibited an aberration of *Brenthis selene* with a large black spot in the left fore-wing. A fine variety of *Melitæa aurinia*, in which all the wings were heavily marked with wedge-shaped white spots. A specimen of *Lycæna arion* with only the orbicular spot. A fine-coloured specimen of *Noctua subrosea*, presented to him by the late Mr. Bond.

Mr. W. B. Pratt exhibited a variety of *Melitæa athalia*, taken in West Sussex, and known as *ab. corythalia*, in which the light ground colour is prevalent; and an underside of *M. aurinia*, in which the cream spots in the basal area of the hind-wing are filled in with black, and the marginal area is almost covered by an extension of the white central band.

Mr. W. J. Kaye exhibited a complete transitional series between *Heliconius phyllis* form *anacreon*, and *H. phyllis* form *venusata*. The twelve specimens were from the same locality on the Mapiri river in E. Bolivia, and showed that all were but forms of one variable species. Mr. Kaye remarked that

*H. phyllis*, in its typical form, was spread over a very large area in the southern half of Brazil and varied but little, while in E. Bolivia it was the most variable of species.

Mr. T. L. Barnett exhibited a considerable series of species taken by him at Wicken Fen in early August, 1910, including *Tapinostola hellmanni*, *Leucania straminea*, *Nudaria senex*, *Herminia cribralis*, *Agrophila trabealia*, *Bankia argentula*, *Cænobia rufa*, *Orthosia suspecta*, etc., together with a bred specimen of *Ægeria andrenæformis*, with the stem of guelder rose and pupa case from which it had emerged, and specimens of *Æ. culiciformis*, which he had met with commonly at Darenth Wood.

Mr. Colthrup exhibited several series taken by him during the present season, and contributed the following notes on them:

“*Luperina testacea*.—A long series taken at Margate in September, 1910, which is remarkable for the range of variation. I was at Margate from the 3rd to the 24th September, 1910, during which time high winds and gales prevailed, with the exception of two evenings, which were beautifully calm, and when I had made arrangements other than entomological. Sugar was a failure, so I turned my attention to flowers, etc. I came across a field enclosed by hurdles, which was cropped short by sheep. The grass had been left close to the hurdles, and here I found *L. testacea* emerging, and drying their wings; some were already *in copula* before this had been accomplished. They emerged from 7 to 9 o'clock in the evenings. The females were very lethargic, and where I left any with a distinguishing mark they were sure to turn up in almost the same place on succeeding nights. The females varied very much in size, some being one and a half inches in expanse of wing, while others were barely an inch. Some had very long, heavy bodies, others emerged with small, short bodies no larger than that of the males. The pattern on the wing varied so much that I more than once thought I was taking a different species. The colour varied from black, dark grey, brown, to pale ochreous in the females, whereas in the males the pale ochreous form did not occur, but I took two beautiful pale grey specimens of that sex.

“*Dianthæcia carpophaga*.—A pale series bred from Eastbourne pupæ. In some specimens the ground colour was a rich white, the markings scarcely discernible. Also, a very beautiful specimen bred from a Folkestone pupa, in which the ground colour was white and the markings an intense black.

"*Charæas graminis*.—A variable series from Eastbourne, including both male and female of the reddish form.

"*Gnophos obscurata*.—A variable series from Eastbourne, where they were taken freshly emerged on the rough ground under the cliffs."

Dr. Hodgson exhibited a very large number of varieties, bred or captured by himself during the last few years, arranged (I) to show divergence or contrast in extreme forms of species, and (II) to show convergence or similarity in forms of different species, in males, females, and undersides.

### I. Divergence.

#### A. Racial: (1) from different localities:

*e. g.* *Cænonympha tiphon*, *Melitæa aurinia*, *Aphantopus hyperanthes*, *Brenthis selene*.

#### (2) From same locality:

*e. g.* *Pieris napi*, *Pieris rapæ*.

#### B. Aberrational:

*e. g.* *B. selene*, *B. euphrosyne*, *Argynnis aglaia*, *Agriades coridon*.

#### C. Racial and aberrational:

*e. g.* *Plebeius argus*, females.

#### D. Seasonal:

*e. g.* *Agriades thetis*, females, 1907, 1908.

### II. Convergence:

#### A. Of allied species.

*P. napi* and *P. rapæ*, uppersides almost white, males.

*P. icarus* ab. *icarinus* and *A. astrarche*, undersides, females.

*A. aglaia* and *A. adippe*, uppersides (open border), males.

*B. euphrosyne* and *B. selene*, deep brown-red markings in excess, undersides, males.

*B. euphrosyne* and *B. selene*, heavily spotted, uppersides, males.

*A. thetis* and *A. coridon*, grey and black, uppersides, females, dwarf; with ciliary striæ black.

*P. argus*, female, and *C. minima*, unicolorous.

#### B. Groups of species.

*P. icarus* and *A. thetis*, lilac blue, males.

*C. argiolus* and *P. icarus*, violet blue, males.

*C. argiolus*, *P. argus*, and *P. icarus*, violet, males.

(Each group shows the same tint scarcely distinguishable, except by artificial light.)

*U. comma* and *C. palæmon*, identical in coloration.

Mr. E. Step exhibited a series of forty photographs of fungi taken during the past twelve months, and representing about three dozen species, including the rare *Amanita strobiliformis*, and *Am. aspera*, *Lactarius cilicioides*, *L. lilacinus*, *Coprinus micaceus*, *Thelephora intybacea*, *Coniophora membranacea*, *Geaster bryantii*, *Lycoperdon molle*, *L. pyriforme*, *Sepultaria coronaria*, and several *Myxogastres*; among the latter *Spumaria alba*, *Arcyria rubiformis*, and *Chondrioderma radiatum*. As in previous years these photos were mainly in illustration of the mycology of Ashted and Oxshott, Surrey.

Mr. A. E. Gibbs exhibited a drawer containing various Palæarctic forms and races of *Papilio machaon*, including a fine large var. *britannicus*, an ab. *aurantiaca*, and spring and summer forms of the Japanese var. *hippocrates*.

Mrs. Hemming exhibited a large number of Argynnids, bred or captured during the last two years, including *Dryas paphia*, male and female, showing considerable melanic tendency, and v. *valesina*, bred in 1910; several specimens to show underside variation of ground colour from brown to green in the same species; and various minor aberrations of *Argynnis adippe*, *A. aglaia*, *B. euphrosyne*, and *B. selene*.

DECEMBER 8th, 1910.

Mr. A. R. Kidner, of Sidcup, was elected a member.

Mr. L. W. Newman exhibited the wild-laid ova of *Calamia lutosa*, *in situ*, within the low-down sheaths of the reed; he also showed the ova of *Hydræcia crinanensis*.

Mr. Sich, on behalf of Mr. Tutt, exhibited a pair of the beautiful Gelechiid *Gelechia tessella*, Hb. (*quadrella*, F.) Mr. Tutt took these on August 9th, 1908, in the Lower Engadine, between Sūs and Lavin, at an elevation of over 4600 feet.

Mr. Robert Adkin exhibited a series of *Anthroccra filipendula*, reared between July 23rd and 31st last, from pupæ collected earlier in the month on rough waste ground on the side of the Downs near Westerham, with specimens captured on June 25th, some years ago, in a meadow at Northwood; and called attention to one of the latter and three of the Westerham series, which had "the borders of the hind-wings distinct and undulated internally, and the sixth spot of the fore-wings small, with a coloured nervure passing through it," thus being in agreement with Stephens' description of *A. hippocrepidis*. He said that it was generally

considered that specimens agreeing with Stephens' description were found in meadows where *A. trifolii* occurred with *A. filipendula* or *A. lonicera*, and in the Northwood locality the two former species did occur together; but so far as he knew *A. trifolii* was absent from the waste land at West- ham, where those individuals were taken; moreover, the specimens from that locality did not emerge until the end of July, which would be considered an unusually late date for *A. hippocrepidis*, which Stephens says is found in June.

Mr. W. J. Kaye read a paper, "Collecting in Brazil," descriptive of a delightful trip he took with Mr. Dukinfield Jones in the earlier part of the year. Mr. Jones exhibited a large number of slides, many of them from photographs taken during the journey, illustrative of Mr. Kaye's remarks (see P. 54).

JANUARY 12th, 1911.

The President referred to the great loss the science of entomology had suffered by the death of Mr. J. W. Tutt, a member of long standing, and President in 1898.

Mr. H. F. Phillips, of Forest Gate, was elected a member.

Mr. A. E. Tonge exhibited a photograph of a small nest of *Vespa sylvestris*, which he had found in a pig-sty; also photographs of the ova (*in situ*) of *Plebeius argus* (*ægon*), *Ruralis betula*, and *Calamia lutosa*, all wild laid, the first-named on heath.

Mr. W. J. Lucas exhibited a teratological specimen of *Anosia plexippus*, taken in September, 1910, by Mr. S. F. Irwin, in the grounds of the Toronto Exhibition. The right fore-wing was shorter and narrower than in normal specimens, the outer margin being somewhat more concave.

Mr. Robert Adkin exhibited representative specimens of several broods reared from a wild female of the black form (*ab. nigra*) of *Boarmia gemmaria*; and communicated the following explanatory note: "The original stock from which the whole of the broods were reared was received as larvæ in the spring of 1908, their female parent being a wild moth taken during the previous summer in the Kentish locality, but the male parent was not known ('Proceedings' 1908, p. 84). The moths reared from them consisted of exactly 40 per cent. of the ordinary pale, and 60 per cent. of the black form. Pairings were obtained between selected moths of the black form of this brood, and a considerable number of ova were deposited, so that, after hibernation, some sixty odd larvæ remained, and these produced in the summer of

1909 21.54 per cent. of the pale and 78.46 per cent. of the black form. Again, selected black moths were paired, and large batches of ova deposited, but a tendency to a weakness that had been noticed in the former brood, in that many of the eggs deposited did not hatch, although full opportunity had been given for second or subsequent pairings, became more manifest in this generation; but such larvæ as came forth from the egg, and got through their first moult, were healthy, and in due time produced moths, the whole of the 1910 emergence being of the black form. These also were paired, and full batches of ova obtained, but the proportion that produced larvæ was very small, probably not exceeding 5 per cent. The majority of the larvæ, instead of feeding slowly through the autumn and hibernating, fed up rapidly, and produced eight undersized moths, all of the black form, in October and November, this rapid feeding up possibly being an additional sign of weakness in the brood, five larvæ only going into hibernation. These results appear to show that, although it is possible by pairing black with black, to produce entirely black broods, as soon as such broods are obtained they begin to lose vitality, and the race soon dies out."

Mrs. Hemming exhibited a long series of *Melitæa aurinia*, bred from larvæ taken in Wiltshire in 1910, where the species is somewhat common. There were also a number of examples caught on the ground from which the larvæ of the bred series were taken.

Mr. Hemming exhibited a series of *Adopæa flava (linea)*, taken in Sussex in 1910, showing two distinct forms, one pale with narrow marginal border, the other dark, and suffused with wider border. On behalf of Mr. P. A. Buxton, he showed another series of *M. aurinia*, bred from the Wiltshire locality. Of this series, all the emergences took place in the afternoon, while in the case of Mrs. Hemming's series this was not so.

Mr. Coote exhibited two very dark green examples of *Panolis piniperda*, with normally coloured examples for comparison.

Mr. W. J. Kaye exhibited a specimen of *Myelobius murina*, an extremely large sphingid-like Pyrale, from S. America, which flew in numbers around the arc lights at the Alto da Serra station.

Mr. Step exhibited a series of photographs by himself and Mr. West (photo-micrographs), illustrating *Brefeldia maxima*, one of the Myxogastres, and made the following remarks:

‘ On October 30th last, at Horsley, I came across a large pine stump, from whose decaying wood a sheet of creamy-white plasmodium was pouring over the bark. It had already covered about four square feet of one side of the stump. Cutting two pieces of bark, well covered with the plasmodium, I placed them in tin boxes, of which one had the back and front perforated with small holes, forming the initials of the firm of tobacco manufacturers by whom it had been sent out. On reaching home this particular specimen was photographed life-size and replaced in the box, care being taken that there should be no contact with the sides, as it was intended to again photograph it when the ultimate stage was reached; and it was therefore desirable to remove it without any risk of breakage. The next morning I was surprised to find that a considerable portion of the plasmodium had bridged the small space between bark and box, poured through the perforations, and formed a new mass on the front of the box, as shown in the second photo. A much smaller quantity had found its way through the similar perforations at the back, which was in shadow. The lid had been tightly closed, thus excluding all light save that which found its way through the perforated initials. It appears, therefore, that the organism is highly phototropic; and it is no doubt in response to light attraction that the individual swarm-cells emerge from the recesses of the rotten wood to form the plasmodium. Though by close watching with the unassisted eye I could not detect the actual movement of this shining mass, yet it was easy to see after brief intervals the advance that had been made, whilst the filmy strands behind indicated the area that had been abandoned.

“ Ultimately the whole of the plasmodium flowed through to the exterior of the box, and consolidated itself into two cushions (*æthalia*), as shown in the third photo, the outer cells flattening to form a tessellated purple-brown crust, whilst the inner ones broke up into the capillitium threads and soot-like spore-mass.

“ The second sample I handed to Mr. West for microscopical examination, and he has kindly made photo-micrographs, giving enlarged views of the plasmodium stage ( $\times 5$  and  $\times 10$ ), the crust of the *æthalia* ( $\times 5$  and  $\times 10$ ), the very characteristic capillitium threads, with their lime-knots ( $\times 450$ ), and the spores ( $\times 375$  and  $\times 600$ ). All that is now needed to complete the series are views of the germinating spores and the swarm-cells in the pre-plasmodium stage, and these I hope Mr. West will also succeed in giving us later.”

Mr. Step also exhibited a cluster of the galls of *Cynips kollari*, and called attention to the manner in which some of these had been explored by birds—probably woodpeckers—in order to extract the larva or pupa. It was remarkable that not one of the galls exhibiting the cleanly bored orifice which marked the exit of the gall-wasp had been touched by the birds, this apparently showing that they had power to discriminate between tenanted and untenanted galls. All the dwarf oaks that pretty continuously bordered a large field between Fetcham and Slyfield, Surrey, were thickly covered with the galls, similarly investigated by birds, and the specimens exhibited were a fair sample of the whole.

Mr. Stanley Edwards exhibited a portion of the jaws with teeth of a small species of *Ichthyosaurus*, from the chalk of Lyme Regis, together with a fossil shell *Aporrhais* sp.? from the Folkestone Gault.

Dr. Hodgson exhibited a long series of *M. aurinia* from various English localities to compare with those exhibited by Mrs. Hemming and Mr. A. F. Hemming, showing that, while most localities had their own general form, the Wiltshire specimens were of very varied forms.

Mr. West (Curator) exhibited a drawer of the Society's collection of Coleoptera, which he was rearranging, and in which he had just placed some sixty species from his own cabinet.

Mr. Priske exhibited a number of slides showing the life-history of the glow-worm which Mr. Main and he were observing, and read a short paper (p. 74).

Mr. Lucas read a paper, "Notes on the Natural Order *Neuroptera*," and exhibited a large number of lantern-slides illustrative of his remarks (p. 66).

Mr. Step communicated the following short reports of the Field Meetings conducted by him during the season :

REPORT ON CERTAIN FIELD MEETINGS *conducted by*  
E. STEP, 1910.

The Council, in its wisdom, allotted four of the Field Meetings to me as conductor, and as very few lists of captures have reached me, I have thought it well to combine reports of the four into one. The most striking feature of these meetings was the consistent favour again extended to me by the Clerk of the Weather, in a season that will not be remarkable in meteorological annals for its fine days, nor among entomologists for a profusion of insects.

*Ranmore Common, June 18th.*—Several members spent the morning on the slopes of Box Hill, and joined the afternoon party at the railway station. The route followed was by Westhumble and Bagden farm, thence through the woods to the Post Office, a short time being spent on the slopes of the escarpment prior to tea, to which twenty-one members and friends sat down. Lepidoptera were scarce, but the coleopterists had better sport, and the usual chalk-formation flowers were fairly abundant. Mr. Turner succeeded in finding a number of flower-spikes of the musk orchis (*Herminium monorchis*). Messrs. Edwards and Ashdown report the following Lepidoptera: *Polyommatus icarus*, *Cupido minimus*, *Thecla rubi*, *Cænonympha pamphilus*, *Nisoniades tages*, *Epinephele ianira*, *Euchelia jacobææ*, *Xylophasia sublustris*, *Dianthecia carpophaga*, *Phytometra wnea*, *Boarmia repandata*, *Venilia maculata*, *Cucullia verbasci* (larvæ), *Acidalia incanaria*, *Melanippe sociata*, *M. montanata*, *Ematurga atomaria*, *Eupithecia lariciata*, *Camptogramma bilineata*, *Pyrausta punicealis*, *P. cespitalis*, *Botys hyalinalis*, *Acidalia ornata*, *A. subsericeata*, *Ebulea verbascalis*. *Lithosia rubricollis* was also reported. Mr. Sich adds *Coleophora apicella*, *C. nutantella*, and *C. discordella*, of which he says, "though not new to my collection, I have never seen them alive before." Also larvæ of *Depressaria carduella* on thistle. Mr. West obtained the Coleoptera and Hemiptera exhibited on June 23rd (see p. 109).

Mr. Ashdown took the following Coleoptera: *Cryptocephalus hypochæridis*, *C. labiatus*, *Lucanus cervus*, *Rhagonycha fuscicornis*, *Sphæroderma testaceum*, *Cistela murina*, *Cionus thapsus*, *Dascillus cervinus*, and the hemipteron, *Sciocoris cursitans*.

*Ockham and Wisley, July 23rd.*—This, I think, was the most successful of our field-days in 1910, for every member appeared to get interesting specimens, whilst the weather was again exceptional. It was remarkable how general was the interest taken in the Mollusca, as evidenced by the zeal with which every member secured specimens of *Aplecta hypnorum* from the roadside pond whence I first recorded the species in Surrey in 1894. A little further, the wall-rue fern (*Asplenium ruta-muraria*) was pointed out on a farmyard wall. Arrived at the pine woods on Ockham Common, interest was displayed in the marsh-plants growing in the swamp leading to the smaller pond. Of these we noted in flower *Lychnis floscucli*, *Ranunculus flammula*, *Hypericum elodes*, *Œnanthe pimpinelloides*, *Drosera intermedia*, *D. rotundifolia*, and *Mentha aquatica*. On the last-named species were found larvæ of the tortoise-beetle (*Cassida equestris*). Mr.

Main also reports the larvæ and pupæ of the Coleoptera, *Mysia oblongoguttata* and *Anatis ocellata*. To Messrs. Dods and Harrison I am indebted for the following list of Lepidoptera noted or taken: *Pieris napi*, *Epinephile tithonus*, *E. ianira*, *Camptogramma bilineata*, *Bupalus piniaria*, *Hypsipetes sordidata* (*elutata*), *Boarmia repandata*, *Acidalia aversata*, *A. bisetata*, *A. virgularia*, *Scoparia dubitalis*, *Thera firmata*, *Coremia designata* (*propugnata*), *Retinia pinivorana*, *Cleoceris viminalis*, *Orobena straminealis*, *Ematurga atomaria*; and larvæ of *Gonepteryx rhamni*, *Anarta myrtilli*, and *Panolis piniperda*. Mr. Scorer took a larva of *Scoliopteryx libatrix* feeding on poplar. Mr. Sich took a fine specimen of *Aventia flexula* by beating Scots-pine; also *Evetria pinicolana* and *Teleia* (*Gelechia*) *dodocella*; *Gelechia sororculella*, from willow. Some mined alder leaves afterwards produced for him *Lithocolletis stettinensis* and *L. alniella*. Two vacated pupa-cases taken from a small willow stem by the same gentleman testified to *Trochilium crabroniformis* being included in the local fauna. The Mollusca taken at the pond were *Planorbis corneus*, *Limnea stagnalis*, and *Succinea putris*. Twenty-one members sat down to tea at the Hut Hotel, after which the larger pond was circled. On the western side the large colony of *Calla palustris*, which has been naturalized here for many years, was found well in flower (see p. 119).

*Bookham Common, September 10th.*—Though dry the day was dull and cool, and little was flying, but a number of larvæ were taken by beating, among these a solitary *Stauropus fagi*, by Mr. Morford. Mr. Tonge had a good haul of *Ochria ochracea* pupæ from the stems of marsh thistle. Other Lepidoptera are reported by Mr. Turner as follows: *Bithys quercus* (1), *Polyommatus icarus* (1), *Epinephile ianira* (a few), *Cænonympha pamphilus* (several). *Melanippe sociata* was common, very worn, as also was *Catoptria ulicetana*. The mines of *Lithocolletis corylifoliella* were common on hawthorn, as also were the deserted cones of *Ornix anglicella*, and the abandoned cases of *Coleophora nigricella*. Mr. Sich reports: "Very few imagines about. Took mines of *Lithocolletis coryli* on hazel; a cocoon of *Lyonetia clerckella* on crab; mines of *Nepticula salicis* on willow, and those of *N. acetosa* in leaves of both *Rumex acetosa* and *R. acetosella*." Mr. Cowham gives the following additional species: imagines—*Pieris brassicae*, *Gonepteryx rhamni*, *Epinephile tithonus*, *Vanessa io*, *Rumicia phlæas*, *Polyommatus icarus*, *Tapinostola fulva*, *Hydræcia nictitans*, *Ennomos tiliaria*, *Larentia viridaria*, *Mesoleuca ocellata*, and *Cidaria truncata*; larvæ—*Hylophila prasinana*, *Eutricha*

*quercifolia*, *Lophopteryx camelina*, *Phalera bucephala*, *Mamestra persicaria*, *Metrocampha margaritaria*, *Selenia bilunaria*, *Boarmia repandata*, *Amphidasys betularia*, *Hemithea thymiaria*, and *Cabera pusaria*. After tea at Mark Oak, at which again twenty-one sat down, the return was made by field paths to Leatherhead.

*Oxshott, October 8th.*—A very dry September, with cold nights, was a very unpropitious prelude to our annual Cryptogamic Meeting. The discovery also that a large party of the Nature Study Union had been ransacking the woods during the morning discounted our prospects. About thirty species were noted, of which most have been previously recorded in our "Proceedings," but a few were new to our Oxshott list. These were *Clavaria coralloides*, *C. pyxidata*, *Boletus pruvinatus*, *Hygrophorus russo-coriaceus*, and *Lactarius lilacinus*. Twenty members and friends met at tea.

*January 26th, 1911.*

## ANNUAL GENERAL MEETING.

The meeting was devoted to the business of receiving the Reports of the Council and Officers for the past year, the announcement of the results of the election of the Officers and Council for the coming year, and the reading of the President's address (p. 77).

The following is a list of the members elected as Officers and Council of the Society for the Session 1911-12.

*President.*—W. J. Kaye, F.E.S.

*Vice-Presidents.*—A. Sich, F.E.S., and A. E. Tonge, F.E.S.

*Treasurer.*—T. W. Hall, F.E.S.

*Librarian.*—A. W. Dods.

*Curator.*—W. West (Greenwich).

*Hon. Secretaries.*—Stanley Edwards, F.L.S., F.Z.S., F.E.S. (*Corresponding*), Hy. J. Turner, F.E.S. (*Report*).

*Council.*—R. Adkin, F.E.S., F. W. Cowham, E. C. Joy, F.E.S., R. A. R. Priske, F.E.S., A. Russell, F.E.S., B. H. Smith, B.A., E. Step, F.L.S.

Votes of thanks were accorded to the Treasurer, Auditors, Secretaries and other officers.

## ORDINARY MEETING.

Messrs. Alfred Holding, of Stoke Newington, N., W. Rodgers, of Camberwell, S.E., and W. H. Knight, of Peckham, S.E., were elected members.

Mr. Hy. J. Turner, on behalf of Mr. A. Murray, of St. Anne's-on-Sea, exhibited a series of forms of *Luperina gueneei* taken by Mr. Murray at the above place, and communicated the following note: "The series includes quite fresh and worn examples of typical *L. gueneei*, and of the so-called var. *baxteri*, and, in addition, several specimens of two other forms much more markedly distinct from this type than is var. *baxteri*. Indeed, these latter are so close that the difference has been expressed as being 'merely due to the pale grey ground-colour having, in the course of time, assumed a somewhat ochreous tinge,' which view cannot be upheld, as a comparison of the perfectly fresh and the worn examples in the box clearly demonstrates. In *L. gueneei* of the type form the fore-wings are 'pale testaceous' in ground, with little contrast between the markings and the ground-colour, which contrast in the worn specimen is seen to be considerably less. There is a distinct 'ochreous tinge' in some lights in the type form, which can only be faintly perceived in the worn example of var. *baxteri*, and is not at all apparent in the quite fresh specimen of this form. I would also distinguish var. *baxteri* by the greater contrast between the ground colour and the depth of colour of the markings. Turning to the first of the two new forms sent to me by Mr. Murray, I note that, in depth of colour both of ground and markings, it is typical *L. gueneei*, with this very marked difference, that the submarginal area between the dark marginal lunules and the submarginal line is much paler than any other portion of the wing, throwing out these dark lunules very conspicuously. In the worn specimen this feature is even more apparent than in the perfectly fresh example. This form appears to be quite as much worth a distinctive name as does that called var. *baxteri*, and I have designated it ab. *murrayi* from its captor. In var. *baxteri* I note that this submarginal area, instead of being lighter, is, on the contrary, distinguishably darker than the general wing colour.

"The other three specimens in the box are undoubtedly *L. gueneei* in all their characters except colour. So dark are they that we must term them melanic. All the markings are much intensified; the ground-colour is very dark grey, with faint flushes of a ferruginous tinge. The contrast

between markings and ground is very much stronger than in any of the other forms. In the worn specimen of this form there is little loss in these melanic characters. There is no trace of the 'ochreous tinge' of the type, nor of the 'pale grey ground-colour.' This, compared with the normal form, is a very striking one, and might be well termed var. *fusca*."

Mr. L. W. Newman exhibited two specimens of *Polygonia c-album*, bred on October 19th and 20th, 1910, by the Rev. A. Stiff, of Leigh-on-Sea. The specimens are var. *hutchinsoni*, which form has not previously been obtained as an autumn emergence. Two others were bred about the same time, also some twenty very varied examples. With these two were shown a varied series for comparison, of summer, autumn, and summer var. *hutchinsoni*, forms. The whole of the summer brood specimens were bred from ova laid by a female captured in the Wye Valley, and the autumn examples were the result of in-breeding from the former. These autumn var. *hutchinsoni* were from the same female as the yellow forms exhibited on a previous occasion.

Mr. Step exhibited a living group of the discomycetous fungus *Humaria rutilans*, from Ashtead; also a sporophore of *Merulius lachrymans* ("dry rot"), from a house in the same neighbourhood where the species had effected wholesale destruction of the woodwork, involving very expensive reconstruction.



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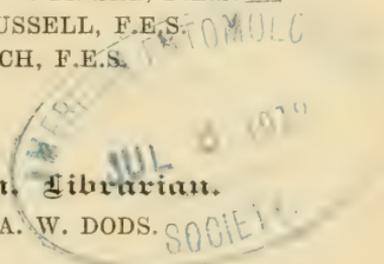
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- 1907 ANDREWS, H. W., F.E.S., Shirley, Welling, Kent, *d.*
- 1901 ARMSTRONG, R. G., B.A., B.C.(Cantab), M.R.C.S., L.R.C.P.,  
55, Granville Park, Lewisham, S.E. *e.l.*
- 1895 ASHEY, S. R., F.E.S., 119, Greenvale Road, Eltham Park,  
Kent. *c, l.*
- 1895 ASHDOWN, W. J., Belmont Road, Leatherhead. *l, c, he.*
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Nor-  
folk. *l.*
- 1872 AVEBURY, The Right Hon. Lord, D.C.L., F.R.S., F.L.S.,  
F.G.S., F.E.S., etc., High Elms, Down, nr. Farnborough,  
Kent (*Hon. member*). *h, b.*
- 1896 BARNETT, T. L., 81, Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1900 BARRETT, J. P., F.E.S., Westerott, South Road, Forest Hill,  
S.E. *l.*
- 1907 BARTER, H. W., 5, Brunswick Road, Camberwell, S.E. *l, b.*
- 1912 BATESON, Dr. W., F.R.S., The Manor House, Merton, Surrey,  
(*Hon. Member*).
- 1909 BAUMANN, R. T., 70, Station Road, Chingford. *l.*
- 1897 BISHOP, E. B., Dean Lodge, Charterhouse Rd., Godalming. *l, b.*
- 1911 BLAIR, K. G., B.Sc., F.E.S., 23, West Hill, Highgate, N. *n, c.*
- 1911 BLENKARN, S. A., F.E.S., Norham, Cromwell Road, Becken-  
ham, Kent. *l, c.*

YEAR OF  
ELECTION.

- 1898 BLISS, M. F., F.E.S., Coningsburgh, Montpelier Road, Ealing. *l*.
- 1895 BOWMAN, K., The May Sharp Construction Co., Ltd., Edmonton, Alta, Canada. *l*.
- 1905 BRIAULT, G. H., 6, Burlington Gardens, Acton, W. *l*.
- 1887 BRIGGS, C. A., F.E.S., Rock House, Lynmouth, R.S.O., N. Devon. *l, m, n, o, British fishes.*
- 1891 BRIGGS, H. M., 8, High Street, Canterbury. *l, orn.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, R.S.O., N. Devon. *l*.
- 1909 BRIGHT, P. M., F.E.S., Fairfield, Wimborne Road, Bourne-mouth. *l*.
- 1895 BROOKS, W., Thundercliffe Grange, near Rotherham. *l*.
- 1900 BROWNE, G. B., Nya Gpur, King Charles Road, Surbiton. *l*.
- 1909 BUCKSTONE, A. A. W., 18, Burlington Lane, Chiswick, W. *l*.
- 1897 BURR, M. B., B.A., F.L.S., F.E.S., F.Z.S., Castle Hill House, Dover. *o*.
- 1890 BUTLER, W. E., F.E.S., Hayling House, Oxford Road, Reading. *l, c*.
- 1911 BUXTON, PATRICK A., Fairhill, Tonbridge, Kent. *l*.
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l*.
- 1889 CANT, A., F.E.S., 33, Festing Road, Putney, S.W. *l, mi*.
- 1910 CARDEW, Capt. P. A., 50, Melbury Gardens, Wimbledon. *l*.
- 1886 CARPENTER, J. H., F.E.S., Redcot, Belmont Road, Leatherhead, Surrey. *l*.
- 1899 CARR, F. B., 46, Handen Road, Lee, S.E. *l*.
- 1899 CARR, Rev. F. M. B., M.A., L.Th., 10, St. Alban's Crescent, Woodford Green, Essex. *l, n*.
- 1897 CHAPMAN, T. A., M.D., F.E.S., F.Z.S., Betula, Reigate, Surrey. *l*.
- 1888 CHITTENDEN, D., 14, Limes Grove, Lewisham, S.E. *l*.
- 1896 CLARK, F. N., Paddington Infirmary, Harrow Road, W. *mi*.
- 1879 CLODE, W. (*Life member*).
- 1899 COLTHRUP, C. W., 141, E. Dulwich Grove, S.E. *l, ool*.
- 1907 COOTE, F. D., 25, Pendle Road, Streatham, S.W. *l, b*.
- 1909 COULSEN, F. J., 17, Birdhurst Road, Colliers Wood, Merton. *l*.
- 1902 COWHAM, F. W., 118, Minard Road, Hither Green, S.E. *l*.
- 1911 COXHEAD, S. W., 5a, Spring Gardens, Upper Clapton, N. *l*.
- 1899 CRABTREE, B. H., F.E.S., Cringle Lodge, Levenshulme, Manchester. *l*.
- 1885 CROKER, A. J., 1045, McClure St., Victoria, British Columbia. *l*.
- 1898 CROW, E. J., 26, Tindal Street, North Brixton. *l*.

YEAR OF  
ELECTION.

- 1910 CURWEN, B. G., 5, Richmond Bridge Mansions, East Twickenham. *l*.
- 1888 DAWSON, W. G., F.E.S., The Manor House, Abbot's Morton, Nr. Worcester (*Life member*). *l*.
- 1900 DAY, F. H., F.E.S., 26, Currock Terrace, Carlisle. *l, c*.
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W. *l, mi, b*.
- 1901 DODS, A. W., *Hon. Librarian*, 88, Alkham Road, Stamford Hill. *l*.
- 1904 EAST, F. J., 69, Cazenove Road, Stamford Hill. *l*.
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, 15, St. German's Place, Blackheath, S.E. *l, el*.
- 1886 ENOCK, F., F.L.S., F.E.S., F.R.M.S., F.R.H.S., 13, Tufnell Park Road, Holloway, N. *d, mi*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex (*Life member*). *l*.
- 1889 FORD, A., South View, Irving Road, West Southbourne, Bournemouth, Hants. *l, c*.
- 1907 FOUNTAINE, Miss M. E., F.E.S., Thirlmere, Godalming, Surrey. *l*.
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Chantrey Cottage, St. Stephen's Road, St. Albans, Herts. *l, mi*.
- 1912 FROHAWK F. W., F.E.S., M.B.O.U., Stanley House, Park Road, Wallington, Surrey. *l, orn*.
- 1899 GADGE, S. W., 59, Frankfort Road, Herne Hill, S.W. *l*.
- 1912 GAHAN, C. J., M.A., F.E.S., The British Museum (Natural History), Cromwell Road, S.W. *c*.
- 1884 GIBB, L., The Shrubbery, Blackheath Park, S.E. (*Life member*).
- 1909 GIBBS, A. E., F.L.S., F.E.S., Kitchener's Meads, St. Albans, Herts (*Life member*). *l*.
- 1908 GOFFE, E. R., 46, Vardens Road, Wandsworth Common, S.W. *l*.
- 1908 GREEN, E. D., 17, Manor Park, Lee, S.E. *l*.
- 1904 GROSVENOR, T. H. L., F.E.S., 8, Gloucester Road, Redhill, Surrey. *l*.
- 1888 HALL, A. E., F.E.S., Cranfield House, Southwell, Notts. *l*.
- 1884 HALL, T. W., F.E.S., *Hon. Treasurer*, Stanhope, the Crescent, Croydon, Surrey; and 61, West Smithfield, E.C. *l*.

YEAR OF  
ELECTION.

- 1891 HAMM, A. H., 22, Southfields Road, Oxford. *l.*  
 1906 HAMMOND, L., 38, Mercer's Road, Tufnell Park, N. *l.*  
 1903 HARE, E. J., F.E.S., Dunham, Boscombe, Hants. *l.*  
 1911 HARRIS, P. F., 26, Thornton Avenue, Streatham Hill, S.W. *l.*  
 1909 HEMMING, A. F., Cambridge Lodge, Horley, Surrey. *l.*  
 1909 HEMMING, MRS. C. U. H., Cambridge Lodge, Horley, Surrey. *l.*  
 1903 HICKMAN, J., 21, Raleigh Road, Penge, S.E. *l.*  
 1905 HILL, E., 3, Dorville Road, Lee. *l.*  
 1888 HILLMAN, T. S., F.E.S., 11, Eastgate Street, Lewes, Sussex. *l.*  
 1911 HOLDING, A., 95, Kyverdale Road, Stoke Newington, N. *l.*  
 1888 HOPKINS, H. E., 31, Farnaby Road, Bromley, S.E. *l.*  
 1889 HORNE, A., F.E.S., 60, Gladstone Place, Aberdeen. *l.*  
 1910 HUMM, P. S., L.D.S., 102, Leigham Court Road, Streatham,  
S.W. *l.*
- 1886 JÄGER, J., 65, St. Quentin's Avenue, North Kensington, W. *l.*  
 1887 JENNER, J. H. A., F.E.S., 209, School Hill, Lewes, Sussex.  
*l, c, d, m, b.*  
 1904 JOY, E. C., F.E.S., Eversley, Dale Road, Purley, Surrey. *l.*
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Dadmans,  
Sittingbourne, Kent. *l, m, marine invertebrata.*  
 1898 KAYE, W. J., F.E.S., *Vice-President*, Caracas, Ditton Hill,  
Surbiton, Surrey. *l, S. American.l.*  
 1900 KEMP, S. W., B.A., F.E.S., Indian Museum, Calcutta. *l, c.*  
 1910 KIDNER, A. R., Surimey Garth, Hatherley Crescent, Sidcup,  
Kent. *l.*  
 1911 KNIGHT, W. H., 196, Choumert Road, Peckham, S.E.
- 1910 LAWRENCE, A. J., 2, Arthur Street, New Oxford Street  
London, W. *l.*  
 1911 LESLIE, J. H., F.E.S., 84, Huron Road, Tooting Common,  
S.W. *l.*  
 1903 LISTER, W. K., F.E.S., Street End, Ash, near Canterbury. *l.*  
 1912 LLOYD, C. T., Camden House, Feltham Hill Road, Ashford  
Common, Middlesex.
- 1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-  
Thames. *Brit. o., odonata, n, m, b.*  
 1910 LYLE, G. T., Bank House, Brockenhurst, Hants. *h.*
- 1892 MAIN, H., B.Sc., F.E.S., Almondale, Buckingham Road, S.  
Woodford, Essex. *l.*

YEAR OF  
ELECTION.

- 1886 MANGER, W. T., 100, Manor Road, New Cross, S.E. *l, c, cr.*
- 1889 MANSBRIDGE, W., F.E.S., 27, Elmbank Road, Sefton Park, Liverpool. *l.*
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l.*
- 1881 MILES, W. H., F.E.S., 33, Alexandra Court, Chowringhee, Calcutta. *mi, b.*
- 1880 MONTIERO, A. A. DE C., F.E.S., 70, Rua do Alecrim, Lisbon.
- 1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l, e h, e d, mi.*
- 1910 MORFORD, D. R., Oak Cottage, Sycamore Grove, New Malden, Surrey. *l.*
- 1911 MORICE, The Rev. F. D., M.A., F.E.S., Brunswick, Mt. Hermon, Woking. (*Life Member.*) *h.*
- 1912 MORRIS, A. C., Leafield, Gibson's Hill, Upper Norwood. *l.*
- 1911 NEAVE, B. W., 95, Queen's Road, Brownswood Park, N. *l.*
- 1906 NEWMAN, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l.*
- 1911 PAGE, H. E., F.E.S., Bertrose, Gellatley Road, New Cross, S.E. *l.*
- 1905 PENN-GASKELL, W. W., Townshend House, North Side, Regent's Park, N.W. *l.*
- 1908 PENNINGTON, F., Manning's Hill, Cranleigh, Surrey. *l.*
- 1901 PEPPER, A. W., The Horniman Museum, Forest Hill, S.E. *mi.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire. *l, h, d.*
- 1888 PERKS, F. P., 22, May's Buildings, St. Martin's Lane, Charing Cross, W.C. *zoology, mi, pond life.*
- 1911 PESKETT, G. E. H., Llanberis, 37, Woodbury Grove, Finsbury Park, N. *l.*
- 1911 PHILLIPS, H. F., 41, Haughton Road, Forest Gate, E.
- 1888 PORRITT, G. T., F.L.S., F.E.S., Elin Lea, Dalton, Huddersfield. *l, n.*
- 1912 POULTON, PROF. E. B., F.R.S., F.L.S., F.Z.S., F.E.S., Wykeham House, Oxford. (*Hon. member.*)
- 1903 PRATT, W. B., F.E.S., 10, Lion Gate Gardens, Richmond, Surrey. *l.*
- 1897 PREST, E. E. B., Arva, Ashtead, Surrey. *l.*
- 1903 PRISKE, R. A. R., F.E.S., 9, Melbourne Avenue, W. Ealing, W. *l, m.*

YEAR OF  
ELECTION.

- 1911 QUARRINGTON, A., 14, The Broadway, W. Norwood, S.E. *l*.
- 1902 RAYWARD, A. L., F.E.S., 3, Albert Mansions, Lansdowne Road, Croydon, Surrey. *l*.
- 1909 RAMSAY, A., 15, Lawn Crescent, Kew Gardens. *b*.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. *orn*.
- 1904 RICHARDS, P., 17, Crescent Road, Kingston Hill, Surrey. *l*.
- 1906 RICHMOND, B. A., M.B., B.Sc., 28, Lower Road, Rotherhithe, S.E. *l*.
- 1902 RILEY, N. D., 94, Drakefield Road, Upper Tooting, S.W. *l*.
- 1910 ROBERTSON, G. S., M.D., St. Anne's, 101, Thurlow Park Road, Dulwich, S.E. *l*.
- 1887 ROBINSON, A., B.A., 5, King's Bench Walk, Temple, E.C. *l*.
- 1894 ROBINSON, LEIGH, F.Z.S., 4, Queen's Walk, Ealing, W. *l*.
- 1911 ROBINSON, LADY MAUD, F.E.S., Worksop Manor, Notts. *l, n*.
- 1911 ROGERS, W. A., 42, Addington Square, Camberwell, S.E.
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l, c*.
- 1900 ROWDEN, A. O., 4, St. John's Road, Exeter. *l, b*.
- 1904 ROWLAND-BROWN, H., F.E.S., Oxhey Grove, Harrow Weald. *l*.
- 1890 ROWNTREE, J. H., Folkton Manor, Ganton, Yorks. *l*.
- 1898 RUSSELL, A., F.E.S., Wilverley, Dale Road, Purley. *l*.
- 1888 SAUZÉ, H. A., 22, Earlsthorpe Road, Sydenham, S.E. *l*.
- 1902 SCOLLIK, A. J., F.E.S., 8, Mayfield Road, Merton Park, Wimbledon, S.W. *l*.
- 1910 SCORER, A. G., F.E.S., Hillcrest, Chilworth, Guildford. *l*.
- 1912 SENNETT, N.S., F.E.S., 32, Bolton Gardens, S. Kensington, S.W. *l*.
- 1910 SHELDON, W. G., F.E.S., Youlgreave, South Croydon. *l*.
- 1898 SICH, ALF., F.E.S., Corney House, Chiswick, W. *l*.
- 1903 SMALLMAN, R. S., F.E.S., Homeside, Devonshire Place, Eastbourne. *l*.
- 1908 SMITH, B. H., B.A., F.E.S., *Vice-President*, Edgehill, Warlingham, Surrey. *l*.
- 1890 SMITH, WALTER, 6, Exmouth Villas, Hampton Hill, Middlesex. *l*.
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l*.
- 1882 SOUTH, R., F.E.S., 96, Drakefield Road, Upper Tooting, S.W. *l*.
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton. *l*.

YEAR OF  
ELECTION.

- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex  
(*Life member*). *l*.
- 1908 STAUBYN, J. S., Tregothnan, Endlesham Road, Balham,  
S.W. *l*.
- 1872 STEP, E., F.L.S., Oakwood House, Barnett Wood Lane,  
Ashtead, Surrey. *b, m, orn, cr*.
- 1911 STOWELL, E. A. C., B.A. (Oxon.), Kingston Grammar  
School. *l*.
- 1909 STONE, F. J., 141, Bedford Road, Clapham, S.W. *l*.
- 1910 STONEHAM, Lieut. H. F., F.E.S., Kinsale, co. Cork. *l*.
- 1911 SWEETING, H. R., M.A., Belmont, Chelmsford Road, S. Wood-  
ford. *l*.
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, ool*.
- 1910 TAUTZ, P. H., Cranleigh, Nower Hill, Pinner. *l*.
- 1911 TODD, R. G., The Limes, Hadley Green, Barnett. *l*.
- 1902 TONGE, A. E., F.E.S., *President*, Aincroft, Grammar School  
Hill, Reigate. *l*.
- 1895 TUNALEY, HY., F.E.S., 13, Becmead Avenue, Streatham,  
S.W. *l, h*.
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 98, Drakefell  
Road, New Cross, S.E. *l, c, n, he, b*.
- 1889 VINE, A. C., 45, Temple Street, Brighton, Sussex. *l*.
- 1889 WAINWRIGHT, C. J., F.E.S., 45, Handsworth Wood Road,  
Handsworth, Staffs. *l*.
- 1911 WAKELY, L. D., 34, Lancaster Road, Wimbledon Common,  
S.W. *l*.
- 1880 WALKER, J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale  
Road, Summertown, Oxford. *l, c*.
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S.,  
F.L.S., F.Z.S., F.E.S., &c., Merton Hall, Thetford, Norfolk  
(*Hon. member*). *l, orn*.
- 1907 WATERER, W. J., 19, Adelaide Road, Brockley, S.E. *b*.
- 1888 WEBB, S., 9, Waterloo Crescent, Dover. *l*.
- 1911 WELLS, H. G., Hurstfield, The Avenue, Gipsy Hill, London,  
S.E. *l*.
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road,  
S.E. *l, c, he*.
- 1878 WEST, W., L.D.S., Holmwood, Barnett Wood Lane, Ashtead,  
Surrey. *l, mi*.
- 1911 WHEELER, The Rev. G., M.A., F.E.S., F.Z.S., 37, Gloucester  
Place, W. *l*.
- 1887 WHIFFEN, W. H., Brockenhurst, Hants. *l*.
- 1905 WINKWORTH, J. T., 290, Burdett Road, E. *l*.

Members will greatly oblige by informing the Hon. Sec. of any errors,  
additions, or alterations in the above Addresses and descriptions.

**THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.**  
*BALANCE SHEET FOR THE YEAR 1911.*

**GENERAL FUND.**

| <i>Receipts.</i>                                                                       | <i>£ s. d.</i>  | <i>Expenditure.</i>                                                | <i>£ s. d.</i>  |
|----------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------|-----------------|
| To Subscriptions received, 98 at 7/6                                                   | 34 17 6         | By Debit Balance from 1910                                         | .. .. .         |
| " " " 9 " 5/-                                                                          | 2 5 0           | " One Year's rent                                                  | .. .. .         |
| " " " 1 " 6/-                                                                          | 0 6 0           | " Attendance, one year                                             | .. .. .         |
| " " " 9 " 2/6                                                                          | 1 2 6           | " Postages, Stationery, and Sundries                               | .. .. .         |
| " " " " One life " £5 5s. 0d.                                                          | 5 5 0           | " Insurance                                                        | .. .. .         |
| " Additional Subscription received of Life Member to make up to new amount of £6 6s... | 1 1 0           | " Subscription to South-Eastern Union                              | .. .. .         |
| " Subscriptions received in advance                                                    | 2 2 6           | " Entrance fees carried to Suspense Account                        | .. .. .         |
| " Arrears of Subscriptions received                                                    | 3 0 0           | " Life Membership Sub. carried to Suspense A/c                     | .. .. .         |
| " Entrance fees received, 15 at 2/6                                                    | 1 17 6          | " Secretary of Colley Hill Preservation Fund, amount collected p/c | .. .. .         |
| " Amount collected at the Society's Meeting for the Colley Hill Preservation Fund      | 2 15 0          | " Vote to Publication Fund                                         | .. .. .         |
|                                                                                        | <u>£54 12 0</u> | " Vote to Library Fund                                             | .. .. .         |
|                                                                                        |                 |                                                                    | <u>£54 12 0</u> |

**SUSPENSE FUND.**

| <i>Receipts.</i>                                  | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|---------------------------------------------------|----------------|---------------------|----------------|
| To Balance from 1910                              | 29 17 6        | By Balance          | .. .. .        |
| " Entrance Fees from General Fund                 | 1 17 6         | " " " " " " " "     | .. .. .        |
| " Life Membership Subscriptions from General Fund | 6 6 0          |                     | .. .. .        |
|                                                   | <u>£38 1 0</u> |                     | <u>£38 1 0</u> |

## LIBRARY FUND.

| <i>Receipts.</i>            | <i>£ s. d.</i> | <i>Expenditure.</i>                               |
|-----------------------------|----------------|---------------------------------------------------|
| To Balance from 1910 ..     | 0 10 6         | By two years' Subscription to "E. M. Magazine" .. |
| " Fines ..                  | 0 1 10         | " Binding ..                                      |
| " ..                        | 2 0 0          | " Librarian's Postages, etc. ..                   |
| " Vote from General Fund .. | .. ..          | " Balance ..                                      |
|                             | £2 12 4        |                                                   |

*£ s. d.*

0 12 0  
1 1 9  
0 2 4  
0 16 3

£2 12 4

## PUBLICATION FUND.

| <i>Receipts.</i>            | <i>£ s. d.</i> | <i>Expenditure.</i>                           |
|-----------------------------|----------------|-----------------------------------------------|
| To Balance from 1910 ..     | 0 0 4          | By Adlard's Account for 1910 "Proceedings" .. |
| " Donations ..              | 39 2 0         |                                               |
| " Sales of "Proceedings" .. | 1 15 6         |                                               |
| " Vote from General Fund .. | 2 14 6         |                                               |
| " Debit Balance ..          | 22 8 11        |                                               |
|                             | £66 1 3        |                                               |

*£ s. d.*

66 1 3

£66 1 3

## ASSETS AND LIABILITIES.

| <i>Assets.</i>                                          | <i>£ s. d.</i> | <i>Liabilities.</i>                  |
|---------------------------------------------------------|----------------|--------------------------------------|
| To Balance from Suspense Account ..                     | 38 1 0         | By Debit Balance Publication Fund .. |
| " " Library Fund ..                                     | 0 16 3         | " Balance ..                         |
| " " Arrears of Subscriptions £15 17s. 6d., valued at .. | 6 6 0          |                                      |
|                                                         | £45 3 3        |                                      |

*£ s. d.*

22 8 11  
22 14 4

£45 3 3

Audited and found correct, *January 20th, 1912.*

A. RUSSELL, }  
FRED. NOAD CLARK, } *Auditors.*

## REPORT OF THE COUNCIL, 1911.

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THE present report marks the completion of the fortieth year of the Society's history; and it is satisfactory to know that, in spite of serious losses through death, the membership shows a slight increase over the previous year. The members whose decease we deplore are Messrs. E. G. Broome, Albert Harrison, G. C. Hodgson, and G. H. Verrall. In addition, three members have resigned and one member has been omitted from the roll in accordance with Bye-law 10, 2. On the other side of the account we have elected twenty-one new members, a number which is a considerable advance upon the additions in recent years, and brings our present total up to 172. This number is made up as follows:—

|                         |            |
|-------------------------|------------|
| Honorary Members ... .. | 2          |
| Life Members ... ..     | 7          |
| Country Members ... ..  | 30         |
| Ordinary Members ... .. | 133        |
|                         | <u>172</u> |

The Balance Sheet, duly audited, is printed on page x, xi. Owing to the largely increased cost of production for the *Proceedings* for some years past, and the difficulty of reducing cost without impairing the value of that publication, your Council thought fit to call a Special General Meeting on December 14th, in order to elicit the opinion of the members as to the desirability of increasing the annual subscription from 7s. 6d. to 10s., and the Life Composition from five guineas to six guineas. Although there was an unusually large attendance of members at this "Special Meeting," there was an unanimous vote in favour of the Council's proposal. It was decided that in Bye-Law 8, Chap. 1, 10s. should be substituted for 7s. 6d. as the Annual Subscription; and that in Bye-Law 8, Chap. 6, six guineas be substituted for five guineas, as the Composition for Life-Membership.

The Meetings have been well attended, especially in the autumn; and the Recorder, Mr. A. W. Dennis, reports that there has been an average attendance of over 34 at each of the twenty-two meetings.

At the Annual Special Exhibition of Varieties held in November, 103 were present, a number not attained before; of these over 35 brought exhibits, the majority of which were of Lepidoptera. The Council hopes that other orders may be better represented on future occasions.

On the suggestion of the President, on December 14th, a special exhibition of *Rumicia phlœas* and its allied forms was held, and proved a great success.

The Society is indebted to Mr. F. Noad Clark for again taking charge of the lantern on each of the four occasions when it has been used.

The following is a list of the Papers read before the Society :

May 11th.—R. PAULSON, "Lichens," with lantern illustrations.

October 12th.—R. ADKIN, "Notes on the Season," with a summary of the subsequent remarks of other members.

October 26th.—W. J. LUCAS, B.Sc., on the Bracken (*Pteris aquilina*), illustrated with lantern slides.

This list is exceptionally short, but, on the other hand, there have been more exhibits at each meeting, and a considerable number of valuable notes have been contributed.

The Honorary Curator, Mr. W. West (Greenwich), reports that the additions to the Cabinets have been more numerous this year than last. He says, "In the Order LEPIDOPTERA, Mr. R. Adkin has given a specimen each of *Apatura iris* and *Hippotion celerio*; Mr. Russell, a bred series of *Taeniocampa rubricosa*; Mr. Newman, a fine pair of melanic forms of *Ennomos alniaria*; and Mr. Sheldon, several species of European Rhopalocera.

"Having completed the re-arrangement of the Society's collection of COLEOPTERA, I am pleased to report that the members interested in that order have contributed a good many species. The donors are Messrs. Ashdown, Ashby, Curwen, Gadge, and myself.

"Mr. Curwen has also contributed a fine series of various HYMENOPTERA, an order hitherto unrepresented in the Society's collections.

"I have also added several species of ORTHOPTERA and HEMIPTERA.

"The only Order that now remains unrepresented in the collection is the DIPTERA, of which, however, I hope to be able to add a cabinet drawer during the coming year."

Mr. Step has continued his work of renovating the specimens in the "Tugwell Herbarium," and a considerable part of this collection is now available for reference. The best thanks of the Society are due to Mr. Step for this work. For his kindness in presenting a

very serviceable cabinet for the accommodation of the collection, the best thanks of the Society are due also to Mr. R. Adkin.

The Honorary Librarian, Mr. A. W. Dods, reports that the Library was used for reference to a greater extent than last year, and that the number of books borrowed shewed a marked increase.

There have been seven Field Meetings held during the year:—

May 27th.—BEACONSFIELD, conducted by Mr. H. J. TURNER.

June 10th.—ST. ALBANS, conducted by Mr. A. E. GIBBS.

June 17th.—BLACKHEATH, ALBURY, SURREY, conducted by Mr. W.

J. KAYE.

July 1st.—REIGATE, conducted by Mr. A. E. TONGE.

July 15th.—CLANDON, conducted by Mr. H. J. TURNER.

September 16th.—BURNHAM BEECHES, conducted by Mr. R. A. R.

PRISKE.

November 4th.—OXSHOTT (Fungus Foray), conducted by Mr. S. EDWARDS.

Messrs. E. Step and H. J. Turner were again appointed as the Society's delegates to the Annual Congress of the South-Eastern Union of Scientific Societies which was this year held at St. Albans in June, and Mr. Step read a report of the gathering. On the last day of the Congress, at the instance of Mr. A. E. Gibbs, a field meeting was arranged to take place at St. Albans conjointly with the Hertfordshire Natural History Society and those members of the South-Eastern Union who were remaining. At the conclusion of the ramble through Gorhambury Park, the seat of the Earl of Verulam, the members were most hospitably entertained in the beautiful grounds of Kitchener's Meads by Mr. and Mrs. A. E. Gibbs.

Mr. R. Adkin again represented the Society at the meeting of representatives of Corresponding Societies affiliated to the British Association, and the thanks of the Society are due to him for his report of the proceedings. (See page 71).

The volume of Proceedings published during the past year, consists of xvi + 176 pages with 9 plates, and is considerably larger than the volume of any previous year. Such a production would be quite impossible without the generous aid of many individual members, who take upon themselves much of the financial responsibility for this necessary portion of the Society's work and influence. To all those who have helped in this, the best thanks of the Society are due.

The following is a list of the additions to the Library mainly by Donation and Exchange:

*Books.*

"Handbook of Tsetse Flies (*Glossina*)," from the Trustees of the British Museum (Nat. Hist.).

"Memoirs of the 1st International Congress of Entomology 1910."

"The Entomologist's Record and Journal of Variation," 15 volumes to complete the Society's set, from Mr. H. E. PAGE."

*Periodicals, Magazines, etc.*

"Entomologist."

"Entomologist's Monthly Magazine."

"Entomological News."

"Irish Naturalist."

"Deutsche Entomologische National Bibliothek."

"Bulletin de la Société Entomologique de France."

"Canadian Entomologist."

"Rochester Naturalist."

"Phillipine Journal of Science."

"Entomologisk Tidskrift."

*Reports, Transactions, etc.*

"Manchester Entomological Society."

"Meeting of Delegates of Corresponding Societies of the British Association."

"Phillipine Bureau of Science."

"Smithsonian Institute, 1909."

"Torquay Natural History Society."

"Horniman's Museum, 1910."

"Chicago Field Museum."

"City of London Entomological and N.H.S., 1909, 1910."

"Entomological Society of Ontario."

"British Association, 1910."

"Norfolk and Norwich Natural Science Society."

"Bolletino Lab. Zool. Portici."

"Croydon Natural History and Science Society."

"Wisconsin Academy of Sciences."

*Separata, etc.*

"Upsala Entomological Publications."

"Janet, The Phylogeny of the Insect."

The Morphology of the Insect."

The Ontogeny of the Insect."

The Morphology of the Basal Membrane of Insects.

The Parthenogenesis of the Worker Ant."

" Lichens and Algæ (Connecticut Academy of Arts)."

" Journeys of Ants, Victor Cornetz."

" *Luperina queenei* as a Species, H. J. Turner."

" Generation and Development of Land Formations on Marine Coasts."

" New Spiders of New England, Connecticut College Series."

" British Museum: Animals and Plants Mentioned in the Bible."

" " " Worthington Smith's Edible and Poisonous Fungi."



PLATE I.



1



2



3



4



5



6

UNFOLDING OF THE BRACKEN LEAF.

- |                                   |                                          |
|-----------------------------------|------------------------------------------|
| 1. Crosier-like first appearance. | 4. Group in various stages of expanding. |
| 2. Crosier uncurling.             | 5. Second leaflets expanding             |
| 3. Lower leaflets expanding       | 6. Young Bracken leaves and Bluebells.   |

## Bracken (*Pteris aquilina*).

By W. J. LUCAS, B.A., F.E.S. Read October 26th, 1911.

Ferns and their near relatives forming the group of plants known as *Pteridophytes*, have descended to us from far distant ages in the world's history. Could we go back to the Carboniferous Period, when coal was being formed, we should find ferns and their allies growing in luxuriance; and the remains of vast forests of them, altered by heat and pressure, are with us now in the form of coal. A great number of species of the *Pteridophytes* have been preserved to us in a fossil state—some being more or less like those living at the present day, some on the other hand showing considerable difference.

If we adopt the nebular hypothesis of the Earth's origin, we may no doubt presume that there was a period in long past times, before the earth had cooled so much as it now has, when bright sunshine was cut off from the surface of the land by a more or less constant canopy of vapour. We may perhaps with some confidence assume this to have been the case when ferns and fern-like plants were so abundant. At any rate since the *Pteridophytes* resemble their distant ancestors closely in appearance, it is not at all unlikely that there is a reason for the partiality, which they usually exhibit, for an environment in keeping with that I have suggested for their predecessors. For it is of course true that we usually look for the *Pteridophytes* in moist glens, deep lanes, and ancient woods—in fact, generally, where the rainfall is abundant and shady spots are plentiful. This also gives the clue to the most favourable conditions under which the greater number of species may be cultivated in captivity.

Proceeding on the same lines we should expect to find the *Pteridophytes* of England more plentiful in the south-west, where the warm moist Atlantic breezes prevail, and becoming less frequent as we proceed east. This is found usually to be the case, though the Bracken, which we are now to consider, is less fastidious than most in this respect.

One striking feature of many ferns is their delicate, much-cut, lace-like foliage. Consequently, the non-botanist is apt to class plants with such foliage amongst the ferns, while ferns with entire

leaves, such as the adder's tongue, he is inclined to look upon as something else. Still, ferns are, as a rule, better classed by most people than the lower Cryptogams—mosses, algæ, lichens and fungi.

Before turning to the Bracken itself we will look at a rough and ready table of the classes of the Vegetable Kingdom in order to find the fern's position amongst plants:—

| VEGETABLE KINGDOM. |              |                   |                      |  |
|--------------------|--------------|-------------------|----------------------|--|
| A. Cryptogams.     | 1. Cellular. | a. Thallophytes.  | i. Algæ.             |  |
| "                  | "            | "                 | ii. Fungi.           |  |
| "                  | "            | "                 | iii. Lichens.        |  |
| "                  | "            | b. Bryophytes.    | iv. Liverworts.      |  |
| "                  | "            | "                 | v. Bog-mosses.       |  |
| "                  | "            | "                 | vi. Mosses.          |  |
| "                  | 2. Vascular. | c. Pteridophytes. | vii. Ferns.          |  |
| "                  | "            | "                 | viii. Equisetums.    |  |
| "                  | "            | "                 | ix. Club-mosses.     |  |
| "                  | "            | "                 | x. Selaginellas.     |  |
| B. Phanerogams.    | "            | d. Gymnosperms.   | xi. Pines, etc.      |  |
| "                  | "            | e. Angiosperms.   | xii. Dicotyledons.   |  |
| "                  | "            | "                 | xiii. Monocotyledons |  |

In the following table the *Pteridophytes* are displayed a little more fully:—

| PTERIDOPHYTES.       |                     |                                                 |         |         |         |                  |
|----------------------|---------------------|-------------------------------------------------|---------|---------|---------|------------------|
| Spores of one kind.  | Ferns .. .. .       | Horsetails, or Equisetums. }                    | .. .. . | .. .. . | .. .. . | 38 Brit. species |
|                      |                     |                                                 |         |         |         | 8 " "            |
| Spores of two kinds. | Club-mosses .. .. . | Pillworts, etc. Selaginellas, and Quillworts. } | .. .. . | .. .. . | .. .. . | 5 " "            |
|                      |                     |                                                 |         |         |         | 1 " "            |
|                      |                     |                                                 |         |         |         | 3 " "            |

There are two points about most ferns which help to distinguish them from other plants in a general kind of way;—(i.) the crozier-like veneration of the young leaf, and (ii.) the bunches of spore-cases, usually on the under surface of the leaves. Both are easily observed in the Bracken, which is therefore a very fair type of the 38 species of Ferns to be found in Great Britain. As, however, these species are distributed among 17 genera, we have considerable variety in our native forms. This variety makes the British ferns an interesting set.

*Pteris aquilina*—the Bracken—is undoubtedly far the commonest of our ferns, being not very fastidious as regards soil, so long as it is not chalk. It does well in the poor sandy or gravelly soils of Surrey and Hants; and certain towns, such as Farnham, appear to have derived their name from its abundance in the district; for there is no doubt that the Anglo-Saxon word, *fearn*, refers to this species. The word Bracken (A.S. *bracce*, pl. *braccan*) itself—also of Anglo-Saxon origin—means “fern,” the reference being to the rough, “broken,” ground on which it often grows. *Pteris* (πτερόν,

a wing) points to the "wing"-like form of the leaves, and the specific name *aquilina* (*aquila*, an eagle) is due to the "spread-eagle" (or "oak-tree" as others think it), which appears when the stalk is cut across.

This fern is found throughout the British Isles, extending as far north as Shetland and climbing to some 2,000 feet in the Highlands of Scotland. Outside the British Isles also it has a very wide range. Though somewhat coarse in texture, the Bracken is really a magnificent plant, usually reaching a height of some three feet on open moors or heaths, but easily attaining six feet in woods and sheltered places. Certain specimens growing against a wall at Ham Common Gate, in Richmond Park, once reached a height of 8ft. 7in. ; but 10 or even 12 feet may be looked upon as the limit of its stature.

What is measured is only the leaf-stalk (sometimes called the rachis). It is not the stem, which grows horizontally underground, quite out of sight, its distance below the surface being usually measured in feet. We have known those who, wishing to cultivate this fern, have planted the leaf-stalk, hoping therefrom to obtain a good display of Bracken in the near future—an experiment as hopeless as planting an oak-leaf to obtain an oak. Should any one wish to ornament a corner of the garden by means of a clump of Bracken, a piece of the rhizome (or underground stem) must be procured—or better, tiny plants that have developed from spores on some such spot as a patch of charcoal and earth, where fir-branches have been burnt in Esher Woods. I can say from experience how fine a bed of Bracken some 3ft. or 4ft. high may be obtained in three or four years from tiny plants only an inch or two in stature.

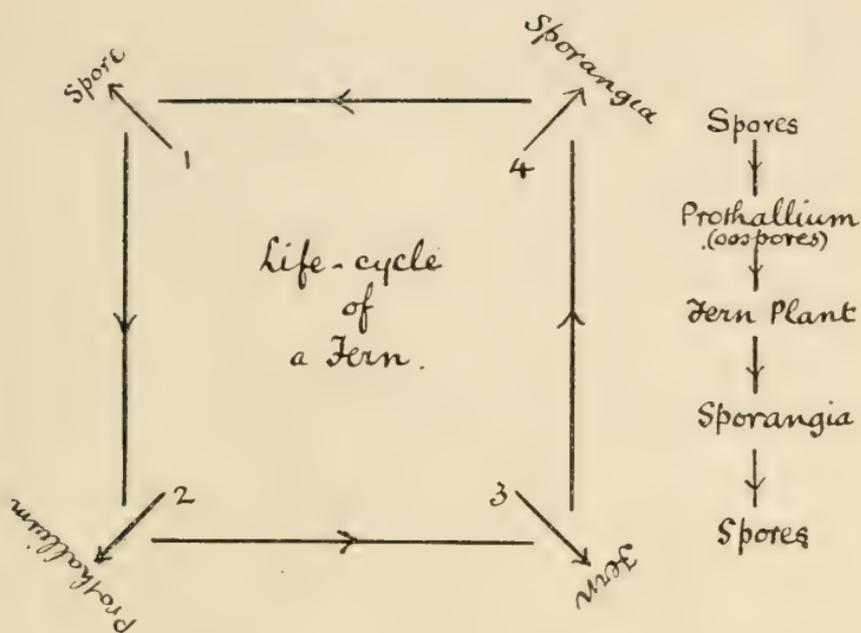
On cutting a section of the rhizome we find the presence of a vascular system. This is extremely important. It appears first in the ferns ; and its appearance points to as important a stage in the evolution of the plant as the appearance of the backbone does in that of the animal. The vascular system is arranged on a principle somewhat different from that of an ordinary flowering-plant—the bundles are concentric, the wood being surrounded by the bast. Each bundle, in fact, is something like the complete fibro-vascular system of a dicotyledonous flowering-plant, and the origin of the arrangement is explained in some such way. So there is no very essential difference between the two. In older parts the stem is strengthened by hard dark tissue, called schlerenchyma. The roots are small wiry fibres, insignificant in section, and of an ordinary type, very similar to that of the higher plants. Though sometimes called a "frond" (*frons*, a leaf)—quite unnecessarily—the leaf is a true leaf of quite the usual type, as a section soon shows. So, as a matter of fact, the vegetative arrangements of the Bracken are not greatly different from those of one of the higher plants.

In a flowering-plant the spores, which form the starting-point of a new plant, are still developed on special parts of the shoots—

anthers and carpels. In the Bracken they arise on the ordinary foliage-leaves. We have now to trace out the life-history of the plant from such spores. To find them we must examine the under-surface of a leaf, and if spore-cases are present, we shall discover them within a narrow fold of the margin. The groups of spore-cases are called sori (*sorus*, a heap). Each separate case (sporangium) is at the end of a stalk, and contains, when ripe, a number of spores, which are much like invisible pollen-grains. An elastic-ring round the spore-case, by its contraction, causes the case to burst, thus allowing the spores to escape. When a spore, in which the future energy of the fern is stored, falls on suitable soil, a row of green cells creeps out, and these cells ultimately develop into a small green film some eighth of an inch across. This is heart-shaped with a notch at the broader end, and is called the prothallium. It is very thin except near the notch. On the under surface of the thicker cushion, little tubes are formed, at the base of each of which is an egg-like spore. Farther back amongst a number of hairs are some other short tubes, antheridia, which produce what are called antherozoids, minute atoms of living matter—quite invisible—with several threads of protoplasm protruding from them. By the aid of these threads the antherozoids are able to swim about in the film of moisture beneath the prothallium till they find an egg and fertilize it.

From a simple cell—the spore—in which all its future was as it were stored, the fern started. It has passed through the prothallium-stage, and now again has its very essence stored up in a single cell—the egg-spore. Thus it has completed one generation of its life-cycle. The egg-spore develops, not into a prothallium, but into a tiny fern-plant, this appearing at the notch. Now the prothallium dies. The plant grows up, and ultimately produces spores of the first kind on its leaves, thus completing the second generation. This is the life-cycle of a fern and its allies. We started with a spore and we have arrived at a spore *of the same kind* again.

It will be noticed that by a generation we mean that part of the life-cycle of an organism, which extends between the points, when its whole energy and essence is shut up in a single cell. Twice in the life of the Bracken (and all ferns) this occurs. Its life, therefore, consists of two generations. Further, the form and activity of the plant during the two stages between the single-cell states are very different. When this is the case we say that the organism passes through an “alternation of generations.” The flowering-plants do so in a way, but to most persons the process is a hidden one. The moss plant has two distinct generations also and the same two kinds of spores, but the conditions between are so different from those of the fern that it does not seem possible for the fern tribes to be the offspring of the moss-tribes. Maybe they followed two lines of descent from common ancestors amongst the algal division of the cellular cryptograms.



Present-day *Pteridophytes* do not represent the highest stage reached when they were a dominant race. The geologic record tells us of flower and seed-bearing examples, which have since disappeared. The less specialized forms, as one would perhaps expect, have continued their existence to the present geologic age.

During the winter the future leaves are white and fleshy, beneath the soil, waiting to develop in the spring. In this stage they are said to form a good substitute for asparagus. Towards the end of April, sometimes rather earlier, the new Bracken leaves begin to appear above the ground in the form of green croziers. In warm May weather they develop rapidly, and at times one almost expects, while watching, to see them lengthening and unfurling, for under the best conditions they may increase an inch in 24 hours. (Pl. 1.)

Even then it is June before they are seen in their full grandeur. They display their bright greenery during July and August, but in September they begin to take on golden or ruddy hues, and so add their quota to the glorious tints of the autumnal country-side.

## ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History  
Society.

By W. J. KAYE, F.E.S.

*Read January 25th, 1912.*

A YEAR has passed since I was before you with an address—a year that will be a memorable one in the annals of our Society. We have at last, after much discussion, raised the price of our membership to newcomers, and we all hope that the result will be satisfactory. The treasurer will have a little less arduous task in meeting the heavy demands of the publication fund, and our balance sheet in the future, we may hope, may be more satisfactory than it has been for a year or two past. Our Proceedings in recent years have been out of all proportion to an annual subscription of seven and sixpence, and although we have raised the price to new members to ten shillings per annum, the Proceedings will still need some generous help from the band of subscribers who have so ungrudgingly given in the past.

The report of the treasurer is, unfortunately, not quite satisfactory, but with the increased subscriptions our financial statement a year hence, we must hope, will show a balance on the credit side. The report of the Council is quite satisfactory, and speaking generally the Society seems to gain fresh life with increasing years. The average attendance is again at 34; the maximum being 103 at the Exhibition of Varieties on November 23rd. The summer indoor

meetings, notwithstanding the opposition in some quarters to their being held, were quite well attended, showing that there is a real need for holding them. The field meetings have also been well attended, excepting the one at Burnham Beeches, which was perhaps too far off our usual localities to attract, or perhaps even to allow of, some members being present. The weather was ideal in every instance and it looks as if the persistent bad weather of 1910 was sufficient to account for the poor attendance in that year. There is no reason to be dissatisfied with the record of 1911 and the interest evinced at the field meetings, as judged by the attendances, seems to be a real one. The exhibits have, I think, been far more varied during the year that has just come to a close than in many recent years. Three years ago Mr. A. Sich, then your president, from this chair deplored the scarcity of exhibits in other orders than Lepidoptera. A change has certainly taken place since then and we should be grateful to Mr. Sich for having been the means of remedying a state of affairs that need not exist. We cannot individually have an intimate knowledge of every branch of Natural History, but we can know something about every order while we are still specialists in our own one or possibly two favourite subjects. Most people find it easy to learn something from an actual demonstration with the real thing, while just as many find it hard to remember details from a mere written statement, more especially on a subject they are not conversant with. Let us then continue to have a varied list of exhibits, for they widen our knowledge and help to make us all-round Naturalists.

It is the painful duty of the president to refer to the losses the Society has sustained by the death of its members or other notable entomologists during the year. It used to be the proud boast of entomologists that the votaries of their science and pastime were a long lived race. But the year, 1911, as far as concerns this Society, unfortunately has claimed several men who had not had by any means long lives. The total list is a larger one than usual.

Gerald George Hodgson, died on February 3rd at the age of 50. He had been a member of this Society since 1907 and his face was very well known at the meetings, at which also he frequently exhibited. His two principal contributions to science have been published in the "Transactions of the City of London Entomological Society." These are "Notes on the Effect of Climatic conditions on Sexual Dimorphism," in the volume for 1908, and "Which is of greater importance to the Rhopalocera—the upper or undersides of the wings?" in that for 1909. Dr. Hodgson's exhibits of the

British blue butterflies were always of interest, for he spent probably more time over this group than over any other, and by hard work in the field turned up many fine aberrations. Mention must be made also of his joint discovery with Mr. T. H. L. Grosvenor of the black form of *Anthrocera trifolii* in a Sussex locality which he kept a secret till his death.

Canon Charles Thomas Cruttwell, died on April 4th, aged 63. He was not very well known to London entomologists, and although an enthusiastic collector, especially of the "micro" Lepidoptera, he did not find time to publish more than field notes, which appeared chiefly in the pages of the "Entomologist's Monthly Magazine." He was, however, a great scholar, and had he been a free man would doubtless have left a more lasting legacy to science.

William Alfred Rollason, died on April 23rd, aged 48. He studied the Lepidoptera, the Hymenoptera-Aculeata and the Ichneumonidæ, and contributed papers to the "Entomologist's Monthly Magazine" and the "Entomologist."

Pieter Cornelius Tobias Snellen, died on March 29th, at the advanced age of 77. His great work was "Vlinders van Nederland," which, commenced in 1867, was continued through 15 years till 1882. He was one of the pioneers in the study of the neuration of the Lepidoptera, and his great work contains constant references to this structure. He also wrote many other papers, a number of which have appeared in the "Tijdschrift voor Entomologie."

Alexander Henry Clarke, died on July 25th, aged 72. He was little known to the later school of entomologists, but was up till near the time of his death a keen entomologist. He was a friend of the late Mr. J. W. Tutt, and occasionally contributed notes to the "Entomologist's Record." He had been a fellow of the Entomological Society for no less than 44 years.

Albert Harrison died on August 28th, in his 51st year. Many of us cannot yet realise that we have lost one of our strongest supporters, and one of our most genial colleagues. He joined this Society in 1892, was president in 1899, and had served on the council several times, always taking the liveliest interest in our affairs. He had also served on the council of the Entomological Society of London. The first meeting that I ever attended here was the one when the late Mr. J. W. Tutt, after reading his presidential address, handed the chair over to the new president, the late Mr. Harrison. In the year that followed, while he was in office, we all had an opportunity of appreciating the sterling qualities of our departed colleague. He did not write much on entomology,

but he had probably no time to do more than what he did. His breeding experiments with the lepidoptera were carried out on a very large scale, and he will be remembered in connection with these by the large exhibits he made from time to time in conjunction with Mr. Main, of *Pieris napi*, *Aplecta nebulosa*, and *Amphidasis betularia*. Mr. Harrison had acquired a very fine library of entomological works, and was well conversant with their contents. There were few, if any, aspects of British entomology that he could not discuss, and even illuminate. Quite lately he had turned his attention to the continental butterflies, but before he had had time to do much with them he was cut off from among us. We shall all miss his kindly personality, and his strong support for this Society.

George Henry Verrall was in his 64th year when he died at Newmarket on September 16th. Although he had been a member of this Society for 24 years, we were not often favoured with his attendance. We were all the same proud to have so distinguished a dipterist as a member, for he was known to everybody as the authority on British flies. The lasting memorial that he has left to Entomological Science is his work "British Flies," of which two volumes had been published, and a great deal more manuscript was in preparation for further volumes, but, unfortunately, he was never destined to issue it in book form. Many new species were made known to Science through his labours. He was one of the oldest members of the Entomological Society of London, having joined in 1866, and in 1899-1900 he filled the office of President. Naturalists in general will have reason to be grateful to the late Mr. Verrall for the enthusiastic manner in which he worked to preserve Wicken Fen. He generously purchased portions of the fen, whenever there were pieces on offer, and handed them over to the National Trust, so that for all time those interested in the peculiar fen fauna and flora, might have an opportunity of studying and enjoying it.

Samuel Hubbard Scudder died on May 17th at the age of 74. He was one of America's most distinguished entomologists, and was known the world over. Perhaps his greatest legacy to Science is "The Butterflies of the Eastern United States and Canada," published in 1888-9, but his name will also be handed down to posterity by his writings on fossil insects, chief amongst which is the work "The Fossil Insects of North America," published in 1890, with two supplementary works in the following year entitled "A Classified and Annotated Bibliography of Fossil Insects" and

“The Index to the known Fossil Insects of the World.” There have been a vast number of other books, papers, and pamphlets from his pen which it is impossible to even enumerate here.

E. G. Broome died at the age of 48. He had been a member of this Society for thirteen years, but could not often attend. He was keenly interested in British Lepidoptera, of which he had formed a good collection.

Of the more important entomological publications during the year, one must mention the “Catalogue of the Lepidoptera Phalænæ in the British Museum,” vol. x., by Sir George F. Hampson. This is the seventh volume treating of the enormous family of the *Noctuidæ*. It is more bulky than its predecessors, and there are more plates accompanying it. The species of the subfamily *Erastrinae* are here described, and it is astonishing to find that more than a quarter of the species are described for the first time, being new to Science.

A very large work, “The Macrolepidoptera of the World,” by Dr. Adalbert Seitz, has made good progress during the year, and the volume on the Palearctic Butterflies has been completed. There is no possible doubt that this ambitious undertaking will be of great service to very many entomologists who are living in places where access to large collections and libraries are prohibited to them. Least progress has been made with the African section of the work, but under the new publisher we may perhaps look forward to a more rapid appearance of this and all the remaining sections.

An important book by Mr. Ernest Edward Austin, entitled “A Handbook of the Tsetse-flies” (Genus *Glossina*), printed by order of the Trustees of the British Museum, is a very welcome addition to the literature on these death-carrying Diptera in their relation to man. There are ten coloured plates and 110 pages of letterpress, and amongst the description of the fifteen species are two that are new. The distribution of the species and the map showing these areas will be particularly valuable. The species are all so well described, and the figures are so good, that identification should be a comparatively easy matter.

“Ichneumonologia Britannica,” vol. iv., treating of the *Tryphoninae*, by Claude Morley, is a valuable addition to our knowledge of these rather neglected Hymenoptera.

“Insecta Transvaaliensia,” by W. L. Distant, has at length assumed the dimensions of vol. i., being the embodiment of the twelve parts which have been periodically appearing for some years past. As a contribution to a knowledge of the entomology of

South Africa it will be invaluable, with its 27 coloured plates and 39 half-tone illustrations. Many species of Lepidoptera, Coleoptera, Hemiptera, and Orthoptera are here described and figured for the first time. Although the author doubts if the publication will be continued, we can only hope that the necessary support will insure further instalments.

Another volume of the "Fauna of British India" has appeared dealing with the Freshwater Sponges, Hydroids, and Polyzoa, by N. Annandale, and is a worthy companion to the already long list of works in this fine series.

"The Flying Apparatus of the Blowfly," by Dr. Wolfgang Ritter, published by the Smithsonian Institute, is an extremely interesting memoir, with a large number of figures of the blowfly's wings in various positions to elucidate how such movements as turning and other evolutions in flight are accomplished.

The year that has just passed has been so remarkable for high temperatures and continuous sunshine, that I think it would be interesting to see how it has affected the Lepidoptera and their relative abundance or otherwise. It will be recollected that about the middle of April last we experienced some exceedingly cold weather, that this was rapidly succeeded by warmth, and that onwards through the months of May, June (except for a brief cool week), July, August, and September, we experienced unusually bright, warm, sunny weather, with a spell of extreme heat in July and August. It is, of course, impossible to say if this or that abundance was due directly to the high temperature. Scarcity and abundance are caused by a complex set of forces. It must be sufficient therefore to record the facts as we find them. In the cases of second and third broods, when usually there is only one, there is pretty clear evidence that climate has been the cause. The cases that have come chiefly under observation are those of the butterflies. The year 1911 will probably be recollected by entomologists as the butterfly year. Usually one of the very first species that comes under our notice in the spring is *Geopeteryx rhamni*. I saw certainly more hibernated specimens early in the year, and one was observed even in my own garden at Surbiton, yet I cannot find that the species has been observed to have been commoner in the summer. Another species that is seen very early in the year is *Celastrina argyolus*. It was probably not more common than usual in its first brood, but the second brood, which was out in the Haslemere district by July 9th, was certainly more plentiful than usual. The earliest date of the second brood I find to be July 6th,

at Woodford, Essex, recorded by Mr. J. A. Simes. In the London district it was very common in the second brood, equally, if not more so than the first brood, which is quite an exception to what we generally experience. Resultant larvæ from the summer brood were exceedingly abundant, and were nearly all full fed, or in pupa, before the middle of September. *Euchloë cardamines* was abundant; Mr. T. H. L. Grosvenor records it as early as April 24th ("Ent. Rec., xxiii., p. 291), and there were plenty of specimens observed at Beaconsfield on the occasion of the Society's field meeting on May 27th. The species was certainly more abundant than for some years past, but the hot weather played no part in accounting for its abundance, for it began to emerge at the commencement of the fine spell, and as usual\* there was no second brood. *Cruonympba pamphilus* was abundant during the summer, after several years when it had been conspicuously less common than usual. The abundance of a species whose larva is a grass feeder, is the more remarkable when one remembers how universally grass suffered during the long spells of drought. With the two species of *Agriades*, I this year had very little experience, but they both seem to have been more abundant in their own special localities than usual. *Agriades thetis* (*bellargus*) Mr. Grosvenor records as scarce in the first brood, and the second emergence more abundant, and first noted on August 7th. This is a very early date, and accounts for the fact that by September 5th, when I visited one of its Surrey localities, I could only find two worn females. On such a date (September 5th) in most years the species is to be taken freshly emerged. I note however that Tutt has a date of July 20th, 1893, when the second brood was found at Sandown by Mr. Prout, and abundantly in several other localities as early as mid-July. *Agriades coridon* seems to have been abundant in its own localities, but it would be difficult to say if it was commoner than usual, as locally it is usually to be taken in large numbers. *Polyommatus icarus* was abundant, and Mr. Grosvenor notes that the third brood was particularly abundant in the Reigate district and very variable. But the Lycaenid that undoubtedly responded in the greatest degree to the exceptional conditions was *Rumicia phlaas*. Over a large part of England it has been recorded as having been very abundant, more particularly so in the autumn. In many places, where it had scarcely been noticed, it suddenly multiplied enormously, and

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\* Barrett, in "Brit. Lep.," vol. i., p. 29, records a second emergence in 1886, near Maidenhead.

visited even suburban gardens in numbers. I noticed in Surbiton that they were particularly attracted to single varieties of China-asters. And although again and again disturbed never left the blooms except for a minute or two. It is remarkable that with the great increase in the numbers of the species, there has been a great amount of variation, and not only in the direction of the dark form *elens*, usually associated with heat, but of albino forms known as *alba* and *schmidtii*. Suffused forms have been numerous, and have been recorded from Little Missenden, Colchester, Bexley, and Helston, and almost anywhere where numbers of specimens were examined.

Mr. H. B. Williams, writing in the "Entomologist's Record," vol. xxiii., p. 275 says: "A very noticeable feature of this year's *R. phleas* has been the large number of suffused forms, due, no doubt, to the heat. Quite a large proportion of my captures have been of the form described by Tutt as *ab. initia*, and one or two distinctly *ab. suffusa*." The var. *schmidtii* has been taken at Windermere, St. Anne's-on-Sea, and Colchester, while the commoner forms with one or more wings bleached, the forms with the band on the hindwings absent or represented by streaks, and the *ab. caruleopunctata*, or blue marked hindwing form, have all been met with not infrequently by those who have taken the species in any numbers. It is remarkable that in this species, unlike the commoner blues, *icarus*, *thetis*, or *coridon*, well-marked examples of specimens with the spots joined or elongated appear to be exceedingly rare, but small aberrations with slightly wedge-shaped spots have been not infrequent. It is not uncommon for this species to have three broods in one year, but it is not often observed to be so extremely numerous as in the autumn of 1911.

It is interesting to compare the records of this species in the year 1893, which was comparable to 1911, for the long duration of high temperature and abundant sunshine. Tutt, in "British Lepidoptera," records the species from several localities as occurring in October, while a fresh specimen was seen at Micheldean on November 1st (Scaranke), and Fowler found that a specially late brood did not emerge till November 12th, at Ringwood. Several specimens, I believe, were seen this year as late as November, while in mid-October it was still abundant.

*Pieris rapæ* and *Pieris napi* were both triple-brooded, and are recorded as such by several writers in the October number of the "Entomologist," as well as by Mr. Grosvenor in the November number of the "Entomologist's Record."

*Pararge megara* has also been triple-brooded in some districts and is recorded as such by Mr. J. W. Muirhead from St. Anne's-on-Sea, Lancashire, by Mr. W. H. Harwood at Colchester ("Entom.," xliv., p. 364), and others have observed it without recording it. Mr. South in his "Butterflies of the British Isles" (p. 124), says of this species "in favourable years there may be three broods." With regard to the Nymphaline butterflies, second emergences are rare, as with a species that does not appear in the perfect state till summer is well advanced, there is not so much time for larvæ to feed up. *Brenthis euphrosyne* is recorded on August 17th in Surrey, by Mr. H. G. Champion ("Entom.," xliv., p. 405), and *Brenthis selene* is recorded as a second emergence on August 20th near Taunton, by Mr. A. S. Tetley ("Ent. Rec.," xxiii., p. 320). Mr. South, writing of *B. euphrosyne* says very rarely a few specimens have been taken in August; and of *B. selene* that it is occasionally seen in August in this country. It is rather curious, that although *B. selene* is later in appearance than *B. euphrosyne*, that the former is not nearly so rare in second emergence as the latter. Barrett quotes several cases of *B. selene* having been taken even commonly as a second emergence, but of *B. euphrosyne* he says, "There is a second brood in August on the Continent; but certainly not except, perhaps, in the most rare and casual manner in this country." He quotes but a single record made by himself at Haslemere on July 15th, 1868. *Vanessa io* was this year markedly commoner than usual throughout Surrey and the adjacent parts of Sussex, and in Essex Mr. W. H. Harwood found full grown larvæ on September 6th ("Entom.," xliv., p. 321), pointing to an attempt at a second brood. *Pyrameis atalanta* is noted by Mr. Grosvenor ("Ent. Rec.," xxiii., p. 291), as almost equally common as *V. io*. But, personally, I did not observe so many specimens as usual. Mr. B. E. Jupp, at Haslemere, did not find it so common as in some years. Two years ago, in that locality, I, in company with Mr. Jupp, found it abundant, settling on the Devil's-bit Scabious. I note that the Rev. C. R. N. Burrows records seeing one on May 24th, but not again. But the Nymphaline that responded exceptionally to the abnormal weather was *Limenitis sibylla*. Mr. G. F. Mathew ("Entom.," xliv., p. 327) recorded a second brood emergence on September 19th near Dovercourt, Essex, after a first brood that commenced to appear on June 14th. Mr. W. H. Harwood also records ("Entom.," xliv., p. 363), seeing two specimens between Colchester and Ardleigh on September 18th. Yet I have not heard of it, neither has it been

recorded, as appearing as a second generation in the New Forest, where the species is perhaps as abundant as anywhere.

Of the two early "skippers," *Nisoniades tages* and *Hesperia malva*, which alone of the British species are ever observed in a second brood, the former has been recorded by Mr. A. S. Tetley ("Ent. Rec.," xxiii., p. 320), from near Taunton, as appearing in mid-August. But of the latter there does not appear to be a published record for the year. It is known, however, to be second-brooded at Lyme Regis regularly, and in 1905 I found it there abundantly in late July. It is noteworthy that in 1893 a second brood was observed and recorded in several localities where usually it appeared in but one generation. Thus, at Cuxton the late Mr. Tutt took it on July 22nd and at Guildford Mr. Groves took it on August 6th, and various observers recorded it in several other localities. (Vide, "Brit. Lep.," vol. viii., p. 286.)

Many notable captures have been made during the year, and some of the more often observed migratory species have been plentiful. Both *Colias edusa* and *Colias hyale* are recorded from many parts of England, as far North as Cheshire. The former was however generally scarcer, while in some Southern localities the latter was common. The immigration appears to have been very limited, very few worn specimens of either species having been seen or captured in early Summer. Most of the specimens secured were in fine condition, and were taken in the latter part of August and the early part of September. Mr. C. W. Colthrup records ("Ent. Rec.," xxiii., p. 276) seeing *C. edusa* in the Maidstone district on August 9th, and *C. hyale* not till September 3rd. On through September *C. hyale* was abundant and in fine condition, but he took but two *C. edusa*. The range of the species over the country was about the same. As far as Cheshire in the North to Norfolk in the East (only for *C. hyale*), to Cornwall and Scilly in the West, and all along the S. Coast.

*Sphinx convolvuli* has been taken all over the country as far North as Manchester, and it will be of great interest to see if the species becomes common in 1912. Probably some thousands of eggs have been laid in this country. Mrs. Venning writing to the "Entomologist's Record" (vol. xxiii., p. 32), notes finding at Polzeath, in Cornwall, between 60 and 70 eggs laid on *Convolvulus arvensis* with the female moth close by. This was on September 2nd, and as the weather was so favourable up till well on in October, there should be a possibility of numbers of moths resulting in due course. Other Sphingid species that migrated to us were *Manduca*

*atropos*, which is recorded from Norfolk, Berkshire, Cornwall ("Entom.," xliv., p. 405), Suffolk ("id.," p. 325), and Essex ("Ent. Rec.," xxiii., p. 304), *Phryxus livornica* was taken in Cornwall by Mr. B. H. Smith ("Entom.," xliv., p. 411), in E. Devon by Mr. J. W. Metcalf ("id.," p. 411), in Surrey by Mr. E. C. Joy ("id.," p. 365), and in the New Forest by Mr. G. T. Lyle ("id.," p. 365).

*Papilio machaon* has occurred in several localities where it is not known to be a resident. Its appearance in these places is probably to be accounted for by a small migration of the species, either from the Continent or from its Cambridgeshire or Norfolk home. Mr. W. H. Harwood ("Entom.," xliv., p. 320) records the finding of two fine larvæ feeding on carrot in a garden near Colchester. Single examples of the imagines are noted from Bishop's Stortford by Mr. C. Mellows (id., p. 365), who remarks that the locality is more than 30 miles from Wicken. Mr. H. M. Edelsten records the species from Enfield (id., p. 365), and at Kelvedon, another Essex locality, Mr. P. C. Reid records seeing two imagines (id., p. 365). Since writing the above I have read in the January number of this year's "Entomologist" of an attempt to introduce the species in 1909 at Easton, near Dunmow, Essex, and as Professor R. Meldola remarks, all these stray specimens in 1911 may be the result of the attempt to colonize the species there. While upholding any attempt to colonize desirable insects, I think that at the same time it is most necessary to publish a statement of the introduction in some recognised journal of Entomology, so that we might be all forewarned of this and that unusual occurrence in any given locality.

*Pyrameis cardui*, which is such a migrant of migrants, was this year hardly seen in this country. I have been only able to find two published records. Mr. B. W. Adkin notes it at Scilly, in August ("Entom.," xliv., p. 324), and Mr. Joseph Anderson on September 11th, at Chichester ("Entom.," xliv., p. 364).

*Euranessa antiopa* has occurred in several localities, and is recorded from Brading, Isle of Wight, on August 17th; Bradwell-on-Sea, Essex, on August 25th; and Berkhamstead, Herts., at the end of August.

*Isseria lathonia* has occurred at St. Margaret's Bay, Kent, and is recorded by Mr. I. C. Gunton on August 13th ("Entom.," xliv., p. 324).

Many interesting migrants among the moths have been noted or captured. *Sterrhia sacraria* has been secured in two such widely separated localities as Aberdeen and the Lizard. The former

record was made by Mr. L. G. Esson on August 18th, the latter by our own member, Mr. B. H. Smith, on September 8th. *Leucania extranea* has been taken on the Devon coast by Dr. Beckwith Whitehouse, on September 20th, but the other *Leucania* species, *L. vitellina*, that occasionally visits us, does not seem to have been noticed. *Plusia ni*, which may prove to be a permanent resident, was taken by Mr. B. H. Smith in the Lizard district on September 9th. *Xanthia ocellaris* has been taken in several localities round London, as well as at Downham Market, Suffolk, and there can no longer be a doubt that this species is native, for from the condition of many of the captured specimens, it is evident that they must have hatched over here. The species seems also to be exceedingly local, and attached to poplar trees, upon which the larva feeds, so that we may see this insect far more generally represented in collections in the near future. *Caradrina ambigua* has occurred on the Devon and Cornish coasts, but not in the numbers in which it is sometimes met with, and it looks rather as if the few specimens secured were the offspring of a former migration, rather than being themselves migrants. *Plusia gamma* is noted by the Rev. C. R. N. Burrows as occurring at Mucking, Essex, on June 9th, and swarming since, but this seems to be the only recorded occurrence of the insect for the year. It was probably seen by many entomologists, but not in sufficient numbers to warrant them to publish their observations. A Pyralid species that frequently accompanies *P. gamma*, *Nomophila noctuella*, seems to have been scarce and rarely observed.

In the few minutes that I still have to spare I wish to say one or two things in relation to that vexed subject "Mimicry." You all know the history of the theories and of what they consist:—How Bates, when he was collecting on the Amazon, found butterflies of different families which were exceedingly like one another in colour, pattern, and also in habits, and how he found them flying together and deceiving him, and how he accounted for this phenomenon by supposing that one species was edible, while the other was nauseous, and that the one escaped under the guise of the other. He most unfortunately called this resemblance "mimicry," a name at once most unsuitable, and to many people most misleading. It will also be recollected how Bates was unable to account for two distasteful species of different families also mimicking one another, and how Fritz Müller, eighteen years later, in 1879, explained the difficulty by suggesting that two species by sharing the attacks of young and inexperienced enemies benefited

by being like one another. This theory in contradistinction to Bates' theory was called "Müllerian Mimicry." Since the theories were promulgated no greater champion of their truths has arisen than Professor E. B. Poulton. What he and others set themselves to prove was, whether there was sufficient evidence that attacks were made either by birds or other enemies in sufficient numbers to account for the operation of Natural Selection in bringing about these astonishing results. The method which was first put into practice by Fritz Müller to discover whether attacks were numerous, and whether many different species were attacked, was applied to the collecting of specimens with notches taken out of the wings, presumably by birds or lizards. In the long and important paper (Trans. Ent. Soc. Lond., 1902, p. 287-584) by Mr. G. A. K. Marshall, on the "Bionomics of S. African Insects," there are several plates with figures showing injuries. Some of these are convincing and others most problematical, and here at once there is ground for scepticism. Specimens with a single notch, that is with only one wing notched, are no proof that the injury was not self-inflicted by the insect flying through rough scrub or what not. But specimens with notches in both forewings or both hindwings, which coincide when the wings are folded, cannot be a self-inflicted injury, as it must have been done while the insect was settled. I think it, therefore, most unfortunate that cases which afford strong, even if indirect, evidence, should have been mixed up with examples which are meaningless. But, perhaps, before discussing this aspect of mimicry I should have broached the question whether birds or other enemies were actually deceived by the resemblance which we see. We shall probably never have as much evidence on this point as to be absolutely certain that enemies are largely deceived. From the human standpoint the case cannot be answered satisfactorily. Dr. G. B. Longstaff ("Trans. Ent. Soc. Lond.," 1908, pp. 607-673), in a paper entitled "Bionomic Notes on Butterflies" has a section "Mimics in the Field deceiving Man," and quotes how he has been deceived by cases of mimicry. Even from the human standpoint I think we should insist on the observer having no entomological knowledge beforehand. Man is deceived in such cases in inverse proportion to the technical knowledge he has of the species concerned. One man would be deceived where another with a greater technical knowledge would not be. Observations of non-entomologists would be far more satisfactory. It might be urged that if an entomologist can be deceived "a fortiori" a non-entomologist would be. This is partly true, but one must be

thoroughly deceived, just as the bird is, and not "momentarily," as Dr. Longstaff tells us he was. That non-entomologists are completely deceived I have direct evidence. Mr. C. B. Roberts, who collected specimens for me in British Guiana, but who had no knowledge of what he was collecting, did send me one or two wasps of the genus *Pseudagenia*, along with the closely resembling moth *Sphecosoma testacea*, thinking that they were all moths. I certainly do not think we should credit birds with any greater acumen in the distinguishing of specimens than that of a non-specially trained human being. But if birds are deceived by moths looking like lichen, or wood or leaves, why should they not be deceived by looking like another living thing of their own kind? Scarcely anyone has ever questioned the resemblance of, say, *Agriopis aprilina* to the lichen on an oak trunk or the wonderful likeness of the leaf butterfly *Kallima inachis* when it rests to a leaf. The argument could still be raised as to whether people had seen birds attacking or hunting for the species to such an extent as to cause Natural Selection to operate. One wonders, of all the hundreds of lepidopterists in this country, how many have ever seen birds hunting on tree trunks or on palings for moths, yet in this country we have in the past 20 years seen some remarkable changes in some of our indigenous species that are to be found in and around our large towns, and it is almost universally agreed that Natural Selection must have acted on the species with the altered conditions of the insects' surroundings. It should, therefore, be quite conceivable that although we do not often see birds attacking butterflies or moths in the air or at rest, attacks can be both numerous and persistent. But Mr. Marshall while in Rhodesia ("Trans. Ent. Soc. Lond., 1902, p. 355), after setting himself to look for and note such cases did not by any means find them of rare occurrence, and other observers have since noted cases not infrequently. Quite recently (in the September number of the "Entomologist's Record," vol. xxiii, p. 218) Mr. R. Shelford records a most interesting observation as to a sparrow attacking a *Pieris rapa*, and after mouthing it, letting it go. A clear case of experimental attack. The same observer later saw the same bird catch and eat a *Chrysopa*, which to our senses would seem to be most unpalatable. The human standpoint seems, therefore, to be not very reliable when we are considering the tastes of birds. Mr. C. W. Colthrup ("Ent. Rec.," vol. xxiii, p. 218) records a number of instances of different birds eating various butterflies, and now that attention has been drawn to the matter

it appears likely that many observations will be made by different people.

Notwithstanding the very complete review of the whole of the possible causes of mimetic resemblance, as given by Professor Poulton in the "Journal of the Linnæan Society" for 1898 (Nat. Select. the Cause of Mimetic Resemb. and Common Warn. Col.), there are still a large number of Entomologists who entertain doubt as to the truths of mimicry at all. I will say here at once that I think it is rather a pity that Professor Poulton's paper was not published in a wholly entomological publication. It is certain that very many entomologists have never even yet seen that comprehensive and exhaustive paper, while a careful perusal of its pages, if one only starts with a perfectly open mind, leaves one forced either to accept Natural Selection as the cause of mimetic resemblance or to have no explanation at all. One can even go so far as to state that those who deny the truths of mimicry deny the truth of Natural Selection. One of the commonest criticisms of mimicry is that the same conditions of climate, etc., produce the same results, and that two or more insects may evolve a pattern independently of one another. One of the most negating answers to this was shown by Prof. Poulton to be the historical case of the two mimetic Ithomiines, *Methona confusa* and *Thyridia psidii*, first noted by Bates in the Amazon valley. These two transparent and black butterflies of the same family, but of different genera, were examined microscopically and were found to have been given a transparent appearance in a different way. Both species, in common with all Ithomiines, have two kinds of scales, usually one kind much broader and shorter than the other. The *Methona confusa* was found to have the long scales reduced to hairs and the broad scales much reduced in size and shape. The *Thyridia psidii* was found to have the long scales reduced but not to hairs, and the broad scales reduced but retaining their original shape far more than the *Methona*. Many other species of various families were examined and the arrangement and nature of the scales was found to be very different. In some the scales were set on edge so that the light passed between them as in *Castnia linus*. In others the scales are flat, but quite transparent, as in the Hypsid Moth of the genus *Anthomyza*. In others the scales are quite normal, except that they are greatly reduced in number, so that light passed between them. To say here that similar conditions of climate produce similar results, is simply an untruth, for if climate can make one species lose a number of its scales, it should act in the

same way for all. As Prof. Poulton truly says, "the comparison of these details is almost a demonstration of the operation of Natural Selection . . . . we cannot conceive of any theory not dependent upon the principle of selection, which could produce such extraordinary superficial resemblances among numbers of species by methods which are entirely unlike in all their details." In 1905 I made a similar examination of the British Guiana transparent groups consisting of such families as Syntomidæ, Hypsidæ, Geometridæ, Erycinidæ, and the subfamily Ithomiinæ, and published the details with a plate in the "Entomologist's Record" for that year. The differences in the methods of obtaining transparency were just as varied as those obtained by Prof. Poulton, and some were even different from those species and families he examined, showing that natural selection could seize on any one or more tendencies to become transparent. The cases of those species, such as the Erycinid butterfly *Stalactis phœdusa*, that have two sets of scales, each of which has undergone an entirely different modification, being particularly instructive. In this particular species normally there are alternately narrow and broad scales, the long narrow scales being set up on edge slightly, which gives the insect under the microscope the appearance of having two layers of scales. In the transparent portions the broad scales are transparent and the narrow scales have become hair-like. In addition, the transparent scales wear off. Truly a remarkable combination of processes to obtain the one end of transparency. But, if objection is taken to mimicry between insects of the same order, there are hundreds of cases of close resemblance between members of different orders. Moths may be like beetles, wasps, bugs or flies, and in nearly all such cases there is an astonishing alteration in habits, altitudes and movements to fit in with the superficial resemblance. If a Syntomid moth, *Correbia lycoides*, is like a Lycid beetle by accident, we should not expect to find that the movements of the moth were abnormal and like those of the beetle. We should also not expect to find that it had a flattened body, which also is abnormal in moths of this family, but which makes it very like in appearance to a beetle's abdomen. Again, if *Macroneme lades*, the Syntomid moth, is like a fossorial wasp of the genus *Salix* by accident, one would not expect to find that it held out its black hind legs in flight in exactly the same way as the wasp does, or that it vibrated its wings when it alighted on a leaf as the wasp does. If there is real resemblance it must be advantageous for the moth to be disguised, or it could never have come about in the precise way alluded to. How

else could it come about but by the operation of Natural Selection? There is no other answer. As Prof. Poulton has ingeniously remarked ("Journ. Linn. Soc.," xxvi, p. 602), "The supposed direct effect of local forces implies the Hereditary Transmission of Acquired Characters." This would be Lamarckism, which as a theory is dying every day. Although there are many things that we cannot explain by Natural Selection it is the best theory we have, and Mimicry in its complex no less than in its simple aspects can only be explained rationally by its aid.

And now it is my pleasant duty to make way for my successor, Mr. A. E. Tonge. That you have made a good choice in your selection for the highest post you have to offer we are all agreed, for he has proved himself to be one of our best scientific lepidopterists, and I shall look forward with pleasure to attending the meetings under his Presidency.

## ABSTRACT OF PROCEEDINGS.

—*over*—

FEBRUARY 9th, 1911.

Mr. W. J. KAYE, F.E.S., *President*, in the Chair.

Mr. L. D. Wakeley, of Wimbledon Common, was elected a member.

Mr. Newman exhibited some shoots of birch, taken from the base of stumps of cut trees, which contained larvæ of *Egeria culiciformis*, or from which larvæ had been taken out by birds. He had found a considerable number of sticks ripped up in this way and the larvæ abstracted. It was usual for the larvæ to feed under the bark of the stumps and not in the basal growths. The suggestion was that the ova are laid at the base of the vigorous first-year growths around the stump, and that sometimes the larvæ bore into these twigs instead of into the stump. At times he had found the cocoon as high as six feet from the ground. It was evident that the larvæ must feed in the wood of uncut trees as well as in the stumps. Mr. Adkin and others had also found larval burrows at a height of six or seven feet from the ground in stems of birch trees.

Mr. Hugh Main exhibited twigs of aspen distorted and swollen into galls by the attacks of larvæ of the Longicorn beetle, *Saperda populnea*.

Mr. Ashby exhibited a series of the beetle *Lasioderma serricorne*, and said that this species had swarmed in a house in Thames Street at the end of last summer, and that these specimens were some of the swarm. The house had to be fumigated and the contents destroyed. At a recent meeting of the Entomological Society of London Commander Walker read a newspaper cutting referring to this house.

The President, on behalf of Mr. B. Jupp, exhibited a very fine variety of *Ennomos angularia*, in which the two transverse lines of the forewing were filled in with a dark fascia. The band thus formed was narrower than the normal width of the space between

the two lines; also a fine *Triphena jimbria* with a beautiful green and white forewing, the white area being particularly well marked. Further, he showed a fine *Boarmia repandata* var. *conversaria*, with a very heavy black central fascia, which was accentuated greatly by the well marked white subterminal line and whitish area preceding it. All three specimens were from the Haslemere district, the two latter being bred specimens.

Captain Cardew exhibited a box containing a number of species which had flown to light in a room of a house at Rozeau, on the West Indian Island, Dominica. Among the species were the Sphingids *Pachylia ficus*, *Pholus vitis*, *P. labrusca*, and *Herse cingulata*, with *Deiopeia ornatrix*, *Argadea apta*, *Epantheria icasia*, *Euceria imrizi*, *Cosmosma demartria*, etc.

The remainder of the evening was devoted to an exhibition of microscopic slides.

Mr. West, of Ashtead, showed species of slime fungi (*Myxomycetes*).

Mr. Fremlin explained the method used for the development of *Protozoa* in a solution of jelly-beef broth.

Mr. Edwards exhibited the ova of the stick insect.

Mr. Adkin showed preparations of the genitalia of species of the genus *Anthrocera*, made by Mr. F. N. Pierce.

FEBRUARY 23rd, 1911.

Mr. J. H. Leslie, F.E.S., of Tooting, was elected a member.

Mr. Turner exhibited three Noctuids sent to him by Mr. A. Murray, of St. Anne's-on-Sea, and asked for information with regard to them. The first he supposed to be a melanic specimen of *Agrotis tritici*, form *aquilina* (?), with black forewings and transverse lines and markings more or less indistinct, having no pale costal streak, the lower wings being darker and only a little clearer on the disc. This form answers to var. *nigra*, Tutt. At a casual glance the second specimen appeared to be the same species, but on closer examination, although the tint and depth of colour were almost identical, the costa was not so straight, there were no black wedges in the submargin, the forewings were not quite so narrow, and there were vestiges of the row of minute dots in the submarginal area, all of which are points characteristic of *A. nigricans*. These dark forms were captured at the same time and in the same locality, and several have been taken *in cop.* with undoubted *aquilina*, but as

the forms were so similar in general appearance, it does not appear an absolute certainty which they were. Hence the further confusion.

The third specimen was a worn *Luperina* sp. ? about which there was some doubt. It was taken in the same place as the last two and was of a rough texture, dusty grey in colour, and was probably a form of *L. cespitis*, but of a small obscurely marked race, which is said to occur along the Lancashire and Sussex coasts.

Mr. H. Moore exhibited a specimen of the very beautiful Leaf-moth *Gloriana (Phyllodes) ornata*, from India.

Mr. L. W. Newman exhibited sticks of willow containing larvæ of *Trochilium bembeciforme (crabroniformis)*, some of which were in quite small dead twigs, while others were in large living stems. He also showed sticks of willow containing the larvæ of the Musk-beetle, *Aromia moschata*, feeding side by side with the larvæ of *T. bembeciforme*, which they very much resemble in their methods of working in the stems and also in their mode of pupation. In a glass topped box he showed a living specimen of *Egeria culiciformis*, which he had bred that day, after some sixteen days forcing. At the same time he was forcing on larvæ of *Arctia caia* and *Callimorpha dominula*, some of which he exhibited and which were full fed. He stated that some of the larvæ of the former species had not responded to the forcing at all and were still quite small.

The President exhibited a varied series of *Spilosoma lubricipeda*, with many forms of the variety *satima*. He briefly mentioned the occurrence of the species in Britain, which had only been recorded by Haworth and later by Dale, in 1837, from Saltfleet, Lincs., till 1891, when Mr. J. Harrison bred a female. Having paired it with a strongly marked northern male, he obtained a stock, from which thousands were obtained by inbreeding. For the past ten years the variety had apparently been lost sight of, and Mr. Kaye asked if members knew of its recent occurrence.

Mr. R. Adkin exhibited specimens of *Agrotis nigricans* of a very dark form to compare with the black example Mr. Turner was showing from St. Anne's-on-Sea. These specimens also came from St. Anne's, but were not so dark as the later example.

The remainder of the evening was devoted to the exhibition of lantern slides.

Mr. A. E. Tonge exhibited about a dozen slides, each containing the life-history of a British Butterfly.

Mr. Edwards showed a long series of slides illustrative of the anatomy of the Lepidoptera.

Mr. Main exhibited a number of slides illustrating the structure

and habits of spiders and their snares, sent to him by Mr. Hancock, of Birmingham.

MARCH 9th, 1911.

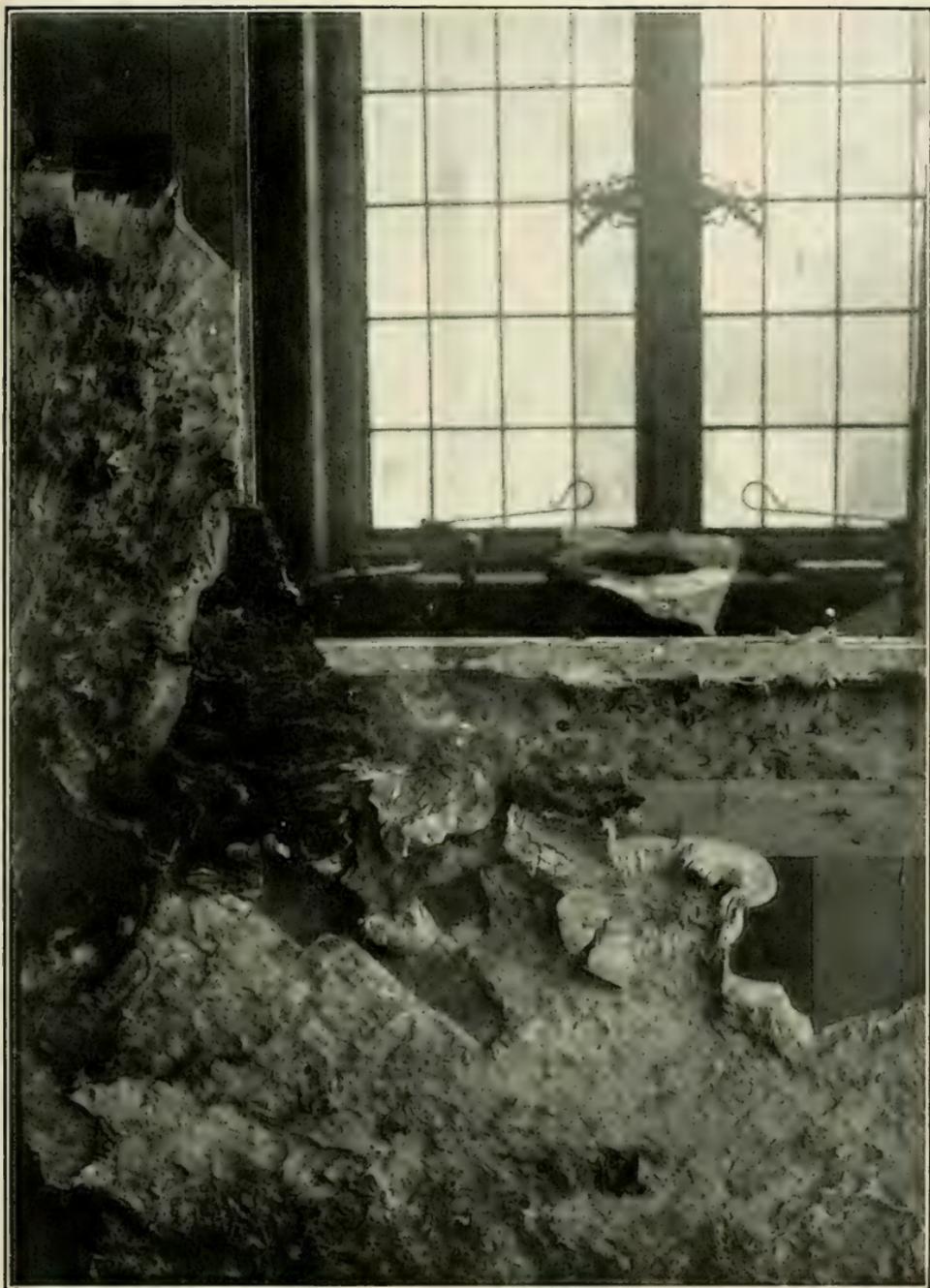
Mr. A. E. Gibbs exhibited a small collection of Lepidoptera received from a correspondent in Jamaica, and read the following notes:—"These specimens were mostly taken on the north side of the Cuna-Cuna Pass, in the Blue Mountains, on paths, or by following up the courses of springs and small tributaries of the Rio Grande. They include a pair of the large and rare *Papilio*, *P. homerus*, until recently supposed to be confined to Jamaica, but now, I believe, discovered on some of the other West Indian Islands. The other *Papilio* in the collection is *P. palaua*. There are two specimens of an *Aganisthos*, which is a very distinct local form of *A. odius*, but which the local collectors call *A. orion*, both being Fabrician names. I have placed an ordinary form of *A. odius* from the mainland below them, and you will notice that it differs in the shape of the central fulvous patch of the forewing, and also in the shape of the hindwing. A specimen of *Gynæcia dirce* differs from the mainland form in the more pronounced character of the markings on the underside. There is a long series of *Hymenitis diaphanus*, the only Ithomiine found in the Island, and below them a single specimen of the only Jamaican Satyrid, *Calisto zaugis*. I also call attention to *Adelpha abyta*, which I believe is a good insect. The local form of *Anartia jatropha* is a dark one and has, I believe, received the varietal name of *saturata*. I do not think the other insects call for special note. There are one or two Hesperids and other butterflies I have not yet identified, as well as several moths."

Mr. Gibbs also remarked that the particular district in which this Pass of Cuna-Cuna is situated is well known for the luxuriance and variety of its ferns.

Mr. Newman exhibited a number of a new kind of larva cage, which he had recently had made, so arranged as to allow of the food plant being kept fresh, while the chances of mould arising were at a minimum. It was made of cardboard waxed, was capable of being packed in a small space for travelling, and had the additional advantage of being very light.

Mr. Step exhibited three photographs depicting the progress of *Merulius lachrymans* ("dry rot") behind the oak-panelling of a house, from which had been obtained the sporophore exhibited on

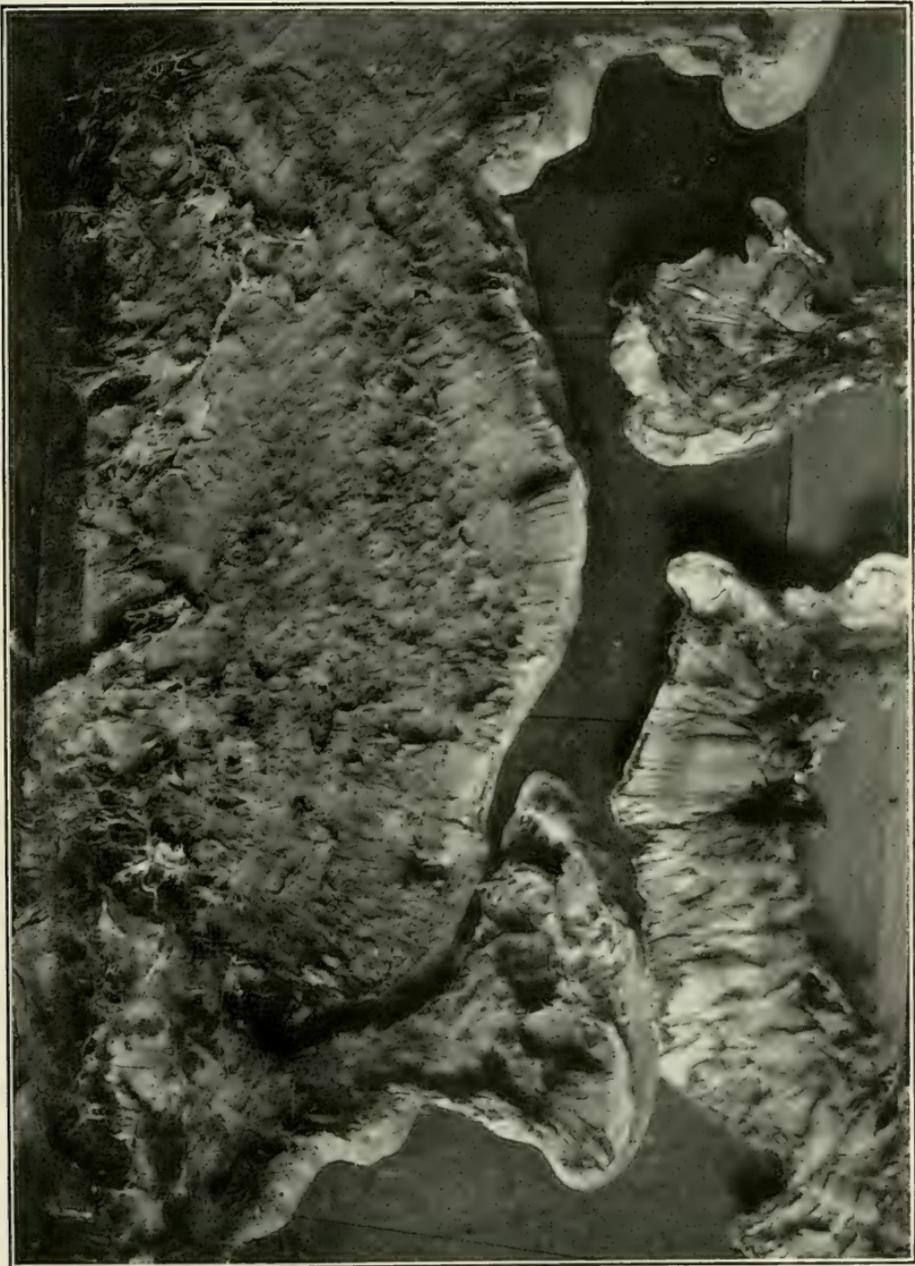
PLATE II.



MERULIUS LACHRYMANS.

The dark portion to the left is a segment of a sporophore that was more than two feet in breadth.







January 26th. These photographs showed the mycelium spreading in a radial manner, and attaining to a felted texture two inches in thickness. Hundreds of square feet of woodwork had been covered with this destructive growth; and in addition it had attacked linoleum and carpets. (Plates II. and III.)

Mr. Robert Adkin exhibited a form of *Nola albulalis*, from East Sussex, in which the broad brown cloud that in ordinary specimens occupied the central area of the forewings was absent, leaving only the darker transverse narrow stripe, thus giving the insect a much paler and more sharply marked appearance than is usual. He said that some thirty years ago he both captured and bred a considerable number of Kentish specimens of this species but so far as memory, assisted by a long series in his cabinet went, they were very uniform in appearance, but among the few that he had seen of recent years from the Sussex locality were several approaching the form exhibited.

The President exhibited several Syntomid species, of the genus *Pseudosphex*, including *P. jonesi* n. sp. and *P. noverea*, to call attention to the remarkable tufted basal joints of the palpi. The long black hair made these organs wonderfully like the jaws of the several species of wasps that they mimicked. A further species of Syntomid was shown—*Sphecosoma testacea*, together with its model a Pompilid species of wasp of the genus *Pseudagenia*. This wasp had only very slightly developed jaws and the Syntomid mimic had no such clothing to the palpi as was found in *Pseudosphex*.

Mr. Sheldon exhibited two specimens of a *Noctua*, concerning which there had been keen controversy some thirty years ago. They were taken about 1874 by a young collector named Taylor, at Derby, and forwarded to various authorities without being definitely determined. They were named by Knaggs *Agrotis helvetina* as new to Britain, he identifying it with a continental species ("Ent. Mo. Mag.," vol. viii., p. 182). The specimens eventually came under the notice of Dr. Mason, who, after some trouble, made them out to be a form of *Graphiphora augur*, with "the ground colour light grey or putty colour; the two black lines crossing the front wing, and those outlining the discoidal spots are there, but are not so pronounced as in the type, the fringe on the hindwings is pink, not grey." (see "Brit. Noctuæ," vol. ii, p. 103).

Mr. Blenkarn exhibited an example of *Epinephela tithonus* of a very pale xanthic colour ? ab. *albida*, taken in the Isle of Wight in July, 1910; a semi-scaleless form of *Saturnia pavonia*: the form

var. *unilinea* of *Macrothylacia rubi*; and a very nice form of *Camptogramma bilineata* with the "outer edge of the forewings dark almost to the tip," taken at Sandown in July, 1910.

Mr. H. Main exhibited examples of various orders of insects to show how they could be reared in captivity, and the metamorphoses watched. The insects were prevented from drying up by being kept in glass topped tins. Into these was first poured some plaster-of-paris, made into a cream with water, and when this had set two layers of blotting paper were put on top. This made a convenient cage for observation, and was easily cleaned when necessary by changing the blotting paper. A family of earwigs hatched from eggs laid in captivity, hibernating Syrphid larvæ, and galls on cabbage stems containing larvæ of *Ceuthorhynchus pleurostigma* (*sulcicollis*) were shown in these boxes.

MARCH 23rd, 1911.

Mr. Stanley A. Blenkarn, of Beckenham, was elected a member.

The President exhibited a series of *Xylina conformis* from Llantrissant, Glamorganshire, with the exception of one specimen labelled Leigh, Essex, which, in the light of what we know of the habitats of this species, badly wants confirmation. It was remarked how exceedingly local and rare this species was, considering it was a regular inhabitant, and not a migratory species. It was likely that it occurred in many suitable localities in S. Wales, but the general character of the district was uninviting to an Entomologist on account of the extensive mining operations, and it was possible that the species was far commoner than generally supposed. It was widely distributed and common throughout Central Europe.

Mr. J. P. Barrett said that he had taken a specimen of the species at Margate, a number of years ago.

Mr. Newman exhibited portions of the stems of osier, showing the damage done by birds to extract the larvæ of *Trochilium bembeciforme*. This occurred during the last fortnight. Quite  $\frac{3}{4}$  in. of wood had to be pierced to reach the larva.

Mr. Newman also called attention to the devastation caused by some hitherto unknown disease among bees. It was said that not a single hive was left on the Isle of Wight, and that now the scourge had spread over the greater part of Sussex into Kent, Surrey and Hampshire. It portended great injury to the fruit crops for this year. Strawberry growers already anticipated an almost total loss of their season's crop. Little seemed to be known

about the disease, which attacked the workers in the first instance, causing a binding effect upon their internal organs, with stoppage and the resultant paralysis, and death. The queen bee, if herself not attacked, would die from starvation. The disease was most contagious, and it was necessary to burn all hives and material likely to be infected. When once attacked there was no hope of saving a single hive.

Mrs. Hemming said that her bees at Horley, Surrey, had succumbed, and that a professional beekeeper on the confines of Tilgate Forest had not been able to save a single hive out of a large number. It had been suggested that the disease was the outcome of the recently introduced custom of spraying charlock with a poisonous compound to counteract the attacks of vermin.

Mr. Step said that the disease had been known as the "Isle of Wight disease," but seemed now to be spreading with much vigour.

Mr. A. W. Buckstone exhibited examples of a bred series of *Apocheima (Nyssia) hispidaria* from Wimbledon parents. The males were paler than the male parent, while the females were variable. The larvæ were fed on elm and hawthorn. All the larvæ (ninety-five) pupated. Eighty-eight moths emerged; the majority being females. The remaining seven pupæ were found to contain dead moths—six females and one male. The soil in which the larvæ pupated consisted of pine mould 50%, silver sand 25%, Japanese fibre 25%. Depth, 10½ inches. The vessel used was an eleven-inch flower pot. About four inches of soil at the bottom was damp, the remainder dry. A double layer of bath towelling was kept over the mouth of the pot, and was always kept moist, and the pot remained outdoors from mid-October. The second week in January the pupæ were removed and placed between layers of Japanese fibre, the mouth of the pot being covered with tiffany. The moths commenced to emerge the third week in January. He also exhibited examples of dwarfed specimens of *Hybernia defoliaria*, of which there was a larger percentage than usual during the period October-December, 1910, in the Wimbledon and Richmond districts.

Mr. Blenkarn read the following short notes on various species:—

Several *Chesias rufata (obliquaria)* which emerged in a pot, the mouth of which was covered with damp bath towelling, failed to develop after ten hours, but on being placed in an ordinary breeding cage the wings developed rapidly, and were fit for flight in half-an-hour. The same thing occurred with specimens of *C. spartiata*.

*Triphena pronuba* larvæ had pupated without feeding after

hibernation. They came to the surface and burrowed again. An attempt was made to force the larvæ in the autumn, but it failed. The pupæ are about two-thirds the usual size. The larvæ were nearly black when full fed.

*Spilosoma menthastræ* ova were found by him on the shell of a living snail in July, 1910.

Several batches of ova of *Hadena pisi* were found on a small plum tree. The larvæ did not appear to feed on the leaves of the tree but descended to the ground, and were found on knotgrass and narrow-leaved plaintain in July, 1910.

Mr. Newman said that the larvæ of *A. hispidaria* pupated readily in two inches of soil, if placed so that a hard concrete floor formed the bottom of the cage. By this treatment he had readily bred the species, and not two per cent of cripples emerged. Several members remarked that this species was very prone to produce cripples in nature.

Mr. Robert Adkin exhibited two varieties of *Arctia caia*, both from Yorkshire larvæ. One reared in July 1909 had the whole of the forewings of a dull smoky-brown with two irregular whitish markings at the base, the lower somewhat triangular in shape; a constricted white streak across the inner area from a point within the costa to near the anal angle; between this and the apex three small white spots, and there were two similar spots near the inner margin; the hindwings were black with basal patches, and broad fringes of dull yellow; there were also some ill-defined yellow spots on the central area. The other, reared July, 1910, had the forewings dead white, with the usual markings of the basal two-thirds indicated by small brown irregular shaped spots, and the apical portion of the outer margin heavily marked with brown; the hindwings were bright orange-red, the inner spot indicated by a black dot on a yellow cloud, and the three outer black spots reduced in size and edged with pale yellow.

He also exhibited living females of *Nyssia sonaria* with eggs in *sitû* under the bark of *Clematis*.

APRIL 13th, 1911.

Miss Maude Alderson, F.E.S., of Worksop, was elected a member.

Mr. W. J. Ashdown exhibited about 100 species of Coleoptera, taken in Switzerland during July, 1910, including:—*Emus hirtus*, *Gnorimus nobilis*, *Ludius hamatodes*, *Homaligus suturalis*, *Lygistopterus*

*sanguineus*, *Idalia alpina*, *Luciola italica*, *Tricodes alvearius*, *Saperda carcharias*, *Pachyta quadrimaculata*, *Strangalia attenuata*, *S. atra*, *Leptura maculicornis*, *L. sanguinolenta*, *Pachybrachys hieroglyphicus*, etc.

Mr. H. J. Turner exhibited living examples of a Longicorn beetle, *Agapanthia asphodelas*, sent to him from Hyères by Dr. Chapman.

Mr. R. Adkin exhibited an Agrotid that was taken in the Isle of Lewis, in 1901. The specimen appeared to be a melanic form of some species, but being in rather worn condition it was difficult to place it with certainty; its general appearance and such markings as could be traced appeared to suggest its being an unusually dark form of *Agrotis simulans*. He also called attention to a *Sciaphila* taken at Unst, in Shetland, 1892, which he thought must be regarded as an obscurely marked specimen of *S. colquhounana*. He further exhibited a specimen of *Pyrameis (Cynthia) cardui*, from the collection of the late Mr. McArthur, in which the inner row of black spots of the hindwings were united into an irregularly shaped blotch.

Mr. L. W. Newman exhibited, on behalf of Mr. Oliver, of Wolverhampton, a series of bred *Aphantopus hyperantus*, the larvæ of which were fed in metal boxes on *Poa annua*, and kept in a warm room all the winter. The imagines emerged in January and February. It was noted that the ocelli were very well developed, compared with a few specimens which had been captured in July in the same locality from whence the larvæ came, and in which the ocelli were somewhat small.

Mr. A. T. Hemming exhibited a comparative series of *Brenthis selene* from Warwickshire and Ashdown, and stated that the former are found to be a larger race than the latter, a fact that holds good both in the largest and smallest specimens from each locality.

|                 |     | Warwickshire. |     | Ashdown. |     | diff. |
|-----------------|-----|---------------|-----|----------|-----|-------|
|                 |     | mm.           |     | mm.      |     | mm.   |
| Largest male    | ... | 45            | ... | 37       | ... | 8     |
| Smallest male   | ... | 33            | ... | 30       | ... | 3     |
| Largest female  | ... | 45            | ... | 38       | ... | 7     |
| Smallest female | ... | 37            | ... | 35       | ... | 2     |

Mr. L. W. Newman reported that in the lanes of N. Kent the snow still lay a foot deep, and that close to it the larvæ of *Arctia caia* were crawling up to feed in the bright sunshine. He had not seen any of the hibernating butterflies, although in other years his records for the Kentish highlands were earlier than those of the present year.

Members reported that *Anisopteryx æscularia* were still to be taken, *Aleucis pictaria* had been out a fortnight, and that *Pieris rapæ* had been seen.

APRIL 27th, 1911.

Mr. P. A. Buxton, of Tonbridge, was elected a member.

Mr. Tonge exhibited a portion of a stem of *Viburnum lantana* with the pupa case of *Ægeria andrenæformis in situ* as left by the imago at emergence. He had found four such cases recently.

The President exhibited a similar stem with the pupa case projecting from the larval burrow and the living imago which had emerged in confinement.

Mr. Kaye also exhibited a fine plant of the Orchid *Cattleya citrina* in flower, and stated that it was a native of Mexico, and grew at a much greater elevation than most species of the genus. It was also an aberrant species in the form of its flower.

Mr. R. Adkin exhibited a remarkable gynandrous specimen of *Lasiocampa (Bombyx) quercus* in which the left antenna and wings followed the male characters and the right those of the female, but were of the male coloration. The specimen was reared from a Yorkshire larva some years ago, and had since been in the possession of Mr. Sam J. Capper, of Liverpool.

Mr. Newman exhibited a larva of *Callimorpha dominula*, in which the usual yellow markings were almost entirely wanting.

Mr. H. W. Andrews exhibited two specimens of *Hilaria æronetha* Mik., a dipteran recently identified as occurring in Britain. They were taken in North Kent on June 20th, and July 23rd, 1910, respectively.

Mr. Edwards and Mr. Hy. J. Turner exhibited several species of each of two groups of N. American Papilios. (1) The *machaon* group was illustrated by *P. polyxenes*, *P. asterias*, and *P. americanus*, and (2) the *glaucus* group, illustrated by *P. glaucus*, *P. turnus*, *P. daunus*, *P. troilus*, and *P. eurymedon*.

It was remarked how prolific N. America is in species of *Papilio* in spite of a more rigorous climate over a large area, compared with the whole of continental Europe which only produced three species.

Mr. Dennis exhibited numerous lantern slides of lichens *in situ*, of the flowering of the larch, and of the toothwort (*Lathraea squamaria*).

Mr. Main exhibited an interesting series of lantern slides of the common millepede, *Polydesmus complanatus*, illustrating his observations so far on their egg-laying and nest-building habits.

MAY 11th, 1911.

Mr. Step exhibited a teratological specimen of horse-chestnut (*Aesculus hippocastanum*), consisting of a bud-scale that was longer and narrower than usual and ended in seven fully developed leaflets as in the typical leaf of the species, the scale itself performing the function of a petiole. The opposite bud-scale was developed in precisely the same manner, but these were the only examples he could find on a number of young trees carefully examined. For the purpose of comparison Mr. Step showed a normal leaf and a normal bud-scale from the same tree. The exhibit demonstrated that the bud-scale is an aborted or undeveloped leaf.

Messrs. Harrison and Main exhibited a long series of *Aplecta nebulosa* and its varieties, from Delamere Forest, and communicated the following notes:—

“The series was bred last year from *robsoni* male  $\times$  *thompsoni* female.

“Only 60 moths were bred, 26 per cent. were of the grey form, 42 per cent. of the *robsoni* form, and 32 per cent. of the *thompsoni* form. This result quite negatives our idea that the form *robsoni* was a heterozygote or hybrid (so-called), and that the grey form and *thompsoni* were homozygotes, or pure. We had been led to this conclusion by the results already reported (‘Proc. S. Lond. Ent. Soc.,’ 1908, p. 84), obtained by ourselves and by Mr. Mansbridge (see ‘Proc. S. Lond. Ent. Soc.,’ 1909, p. 64).

“From a large brood, both parents *robsoni*, we bred 25 per cent. grey, 51 per cent. *robsoni*, and 24 per cent. *thompsoni*, obviously Mendelian proportions.

“From several broods, both parents grey, we bred only the grey form.

“From grey form crossed with *thompsoni* Mr. Mansbridge obtained only *robsoni*, and from the grey form crossed with *robsoni* he bred 50 per cent. *robsoni* and 50 per cent. grey. These two latter broods were very small, but all the results pointed to the conclusion mentioned above, and appeared to be parallel to the well-known case of the Andalusian fowl, where we have also three forms, a black, a white (splashed with black or blue), and a blue, the latter being the hybrid, and the two former being pure. However, the results obtained last year show that the problem is not so simple as this, and that it will require further experiments before it can be solved.”

Mr. Harrison and Mr. Main exhibited hybrids of *Biston hirtaria* and *Nyssia zonaria*, reared by Mr. Harrison of Middlesborough; male and female from *N. zonaria* male  $\times$  *B. hirtaria* female, with typical specimens of both species for comparison.

Mr. Newman exhibited hybrids of the same species, and stated that to his knowledge no females had yet been reared from the crossing *B. hirtaria* male and *N. zonaria* female.

Mr. R. Adkin exhibited series of hybrids between *Biston hirtaria* male  $\times$  *Nyssia zonaria* female and *N. zonaria* male  $\times$  *B. hirtaria* female, together with series of the two species for comparison.

He said that it would be remembered that some time last year ("Proc. S. Lond. Ent. S.," 1910, p. 141) he exhibited specimens of the last named hybrid and called attention to the remarkable form taken by the single female that he then had. Through the kindness of Mr. Harrison, of Middlesborough, who had paid considerable attention to the cross-pairing of these and other species, he had this spring been enabled to rear the series now exhibited. The males reared from each of the two crosses were very much alike; in size about midway between the two parents, and in markings and colour combining their characters in a remarkable way. But the point to which he wished to call particular attention was the apparent attempt on the part of the females reared from the *zonaria* male  $\times$  *hirtaria* female cross to produce fully developed wings, which had resulted in the production of a very curiously formed insect, having wings equal in length to those of the male parent, but of only about half the width and acutely pointed at the apex; of a pale grey colour strongly irrorated with blackish, practically devoid of markings other than a darkening of the wing-rays, and fringed with an abundance of coarse, bristly hairs—their general aspect being that of a greatly enlarged edition of the rudimentary wings of the *zonaria* female. Of the *hirtaria* male  $\times$  *zonaria* female cross, no females had been reared among the specimens that had come under his notice, amounting to a score or so in all.

Mr. Gough exhibited specimens of the form *arete* of *Aphantopus hyperantus* taken in both Kent and Surrey. He also showed several forms intermediate between *arete* and the type.

A resolution was passed strongly condemning the action of the Government in presumably misappropriating a portion of the land previously earmarked for the projected completion of the Natural History Museum.

Mr. R. Paulson, F.R.M.S., read an interesting paper on "Lichens," illustrated with numerous mounted specimens and a considerable number of lantern slides.

MAY 25th, 1911.

MR. R. ADKIN, F.E.S., in the Chair.

Mr. Hugh Main exhibited a living female Scorpion which he had just received from the W. Indies. He stated that the Scorpions were viviparous, and that during the journey several young ones had been produced. It was said that these young were placed by the female on her own back, and that she carried them thus for some weeks. At the present time there were two of the living young on the back of the mother.

Mr. West called attention to the Society's Collection of Coleoptera which he was exhibiting, the cleaning and resetting of which he had now completed. At the same time he wished to thank Messrs. Ashby and Ashdown for the numerous additions which they had made to the collection during the past year.

Mr. H. Moore exhibited some Coleoptera just received from the Orange River Colony, two or three specimens of which were still living, in spite of their six weeks' journey. He also showed a Sea-urchin from the West African coast. It belonged to the extremely compressed section, with very strong lateral teeth-like projections on one edge. It was afterwards found to be a species of *Rotula*.

Mr. Edwards exhibited a specimen of the dry-rot fungus, *Merulius lacrymans*, which he had found at Blackheath.

Mr. Step, on behalf of Mr. Hy. J. Turner, exhibited a specimen of the rare Crucifer, *Dentaria bulbifera* from Beaconsfield, where it had been found in some local abundance. He pointed out the curious black bulbils in the axils of the leaves. These were the principal method of reproduction, as the seeds rarely ripen. The flowers had fallen and the long siliquæ characteristic of the family were just formed.

Mr. R. Adkin exhibited a series of *Nyssia zonaria* reared from Wallasey parents. The larvæ were fed up in 1909 ("Proc. S. Lond. Ent. Soc.," 1909, p. 87), and in the following spring ten moths emerged, all of them females; but the larger number of the pupæ remained over to the spring of the present year, when 45 moths emerged, 29 of them being males and 16 females. He called attention to some small points of variation in the series, four of the specimens being much paler than the others, and in another the dark grey transverse lines of the median area of the forewings were united towards the inner margin, thus forming an

incomplete dark fascia, while in two or three others there were indications of a tendency towards a similar form of variation.

Mr. Blenkarn exhibited the Coleopteron *Myrmedonia funesta*, and the ant *Formica fuliginosus*, in the nest of which the beetle was found by him at Sandown.

Mr. Gadge remarked that some years ago he packed a number of large Orthoptera in damp material at Pretoria and forwarded them home. Previous to packing them he allowed them to drink a comparatively large quantity of water. Most of them reached home alive after a journey of six or seven weeks in close confinement. He even tied them round with fine string to prevent them from breaking off their legs. He was of opinion that the moisture imbibed was an important item in keeping them alive.

May 27th, 1911.

#### FIELD MEETING AT BEACONSFIELD.

Conductor: HY. J. TURNER, F.E.S.

The Society have held Field Meetings at so many places around the metropolis during the last twenty years, that it is somewhat difficult to find pastures new, and then only by going farther afield, making it less easy to arrange for the afternoon party.

A previous visit or two and a careful study of the Ordnance map led me to choose a very pleasant walk by woodland paths and retired lanes, from Beaconsfield station to Winchmore Hill. At this latter place arrangements were made for tea and subsequently the return journey was planned to be made by a different route. The weather was quite favourable and most members picked up acceptable specimens, although nothing was very abundant. The half dozen members of the morning party had a very pleasant ramble in another direction, bearing westward, round fields, woods, shady lanes and sunny sheltered banks, getting back to the station in time to receive those whose opportunities were more limited.

Taking the order Lepidoptera first, no less than thirteen species of the Rhopalocera were reported, of course including the three common whites *Pieris rapæ*, *P. brassicæ* and *P. napi*; *Euchloë cardamines* was common, but perhaps the most common species was *Rumicia phleas*, which was flying on the banks near the railway in some numbers with a few *Polyommatus icarus*, *Cronomypha pamphilus*, and an odd specimen or two of *Hesperia malvæ* and *Nisoniades tages*. *Gonepteryx rhamni*, *Vanessa io*,

*Celastrina argiolus* and *Aglais urticae* were seen on the sunny outskirts of woods. Ova of *E. cardamines* were common on the Hedge Mustard flower heads. *Euclidia mi* and *E. glyphica* quite fresh out were flying with the *R. phleas*. Odd specimens of *Hylophila prasinana*, *Lithosia sororecula* (*aureola*), *Drepana falcataria*, *D. cultraria*, *Cilie glaucata* (*spinula*), *Notodonta trimacula* var. *dodonea*, *N. chaonia*, and a few *Hepialus lupulinus*, were reported by different members. Only one or two species of *Noctuae* were met with, and those who remained to sugar, had an absolute blank, with plenty of time to observe the night-jars and bats. *Demas coryli*, *Diloba caruleocephala* and *Acontia luctuosa*, were taken, and a few larvæ of *Plusia chrysitis* were beaten from nettles. Several of the party met with *Melanippe montanata*, *M. sociata*, *M. fluctuata*, *Coremia ferrugata*, *C. unidentaria*, *C. designata* and *Cidaria suffumata*. Other species of the *Geometrinae* met with were *Venilia macularia*, *Hemerophila abruptaria*, *Rumia luteolata*, *Cabera pusaria*, *Bapta temerata*, *Strenia clathrata*, *Eupithecia exiguata*, *Anticlea badiata*, and *Anaitis plagiata*. The members of the *Pyrales* group observed were *Pyrausta aurata* and *P. ostrinalis*, while four species only of the *Tortricidae* were reported, viz., *Phocopteryx lundana*, *Capua favillaceana*, *Sericoris lacunana* and *Symæthis oxyacanthella* (*fabriciana*). *Micropteryx calthella* were as usual common in the flowers head of buttercups, while *Adela rufimitrella* (*frischella*) was met with on flowers of speedwell.

One or two members tried beating for larvæ without any brilliant success. *Hibernia defoliaria*, *H. marginaria*, *Himera pennaria*, *Phigalia pedaria* (*pilosaria*), *Hypsipetes furcata* (*sordidata*), *Hemithea strigata*, *Abraxas grossulariata*, *Diloba caruleocephala*, *Calymnia trapezina*, and *C. affinis* were some of the species met with in this stage. A larva of *Cosmotriche potatoaria* and several larvæ of *Porritia galactodactyla* were also taken. Among the other orders but few species were reported. The *Coleoptera* met with were mostly "common everywhere" ones, although perhaps *Telephorus lividus*, *T. pellucidus*, *Rhagonycha limbata*, *Agriotes pallidulus*, *Anobium domesticum*, *Clytus arietis*, *C. mysticus*, *Timarcha tenebricosa*, *Chrysomela hyperici*, *Cassida flaveola*, *Mordellistena abdominalis* and *Polydrusus tereticollis*, may be worth noticing. Of the *Homoptera* the only species worth noting was *Triecphora vulnerata* (*sanguinolenta*). The common *Panorpa*, *P. communis* (?) was all over the place and so also were several species of the *Hemerobiidæ*.

A species of *Geranium* was met with in flower, which at the time

no one recognised. Mr. Noad Clark has since reported that he has no doubt that it is the rare dusky crane's-bill, *Geranium phæum*. In one of the meadows the curious adder's-tongue fern *Ophioglossum vulgatum* occurred, *Allium ursinum* was met with in the woods, where *Asperula odorata*, the woodruff, was abundant. Very fine specimens of the bugle, *Ajuga reptans* and of *Lamium galcabolton* occurred. Perhaps the rarest plant found, although it had already shed its flowers, was the coral-root, *Dentaria bulbifera*, whose stems were conspicuous with their jet black bulbils in the axils of the leaves and flower pedicels.

Most of the party kindly sent in notes on their captures, and expressed themselves very pleased with the outing and with the possibilities of the locality, although "nothing very exciting" occurred. One member, however, went so far as to say "it was one of the most enjoyable Field Meetings I have ever attended, pleasant company, glorious weather, and a right down jolly tea."

JUNE 8th, 1911.

DR. T. A. CHAPMAN, F.Z.S., F.E.S., in the Chair.

Mr. H. W. Andrews exhibited examples of many genera of the Dipterous family, *Syrphidae*: of the individual specimens a large number were from North Kent.

Captain P. A. Cardew exhibited an aberration of *Anarta cordigera*, taken at Rannoch in May of this year, in which the hind-margin and base of the forewings were of an unusually pale grey.

Mr. S. Blenkarn exhibited about 150 species of Coleoptera taken in the Isle of Wight from April 23rd to May 10th, of which more than 40 were species of Geodephaga up to the end of the genus *Bembidium*. There were among them two species new to the Isle of Wight list, viz., *Tachyusa umbratica* and *Galerucella calmariensis*.

Mr. S. W. Gadge exhibited a box of Lepidoptera, pinned so as not to show the pin through the thorax. It looked a neat method, but the insects could not be moved without the forceps.

Mr. Stanley Edwards exhibited a box of species of the genus *Charaxes*, including *C. pyrrhus* from Amboyna, *C. delphis* from India, *C. citharon*, *C. smaragdalis*, *C. pelias*, and *C. tiridates* from Africa. He also showed larvæ of *Diloba ceruleocephala* feeding on laurel, received from Rev. G. Wheeler and obtained at Bourton in Gloucestershire.

Dr. Chapman exhibited the living larvæ of *Callophrys avis* from the South of France.

JUNE 10th, 1911.

FIELD MEETING AT ST. ALBANS.

*Conductor:* A. E. GIBBS, F.L.S., F.E.S.

Advantage was taken of the meeting of the Congress of the South-Eastern Union of Scientific Societies at St. Albans in June last to hold a field meeting in that neighbourhood. An invitation was extended by the local committee to our members, as well as to those of the Hertfordshire Natural History Society, to participate in the excursion to Gorhambury on June 10th, the last day of the Congress, and a party numbering about 100 assembled at the Town Hall of the ancient borough at three o'clock, whence they were conveyed in motor omnibuses to Gorhambury, the seat of the Earl of Verulam, between two and three miles to the west of the town, where they were welcomed by the Earl and Countess, who very kindly permitted an inspection of the valuable pictures and other treasures with which the house abounds. Gorhambury takes its name from the de Gorham family, two members of which, in the 12th century, were Abbots of St. Albans. The first of the four mansions, which have stood on different sites in the park, was built by Robert de Gorham, who ruled over the rich and powerful monastery from 1151 to 1167. In the 16th century Gorhambury was in the possession of Sir Nicholas Bacon, Elizabeth's great Lord Keeper, who on more than one occasion entertained the Virgin Queen in lavish style during her "progresses" through the country. He built the second mansion, some ruins of which still remain. It is recorded that when Her Majesty first visited him at Gorhambury she exclaimed, "My lord, what a little house you have gotten!" to which the Lord Keeper wittily replied, "Madam, my house is well, but it is you that have made me too great for my house." A third mansion was erected by Sir Nicholas' still more illustrious son, the great Sir Francis Bacon, Baron Verulam, Viscount St. Albans.

"The great deliverer, he who from the gloom  
Of cloistered monks and jargon-teaching schools,  
Let forth the true philosophy."

The present residence dates only from the last quarter of the 18th century. After viewing the pictures and the Elizabethian and Baconian relics, and having thanked the noble hosts for their kindness, the party assembled on the steps at the front of the house, and grouping round the Earl and Countess and the Mayor

and Mayoress of St. Albans, a photograph was taken. Those present then had the choice of joining either of two parties, one of which, under the guidance of Mr. C. H. Ashdown, hon. secretary of the St. Albans Architectural and Archæological Society, proceeded to view the ruins of the second mansion above referred to, while the other party, which included most of the South London members who took part in the excursion, led by Mr. A. E. Gibbs, crossed the park to the beautiful avenue of fine old trees, forming its northern boundary, which they followed to its eastern termination. Lord Verulam had kindly entrusted his private key of the park gates to the leader, and the party were thus able to pass into the meadows in the valley of the Ver by a picturesque and little-frequented route. The standing grass being almost ready for the mowers, arrangements had been made with the tenant farmer, Mr. W. Nott, who kindly cut a path through it, which led to the large fishpools made or enlarged by Sir Francis Bacon, and known as the "Pondyards." It was here he built the third mansion, the water-supply to the house erected by his father on the higher ground presenting great difficulties. The philosopher is recorded to have said that as he could not carry the water to his house he would carry his house to the water. Very little time remained for the naturalists to investigate the flora and fauna of these interesting old ponds, with their wealth of aquatic and semi-aquatic plants, and abundant insect life. The motor-bus was waiting on the great north-west road—the ancient Roman Watling Street—and the party were conveyed to St. Albans, where they were subsequently joined by the archæologists who had followed Mr. Ashdown's lead, and a very pleasant trip was brought to a close.

[The foregoing account by Mr. Gibbs requires a brief addendum. The "trip" ended in a reception by Mrs. Gibbs in the beautiful grounds of Kitchener's Meads, where the party refreshed themselves under the most pleasant conditions, the greatest attention being paid to their comfort.—Ed.]

JUNE 17th, 1911.

FIELD MEETING AT BLACKHEATH, CHILWORTH.

*Conductor* : W. J. KAYE, F.E.S.

On June 17th a new locality was visited for one of the field meetings of the Society. Blackheath, near Chilworth, on the south side of the North Downs was the scene of operations, and from

many expressions of opinion the venture was approved of. The geological formation is greensand, and the curious phenomenon is seen of quantities of iron-stone of the size of road metal spread in varying amounts over the heath. This valuable stone is collected and piled into large heaps ready for carting. In places the surface of the ground is loosely forked over and the pieces of rock just beneath are shaken out.

The day was fine with a suspicion of rain, but no rain fell, and on the whole there was a considerable amount of sunshine, which was fortunate in more ways than one, for tea was partaken of in the open air, Mr. and Mrs. Kaye having brought up the refreshment in their motor. The number of insects taken was not large, and curiously only one butterfly was seen, *Cænonympha pamphilus*. The want of much variety in the vegetation probably accounted for the rather meagre total. The following list is due to the records of Mr. R. Adkin and Mr. A. Russell. *Cænonympha pamphilus*, *Bupalus piniaria*, common about the pines, *Ematurga atomaria*, *Anarta myrtilli*, and *Pleurota bicostella*, all common on the heath. *Melanippe sociata*, *Acidalia subsericeata*, *Macaria liturata*, *Cybosia (Lithosia) mesomella* (fine), *Larentia viridaria (pectinataria)* (fine), *Camptogramma bilineata*, *Thera variata*, *Aspilates strigillaria*, common on the heath and in fair condition, *Aplecta tinctoria* and *Triana psi*. *Scodionia belgiana*, although a denizen of heath was not seen. The return home was made as in coming, via Chilworth station on the S.E. and C.R., and it was found that although the journey was rather long (one and a half hours), the proximity of the heath to the station made it worth while.

JULY 1st, 1911.

#### FIELD MEETING AT REIGATE.

Conductor : A. E. TONGE, F.E.S.

The weather having been unpropitious the previous day and continuing so during the morning, no doubt had a detrimental effect upon the attendance, but four members braved the showers and spent the morning on the slopes of Colley Hill and were joined there later by the afternoon party.

By the time the latter reached Reigate Station the sun had put in a belated appearance and all were favoured with a gloriously fine afternoon.

The route taken was westward at first along Somers Road, and then northward up Coppice Lane to the foot of Colley Hill, then westward again as far as the old waterworks. Here the party ascended the face of the grassy slope, which severely taxed the energies of more than one of them, but on reaching the top, the glorious view away to the south over the Weald of Surrey and Sussex went far towards making up for their exertions.

The path along the top was now followed eastward past the handsome stone drinking fountain presented to the Borough by Col. Inglis, and through the beech woods past the dismantled fort, which was built as one of the outer defences of London. Just past this a narrow lane northward afforded a short cut to the "Crossway's House."

Owing to some misunderstanding between the proprietor and his family, we had to wait some time before tea was put upon the table, but eventually twelve members and friends sat down to an enjoyable meal to which they were able to do full justice.

Nothing of special note appears to have turned up during the walk, but no less than seven species of "plumes" were either taken or noted.

Two members have been good enough to send me lists of insects, and Mr. Step a list of plants observed.

Most of the more or less conspicuous chalk flowers were in considerable abundance, including *Blackstonia perfoliata*, *Hypericum perforatum*, *Verbascum thapsus*, *V. nigrum*, *Clematis vitalba*, *Thymus serpyllum*, *Inula conyza*, *Asperula cynanchica*, *Anthyllis vulneraria*, etc., with *Ophrys apifera* and *Orchis pyramidalis*.

Lepidoptera was fairly abundant and among other species the following are the more worth notice:—*Pieris rapæ*, *Epinephela jurtina*, *Ctenonympha pamphilus*, *Polyommatus icarus*, *Nisoniades tages*, *Angiades sylvanus*, *Anthrocera jilpendulæ* (cocoons) in plenty, *Euchelia jacobææ* (larvæ) abundant, *Macrothylacia rubi* males, *Triana psi*, *Triphena pronuba*, *Teniocampa incerta* (larvæ), *Cucullia verbasci* (larvæ), *C. umbratica*, *Rivula sericealis*, *Rumia luteolata*, *Geometra vernaria*, *Acidalia dimidiata*, *A. ornata*, in plenty, belated specimens of *Cabera pusaria* and *Lomaspilis marginata*, *Larentia viridaria*, *Melanippe procellata*, *M. sociata*, *M. galiata*, *Camptogramma bilineata*, *Phibalapteryx vitalbata*, *Cidaria dotata*, etc.

Among the so-called "micros" were the following:—*Pyrausta purpuralis*, *Scopula olivalis*, *S. prunalis*, *Ebulea sambucalis*, *Gillmeria ochrodactyla*, *Oryptilus parvidactyla*, *Marasmarcha lunedactyla* (*phæodactyla*), *Stenoptilia pterodactyla*, *Wheeleria niveidactyla* (*balio-*

*dactyla*), *Merrifieldia tridactyla* (*tetradactyla*), *Alucita pentadactyla* (*Crambus perlellus*, *C. culmellus*, *Penthina pruniana*, *Catoptria hypericana*, *C. cana*, *Eupecilia carduana*, *Xanthoetia hamana*, *Argyrolepis enicana*, etc.

JULY 13th, 1911.

Mr. Percy Harris, of Streatham Hill, was elected a member.

Mr. A. E. Tonge exhibited ova of *Manduca atropos*, dissected from a captured female by the Rev. C. R. N. Burrows. They were infertile, and now discolouring. The female laid one ovum, which hatched out, the larva being about  $\frac{3}{8}$  in. long, pale green, with a straight black caudal horn when received on July 3rd. He now exhibited it in the third instar in which it had the lateral stripes very boldly marked, and the caudal horn still long and straight.

Mr. A. W. Dennis exhibited a photograph of a flower spike of the bee orchis *Ophrys apifera*, found near Reigate in June by Mr. J. Winkworth, in which four of the flowers each had three lips, other parts of the flowers being also in excess. The colour was normal.

Mr. Hy. J. Turner exhibited a spray of the lesser bladderwort *Utricularia minor*. The plant was originally found by him in the Cutmill pond, west Surrey, in the early autumn of 1910. He had kept it in a glass jar in which he had placed a layer of humus and decaying leaves, and which had been kept filled with tap water. The plant dwindled in the winter to small branchless green balls, which floated on the top of the water until the spring, when a mass of branches with abundant bladders was produced.

Mr. R. Adkin exhibited a series of *Biston hirtaria* from Aviemore that had remained in pupa for three winters, and which showed some unusual variation. He said, "When the late Mr. McArthur was collecting in the neighbourhood of Aviemore, Perthshire, in the spring of 1908, he met with a good many specimens of *B. hirtaria*, some of which showed a certain amount of variation, the most pronounced forms being a male of a greyish colour and several females that Mr. McArthur described as "golden." During the summer of 1908 I fed up portions of broods obtained from some two or three of the last named, and both in 1909 and 1910 a few moths were reared from them, but there was nothing very striking about them ("Proc. S. Lond. Ent. Soc.," 1910, p. 110). In the present year, however, the emergence took a much longer time, some fifty specimens having come forth, and among them

there is a considerable amount of variation in both sexes. Five of the males are of a grey form, which in the more extreme specimens is completely grey, with blackish markings; others are strongly speckled with bright yellow, and the remainder typical, or nearly so. Among the females one is distinctly of the grey form, and another somewhat approaches it, while many were, on emergence, quite "golden," but unfortunately this brilliant appearance almost entirely disappears after death, leaving them practically indistinguishable from ordinary typical specimens. Of those that emerged in 1909 and 1910, just 40 per cent. were hopelessly crippled, but of those reared this year only 20 per cent. were so affected."

Mr. West, of Ashted, exhibited a series of *Dianthecia capsicola* bred by him from larvæ taken in his garden on *Silene inflata*, and an example of *Xylophasia hepatica* which he had captured in a headless condition.

Mr. Blenkarn exhibited a selection of about 2,500 bred examples of *Abraxas grossulariata* from Gateshead. The variation was scarcely more than trivial, only a very few aberrations of note being produced. Two specimens had asymmetrical markings; in one the left wing was very much suffused with black, while the right wing was about normal in marking, and in another nearly the whole of the yellow coloration was suppressed on the left wing, while on the right this colour was well developed.

Mr. Jäger exhibited a series of twelve *Callimorpha hera* bred on June 22nd of this year, a much earlier date than he had ever reared the species before. The usual time of emergence was late July. He stated that the imagines were very active in the early morning and late evening, but apparently rested during the afternoon.

Mr. Tonge exhibited flowers of *Statice limonium* gathered a few hours earlier on the shore of Langstone Harbour.

Mr. W. J. Kaye exhibited a fine aberration of *Mimas tilia* bred from a Bexley larva. It had the usual transverse fascia of the forewings reduced to a very small elongated central spot. He made reference to the coloured plate issued in the "Entomologist's Record" for 1891, with notes on the species by the late Mr. J. A. Clarke. One of the figures was almost identical with the present example. It was remarked that all the figures of the aberrations, as well as the specimen shown, had a very red central area, while the more typical forms had the central area much more greenish.

Mr. Step read a Report of the Delegates to the Annual Congress of the South-Eastern Union of Scientific Societies, held at St. Albans in June.

JULY 15th, 1911.

## FIELD MEETING AT CLANDON.

Conductor : HY. J. TURNER, F.E.S.

The weather had been fine, may we say too fine, for a long period, so that everywhere the ground was beginning to take on that state of dryness which precludes abundance of insect life. There was only a fair attendance, for holiday weather had drawn members away, but those who came to the meeting enjoyed the two districts visited, and even captured useful specimens to take back.

The days being long it was arranged to take a shorter round than on previous meetings from Clandon station, have tea about six o'clock, and return to the station by a different route.

As usual there was a morning party who took a quite different road from either of those selected for the main party. The private woods which they explored were quite a reminder of the New Forest in its darker recesses, but the walk at length terminated in "birds" and a keeper, strange to say of an exceptionally mild and gentle speech, by whom they were directed into an open pathway on the opposite side of the railway which was neither private nor hemmed in by restraining hedges, and by which they found their way to the station to meet the later arrivals.

Tea had been arranged at the "Queen's Head," at East Clandon, and the plan taken was to cross the main Guildford road, take a path shortly beyond to the left, and over the beautiful and varied Downs to the corner known as "Scotland Farm." There a stile on the left led through plantations of fir and juniper, across the old race-course, and down-hill again to the rendezvous for tea. Although the Hostel for tea was quite new to the Society, the accommodation was found to be perfectly satisfactory, and justice was fully carried out. Subsequently, the walk was continued in a northerly direction, under the railway, and after wandering for a short time about the enclosure on the left, known as Clandon Common, the path across the field was taken leading out into the road to the station for return by 8.33. Two capital areas not generally known were traversed, and those who were present could tell from the varied vegetation and surroundings that many good things entomologically should be obtainable.

From the lists of captures kindly sent in I note the following:— Eight species of Rhopalocera, including *Aphantopus hyperantus*: larvæ of *Notodonta chaonia* and *N. dromedarius*, a female of *Psilura*

*monacha*, *Euchelia jacobææ*, larvæ in plenty; among the Noctuæ, *Triana psi*, larvæ of *Teniocampa incerta* and *T. stabilis*; among the Geometers were *Acidalia aversata*, *A. bisetata*, *Eubolia limitata*, *Melanippe fluctuata*, *M. sociata*, *M. unangulata*, *Hypsipetes furcata* (*elutata*), *Lomaspilis marginaria*, *Cabera pusaria*, *Rumia luteolata*, *Macaria liturata*, *Tephrosia crepuscularia*, *Ematurga atomaria*, *Strenia clathrata*, *Abraæas grossulariata*, and *Eupithecia lariciata*; of the Pyrales, *Pyrausta purpuralis*, *Botys pandalis* and *Ebulea stachydalis*; among the Crambi, *Crambus perlellus* and *C. culmellus*; of Plumes, *Stenoptilia pterodactyla* (*fusca*) and *Leioptilus tephrodactyla*; of Tortrices, *Eupacilia dubitana*; and of Tineids, *Cerostoma costella* and *C. radiatella*. The mimetic Dipteron *Volucella bombylans* was also reported.

July 27th; 1911.

MR. R. ADKIN, F.E.S., in the Chair.

Mr. Kenneth G. Blair, F.E.S., of Highgate, N., was elected a member.

Mr. Step exhibited living plants of the rare Orchid, *Goodyera repens*, from Aberdeenshire. Superficially resembling *Spiranthes*, the flower structure presents several small differences, but the most obvious departure from the latter genus is seen in the entire absence of tubers, the rootstock of *Goodyera* being stemlike, branched and creeping. The flower spike is covered with glandular pubescence, which also extends over the bracts and sepals. In this country it has only a restricted range—from Cumberland in the south to Ross and Ayr in the north.

Mr. Step, on behalf of Mr. H. Moore, exhibited a fine specimen of the starfish, *Astropecten irregularis*, recently received from Setubal in Portugal.

Mr. W. West (Greenwich) exhibited numerous interesting insects taken by him during the past month in the New Forest, including *Ægeria spheciformis* from Holmesley, a suffused example of *Anthroceræ trifolii*, a short series of *Cicadetta montana* including a female, which sex is very rarely met with; a series of the rare Heteropteron, *Eysarcoris æneus*, and a number of more or less notable species of Diptera, Hymenoptera and Hemiptera.

Mr. Stanley Edwards exhibited specimens of the extremely beautiful *Stalachtis evelina* from the Lower Amazons, and several fine species of the South American genus *Mesosemia* (*Lemoniinae*).

Mr. R. Adkin exhibited a pair of *Dimorpha* (*Endromis*) *versicolor*

reared in the spring of this year from ova deposited by a wild Avimore female in 1908, the pupæ having thus remained over three winters ("Proc. S. Lond. Ent. Soc.," 1910, p. 109). Also a short series of the same species reared from inbred ova of 1909, and which had therefore passed two winters in pupa. He said that in his experience a small proportion only of imagines appeared in the first year after pupation; the greater number in the second, while a few stragglers generally remained over to the third year.

Mr. Stanley Blenkarn exhibited a teratological example of the Coleopteron *Carabus nemoralis*, in which the tarsi of the right fore-tibia was divided into three, each terminating in a perfect tarsus and claws; two specimens of *Helophorus tuberculatus*, a very rare beetle, taken by Mr. J. McLeod, near Coatbridge, Lanarkshire; examples of the beetle, *Galerucella fergussoni*, taken at Frankfield, Lanarkshire—a species quite recently new to science; specimens of the curious Hemipteron, *Ledra aurita*, beaten from oak at West Wickham.

Mr. Jäger exhibited a Nematoid worm which had emerged from the larva of a *Cucullia*.

Mr. Sperring exhibited a number of aberrations of Lepidoptera, including a smoky suffused example of *Cosmotriche potatoaria* from Benfleet; a seven-spotted specimen of *Anthrocera jilipendula* taken on June 25th in N. Kent; a *Callimorpha dominula* with very dark hindwings and considerable absence of scales; it was the last to emerge of a brood; two specimens of *Arctia caja*, one of which had asymmetrical markings on the forewings, and in the other the hindwings were yellow. He further showed a number of *Abraxas grossulariata* bred from larvæ taken from the same spot from which he obtained smoky suffused specimens two years ago. Last year the two final examples to emerge were smoky. Among those now exhibited many were considerably darker than the normally marked ones, the black being massed mainly towards the outer margin in the forewings. In addition Mr. Sperring exhibited a *Dicranura vinula* of unusually dark coloration, and several *Cænonympha pamphilus* with very brilliantly marked undersides.

Mr. Sperring in making this exhibit wished to call attention to the fact that most of these aberrations emerged either at the beginning of the period of the brood's emergence or towards the end of the time. In his experience this was usually the case with aberrations.

AUGUST 10th, 1911.

Mr. Jäger exhibited several specimens of different orders, and

communicated the following notes upon them. "The large spider, *Mygale aricularia*, was sent to me from India. These spiders do not spin a web, but lie in wait in crevices and holes for their prey, which consists of insects, and occasionally small birds. You will observe the formidable fangs attached to the mandibles, also the eight eyes on the upper part of the cephalothorax. In my small case is a representation of the life-history of the Colorado beetle, *Doryphora lineata*, from the ova to imago with intermediate stages."

Mr. W. West (Greenwich) exhibited the following species of Coleoptera and Hemiptera:—A series of *Asemum striatum* and var. *agreste* taken in pine stumps in the New Forest in June; a male and two females of the very rare *Monohammus sartor*, cut from spruce fir in a workshop at Deptford; *Acocephalus tricinctus*, a male and four females taken in the saltmarshes at Great Yarmouth, and one of Mr. J. Edwards' recent additions to the British List; a series of *Plagiognathus albipennis*, obtained from *Artemisia maritima* at Great Yarmouth; *Aræspus pulchellus*, taken at the roots of reeds at Great Yarmouth; and a series of *Chlorina glaucescens* on reeds at the same locality.

On behalf of Mr. Carr, Mr. West exhibited the two species of grasshopper, *Stenobothrus bicolor* and *Platypleis brachyptera*, from Oxshott.

Mr. Stanley Blenkarn exhibited the Coleopteron, *Quedius revans*, taken from moles' nests in the Isle of Wight, and described recently as new to science. He also exhibited a double-banded example of *Noctua rubi* taken at Beckenham on August 30th, 1910, together with a suffused single-banded specimen taken at Beckenham on August 1st, 1911.

Mr. Dods exhibited the living larva and an imago of the large silk-producing Saturniid *Platysamia cecropia*, and also *Anthrocera filipendula* and *Dryas paphia* from Hailsham, Sussex.

Mr. Carr exhibited specimens of the local tiger beetle, *Cicindela sylvatica*, from Oxshott.

Mr. Stanley Edwards exhibited a box containing several species of the genus *Libythea*, and contributed the following notes:—The twelve or fourteen species of this Sub-family, which it hardly appears necessary to divide into genera, are singularly scattered over all the warmer parts of the globe, except, I believe, the continent of Australia and Polynesia. The type of the genus *Libythea celtis*, Fuessly, inhabits South Europe and Asia Minor. The Ethiopian region has three species, India and the Indo-

Malayan Islands have three species, the Austro-Malay and Australian Islands two or three, two are natives of the United States and the West Indies, and one is found in Surinam and Brazil. "It does not seem improbable that these few and widely scattered congeners are but the surviving members of what was once a numerous and generally prevalent group" (Trimen). The same opinion is expressed by the late Dr. Scudder, who mentions the discovery of two fossil species in Colorado. The *L. celtis* feeds on the nettle tree *Celtis australis*, but will also eat cherry.

AUGUST 24th, 1911.

Mr. J. Jäger exhibited a few forms and aberrations of British Lepidoptera, including the following species: —*Rumiccia phloras* with the band on the hindwings replaced by wedge-shaped marks, from St. Leonard's; and *Celastrina argiolus*, several females showing variety of colouring, one being very silvery in appearance, from Starcross.

Mr. S. R. Ashby, series of the Coleoptera *Balaninus nucum* and *Phytodecta pallida*, taken at the Society's Field meeting at Clandon on July 15th.

Mr. Hy. J. Turner exhibited forms of *Papilio podalirius*, including var. *feisthamelii* ab. *ornata*, and two forms bred from pupæ given him by Dr. Chapman, in which the black markings were blurred, additional cloudy transverse markings were present and there was a considerable sprinkling of black scales scattered over the pale yellow areas especially of the forewings. These latter forms were probably to be considered as falling under ab. *undecemlineatus*, from which they differed in the ill-development of the eleven transverse lines, bands, or fascia on the costa, and had in addition cloudy and blurred markings. In the *Berliner Entomologische Zeitschrift* for 1902, p. (4), figs. 1, 2, 3, 4, were figs. showing somewhat similar forms from the Harz Mountains in Germany, which locality was possibly the origin of the forms exhibited. At pp. 119-133 (Pl. II.) was an account with figures of various forms of a somewhat similar character as well as an account of the variation of *P. podalirius* as then (1902) worked out. This was by Oscar Schultz, who, during the past fifteen years, has laboriously compiled an annotated list of all gynandromorphs of Macro-Lepidoptera which it has been possible to trace, and whose recent decease immediately after sending his last contribution of the above work to the printers, we have to deplore.

Mr. Hy. J. Turner referred to the exhibit made by Mr. Jäger on July 23rd last of a thread worm which had emerged from the larva of a *Cucullia*, and communicated the following note:—

“These Thread Worms belong to the Natural Order *Nematoidea*, of which the members are mostly internal parasites. The dreaded *Trichina*, the *Filaria* or “whip worm,” and the small “thread worm” so frequently a parasite of children, are familiar examples of this group of animals. The genus *Mermis*, to which the worm exhibited probably belongs, has species which are parasitic within the *Insecta* and at a certain time make their way out by perforating their hosts and hide themselves in the soil. There they reproduce, and the embryos are born viviparously, and pass some time in the ground. They wander in search of an insect host, the caterpillar of a moth or beetle for instance, which they penetrate by means of a sharp stylet that is hidden within the head when not in use. Large numbers of these worms are sometimes found in the soil, and I have seen them on more than one occasion in numbers on the heads of flowers. The genus *Gordius*, to which the worm was supposed to belong, has a somewhat similar habit, but is found within the bodies of carnivorous water insects. These feed upon the larvæ of *Tipulidæ* and *Ephemeridæ*, the primary hosts of the young worm embryos, which arise from the ova laid by the mature worm after it escapes from its final host.”

Mr. Adkin showed a specimen of *Aplecta occulta* from Rannoch, intermediate in general coloration between the usually dark form obtained from that locality and the light southern type.

Mr. Morford exhibited a specimen of *Colias hyale* captured by him at Mickleham on August 20th of this year, and also a specimen of *Nisoniades tages* taken at the same time and place. The latter was possibly a second brood specimen.

Mr. West (Greenwich) exhibited specimens of the two local species of Diptera, *Cerorhys pictus* and *C. omissus*, taken by him in the salt marshes at Great Yarmouth.

Mr. West (Ashtead) exhibited a specimen of the rare burying beetle, *Necrophorus interruptus*. There were originally two, but one had devoured the other.

Mr. Main exhibited a portion of wasp comb containing living larvæ and described the feeding of the larvæ by the mature wasps. Dr. Chapman said that he occasionally had found a larva in the cells reversed, and suggested that if the comb were placed in a temperature of at least 105° the development of the larvæ would proceed more rapidly. He had this year procured some seventeen

wasps' nests with the object of obtaining specimens of the curious Coleopteron, *Metæcus paradoxus*, but only succeeded in obtaining one example. Some years ago he obtained a number in that way, but probably the scarcity of the Coleopteron this year was due to the season of last year being so unfavourable for wasps. (See "E.M.M.," 1912, p. 29).

Mr. Edwards exhibited examples of *Papilio codrus* from Aboyna, *P. solon* from the Solomon Isles, possibly only an island form of the former, another very rare form *P. westwoodi* from the same locality, and *P. empedocles* from Java, which last is probably only another local variation of the first named species.

Mr. Step exhibited a piece of the root of marram grass, picked up on the sand-dunes at Climping, which closely resembled in shape and the growth of its branches, the body, limbs, head and antennæ of a stick insect.

Mr. Blenkarn exhibited a number of living stick insects which he had bred from ova some three months previously, and which were now about half grown. The species was *Dicippus morosus*, a native of India.

Mr. Kaye exhibited a specimen of the extremely rare hawk-moth *Pholus typhon*, from W. Mexico; it was closely allied to the well known *P. achemon* from S. America.

Dr. Chapman exhibited young living larvæ, of the three high-level European species of *Lycaenida*, viz.:—*Lattiorina orbitulus*, in its hibernating skin, feeding on *Soldanella*: *Vacciniina optilete*, very small, feeding on bilberry, the leaves of which it blotched brown, of a similar shade to its own skin, and *Albulina pheretes* feeding on *Colutea arborescens*, into the leaves of which it made small circular mines. They were all bred from ova obtained this season in Switzerland.

Several members reported on the season. Mr. Adkin had seen *N. tages* on August 13th, Mr. Harrison had seen one specimen of *C. edusa* at Shoeburyness, Mr. Kaye had seen an example of both *C. edusa* and *C. hyale*, and also noted that *C. argiolus* had appeared on July 13th, Mr. Morford had met with the same species on July 4th, and had at the present time third-brood specimens of *Selenia bilunaria* (*illunaria*), and many members had observed the abundance of *Pieris rapæ*, specimens being found even in the busy streets of the metropolis.

Mr. Kaye made some remarks on the Report and work of the Surrey and Kent Committee of the Commons and Footpaths Preservation Society, giving numerous instances where the influence

of the organization had been useful in preserving paths and open spaces in the districts with which many of the members were familiar, and urging as many members as could to support the work of the Society by subscribing to its funds.

SEPTEMBER 14th, 1910.

Mr. Turner exhibited a photograph of several specimens of *Lithosia deplana* (*helveola*) sent him by Mr. Cockayne, one being very dark in coloration, and asked if any such melanic examples had previously been recorded. Several members had met with the form, and said that in some seasons it seemed to predominate, while in others it was not observed. Mr. Turner also called attention to a form he was exhibiting in which the hind marginal area of the hindwings was much darker than the discal and basal areas.

Mr. Grosvenor exhibited an extensive series of *Pieris napi* taken and bred in 1911, from Surrey, Sussex, Westmorland, Herts, Aberdeen and Fermanagh. (See table, p. 53.)

Mr. West, of Greenwich, exhibited two species of Hemiptera recently taken by him at Milton, near Gravesend:—*Teratocoris antennatus*, on rushes, and *Nabis lineatus*. He also exhibited the Orthoptera *Stenobothrus elegans* and *Platypleis roesellii* from the same locality.

Mr. A. E. Gibbs exhibited long varied series of the Corsican forms of three species of Satyrids that are found in Britain, viz., *Satyrus semele* var. *aristæus*, *Pararge megæra* var. *tigellus* and *Epinephele jurtina* var. *hispulla*. The general brightness of colour of these southern specimens was very noticeable. They were all taken by himself during a holiday spent in Corsica from late June to early August.

Mr. Kaye exhibited a specimen of a rare species of *Sphingida*, *Xylophanes aglaor* taken by himself in the early part of the year in South Brazil. It was a near relative of the well known North American Sphingid, *X. tersa*. He also exhibited the young larvæ of *Rumicia phlæas* and of *Plusia bractea*.

Dr. T. A. Chapman exhibited empty and occupied galls of *Andricus ostreus* from oak, a few still showing traces of their original brilliant colouring. These galls have been very abundant this year, in places carpeting the roads on which they had fallen.

Mr. E. Step, on behalf of Mr. Dennis, exhibited the Slipper Limpet, *Crepidula fornicata*, an American mollusc, which has the

| 1st EMERGENCE.<br>MALES.          | 1st EMERGENCE.<br>FEMALES.      | 1st EMERGENCE.<br>MALE UNDERSIDES.                                                 | 2ND AND 3RD EMERGENCE.<br>MALES AND FEMALES.                  |
|-----------------------------------|---------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1. Apex Pale.                     | 1. Pale grey.                   | 1. Nervure markings broadened out, forming band round outer margin of secondaries. | 1. Discal spot large.                                         |
| 2. Without apical blotch.         | 2. Markings heavy.              | 2. Nervures broadly green.                                                         | 2. Discal spot small.                                         |
| 3. Large discal spot.             | 3. Failure of black pigment.    | 3. Nervures broadly green.                                                         | 3. Ochreous.                                                  |
| 4. Large discal spot.             | 4. Nervures heavily marked.     | 4. Upperside, white scaling on underside of secondary.                             | 4. Dusky suffused.                                            |
| 5. *Discal spots unequal in size. | 5. Nervures lightly marked.     | 5. Colour yellow.                                                                  | 5. Dusky suffused.                                            |
| 6. Male with female markings.     | 6. Secondaries suffused orange. | 6. Colour pale.                                                                    | 6. Yellow.                                                    |
| 7. Gynaecomorph.                  | 7. Nervures lightly marked.     | 7. Nervures with black scaling (1910).                                             | 7. Black spot in disc of secondaries.                         |
| 8. Black margin to primaries.     | 8. Nervures heavily marked.     | 8. Nervures broad to disc.                                                         | 8. Large size, nervures without black scaling, 3rd emergence. |
|                                   |                                 |                                                                                    | 8. Upperside female, small size.                              |
|                                   |                                 |                                                                                    | 6. Underside very lightly scaled, female.                     |
|                                   |                                 |                                                                                    | 5. Underside nervures heavily scaled, female.                 |
|                                   |                                 |                                                                                    | 4. Underside orange, female (1910).                           |
|                                   |                                 |                                                                                    | 3. Underside nervures male lightly marked.                    |
|                                   |                                 |                                                                                    | 2. ditto, males.                                              |

5\* Also has white upperside scaling on underside of secondaries.

habit of heaping together one upon another; as many as twenty often being met with in one pile. It had occurred in very considerable numbers in the estuary of the Thames in brackish water, frequently attached to pebbles, and was known as being a pest in oyster beds in North America. It was already becoming a pest on our shores, to which it was probably introduced at the time the American oyster was imported into this country for laying down new oyster beds.

Mr. J. P. Barrett exhibited the larvæ of *Syntomis phegea* in their 4th instar. They were obtained by him in Sicily on the slopes of Mt. Etna, and fed readily in this country on dandelion.

SEPTEMBER 16th, 1911.

FIELD MEETING AT BURNHAM BEECHES.

Conductor: R. A. R. PRISKE, F.E.S.

The extremely small number who gave in their names, owing no doubt to the exceptionally dry season offering but few opportunities for productive entomological work, induced the indulgence in an extended motor ride, and finally an early return to town.

SEPTEMBER 28th, 1911.

Mr. W. J. Kaye exhibited a series of *Ephyra pendularia*, including among various other forms some very beautifully marked specimens of the form *subroseata*.

He also exhibited a finely grown flowering specimen of the rare orchid *Masdevallia macrura*, the largest species in the genus.

Captain Cardew exhibited a beautiful series of *Hadena contigua*, bred from ova laid by a female captured in the New Forest. From the 62 ova which hatched he had been successful in obtaining no fewer than 49 perfect imagines.

Mr. H. Moore exhibited numerous specimens, and read the following short note on "Butterflies in the Forest of Arques":—

"On August 12th last I went over to Dieppe with the idea of spending the week-end collecting in the Forest of Arques. My only excuse for referring to it is the paragraph in the last number of the *Entomologist's Record* concerning the abundance of Whites, where Mr. Kaye mentions the numbers of *Pieris brassicæ* and *P. rapæ* with only a few *P. napi* in the same neighbourhood, and as

my experience was somewhat different, I have thought it worth recording. I found *P. napi* in thousands, *P. brassicæ* was represented by a few dead specimens, and *P. rapæ* was scarcely noticeable on the wing, but *P. napi* were everywhere, and on the slope below the forest from the St. Martin road, perhaps to say 'clouds of them' would scarcely be an exaggeration. The same might almost be said of *Pararge megara*, the next most abundant species. *Pararge ægeria* var. *egerides* was also numerous in certain of the 'rides,' and in connection with these two species I might say that upon two occasions this autumn, when I have been upon the road before sunrise, *P. megara* was on the wing to welcome the first rays, and in the forest I saw *egerides* in the early dawn. *Polyommatus icarus* was also abundant, and though I examined a number of females, I only came across one blue form. A week earlier, at Eastbourne, I had found *Agriades coridon* abundant, and I anticipated getting a further selection, but the species was only represented by one female, and that worn. Neither *Epinephele jurtina* nor *Cenonympha pamphilus* were numerous, but amongst the few of the latter I netted I found one with the apical spot beneath bi-pupilled. Not a species of *Argynnis* or of *Vanessa* was seen, and though the air seemed alive with butterflies, there were practically none to take. The specimens exhibited must be merely considered as a record of an unsuccessful, but otherwise enjoyable, outing."

Mr. Moore also showed a specimen of *Agrius convolvuli* taken in South-East London, and said that it was the only one he knew of that had occurred there this season.

Mr. Joy exhibited a coquilla nut (*Attalea pinifera*) from South America in which was a large larva, presumably of a coleopteron, filling up the cavity usually occupied by the kernel of the nut. It was remarked that the natural appearance and hardness of the nut had procured for it the name of "Vegetable" or "Imitation" Ivory—a name shared by the seeds of *Phytelephas macrocarpa*.

Mr. Main exhibited a very fine living specimen of *Aplecta prasina* (*herbida*) bred from an ovum laid by a female captured in Abbot's Wood. He stated that the larvæ were feeding up very erratically; one imago had emerged, some were in pupæ, while others were still feeding, some even being small at this date. It was noted how delicate and beautiful was the colour of this insect when bred.

Mr. Step exhibited some specimens of Myxogasters, and stated that they were by some considered as plants, and by others as

Protozoa. In the young stage they certainly had the amœboid character of creeping over surfaces and objects, but subsequently became encysted, stationary, and plant-like.

Mr. Buxton exhibited several specimens of *Hadena protea* picked from a series taken at sugar at Fairhill, Tonbridge, this year. The females are generally of the blotched form, while many of the greenest specimens are males. He remarked that he had never found this species at rest on trunks of trees near Tonbridge.

He further showed a series which he supposed to be of *Anthrocera hippocrepidis*. They were taken far from any locality known, for *A. trifolii*, and were obtained rather late for *A. hippocrepidis*, and rather far north. The specimens were large for this species, with spots large, and with the sixth spot *not* generally divided. Also two teratological specimens of *Anthrocera filipendulæ*, in one of which the left hindwing was completely missing, Salisbury; and in the other the antennæ were only half the normal length, very thick and contorted, and with no definite club, Wrotham, Kent. Both specimens were males.

Mr. Step remarked upon the phenomenally dry season, and the consequent absence of even the most common fungi, especially of all ground species. The only species he had seen in any numbers were the tree-frequenting *Polyporus sulphureus*, and "beefsteak fungus," *Pistulina hepatica*, which were appearing much nearer the ground than usual.

#### OCTOBER 12th, 1911.

Mr. H. R. Sweeting, M.A., of South Woodford, was elected a member.

Mr. W. J. Kaye exhibited a series of *Lithosia deplana* (*helveola*), both bred and captured examples, of which the latter were in most cases darker, but not one specimen was so dark as the specimen belonging to Mr. Cockayne, referred to at the last meeting.

Mr. Barrett exhibited three series of *Lithosia deplana*, one obtained years ago, another in 1909, and the third specimens of this year. All in the second series were considerably darker than any in either of the other series, and several specimens were without the yellow costa, which was so conspicuous a feature in the darker examples in Mr. Kaye's series.

Mr. Barrett also exhibited two specimens of *Xylina furcifera* (*conformis*), *viz.*, the example taken in October, 1904, in the East of England, and one of the examples bred by Evan John in South

Wales, in 1876. The latter was much darker than the former, and was referable to the ab. *suffusa* of Tutt. It was stated that the continental form was the lightest of the three main forms of the species.

Mr. Sich exhibited specimens of *Gracilaria springella*, and stated that he had bred them from the leaves of *Phillyrea media*, a food-plant not hitherto recorded. The larvæ were a pest in many gardens, disfiguring extensively the leaves of lilac, privet, and ash, all three members of the natural order, *Oleaceæ*. The *Phillyrea* was a member of the same family, and a native of the Mediterranean littoral. As a rule the leaf-miners were extraordinarily particular as to their food, each species confining itself to the leaves of one species of plant only. In this case all the plants attacked were members of a very compact family.

Mr. R. Adkin exhibited a specimen of *Tortrix podana*, bred on September 13th from a pupa taken in a shoot of *Euonymus japonica* at Eastbourne, on the 7th of that month. He said that he was very much surprised to find this species emerging in autumn, and he should have been inclined to regard the appearance of this specimen as an accidental circumstance, but for the fact that in correspondence with the Rev. W. Claxton he had learned that that gentleman had reared several specimens about the middle of September from larvæ collected earlier in the month from *Euonymus*, at Weymouth. This appeared to suggest an undoubted second emergence of the species this year, a circumstance that he believed to be without precedent.

Mr. B. H. Smith exhibited a female specimen of *Sterrha saccharia*, and an example of *Rumicia phleas* with the right fore-wing only of the *schmidtii* form. Both were taken by himself during a few days spent recently in the neighbourhood of the Lizard, Cornwall. The specimen was too exhausted to lay, although every endeavour was made to induce it to do so. Another collector had just previously taken a male specimen, but they could meet with no other examples. The Noctuæ seemed to be particularly attracted to the tamarisk bushes, which appeared to have a soporific effect upon them, for it was possible to box numbers of specimens while at rest soon after dark. Among other rarities taken in the neighbourhood during the visit were specimens of *Plusia nī*, *Laphygma exigua*, and *Phryxus livornica*.

Mr. Dods exhibited the huge cocoons of the large silk producing Saturniid, *Philosamia cecropia*, one of which was extremely light in colour. The others were uniformly dark, but had at first been

white, and upon getting damp subsequently became dark brown.

Mr. Step said that most of his cocoons spun by larvæ from the same source were white, but light and dark examples adjoined, though all had been kept dry.

Mr. Main referring to the Coquilla Nut and its larval inhabitant exhibited at the last meeting, said that Mr. Gilbert Arrow of the British Museum had furnished him with the following note on the exhibit:—

“The larva was that of the Coleopteron *Caryoborus nuctuorum*. The Coquilla Nut (*Attalea pinifera*) is a native of Brazil, and the fibre of the tree is used for making ropes, brooms, etc. The beetle is one of the so called “pea-weevils,” the grubs of which feed in seeds, especially peas and beans, which they enter in the unripe state.”

Mr. K. G. Blair exhibited specimens of the Neurepteron, *Boreus hiemalis*, which he had met with on Stanmore Common, in Essex.

Mr. Blenkarn exhibited numerous species of Coleoptera taken by him during the season including *Clytus arietis*, *Cicindela sylvatica*, *Dytiscus marginalis*, *Aromia moschata*, etc.

Mr. Adkin made remarks on the season and numerous members joined in the discussion. Subsequently Mr. Adkin communicated the substance of what was said in the following notes:—

#### Notes on the Season.

*Introduced by R. ADKIN, F.E.S.*

Mr. Robert Adkin said that the season of 1911 had been such an exceptional one that the experiences of members in regard to their field observations could not fail to be interesting. Probably most of them had had a summer holiday, and if they could do no more than give some account of their doings at that time he thought even that would be of much interest. The season, he said, had been one of the finest within the memory of the present generation, as was shown by the meteorological office reports. In the south-east of England, the district with which they were most closely connected, in the three summer months, June to August, the mean temperature had exceeded the average by no less than four degrees, the rainfall had been 3.16 inches below the normal, and we had enjoyed 225 hours more sunshine than we were supposed to be entitled to, while September, the first of the autumn months, had been hardly less fine, and it would be interesting to find whether this unusually warm, dry weather had had any marked effect.

Speaking for himself, he had spent his holiday at Eastbourne, chiefly on the chalk downs to the west of the town, and was in that neighbourhood on the week-ends of August 6th, 13th, 20th, and 27th, and continuously from September 7th to October 6th. The downs were by no means so much burnt up as he expected to find them, but what struck him most was the way in which the butterflies were distributed all over them; as a rule one expected to find most of the usual species commonly only in the sheltered spots, but this summer they appeared to have wandered from their retreats and spread themselves all over the downs, numbers flitting about even upon the highest and most exposed parts. Another interesting point was the abundance of some species and the apparent scarcity of others that one usually expected to find commonly.

Naturally, on these chalk downs the "Blues" are a strong feature. *Agriades coridon* was in full force from August 6th, and had probably even then been on the wing for some time, until mid-September. *A. thetis* (*bellargus*) was first seen on the same date, and on August 7th several males were met with, and like *A. coridon* was missed about September 15th, whereas in 1910 it was not found until August 21st, and even so late as the first week in October a few examples in fairly fresh order were seen. *Polyommatus icarus* was commonly met with during the whole period, a fresh emergence of small numbers taking place about September 15th. No *Celastrina argiolus* were seen on the wing, and a search for the larva on September 9th produced about six individuals, which pupated within a couple of days of that date. Further search proved fruitless, all evidently having pupated, although it was quite clear from their attacks upon the ivy flower-buds that they had been very common earlier. In 1910 an imago was on the wing on September 15th, and larvæ were found in all stages well into October. A careful search was made for a second emergence of *Cupido minimus* in its favourite haunts on several occasions about the middle of August and early in September, but without success; possibly the search may have been commenced too late in the season.

*Rumicia phleas* and *Cænonympha pamphilus* were both very abundant, the former especially being much more so than usual; both appeared to have a succession of broods, and odd specimens of each were met with right up to the first week in October, possibly they may have continued even later. *Epinephele jurtina* (*ianira*) and *Hipparchia* (*Satyrus*) *semele* were both quite as common as

usual, the former throughout the whole period, and the latter being seen even so late as September 8th. A specimen of *Nisoniades tages* taken on August 13th suggested a second emergence. The Vanessids were by no means common. In the course of a morning's ramble one might see a couple of specimens of *Pyrameis cardui* and three or four *P. atalanta*, but during the whole stay only some half-dozen examples of *Aglais urticae* were met with.

The Pierids were interesting in that although *Pieris rapa* was fully as common as usual, numbers being on the wing wherever one went, either on the downs or flitting about the gardens in the town, *P. brassica* was positively scarce; during a morning's walk on the downs one might see two or three examples at the most, and in the town gardens a similar state of things existed, even the cottage gardens, which in some years are swarming with the species, appeared to be practically free from its attentions. No *Colias* were seen, and enquiries from others who had collected in the neighbourhood failed to produce any records of either species having been met with. Another notable case of unusual rarity was that of *Plusia gamma*. Usually during August and September examples are continually on the move from morning till night, but this Autumn the species was not noticed until September 7th, on which day one was seen, and not more than two were met with on any one day, the last on September 25th. *Nomophila noctuella* (*hybridalis*), a species that is often abundant at the same time as *P. gamma*, was also exceedingly rare, the only records being single specimens on September 14th, 21st, and 23rd respectively.

A very worn example of *Agrius* (*Sphinx*) *convoleuli* was found at rest on a fence near the sea on the morning of September 18th, and inquiry elicited the information that at least fifteen specimens had been taken in the neighbourhood during the latter part of the summer, and that two larvæ also had been found, one crawling upon a road a mile or so inland, and the other by searching the food plant in the vicinity. Both had pupated since. *Macroglossa stellatarum* was fairly common, the last noted being on October 4th.

*Aspilates ochrearia*, *Melanippe galiata*, and such like species that haunt the lower slopes of the downs and broken ground near the sea, appeared to be scarcer than usual, but it may be interesting to note that the winter nests of *Porthesia chrysothruva* were found in some numbers on the stunted blackthorn bushes; so many were there, indeed, that should all the larvæ they contain survive the winter, the food supply in the immediate vicinity would surely prove insufficient to support them until the time for pupation.

The pretty little *Tortrix promubana*, of which the second emergence usually takes place about the beginning of September, appeared to be practically over early in August, but stragglers met with during the latter part of September appeared to indicate a partial third generation. A single specimen of *Tortrix podana* that emerged on September 13th from a pupa found in a shoot of *Euonymus japonica*, was clearly a case of a second brood, a circumstance that was thought to be very unusual in this species. *Teras contaminana* was common among the blackthorns during the latter half of September, showing no great variance from the usual time of appearance of the species.

Mr. B. Harold Smith said that his holiday had been spent in South Cornwall near the Lizard, between September 4th and 25th. The weather was very fine during the first fortnight, but the last week was rainy with high winds, so that during that part of the time comparatively little collecting could be done. His experience in regard to *Pieris brassicae* was at variance with that of Mr. Adkin at Eastbourne, for in Cornwall he had found it very abundant, and at night numbers were to be found at rest on a species of *Mesembryanthemum*. *P. rapae* and *P. napi* also were very common, but less so than the first named species. *Colias edusa* was met with very sparingly, about six examples in all being seen. One female that was taken deposited a number of eggs which commenced to hatch about October 3rd, and were not all out till the 11th. *Rumiccia phlaeas* swarmed everywhere, and included a number of the var. *caeruleopunctata*. One female was taken in which the right forewing was of the var. *schmidtii* form, fading away to almost white at the outer margin. *Pyrameis atalanta* was very plentiful, and *P. cardui* fairly so, but *Aglais urticae* was distinctly scarce. *Pararge megara* also was very plentiful.

*Agrius (Sphinx) convolvuli* was not uncommon, and two each *Manduca (Acherontia) atropos* and *Phryxus (Deilephila) licornica* were taken at light, a larva of the latter species also was found which selected sallow as its food from among a number of plants with which it was supplied. *Sesia (Macroglossa) stellatarum* was abundant, and on two occasions was noted on the wing well after half past six in the evening, once when it was quite dark, with high wind and squalls of rain and fog.

Geometrae as a rule were scarce, but a couple of specimens of *Sterrhia sacraria* were taken, one, a female, on the wing, by Mr. Smith, the other, a male, flying over coarse grass, by a friend who was with him. *Acidalia marginipunctata (promutata)* occurred fairly commonly on the sugar patches.

Noctuæ were better represented, *Polia xanthomista*, *P. flavicincta*, *Epunda nigra*, *E. lichenea*, *Bryophila muralis*, *Aporophyla australis* and its var. *ingenua*, *Noctua glareosa*, and *N. castanea*, among others, being taken at "sugar," while second emergences of *Agrotis exclamationis* and *Apamea didyma (oculea)* were met with. A single example of *Laphygma exigua* was taken at light, and one of *Plusia ni* at flowers of virginia stock.

It was regarded as an interesting fact that the tamarisk bushes (*Tamarix gallica*) appeared to exercise quite a soporific influence on the *Noctua*, and were often quite as productive of specimens as the sugar patches. The moths were found resting on the boughs, and allowed themselves to be quietly boxed.

Mr. J. Platt Barrett remarked that in the second week of July he returned from Sicily, and found London suffering from the most prolonged heat-wave of modern times, which was even more oppressive to him than the heat of Sicily. At once he hurried off to his old haunts in East Kent, and to his great disappointment found that the special species which have usually occurred there in mid-July were absent. Whether they had been drowned out by the excessive rains of last year (1910), or hurried over by the heat-wave he could not tell; perhaps time will show. Some local species were out in limited numbers, but sugaring on the sandhills was a failure, and as he found heavy falls of honeydew he was not surprised. He consequently turned his attention to the heads of marram grass (*Ammophila arundinacea*) which were very sticky; however, he had no luck there either, the few moths on the marram being the most common species, such as *Leucania pallens*, *Agrotis tritici*, etc.

Early in August he paid a visit to Yorkshire, extending it as far as Arnside, and on his way back broke his journey at St. Anne's-on-Sea, on the Lancashire coast, where he worked the sandhills with even less success than in East Kent, *Agrotis tritici* and *A. cursoria* being the most frequent species met with. A friend, however, very kindly supplied him with examples of *Luperina nickerlii* var. *gueneei*, taken earlier in the season.

Returning home, he spent a week-end with one of his daughters at Worthing, and visited the downs. It being the middle of August he hoped to get a few female specimens of *Agrion thetis (bellargus)*, but not one was to be seen; everything was dried up, and *Polyommatus icarus*, *Ceanonympha pamphilus*, *Epinephele jurtina (ianira)*, and *Rumicia phleas*, generally in worn condition, monopolized the downs.

His other daughter visited Sidmouth, and he spent the last week in August with her. Long walks on the cliffs were taken, as well as in the woods, and in all some twenty species of butterflies were seen, all of the commonest, not one he considered worthy of a pin.

Everywhere he went the foliage appeared to be uneaten by lepidopterous larvæ. In his suburban garden the plants were practically unmolested, in marked contrast with the autumn of 1909; and he was of opinion that the lack of moisture had killed off the larvæ.

A general discussion followed, in the course of which Mr. H. R. Sweeting, referring to the failure of Mr. Adkin to find a second emergence of *Cupido minimus* at Eastbourne, said that when he was there in 1906 he took a specimen on August 1st, two on 5th, and another on 6th of that month; and Captain P. A. Cardew considered the species to be regularly double-brooded at Dover, where he had taken it during August in the years 1906, 1907 (a cold, wet season when very few only were taken), 1908, and 1909. He also mentioned that he had taken an undoubted second-brood specimen of *Celastrina argiolus* on July 3rd last.

Mr. A. L. Rayward, commenting upon the dryness of the season, said that he had kept two batches of ova of *Orgyia antiqua* under observation, the one in his garden at Croydon the other on the road from his house to the railway station. Some ten or twelve only of the eggs hatched, the greater number having apparently been dried up and killed by the excessive heat and dryness of the atmosphere.

Mr. C. W. Colthrup remarked that *Plusia gamma* was an absolute pest at Polegate on July 28th and 31st, and he thought that its scarcity at Eastbourne must have been due to its being over before it was looked for there; he was aware of the sudden appearance of the species and its equally sudden disappearance. He also mentioned that *Pieris brassica* was very abundant at Margate from September 3rd to 11th when it suddenly became quite scarce. *Luperina testacea* was one of the common species that he had found much less numerous this year than last. In 1910 he would have had no difficulty in taking fifty specimens on any one night during a three weeks stay at Margate, but this year under similar conditions no more than nine specimens were seen on any night and on one occasion only three. His most interesting capture had been *Colias hyale*: he had heard that freshly emerged specimens had been taken near Margate about the middle of August, and on his arrival in the district on September 3rd he took four worn

individuals. On the 8th, however, a couple of fresh examples were taken, and from that date onward until the end of his three weeks' stay, there appeared to be continued emergences, upwards of eighty specimens in all being taken. Only two *Colias edusa* were met with.

OCTOBER 26th 1911.

The Rev. George Wheeler, M.A., F.Z.S., F.E.S., of Gloucester Place, W., and Mr. H. B. Wells of Gipsy Hill, were elected members.

Mr. A. Sich exhibited specimens of *Lithocolletis hortella*, F., an oak feeder and *Lithocolletis sylvella*, Hw., a maple feeder. He said that these species differ from all others of the genus in their ground colour and in the possession of very slender fasciæ on the forewings. They are somewhat similar in ground colour and markings, but *L. sylvella* may easily be recognised by the last two fasciæ forming together the letter K. This mark is clearly visible on the left forewing. On the right forewing the letter-like mark is of course reversed.

Mr. A. Russell exhibited a specimen of *Phryxus livornica*, taken by Mr. E. C. Joy in his garden at Purley on August 3rd, 1911, at about 7.30 p.m., hovering over a clump of white phlox, and three specimens of *Diacrisia sannio* (*Euthemonia russula*), females bred from ova laid by a female taken near Grange-over-Sands about the middle of July. Out of a full brood of larvæ six went ahead, pupated, and produced female moths, the three exhibited being the largest. The imagines emerged, two on September 7th, one on September 9th, one on September 12th, and the remaining two on September 13th. The rest of the larvæ are going over as is usual with the species. It will be observed that the forward movement was entirely restricted to larvæ producing female moths. Included in the exhibit was a captured New Forest female, by comparison with which it was noticed that those bred are somewhat under-sized. Mr. Russell recorded the capture of a female specimen of *Bithys quercus* in a very worn condition, at Haslemere, on September 1st, 1911.

Mr. R. Adkin exhibited a series of *Eupithecia subfulvata* reared from ova. The parent moth was taken by Mr. A. Sich in his garden at Chiswick early in August 1910. The eggs hatched on the 12th of that month, the larvæ fed up on yarrow, eating the lower leaves but apparently avoiding the flowers, and they had all

pupated by October 9th. The moths emerged between June 27th and July 27th, 1911. Mr. Sich said that the female parent had probably flown into the garden from the adjacent meadow.

Mr. H. Moore read the following note on a Silphid beetle from the Orange River Colony :—"Some months ago I exhibited a pair of beetles that had been kept for nearly two months without food, *i.e.*, since their capture in the Orange River Colony. The male died shortly afterwards, but the female is still apparently in good health. They were taken during the third week in March, which gives an age for the survivor of over seven months; but though interesting in itself, that is not my excuse for again exhibiting the beetle. The beetles were brought home in a common chip match box, and at the time were noticed to be covered with a whitish dust, apparently scraped off the box. The beetle is black, sparsely covered with stiff reddish hairs, and during the time we have kept it, we have been much exercised as to how it got the particles of food over its elytra and thorax. Its captor says it is an exudation, but upon putting it under the microscope, we distinctly recognised what appeared to be the mycelium and spore clusters of a fungus. The beetle in fact appears covered with mildew, and as I understand this is their general condition during life, I have thought the occurrence worth noting."

Mr. W. G. Sheldon exhibited a long series of *Colias nastes* var. *vernandi* in beautiful condition, taken by him near Abisko in Swedish Lapland during mid-June last. He remarked on the similarity of the Arctic fauna and flora to the fauna and flora of the Alps. The plants and general appearance of the swamps were apparently identical in both localities. Unfortunately, the weather was most unfavourable. He found butterflies by no means generally distributed, and nearly always associated with swampy ground. It appeared that, immediately upon the disappearance of the snow, insects began to appear and many species soon became common. The series contained several of the known forms, including ab. *immaculata*, and one or two interesting aberrations.

Mr. L. W. Newman exhibited long and varied series of *Amorpha populi* bred from selected parents from Bexley, 1911. The specimens varied from extreme deep pink to delicate flushed pink, and very light pale drab to darker drab, with three specimens of a partial second brood, the wings of which were extremely narrow and the colour a pretty pink. He also showed a short series from Aberdeen, all of which were pink and heavily banded. At the same time he reported that he had obtained one gynandromorph among those bred.

Mr. Blair exhibited male and female specimens of the "stick insect," commonly known as *Dirippus morosus*, and pointed out its characters. He remarked that the name the species had been hitherto known by was incorrect. It was a species of the genus *Linchodes*. He also showed imagines of the Neuropteran, *Boreus hyemalis*, of which he had previously exhibited the larva and pupa.

Mr. Maine also exhibited *Boreus hyemalis*, and called attention to its curious habit of making sudden leaps. He also exhibited the larva of the common Scorpion-fly, *Panorpa communis*.

Mr. Baumann exhibited a nearly black form of *Acidalia virgularia* with white fringe and only a narrow sub-basal transverse band light in colour. It was taken at Lewisham.

Mr. B. L. Curwen exhibited series of the four species of *Colias* he had obtained this year in Switzerland, *C. paleno*, *C. phicomone*, *C. hyale*, and *C. edusa*. He also showed melanic forms of *Cidaria immanata* from Brockenhurst, and of *Hypsipetes sordidata* (*elutata*) from Wimbledon Common; a specimen of *Mania maura*, bred from Wimbledon larva, with very strongly contrasted black and buff markings; an example of *Rumicia phleas* with four blue spots on the margin of the hindwings, taken at the Beaconsfield meeting; a specimen of *Callimorpha dominula* with yellow underwings, from Harbridge, Hants; and *Spilosoma lubricipeda* var. *zatima*.

Mr. Blenkarn exhibited three recent additions to the British list of *Haliphus* (Coleoptera), and communicated the following note:—

"Mr. Edwards, in the January number of the "Entomologist's Monthly Magazine," gives a paper on the revision of this very confused family, and as far as I know he is the only one who has separated the *ruficollis* group during recent years.

*H. heydeni*.—He says the chief points in this species are, "Elytral interstices of the female without punctulation, size smaller than *ruficollis*, wider at the shoulders, and more rapidly narrowed behind; an easy species to distinguish." The female specimen I show was taken by him in the Cotswold district.

*H. immaculatus*.—Elytral interstices of female with punctulation. The elytral punctures forming the apex of the ninth row, show a tendency to become merged in a black marking. The pair shown came from a new locality, Kessingland, near Lowestoft, in August 1911.

*Gabrius stipes*.—The chief distinctions of this species are that the penultimate joints of the antennæ are strongly transverse, first joint black, head broad, femora dirty testaceous, tibiæ pithy. Dr.

Taylor says ("Ent. Mo. Mag.") that this should be a common species in the South of England. The specimen I have was taken at Beckenham on May 25th, and kindly identified by Commander Walker."

Mr. Buckstone exhibited an extremely fine variety of *Brenthis selene*, taken at Wanborough near Guildford. The whole of the usual transverse markings on the forewings were absent. Only three costal blotches were present, and the sub-marginal markings consist of an imperfect row of black spots. The hindwings also had the sub-marginal row of black spots, with only a good-sized discoidal mark and a small basal spot.

Mr. W. J. Kaye exhibited a huge leaf of the black poplar picked up in Mr. Gibbs' garden at St. Albans; the tree was some 30ft. in height and the leaves were all exceptionally large this year. The one exhibited measuring  $12\frac{1}{2}$ in. by 12in.

Mr. Lucas read a paper entitled "Bracken" (see p. 1), and illustrated his remarks with a large number of lantern slides mostly from photographs taken by himself. Some of these are reproduced in Plate I.

NOVEMBER 4th, 1911.

FIELD MEETING AT OXSHOTT.

Conductor: STANLEY EDWARDS, F.L.S., F.Z.S., F.E.S.

Owing to the exceptional season the meeting originally arranged for October was deferred until early November. The Fungus Foray is usually a favoured meeting, attended by a good number of members. On this occasion some seventeen members and friends were present and much enjoyed the late autumn ramble, though the available daylight was short. Very few species of Fungi were in evidence, and many common species were either completely absent, or only represented by stray examples. Even *Amanita rubescens* was not met with, and only one or two odd specimens of the beautiful and conspicuous *A. muscaria* were seen.

The most noteworthy of the species found were:—*Otidea aurantia*, a very beautiful orange-coloured fungus, *Phlebia contorta*, *Tremellodon gelatinosum*, *Calocera viscosa* and *Cordyceps ophioglossoides*, together with the Myxomycete, *Leocarpus vernicosus*.

NOVEMBER 9th, 1911.

Mr. H. E. Page, F.E.S., of New Cross, and Mr. W. L. Coxhead, of Clapton, were elected members.

Mr. R. South exhibited, on behalf of the Rev. A. P. Waller, a series (24 specimens) of a *Leucania* reared in 1911 from ova deposited by a female *favicolor* taken at sugar in a marsh, July, 1910, in the Woodbridge district, Suffolk. Nine of the specimens agree with the female parent, about twelve of the others are distinctly referable to *L. pallens*, and the remainder are intermediate. A female taken in the same marsh, June, 1907, and three of the thirty moths that were reared in 1908 from the ova she deposited. In this case the female parent was apparently *pallens*, but all the progeny were *favicolor*, seven being of the yellow form—*lutea*, Tutt. A series of *L. pallens* taken at sugar in 1911, at Waldringfield. One of the specimens was very like *favicolor*, another was a good example of *ectypa*, Hübn., several were of a reddish tint, some had the hindwings marked as in *L. straminea*.

Mr. L. W. Newman exhibited a long series of *Pyrameis cardui* reared from ova obtained from females captured at Folkestone, September 2nd last. Some 500-600 ova were deposited, and were at once brought into a hot-house, which was kept at a temperature of about 80° in the day, going down to 65° or 70° at night. The ova hatched about September 7th, and the larvæ fed up very rapidly. Pupation began on September 30th and continued for about a week; the first imago emerged on October 8th, and all were out by October 16th. The larvæ were fed on stinging nettle. The series showed a considerable variation, some were abnormally pink, while a few were devoid of this colour, the most noteworthy variation, however, was in the large white apical spot being almost totally obscured with black scaling in a few, while others had merely faint traces of this black scaling. A few others showed minor variation, such as a small extra spot, but the majority of the brood were normal specimens.

Mr. W. J. Kaye exhibited three specimens of *Fumicia phlaas*, bred from ova laid by a female captured in his garden at Surbiton. The larvæ were kept in a hot-house and these three fed up in about twenty-one days.

Mr. H. W. Andrews exhibited the following local species of Diptera, all of which were new to the fauna list of North Kent:—*Syrphus vittiger*, Zett., two males and one female, and *Syrphus*

*lineola*, Zett., male, both from Bexley; also *Sciomyza simplex*, Fln., from the Thames Marshes.

Mr. R. Adkin exhibited a short series of *Peronea variegana* taken, or reared from larvæ feeding in the roses, in his garden at Lewisham during the past summer and autumn. They consisted of two typical specimens bred on August 10th and 19th respectively, one v. *borana*, Haw., bred August 10th; one v. *asperana*, Fb., bred July 23rd; and another small specimen of the same form captured October 6th, evidently an example of a second brood; and one v. *cirrana*, Curt.

Mr. A. E. Tonge exhibited short series of *Xylina socia* (*petrificata*) and of *X. semibrunnea* for comparison, and called attention to the constant presence of a black capital "I" mark at the anal angle of the forewing in the latter species, no trace of which was apparent in the former; and remarked that this mark constituted a very good means of separating the two species.

Mr. Colthrup exhibited the same two species from the New Forest, and remarked that *X. semibrunnea* was not supposed to occur there, but a comparison with Mr. Tonge's exhibit left no doubt that he had one example of this species among his captures.

Mr. H. Moore exhibited several Tsetse Flies (*Glossina*) from the Lake Chad district and read the following note:—"Two years ago the Royal Society issued a pamphlet on the Sleeping Sickness, with a very useful plate of some of the principal African blood-sucking flies, for the benefit of travellers and residents in Tropical Africa. Several of these I sent to as many correspondents, with the usual begging accompaniment. In reply I received one small box from North Nigeria containing a few specimens collected at Maifoni, the British Station on Lake Chad—which unfortunately suffered in transit. There were several Tsetse flies (*Glossina tachinoides*) one *Tabanus fasciatus* (Fab.), perhaps the commonest of the Serost flies, and a few odds and ends, chiefly fragments. There was also a bee, of which I await particulars. I have included in my exhibit an unnamed species of *Bombylius*, from the Orange River Colony, which is generally considered, in error, by non-entomologists one of the stinging flies."

Mr. E. Step exhibited a group of the very brilliant fungus *Otidea* (*Periza*) *aurantia* found by Mr. West at Oxshott, during the Fungus Foray on November 4th.

Mr. A. W. Buckstone exhibited two series of *Brenthis selene*. The first was a small dark form from high ground, gravel soil overlying chalk. This race flies from the end of June to the end of

July. The second was a larger and lighter-coloured form from low marshy ground, clay soil. This race flies from the end of May to the end of June. Mr. Buckstone also reported that at Horsley last July he took a live toad with its head partly eaten away by maggots. On cutting its abdomen open black fluid flowed therefrom. Its blood was also in a watery condition. Several members remarked that they had found toads attacked by maggots while alive. The eyes were particularly subject to these attacks. It was usually due to the larvæ of *Lucilia bufonivora* or of *Calliphora silvatica*, and they are said to eat their way from the nostrils to the brain and eyes, producing effects similar to those of *Cænurus cerebrialis* in sheep. Death usually resulted from the destruction of the brain.

Mr. Hugh Main exhibited the large grub of a *Dynastes* (sp.?) beetle sent him from Ceylon. It was feeding on cocoa-nut fibre.

Mr. F. B. Carr exhibited Lepidoptera mostly captured by his son the Rev. F. M. B. Carr, during June, 1910, in Shropshire, including long series of *Cænonympa tiphon* var. *philoxenus* from Whixall Moss, North Salop; a good series of *Nemeophila* (*Parasemia*) *plantaginis*, mostly captured, with a few bred from ova laid in June, producing imagines in September. The latter were mostly females with only three males, one of which is a var. with dark hindwings. Long series of *Larentia* (*Entephria*) *caesiata* found at rest on rocks on the moors on June 22nd. *Melanippe* (*Xantherhoë*) *tristata*, very abundant on the moors. *Emmelesia* (*Perizoma*) *albulata*, very abundant in one field. *Eupithecia pulchellata*, very abundant on the rocks. *Cleoceris* (*Bombycia*) *viminalis*, larvæ abundant on Sallows, producing dark imagines. Light forms shown for comparison, bred at the same time from Oxshott larvæ.

Mr. Sich exhibited specimens of *Lithocolletis stettinensis*, a species attached to alder, from Oxshott.

Mr. Stanley Edwards exhibited a specimen of the giant puff-ball, *Calvatia gigantea*, from a garden at Blackheath. It was said to reach a size of two feet in diameter at times.

Mr. A. E. Tonge exhibited lantern slides of various species of the genus *Egeria* (*Sesia*) showing the living imagines shortly after emergence, generally close to the exit larval burrow. He also showed photographic slides of the ova of several species of the same genus.

Mr. Dennis exhibited a series of lantern slides illustrating the various characteristic plants indigenous to a salt-marsh, showing both their individual specific characters and their massed effect *in situ* in the marsh.

Mr. J. P. Barrett exhibited lantern slides illustrating numerous scenes and collecting grounds around Mt. Etna, Sicily.

Mr. Hugh Main exhibited lantern slides showing details of the economy of the wasp, structural points in the glow-worm, the larva of *Theretra porcellus*, and a most interesting and unique series of slides illustrating his observations of the oviposition, cell building, and mothering of her offspring by the millepede (*Polydesmus complanatus*). See page 32.

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## BRITISH ASSOCIATION.

### REPORT OF THE DÉLEGATE TO THE CONFERENCE OF CORRESPONDING SOCIETIES.

By ROBERT ADKIN.

The Conference of Delegates of Corresponding Societies of the British Association was held during the Portsmouth Meeting, on Thursday, August 31st, and Tuesday, September 5th, under the chairmanship of Prof. J. W. Gregory, F.R.S., the Vice-Chairman being Mr. William Dale, F.S.A., when the following business was transacted.

The Chairman read an address, taking for his subject "The Scientific Misappropriation of Popular Terms," in which, after pointing out that the Societies represented at the Conference are the strongest link between the technical specialist and those who take a friendly interest in science, dwelt upon the danger of using an old familiar word to express a new idea, in the vain hope of catching the public mind. It is worse, said he, to be misled by a plausible phrase than to be startled or repelled by a correct technical statement, and he urged that Science will lose more by the misuse of current English than by the invention of new terms for new ideas. To put new meanings into standard English words appears unjustifiable.

Mr. F. Balfour Browne referred to the question of the "Systematic Recording of Captures" which he introduced at the Conference in 1910, and reported that the Committee then

appointed to consider the matter were likely to arrive at a working agreement. The Watsonian County and Vice-County system appeared to be a sound one, but others had been put forward, and there was a likelihood of a compromise.

Mr. Harold Wager read a paper on "The Study of Fungi by Local Natural History Societies," which was illustrated by a number of very beautiful and instructive drawings prepared by Mrs. T. R. R. Stebbing, Mrs. W. P. D. Stebbing, and Messrs. Peck, Clarke, and Crossland. He referred to the large field opened by the study of fungi, their beautiful forms, and the desirability of making accurate drawings of any unusual species found. There were many important problems connected with the study of fungi, and there were yet many of them to be worked out; information in regard to habitat and nature of a species and its association with other species would be useful. There is also ample work to be done among the micro-fungi, which should be studied as living organisms, and their life-histories are of more importance than their classification. Touching upon the utilitarian aspect, he mentioned that there were some seventy or eighty species of edible fungi, but it was the connection of fungi with decay, their destructive effects upon timber, and their production of disease in animals and plants, that opened up the great field for useful study.

A long discussion followed, in the course of which Prof. M. C. Potter considered the subject was one that might well be taken up, in any of its branches, by local Societies; they would no doubt need a guiding hand, but there was no dearth of books on the subject that would be a help to them. Miss Lorrain Smith said the study would be found most fascinating, but it should be based on an accurate knowledge of what had already been done, and not taken up in a haphazard way. Miss H. C. I. Fraser heartily supported Mr. Wager's paper. She said the internal structure of fungi needed careful study, which should be encouraged, and the smaller fungi especially would be found very interesting. She suggested the desirability of some central authority to correlate the work of local societies. Sir Daniel Morris, as an instance of damage caused by fungi, said that *Fuonymus japonica* was introduced into England as an ornamental shrub about a hundred years ago and flourished exceedingly until some ten years since, when its leaves began to be attacked by a disease, which gave them much the appearance of having been whitewashed, and which had spread all along the south coast. This had recently been found to be caused by a fungus. Mr. Cheesman thought the study of fungi important, especially

from its economic standpoint, and said that it would prove an interesting study for the members of Local Natural History Societies at a time of year when their botanists had little else to do. Mr. Brooks said that the workers in laboratories would be glad of all the material they could get, and that they would be much indebted to the field-workers for supplies. The Rev. T. R. R. Stebbing, Messrs. W. Mark Webb, and W. P. D. Stebbing also spoke. Prof. Gregory, from the chair, gave the thanks of the meeting to Mr. Wager for his paper, and to the artists and photographers for their very interesting pictures. Mr. Wager, in acknowledging the vote of thanks, said he hoped the subject might receive more attention at the hands of the local societies in the future and that reports of their doings may be given in at the next conference. Many problems in biology could be helped by the Study of Mycology.

Sir Daniel Morris (Bournemouth) introduced the question of "Co-ordination of the Work of Local Scientific Societies." He thought such procedure would tend to make one strong society in a town instead of several small and struggling societies. As an illustration he instanced the Bournemouth Society as being organized into seven sections, each having its own officers and doing its work in its own way, but at times, when a section had something to show, it was able to arrange a meeting and interest the whole of the three hundred members. The strength of the large society also, he thought, would receive greater attention. Dr. Tempest Anderson, Mr. Thompson, and others supported the suggestion, but Mr. W. Whitaker thought it quite immaterial so long as work was done. Undoubtedly joint meetings were good, Botany and Zoology for instance, should go together and help each other. Prof. Gregory hoped that Sir Daniel Morris would bring forward a formal motion at the next conference, and that it would then be fully debated.

Mr. W. Mark Webb read a paper on "The Protection of Plants." Having referred to Mr. A. R. Horwood's paper on "The Extinction of Cryptogamic Plants" read before the congress of the South-Eastern Union of Scientific Societies at Guildford, in 1910 (*South-Eastern Naturalist*, 1910, pp. 56-86), and taking the causes there enumerated, he said we might leave those coming under the heading of "climatic" aside. But the others, which are largely due to the effects of civilization, such as drainage, agriculture, deafforestation and so forth, which can only be regarded as necessary evils, might be overcome by the formation of reservations of areas, left so far as possible in their natural state,

where plants generally may flourish, and by the special protection of small enclosures in which the rarer or local species may grow undisturbed. He thought that many landowners would gladly help if the movement in its favour became general, and he had no doubt the National Trust would be willing to consider the suggestion as regards many of their properties. Then there were the causes that came under the heading of "Industrial," such as smoke, injurious gases, etc., and which were being dealt with by the Smoke Abatement Societies, whose hands it might be possible to strengthen. He also referred to the general levelling up of open spaces taken over by municipal authorities, and of the formation of golf courses, also to the digging up of the roots of wild flowers by hawkers, which would not go on if there were not a demand by the public for them, and for which legislation is the only remedy. Although bye-laws have been passed covering many counties, they only apply to public places, and the councils have no jurisdiction over private properties. And then there is the indiscriminate collecting by those who believe themselves to be the lovers of wild flowers. Some societies were already dealing with these matters in a militant way, but it was felt that they would not be able to do a great deal in the desired direction unless they could get the cordial co-operation of naturalists all over the country, of the press, of the schoolmasters, of the clergy, and of the landowners; and he appealed to those present to do everything in their power to offer all the help possible to bring about a better state of affairs. A short discussion followed, in the course of which Miss Crossfield (whose brother had given £1,000 towards the purchase of Colley Hill, Reigate) spoke of the fact that several species of Orchids would be protected by the proposed dedication to the public, and its care by the National Trust.

Some other business having been disposed of, the Conference was brought to a close.

NOVEMBER 23rd, 1911.

### THE ANNUAL EXHIBITION OF VARIETIES, ETC.

The Rev. F. D. Morice, M.A., F.E.S., President of the Entomological Society of London, was elected a member.

Mr. R. South exhibited an extreme melanic aberration of *Brenthis (Argynnis) selene*, captured by Mrs. Helyar in the New Forest, in June, 1911. Unfortunately the specimen had the outer

margin of all the wings almost entirely torn away. A pale, dull, banded specimen of *Ephyra linearia*, taken in Epping Forest by Mr. S. P. Betts, in June, 1908. In addition to its unusually pale colour, the second transversed line of all the wings was somewhat broader than usual, and the space between it and the third line was irrorated with purplish-brown. A specimen of *Rumicia* (*Chrysopterus*) *phleas*, referable to var. *eleus*, Fab., which was taken in Surrey; also an example of ab. *schmidtii*, captured by the Rev. W. Claxton in Essex. Six of the more unusual forms of *Sarothripa undulans* (*revayana*) occurring in the New Forest, where the species is highly polymorphic. An extensive series of *Leptogramma literana*, chiefly from the New Forest. As arranged, about 35 modifications in colour and markings were indicated. These include the forms named—*asperana*, Schiff., *arugana*, Hübn., *squamulana*, Hübn., *irrorana*, Hübn., *squamana*, Fab., *tricolorana*, Haw., *fulvomixtana*, Stph., *romanana*, Fab., and *olivana*, Rebel. The last named variety seems to be the rarest of the named forms of *L. literana* occurring in Britain; the specimen shown, which was taken in the New Forest this year, is the only one he had seen.

Mr. South, on behalf of the Rev. A. P. Waller, exhibited the series of the *Leucania*, with *L. faricolor* and *L. pallens*, shown at the last meeting.

Mr. Robert Adkin exhibited series of *Abraças grossulariata*, arranged to show various forms captured or reared from wild larvæ and forms "reared under domestication," i.e., obtained by breeding for many generations from selected parents, together with more or less typical forms for comparison, and called attention to the infinite variety of the wild forms.

He also exhibited a specimen of *Zonosoma orbicularia*, reared during the past summer from a New Forest larva, in which the whole of the wings were of a rich red-brown, becoming almost black at the margins, the only markings being a faint indication of the sub-marginal white line on the fore-wings, and minute white dots on the hind-wings. A form of *Melanippe fluctuata*, captured near Colchester this year, in which the usual dark costal patch was united with the basal patch by a narrow dark line along the costa, and continued across the wing as a dark fascia, much constricted beyond the middle and broadened out on the inner margin. Many of the usual transverse lines were absent.

Mr. A. A. W. Buckstone exhibited, among other species, a specimen of *Brenthis selene* with most of the transverse markings absent from the base and disc of the wings.

Mr. L. W. Newman exhibited a series of *Mellinia* (*Xanthia*) *ocellaris* bred from a female captured at Hampton-on-Thames, including typical specimens and the two varietal forms, one very similar to *M. gilvago*, and the other like *Citria fulvago* (*cerago*) in colour and markings. A large number of striking varieties from the collection of Mr. J. S. Capper, including a fine series of extreme forms of *Melitæa aurinia* (*artemis*) from various localities; *Euchloë cardamines*, including a fine lemon-tipped aberration; a *Brenthis euphrosyne* with hindwings nearly all black; a *Pieris napi* from Ireland, of a deep yellow colour; a wonderful aberration of *Pyrameis cardui*, with the tips of the forewings all black; a strange form of *P. atalanta*, bred by Mr. Arkle, of Chester, having irregular melanic blue scalings in various parts, especially on the right forewing; a series of *Agriades coridon* showing the extreme range of colour variation in both sexes; and five fine forms of *Arctia caja*, one very curious in having the left forewing all brown and other wings normal, another was suffused all over with brown, with the black spots on the hindwings showing through, and a third specimen had a conspicuous pure white fringe.

Mr. A. Quarrington exhibited varieties of the following species of British Rhopalocera:

*Pyrameis cardui*.—A fine female with conspicuous blue spots on the hindwings, netted in a garden at West Dulwich towards the end of June, 1906.

*Aglais urticae*.—Bred from wild larvæ, August, 1911.

*Polygonia c-album*.—A yellow variety, bred from larvæ supplied by L. W. Newman; it emerged on September 8th, 1911.

*Celastrina argiolus*.—One with pale spots on hindwings, which emerged in July, 1910; and one deep blue with very black margin, bred in September, 1911.

*Agriades coridon*.—One with confluent large spots, netted near Purley, in July, 1911, and one with pale spots on margin, netted at Reigate, in August, 1911.

*Rumicia phlæas*.—One with dribbled spots, one ab. *schmidtii* netted in September, 1911, near Streatham Common, and one with the marginal band on hindwings nearly absent, netted on Wimbledon Common in August 1911.

Mr. P. M. Bright exhibited a fine series of varieties of *Mimas tilia*, including some of the best varieties from the late Mr. J. A. Clarke's collection. Several varieties of *Amorpha populi*, including a remarkable gynandromorphous specimen. As usual in gynandromorphs, the female wings were much larger than the male

wings. But the most remarkable thing about this specimen was that the male side was the grey form while the female side was the pink form, the very clean dividing line running down the centre of the body. Another remarkable specimen was a unicolorous female without any of the usual markings on the wings.

Mr. Hy. J. Turner called attention to an article in the *Bull. Soc. Ent. France* by M. Roger Verity of Florence, in which he names the Scotch form of *Erebia athiops* as var. *caledonia*, distinguishing it from the typical alpine race by its smaller size, its comparatively narrower and longer wings, its narrow fawn-coloured band which never contains more than three small ocelli (the alpine race often has four or five, especially in the female), and its underside with the transverse bands very often less distinct. In illustration of this Mr. Turner exhibited a series of the Scotch form from Aviemore, with a large number of examples from various central European localities including Grindelwald males of medium size, very dark ground, dark inconspicuous bands on forewings, bands on hindwings broken more or less into blotches, eyespots without white centres; Brunnen males very similar; Vitznau females large, very bright banded, and well spotted; Gemmi males and females large with brown ground and bright markings; Cortina, Tyrol, very dull small forms comparable to the Scotch males; Innsbruck, an extremely dark male with very inconspicuous band; Susa, male with narrow broken band on fore-wing and small almost obliterated blotches on the hind-wings; Torre Pellice, very large males similar to the last but very large; Breganz, very large females with brilliant bands and conspicuously centred spots, two specimens with five spots on forewing, the rest with four; S. Jura, very light banded females; near Sion, a small very light ground underside; Gersau, an extremely large fine female underside of the form *leucotonia*, with six eye-spots on forewings, five of which are white centred; and near Stalden and Croda di Lago, light females. None of the continental specimens were smaller than the Scottish race, and most of them were larger in wing area and generally corroborated the differentiation as summarized above.

Mr. Turner also exhibited a box of *Luperina* forms illustrative of *Luperina nickerlii* var. *gueneei*, and stated that Dr. Chapman and he had been aided in their investigation by references and material most kindly sent by M. Oberthur, of Rennes. The exhibit comprised a series of var. *gueneei* from the Lancashire coast, *L. grasslini*, Obthr., from the Pyrenees-Orientales, *L. nickerlii*, from Bohemia, *L. testacea* var. *gueneei* = var. A of Guenee (*Species Gen.*) from

Hyères and Oran, *L. testacea* from several English localities, Brunswick, Buda-Pesth, Rennes, Linz, Hamburg, etc., and of *L. dumerilii* from La Vendée, Lyons, Vannes, Sicily, Rennes, and Gerryville d'Oran, Algeria. Mr. Turner stated that the genitalia of *L. nickerlii*, Bohemian, *L. gueneei*, British, and *L. graslini*, Oberth., Eastern Pyrenees, were identical, and confirmed their previous conviction that these insects were geographical forms of one and the same species. As additional evidence, M. Oberthür informed him that the so-called *L. graslini* taken 1908 were identical with the insects in his (M. Oberthür's) collection taken and bred by Mr. Graslin in 1847 and 1857. These last specimens were identified by Dr. Nickerl himself as the same species as the *L. nickerlii* he had been in the habit of taking in Bohemia. Further, in the "Ann. Soc. Ent. France" for 1863, M. Graslin describes the larva of *L. graslini*, and compares it with that of *L. testacea*, from which it is abundantly distinct.

Mr. Stanley Blenkarn exhibited a number of insects taken by him in Braganza, North Portugal, in a vineyard, on November 4th, 1911, including the harvesting ant, *Aphanogaster barbarus*, and several species of Orthoptera and Coleoptera.

Mr. Hugh Main exhibited long and fine series of *Boarmia repandata*, bred this year by Mr. A. Harrison and himself, comprising a series bred from a North Wales male var. *conversaria* and a Yorkshire melanic female. All the offspring, both male and female, show the presence of the dark band of the *conversaria* form, some more strongly than the others. The ground colour of both sexes is dark, but in the males it has a brownish tinge very noticeable in daylight, resembling that of the male parent. In the females the ground colour is much darker, closely resembling that of the female parent, and with no trace of brown colour. A series bred from Yorkshire parents, ranging from a suffused dark colour to a dark mottled-grey. A series bred from Lancashire parents, fairly uniform in appearance, but much blacker than the preceding series. A series bred from a North Devon female, showing a fair amount of variation in the colour and pattern.

The Rev. F. D. Morice exhibited a small box of bees containing the smallest and the largest bees known to him—*Ceratina parvula*, Sm., and *Nylocopa*, sp. ?; Gilbert White's "Hoop-shaver bee," *Anthidium manicatum*, L.; the famous "Upholsterer bee" *Osmia* (olim *Anthocopa*) *papaveris*, Latr.; and two pairs of a Mediterranean snail-shell-inhabiting bee, *Osmia ferruginea*. He also showed photo-micrographs of the details in the "saws" of various Palearctic sawflies of the Genus *Dolerus*.

The Rev. J. E. Tarbat exhibited a short series of *Gnophos obscurata*, comprising specimens from Freshwater, Whitby, Dawlish, Budleigh Salterton, and the New Forest, each set showing a ground colour distinctive of the area of origin. Attention was drawn to the set exhibited from Budleigh Salterton, which contained specimens of two quite distinct forms, the one ochreous and the other almost black. He understood that the ochreous form had not been met with hitherto.

Mr. T. L. Barnett exhibited a bred series of *Pygmae anachoreta*, from Devonshire, and of *Apamea leucostigma*, including many forms of var. *fibrosa* from the Fen district of Cambs.

Mr. Schooling exhibited some extremely large specimens of *Arctia caja*, including two second brood examples, and a very fine aberration in which the rich dark colour was so largely extended on the forewings as to leave only an imperfect and narrow sub-marginal light fascia, with one or two apical and several sub-costal dots of the same cream colour, while the intense black blotches of the hindwings were united into a band of irregular width. He also showed a very pretty aberration of *Abraxas grossulariata*, in which there were only mere traces of the usual dark markings.

Mr. C. W. Colthrup exhibited a series of seventy-nine *Colias hyale* taken at Margate between September 4th and 23rd this year; also the only *C. edusa* taken. He communicated the following note:—

“The *C. hyale* are not such a rich sulphur yellow as those taken in 1900 and 1901, a short series of which I have put in the box for comparison. All the females taken this year were of the white form, and two of the males are nearly white. The last specimen in the 1900 row is a yellow female, the only one I have taken in the three years I have had the good fortune to meet with the species. The fifth specimen in the third row, although freshly emerged, has the dark markings very pale. Several examples have the discoidal spot on the underside of the forewing elongated into a very conspicuous streak.”

Mr. B. H. Smith exhibited a very fine aberration of *Melanippe montanata* having the median band obsolete and the forewings almost completely white; a *Catocala nupta*, with hindwings smoky brown; and three specimens of *Agrius concolvuli*, all taken at Warlingham, Surrey. *Manduca atropos* (two examples), *Phryxus livornica* (two examples), *Sterrhia sacraria*, *Laphygma exigua*, *Plusia ni*, *Aporophyla australis* var. *ingenua*, a series of *Polia xanthomista*, and a series of *Rumicia phlaeas*, including one example with right forewing var. *schmidtii* fading into var. *alba*. All these latter were taken in September, in South Cornwall.

Mr. Alfred Sich exhibited the Gelechiid, *Argyritis pictella*, Zell, This species used to occur on Barnes Common in Stainton's time, a locality which must have been quite suitable for it in those days.

On behalf of Mr. E. D. Green, Mr. Sich exhibited a series of *Depressaria putridella* recently captured in North Kent, in the locality where Mr. Green first discovered it some few years ago.

Mr. K. G. Blair exhibited an example of *Mimas tilia*, with dark transverse markings across the left primary wing reduced to a single round spot: the markings on the right primary being normal. A teratological specimen of *Carabus catenulatus*, from the New Forest, in which the reflexed margins of the thorax were symmetrically excised in the posterior half on each side. *Pimelia fornicata*, with the right antenna duplicated some distance from its base, and with one branch again divided at the tip.

On behalf of Mr. W. N. Blair, Mr. Blair exhibited living specimens of the Medicinal Leech, *Hirudo officinalis*, from the New Forest, where it is said not to have been met with since the year 1869. Mr. Lucas observed that in one pond in the New Forest this year the species had been exceptionally common; a stick dragged through the water would be followed by a number of these leeches.

Mr. A. E. Tonge exhibited 23 stereoscopic photographs of lepidopterous ova *in situ*, wild laid, all magnified five diameters. Specimens of each of the following Clearwings bred or caught by him in 1911:—*Trochilium bembeciformis*, *T. apiformis*, *Egeria spheciiformis*, *E. andrenaformis*, *E. culiciformis*, *E. cynipiformis* (*asiliformis*), *E. tipuliformis*, and *E. chrysidiformis*. He also showed a series of *Lobophora rivetata* bred from larvæ obtained on ivy buds at Goring and Midhurst, Sussex.

Mr. W. B. Pratt exhibited a very beautiful form of *Ephyra pendularia* in which the marginal and submarginal areas were extremely dark in coloration.

Mr. A. E. Tonge made the following observation on a Kingfisher:

“While crossing a canal bridge in Hampshire yesterday, I heard the call note of a Kingfisher and looked round in time to see the bird flying rapidly towards me, at a height of at least fifteen or twenty feet above the water. When about twenty-five yards away it suddenly checked its flight and dropped like a stone into the water, with a very audible splash, and entirely disappeared under the surface, the water momentarily closing over it. After an appreciable fraction of time it reappeared and took wing without effort from the water with a small fish wriggling vigorously in its beak. It

flew to the bank, alighted, and proceeded to kill its capture by rapidly beating it on the ground. I left it to enjoy the reward of its labours."

Mr. R. T. Baumann exhibited a series of *Hydriomena furcata* (*sordidata*) bred from larvæ collected at Leith Hill and Manchester, the latter forms being all of the black race; a series of *Dianthocia carpophaga*, including some very pale forms, bred from wild pupæ collected on the East Sussex coast; and a short series of *Phibalapteryx vittata* (*lignata*) taken at Gower, near Swansea.

Mr. A. G. Scorer exhibited aberrations of *Abraeus grossulariata*, bred from St. John's Wood larvæ; aberrations of *Rumicia phleas*, including one with long tails, one with underside spotless, and one with right lower wing bleached; aberrations of *Papilio machaon*, one being exceptionally heavily banded, the band almost absorbing the large discoidal spots, and another was a light banded specimen as contrast to the former; both were bred from Wicken pupæ; aberrations of *Euchloë cardamines*, one dwarf measuring 28·5mm., another with a white streak running through the orange patch on right wing; a male *Porthesia similis* with costal margins edged with black; aberrations of *Hadena* (*Eumichtis*) *protea* from the Guildford district; a pink form of *Himera pennaria*, female, bred Guildford; two *Callimorpha dominula*, one with rounded wings, the other with asymmetrical markings; several aberrational forms of *Pieris napi*, including a heavily spotted male, and a set of five undersides showing marked variation in colouring, including two from Donegal.

Mr. J. G. St. Aubyn exhibited two fine specimens of the yellow form, *ab. glava*, of *Anthrocera filipendule* taken at Coulsdon in July last.

The Rev. F. M. B. Carr exhibited a box of insects collected last June in mid-Wales, including *P. interrogationis*, a variable series, one with heavy wedge-shaped markings in place of the customary "note of interrogation"; together with the Dragonflies:—*Caloptyryx virgo* and *C. splendens* taken within about a yard of one another.

Mr. H. W. Andrews exhibited the following dwarf specimens of Diptera, *Bombylius major*, L., *Eristalis pertinax*, Scop., and *Chrysochlamys cuprea*, Scop., with normal forms for comparison.

On behalf of Mr. P. J. Barraud, Mr. Andrews exhibited a teratological specimen of *Spilogaster uliginosa*, Fln., with the terminal portion of the 3rd and nearly the whole of the 4th longitudinal vein missing in each wing.

Mr. Stanley Edwards exhibited a specimen of the large Coleopteron, *Oxygnathus audouini*, from North Borneo, with

abnormal antennæ, an example which had been supposed to be a gynandromorph. However, Mr. Gahan had kindly dissected out the genitalia (which had been mounted and were exhibited in the box) and the specimen was ascertained to be a female.

Mr. Edwards also exhibited a box of Papilionidæ containing series and examples of *Papilio policeses* and its allied forms *P. lurinus* and *P. nyassinus*, all from the African region, together with series of *P. ajax* and *P. marcellus* from New Jersey.

Mr. J. Platt Barrett exhibited a drawer containing male and female comparisons of the following species and forms from Britain and from Sicily:—*Gonepteryx rhamni* with *G. cleopatra*: *Hipparchia semele* with var. *algerica*, very large; *Epinephle jurtina* with vars. *hispulla* and *fortunata*: and long series of *Euchloë damone* and small fine 2nd. brood of *Leptidia sinapis*. He also showed a second drawer containing a large number of geographical representatives of *Melanargia galathea* and pointed out their racial characteristics as follows:—

BRITISH FORMS from various localities all situated at altitudes below 500 ft.—white markings in excess of black, average size 2 in.

CONTINENTAL FORMS FROM THE ALPS:—Brigue, over 2000 ft.—closely approximate to English form. Berisal, over 5000 ft.—smaller than English form, black predominates. From the Appenines:—Pracchio, 3000 ft.—very small, average  $1\frac{3}{4}$  in., black in excess. From Calabria:—Gioja Tauro, near sea level—very dark, approximates to var. *turcica*, average size 2 in. Pakui, Monte Elia, 1000 feet—darkest form, smaller than sea-level specimens. Aspromonte—Scylla, over 2000 feet—two forms here (1) small and very dark, (2) slightly large, pale portions very white.

ISLAND FORMS FROM SICILY:—Monte Cicci, 2000 feet—a large dark form, approximates to var. *procida*. Gravitelli (Messina), 500 to 800 feet—var. *procida*, larger and darker than last. Monte Scuderi, 1000 feet—very large, average  $2\frac{1}{4}$  in., black and white about equal. Megana Hyblæa, near the sea level—paler than English = var. *syracusana*, Zell. Syracuse, near sea level—var. *syracusana* “larger, back ashen, belly white, average size,”  $2\frac{1}{8}$  in. Monte Ætna, over 3000 feet—medium size and colour.

Mr. T. L. Barnett, on behalf of Mr. Cannot, exhibited specimens of *Wheeleria spilodactyla*, from Freshwater, Isle of Wight, of which one example had the forewings undivided into “feathers,” and with only one cleft in the hindwings, though nearly all the usual markings were present.

Mr. W. J. Kaye exhibited an unusually large spray of the magnificent Orchid, *Cattleya labiata*, having five flowers. Three flowers are said to be the usual number in this country, even four flowers are very rare; no doubt the excess of sun-heat of the present year had been the primary cause of the increased development of the flowers.

Mr. C. P. Pickett exhibited a cabinet drawer containing *Angerona primaria* showing the effect of colour environment on the race, which he had been breeding experimentally for the last fourteen years. A brood of larvæ was split up into several sections and fed under various coloured muslins throughout their larval period. Those fed under *red muslin* produced some of the darkest banded males, several being of a blackish chocolate, while the banded females were of a rusty reddish chocolate. Those fed under *pink muslin* produced some of the finest specimens reared, many of both sexes showing a tendency for the bands to disappear. One pair have only a slight trace of bands, and closely resemble the plain form. The form *pickettaria* came out strongly in this portion. None of these approached in any way those fed under the red muslin. Of those fed under an *orange-yellow muslin*, all the females had the ordinary yellow ground colour much deeper, several being quite orange-yellow. The males were a deeper and richer orange. Those fed under a *cream muslin with a green plaid pattern stamped on it* produced some of the most curious forms bred. Several specimens have patches and bleached markings, varying in size and on varying parts of the wings, and look as though response to environment had produced them. As a whole they are not at all rich in colour, but rather inclining to be dull. Pairings have been taken from each brood to continue the experiment next season.

Mr. Pickett also exhibited the following series and aberrations:— A series of *Melanargia galathea* bred from Folkestone larvæ and fed up in a greenhouse. Some of the females were extremely large, one male had a deep black border around all the wings (near var. *procida*). *Colias hyale* taken at Dover in August, one of the males had the row of spots on the underside unusually prominent. Series of *Agriades coridon* from Dover, including numerous vars. and abs. *absoleta*, *striata*, *minor*, etc. Series of the same species from South Cambridge, including among other named forms var. *semi-syngrapha*, a very fine female form with the hindwings perfectly blue. Two specimens had the undersides of a deep smoky shade over the entire surface of the four wings. Another very striking form was

of the ab. *obsoleta* type, but having the ground colour of the under-side white striated with grey and without the usual spots on the border. Several specimens were ab. *striata*, and several were asymmetrical as regards size and markings. Long series of *Celastrina argiolus*, including specimens of four broods captured during the present year, among them several very dwarf forms, extra large females, and a slate-coloured male from Worthing.

Mr. W. J. Kaye exhibited various species of Syntomidæ that he had taken on flowers in South Brazil, and remarked on the large number of species that occurred in tropical South America, forming at times quite the feature of the collecting. Nearly all the specimens exhibited were taken in the early morning, and it was found that as soon as the sun began to gain power the Syntomidæ very largely disappeared. The species exhibited included *Napata euryane*, *Napata splendida*, *Napata castra*, *Trichura di-ranthia*, *Trichura grandis*, *Cyanopepla jucunda*, *Coreura atavia*, *Mallodeta sanguipuncta*, *Mesolasia paula*, *Mesolasia melanobasis*, *Callopepla inachia*, *Cyanopepla orbona*, *Chrysostola variegata*, *Argyroides sanguinea*, *Argyroides ophion*, *Pheia hamapera*, *Tipulodes ima*, *Sanita melanifera*, *Cosmosoma xanthistis*, *Agyrta dur*, *Euagra azurea* and many others.

Mr. W. G. Sheldon exhibited European Diurni including unusually fine selected series of *Euchloë euphenoides*, from the Riviera and the South of Spain; *Zegris eupheme* var. *meridionalis* from Granada; *Leptosia sinapis* from many localities; *Leptosia duponcheli* from Digne; *Thais polyvena*, bred, from Buda-Pest, with ab. *ochracea*, and var. *cassandra* from the South of France; *Thais rumina* and ab. *canteneri* from Andalusia; var. *medesicaste* from Southern France, and ab. *honoratii* from Digne; *Polygonia c-album* from many localities, all the specimens being ab. *hutchinsoni*; *Polygonia egea*, bred and captured, from the Riviera; and *Araschnia levana* with var. *prorsa*, and intermediate specimens obtained by subjecting pupæ, which would normally produce var. *prorsa*, to cold.

Mr. G. E. Frisby exhibited nearly all the British species of the genera *Andrena* and *Cilissa*.

Mr. Carpenter reminded the members that some years ago the late Mr. Winkley took a specimen of *C. nupta* at Streatham precisely like that of Mr. Smith's; and Mr. Scorer reported another similar example from North London.

Mr. Scobell remarked how necessary it was scientifically to make dissections of all those specimens which were supposed to be gynandromorphous, as Mr. Edwards' specimen had been. Mr.

Newman mentioned that his gynandromorphous *Amorpha populi* had been dissected by the Rev. C. R. N. Burrows.

Mr. R. Adkin explained to the meeting the position at Colley Hill, Reigate, which was in danger of being sold and built upon in the near future. An effort was being made, he said, to acquire it, so that the National Trust could have control of it, and the Society had been asked to help. As their funds did not allow of donations of this nature being made, it had been suggested that a collection should be made at the present meeting. This was done and the sum of £2 15s. was collected and sent to the local committee.

DECEMBER 14th, 1911.

### SPECIAL MEETING.

The following proposed alterations in the Bye-Laws were discussed.

That Bye-law 8, sub-section 1, be altered by substituting "Ten Shillings" for 7s. 6d. as the annual subscription for Ordinary Members.

That Bye-law 8, sub-section 6, be altered by substituting "Six Guineas" for Five Guineas as the composition for Life Membership.

And that such alterations become effective as and from the first day of January, 1912, and apply to all members elected after that date.

The meeting, which began at 7.30, was an exceptionally well attended one, and after considerable discussion the proposals of the Council, as printed above, were unanimously carried.

### ORDINARY MEETING.

Messrs. R. G. Todd, of Hadley Wood, G. E. H. Peskett, of Ilford, A. Quarrington, of West Norwood, and E. A. C. Stowell, B.A., of Kingston, were elected members.

Mr. W. West (Hon. Curator) exhibited a drawer from one of the Society's cabinets, in which he had arranged a nucleus of a type collection of Hymenoptera, of which Order several members had recently given a number of species to the collection.

There was a special exhibition of *Rumiccia phleas* and its allies.

Mr. Tonge exhibited short representative series from Suffolk,

Surrey, Essex and Kent, together with three specimens bred from continental ova, all of which had blue spots on the hindwings. He pointed out that this characteristic was prominent in the specimens obtained in Suffolk. One of the Surrey examples had the ground colour dull yellowish-brown in place of the usual bright coppery-red colour.

Mr. Newman, on behalf of Mr. Quarrington, exhibited a series including an example of ab. *schmidtii*, two examples with beautifully striated undersides, and several specimens with the usual coppery bands absent from the lower wings.

The Rev. G. Wheeler exhibited series from England (both broods), South France and South Switzerland; suffused forms from England (Lyndhurst, 1911), Switzerland and Italy (one of the Swiss specimens, from Brig, having the hindwings and the suffusion of a much paler brown than usual); ab. *caeruleopunctata* from the same three countries; a rather pale ab. *intermedia* female from Switzerland (S. Nicolas); an ab. *bipunctata*, from Switzerland, the inner spot being very small, thus approaching ab. *unipunctata*; and an ab. *obsoleta*, from Surrey, with only one tiny touch of copper on the hindwing, but showing in some lights black radiated spots at the border.

Mr. R. Adkin's contribution to the exhibit comprised a series taken on the Downs near Eastbourne, between September 5th and 14th last, the chief feature in which was the difference in size of the specimens, the largest measuring 35mm., and the smallest 25mm. in expanse; a series from various localities showing modifications in the spotting of the forewings, in one specimen the spots on the upperside were greatly reduced in size, while in others they were much increased, and underside specimens having the spots pear-shaped; modifications of the band of the hindwings, in which the copper colour was absent, or indicated only by a few transverse streaks, and others having a row of prominent blue spots; and a series showing variations in colour, one specimen having the forewings of a brassy tone, and a cloud of the same colour at the base of the hindwings, and another suffused with black scaling.

Mr. A. E. Gibbs exhibited series from various localities. The British examples included an interesting Hertfordshire aberration, in which the right forewing is straw-coloured with the exception of a coffee-coloured streak in the costa, and two examples of ab. *obsoleta*, one of which formerly belonged to Henry Doubleday. Other series were from North-East France, the Eastern Pyrenees, Corsica,

Algeria, Japan and Turkistan. The five Corsican specimens are dark, of the form var. *eleus*, those from Turkistan are known as var. *turania*. The Japanese specimens are very large, and especially in the summer brood, very dark. A short series from North America (Canada and the United States) of the species known as *Heodes hypophleas* scarcely differed from the Palearctic species, and it presents the same range of variation as does *H. phleas*, and is common throughout the greater part of the Nearctic Region. In addition Mr. Gibbs showed numerous allied species of the genus *Chrysophanus*, etc., including *Heodes virgaurea*, *Lowia alciphron* and var. *gordius*, *C. hippothoë*, and *L. lorilis*, from Southern and Western Europe, *C. parana* from India, *C. solustius* from New Zealand, and *C. thoë*, *Epidemia mariposa*, *E. zeroe*, *C. helloides*, *E. dorcas*, *E. epixanthe*, *Tharsalea hermes*, *Gaëdes xanthoides*, and *G. gorgon* from North America.

Mr. Turner exhibited series and examples from various localities, including his beautiful var. *alba* from Brasted.

Mr. R. South exhibited a selection of British specimens illustrating the ordinary variation of the species.

(a) Red-copper, and pale copper inclining to brassy. (b) Dusky suffusion on forewings, leading up to var. *eleus*, Fab. (c) Spots on forewings large, band on hindwings narrow. (d) Spots on forewings small, band on hindwings broad. (e) Spots on forewings small, band on hindwings narrow. (f) Tendency of band on hindwings to break up, leading to ab. *radiata*, Tutt. (g) Presence of blue dots or spots on hindwings, ab. *caeruleopunctata*, Staud. An example of ab. *schmidtii*, from Essex; some specimens of var. *timeus*, Cramer, from Northern India; and two forms of the large Chinese race were also included.

Mr. South said "The variation of the North American *hypophleas*, Boisds., is almost exactly parallel with that of the European *phleas*, and it is curious to note that whilst the form with elongate spots—ab. *extensa-conjuncta*, Tutt—is sporadic in Britain, the counterpart aberration of *hypophleas* is recurrent and certainly not uncommon in some parts of Massachusetts. There are seven examples of the form from that State in the British Museum. Ab. *fasciata*, Strecker, has the spots elongate as in *extensa-conjuncta* but they are all of about the same length, and rather broader, so that the forewings appear to be traversed by a broad black band. A British specimen of this form has been recorded from Finchley, and there may be others in our collections."

Mr. Cowham exhibited series, including a specimen of the var. *schmidtii*, taken at Oxshott.

Mr. Frohawk exhibited a long bred series of both sexes of *Chrysophanus dispar* var. *rutilus*, from continental ova. The larvæ were fed on dock, sorrel, etc., and were very easy to rear.

Mr. C. P. Pickett exhibited long and varied series including 1st brood from Clandon in May; 2nd brood from Folkestone in early July, one of the females with the right forewing silvery over three parts of its area; 3rd brood from Folkestone in August, some being extra large, and one specimen with elongated and united spots on the forewing; third brood from Leytonstone in August, one male with the underside of the right hindwing having the black spots on an orange ground-colour as in the forewings; a fourth brood from Northwood in October; all of this brood were small in size, no female being larger than an average sized *Cupido minimus*. These were all insects of the year 1911. He also exhibited a selection from his captures and his breeding during the past ten years, including many dark and suffused forms, several with irregular white or silvery patches on the wings, and many unusually large females with the blue spots on the hindwings very pronounced. The exhibit also contained an example of *Chrysophanus dispar*, originally in the "Briggs" collection.

Mr. Edwards exhibited short series of *C. alcyope* and *C. chinensis*, species from Central and Eastern Asia respectively, and closely allied to *R. phlaas*.

In the subsequent remarks on the exhibits many members had observed the species in gardens, city streets, etc., from which it had never hitherto been recorded. Mr. Adkin said that the percentage of variation to any striking degree seemed to him very small, but he remarked that the later broods were somewhat darker in general coloration. Mr. Newman had examined three to four thousand specimens in the field and found varieties exceedingly scarce; two ab. *striata*, four with absence of band from hindwings, and one with a pale wing were the only specimens of any note. He saw neither ab. *schmidtii* nor ab. *alba*. Mr. Wheeler said that the species was generally very scarce in Switzerland. Mr. Turner had this year met with it in several places, but in previous years he had not seen a single example during his collecting in the Alps. Mr. Frohawk said that the larva in his experience was capable of going into hibernation at any point of its larval existence.

Mr. Ashdown exhibited a large number of species of Rhopalocera taken in June and July in Switzerland and around Chamonix, including *Heodes virgaurea*, *Chrysophanus hippothoë*, *Loweia alciphron* var. *gordius*, *L. dorilis*, some sixteen species of Lycænidiæ, *Apatura*

*ilia*, *Pararge achine*, *Ceneis aëlo*, *Melitæ aurinia* var. *merope*, *Brenthis daphne*, etc.

Mr. Newman exhibited a number of well marked aberrations from the collection of Mr. S. G. Hill of Folkestone, including four of the "black" form of *Limenitis sibylla*, *Diacrisia sannio* (*russula*) with the bands on the hindwings absent, a very varied series of *Colias hyale* taken at Folkestone in 1900, including a specimen in which the apex of each forewing was entirely black, several fine *Aricia medon* (*astrarche*) with no markings on the upper side, a *C. edusa* var. *obsoleta*, and several var. *helice*, of which one was an intermediate.

Mr. R. South exhibited a long series of *Acidalia virgularia*, Hübn., and contributed the following note:—

"Three generations of moths, reared in 1911, the descendants of a female captured at Bishop Auckland, Durham, in August 1910. All the specimens of the first generation were of large size and well marked. Those of the second generation were small, pale in colour, and only faintly marked. The imagines of the third generation were mainly of the second brood or summer form, but a few of them were similar in all respects to the first or spring form, and these were the last to emerge. Some larvæ from moths of second generation did not feed up, but hibernated in the usual way. Larvæ from moths of the third generation are also hibernating, but they are less than half the size of the others."

Mr. Joy exhibited two examples of *Apatura iris* bred from larvæ taken in the New Forest on August 11th, 1911. Out of a number of larvæ which he was keeping, two raced on, with the result that they pupated instead of hibernating. The female emerged on November 19th.

Mr. Blenkarn exhibited several light specimens of *Lithosia deplana*, obtained from the neighbourhood of Margate, with several dark specimens from Esher; and a specimen of *Periplaneta australasia*, a cockroach not very often found in this country. It was taken from a case of oranges from Jamaica.

Mr. Edwards exhibited male and females of the remarkable sexually dimorphic species *Euripus halitherses*, the females greatly resembling the Euplœine species *Danisepa* (*Euplœa*) *rhadamanthus*.

Mr. C. P. Pickett exhibited a female specimen of *Hipparchia semele* bred from a larva taken at Folkestone, and showing the dark rich mottling of the underside, the outer edges of the hindwings being of a rich mottled black with conspicuous black central markings, while the upperwings were of a rich golden-brown with the usual black markings much deeper in tone.

Mr. E. Step exhibited a further portion of the "Tugwell" herbarium which he had been renovating for the Society, and in doing so called attention to the very serviceable cabinet which Mr. R. Adkin had presented to the Society to house the collection.

JANUARY 11th, 1912.

Mr. A. SICH, F.E.S., *Vice-President*, in the Chair.

Mr. C. G. Gahan, M.A., F.E.S., of the British Museum (Nat. Hist.), and Mr. N. S. Sennett, F.E.S., of South Kensington, were elected members.

Mr. A. W. Buckstone exhibited a series of *Hybernia defoliaria*, from Wimbledon, West Wickham, Bexley, and Epping Forest, the majority being from the first-named place. He said that there appears to be more variation in the species now than there was thirty or even ten years ago. There has been a decided decrease in the numbers of the type as compared with the other forms during the last seven years at Wimbledon. Those appearing during the first few weeks show more variation in colour, markings, and size, than those appearing later in the season, and they vary from year to year. The non-banded form appears to produce the greatest number of cripples, and is more variable as regards size. The females are not so sensitive to severe weather, and will emerge from the pupa under climatic conditions which are almost prohibitive to others of the genus. They frequently emerge after the frost has been on the grass for three or four hours, while the females of *H. aurantiaria*, *H. marginaria* and *H. leucophaaria* require a South or South-West wind to bring them out. The date of earliest capture was September 30th, and the date of latest capture April 15th. He found them very difficult to breed; about six hundred larvæ taken in various seasons produced six crippled males and about the same number of females.

Mr. H. Moore exhibited a huge tree-cricket from the interior of Borneo, and read the following note:—

"In about the centre of British North Borneo, some six days journey up the Labuk River, the Exploration Company have cut a path through the dense jungle for some eight or nine miles, to a spot which, for want of a name, they have called Karang, where they are at present proving a copper lode. It was along this jungle path my friend found the large tree-cricket *Eumegalonodon blanchardi* (Brongt), which I now exhibit. Its green colour has faded, but when alive the tegmina have a leaf-like appearance,

and one of the natives present asserted that they were real leaves that the insect had fastened to its body. At present this species appears only to be known from North Borneo. My friend is three day's journey from the nearest white man, and to relieve him from the tedium of his surroundings, I hope to make an entomologist of him, or, at least, a collector, and so benefit us both."

THE LEPIDOPTERA OF A LONDON GARDEN.—Mr. Robert Adkin exhibited the following specimens taken in his garden at Lewisham, during the year 1911, being additions to the list given with his paper ("Proc. S. Lond. Ent. Soc.," 1910, pp. 1-12).

*Plusia moneta*.—A single specimen taken on the wing, July 7th.

*Eupithecia isogrammaria*.—Came to light in the house, August 18th.

*Monopis rusticella*.—Was taken flying in the summer-house, May 24th.

*Gracilaria syringella*.—Taken on the wing under trees in the early evening of May 26th.

*Argyresthia gedartella*.—Two specimens came to light on the nights of July 19th and 21st respectively.

*Gelechia malvella*.—Two specimens came to light, July 21st. This species is supposed to feed in the seeds of Marsh Mallow, a plant which, so far as I am aware, does not grow in our immediate neighbourhood, and I think it very probable that the larva may have found a suitable pabulum in the seeds of the hollyhocks, which have been grown for some years in adjacent gardens.

Mr. A. E. Gibbs exhibited an aberration of *Pyrameis atalanta*, and contributed the following note:—"This specimen of *Pyrameis atalanta* was bred from a larva taken on the Col de Vizzavona, Corsica, on July 13th, 1911. Both larvæ and pupæ were found in some abundance on the nettles on the waste ground opposite the hotel, where also several colonies of *Aglais urtica*, var. *ichnusa* were feeding. I fed up a good many of each species, var. *ichnusa* yielding no varieties, but among the *P. atalanta*, which emerged during the first few days in August was a specimen in which the diagonal bands of the primaries and the marginal band of the secondaries are more or less pink, and which proximally on the forewing and distally on the hindwing are almost white. A more typical specimen of the southern narrow banded form from the same brood is shown for comparison."

Mr. Stanley Blenkarn exhibited five specimens of *Anthrocera* (*Zyggana*) *trifolii* var. *confluens* from Withycombe and Horsley; two specimens of *Homalota decipiens*, Sharp (believed on the continent

to be the female of *H. analis*), taken at Sandown, Isle of Wight, on November, 1911, and considered rare; two *H. analis*, from Shirley, common; and two *Bledius secerdendus*, a species which Dr. Joy brought forward as new in the December "Entomologists' Monthly Magazine." It was taken at Dovercourt by Mr. Newberry.

Mr. H. Main exhibited Glow-worm larvæ reared from eggs laid in the autumn of 1910, and he and Mr. R. A. R. Priske communicated the following note:—"In continuation of the 'Notes on the Glow-worm,' which were communicated last year (*Proceedings* 1910-11, pp. 74-6) we have to report that the larvæ hatched from eggs in September, 1910, are now (January 11th, 1912) reduced to three in number, but these seem to be progressing favourably. A larva found in September, 1910, pupated on May, 28th, 1911, disclosing a female pupa. This was liberated by the splitting of the larval skin on the two sides in the anterior region, and the pupa gradually worked its way out, as seen in Plate 4, Figs 1, 2. The pupa was of a pinkish colour, and showed no trace of wings. The imago emerged from the pupal skin on June 5th. Some females confined in a box containing grass deposited a number of eggs, each being attached to the grass. On December 27th last, on the downs near Eastbourne, five young larvæ were found under stones. They were all fairly active and readily fed on snails and slugs. It was also found that they would eat small pieces of earth-worm. From the size of these larvæ we judge that they will not be fully developed till the spring of 1913."

Mr. Main also showed the larva and imago of *Ocyppus olens*.

Mr. Tonge reported that he had taken a specimen of *Phigalia pedaria* (*pilosaria*) on December 29th last at Reigate; and had found a *Nylocampa areola* (*lithoriza*) on a telegraph-pole near Eastbourne on January 5th.

Mr. A. E. Gibbs reported that *Adopca lineola* had been taken during the past year in Herts, on the Cambridge border, by the Rev. G. H. Raynor.

The following Reports of the Field Meetings held during the year were communicated:—

Beaconsfield, May 27th, by Hy. J. Turner (see p. 36).

St. Albans, June 10th, by A. E. Gibbs (see p. 39).

Blackheath, Albury, June 17th, by W. J. Kaye, (see p. 40).

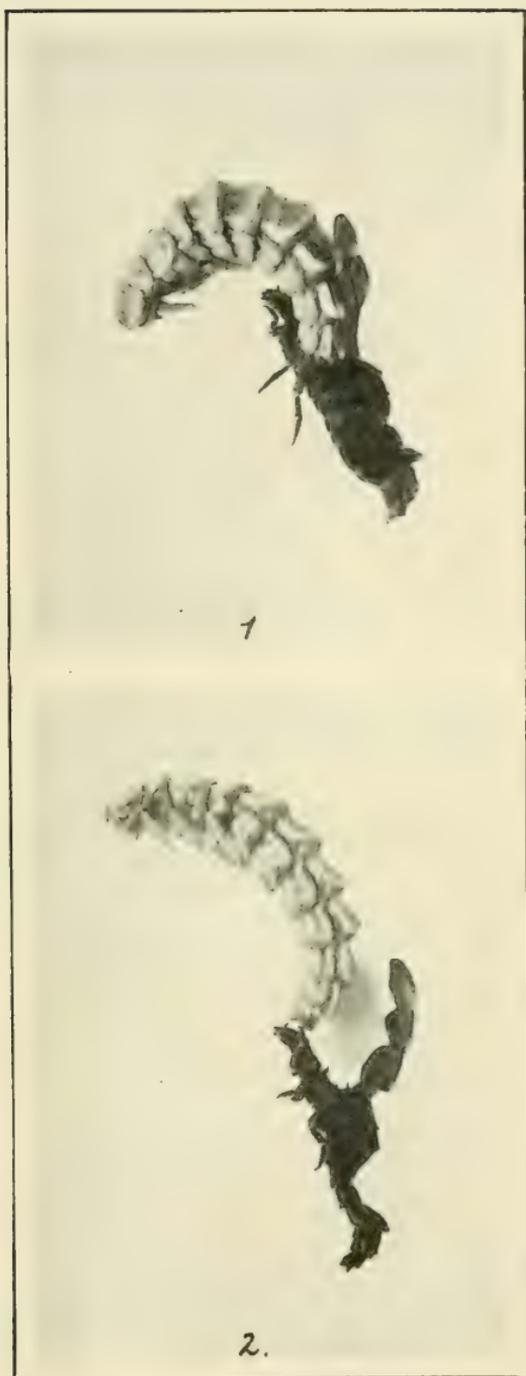
Reigate, July 1st, by A. E. Tonge (see p. 41).

Clandon, July 15th, by Hy. J. Turner (see p. 45).

Burnham Beeches, September 16th, by R. A. R. Priske (see p. 54).

Oxshott (Fungus Foray), November 4th, by Stanley Edwards (see p. 67).

PLATE IV.



THE GLOW-WORM (*LAMPYRIS NOCTILUCA*, L.).

1. Pupa of female just emerging from larval skin.  $\times 2$ .
2. Pupa of female just free from larval skin.  $\times 2$ .



JANUARY 25th, 1912.

## ANNUAL GENERAL MEETING.

The first meeting was devoted to the business of receiving and adopting the Reports of the Council and Officers for the past year, the announcement of the results of the election of the Officers and Council for the ensuing year, and the reading of the President's address (p. 6).

The following is a list of the members elected as Officers and Council of the Society for the Session 1912-13.

*President.*—A. E. Tonge, F.E.S.

*Vice-Presidents.*—W. J. Kaye, F.E.S., B. H. Smith, B.A., F.E.S.

*Treasurer.*—T. W. Hall, F.E.S.

*Librarian.*—A. W. Dods.

*Curator.*—W. West (Greenwich).

*Hon Secretaries.*—Stanley Edwards, F.L.S., &c. (*Corresponding*), H. J. Turner, F.E.S. (*Report*).

*Council.*—C. W. Coithrup, F. W. Cowham, A. E. Gibbs, F.L.S., F.E.S., R. A. R. Priske, F.E.S., A. Russell, F.E.S., A. Sich, F.E.S., E. Step, F.L.S.

Votes of thanks were accorded to the Treasurer, Secretaries and other officers.

## ORDINARY MEETING.

MR. A. E. TONGE, F.E.S., *President* in the chair.

Mr. A. C. Morris, of Upper Norwood, and Mr. F. W. Frohawk, of Wallington, were elected members.

Mr. Newman exhibited an example of fasciation in the stems of willow (*Salix caprea*). It was remarked that in the neighbourhood of Eastbourne the willow was fully out at the end of December.

Mr. Main exhibited a narcissus bulb, sent to him by Mr Winkworth, which had been attacked by the larva of the narcissus fly, *Merodon equestris*. It was said to be extremely injurious, and often devastated a crop of these plants.

Mr. R. Adkin exhibited an example of *Tinea pallescentella*, taken by him on Xmas day, apparently just emerged.

Mr. Kaye said that he had seen *Gonepteryx rhamni* flying in the sunshine over the snow at St. Cergues on the southern slopes of the Jura, above Nyon, Lake of Geneva.

Mr. F. Noad Clark said that taking advantage of an infestation

of the bed-bug (*Cimex lectularius*) in the Paddington Infirmary last autumn, he had obtained ten ova in October, which, enclosed between two watch glasses, had hatched in eight or nine days. The young were sealed up without food on October 25th, and had remained alive for a considerable time, the last survivor only died on January 2nd. It was interesting to know that this pest had the power, even in extreme youth, of going without food for a lengthy period until a more favourable opportunity afforded means of obtaining it.

Mr. H. Moore exhibited a collection of Rhopalocera sent to him from the inland area of Borneo, and contributed the following notes on butterflies from Karang, B. N. Borneo:—"It rains every other day at Karang, situated between the Labuk and Kinabatangan rivers; it is really the watershed, and that part is wet even for Borneo. Preserving specimens there is more difficult than collecting them, and unless they are caught just before post day, they are apt to be rotten before the next mail leaves. That at any rate was the fate of the first lot intended for me. During the thirty years I have been receiving insects from all quarters of the world, I have seen many strange ways of sending them. Leaves from Bibles are not an uncommon wrapping for insects from Africa, but this is the first time I have known anyone to cut up his shirt for the purpose—my friend thinking the flannel would absorb the moisture. The plan answered, and the only damage done to the specimens may be attributed to the clumsy hands of the Customs Officer. Some of the butterflies are interesting, not for their rarity, but as local races of well-known and widely distributed forms, and all as coming from a very wet and out-of-the-way locality. Perhaps the best is the form of *Papilio evemon*, which lacks several of the green discal streaks on the upper surface of the forewings, and the red spot on the costa of the hindwings beneath: recently described by Dr. Jordan as a new sub-species. Then there is *Papilio itamputi*, the Bornean race of the continental *P. antiphates*; with its extended yellow area on the hindwings beneath. Amongst the *Pierida* is *Terias gradimens=rabel*, the local race of *Terias tilaha*. Of the *Limnina*, the race *virgo* of *Hestia iogani* is the only one of note, but amongst a fairly long series of *Danisepa lowii*, one of the *Euphrina*, is a solitary female, which lacks the purple lustre of the male. Of the *Nymphalina* there are species of *Cethosia*, *Terinos*, *Parthenos*, *Neptis*, *Cupha*, *Cirrhochroa* and *Charaxes*, all well known from Borneo, which do not call for any special reference—common, if you will, but none the less acceptable."

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