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AMERICAN
Entomological Society.

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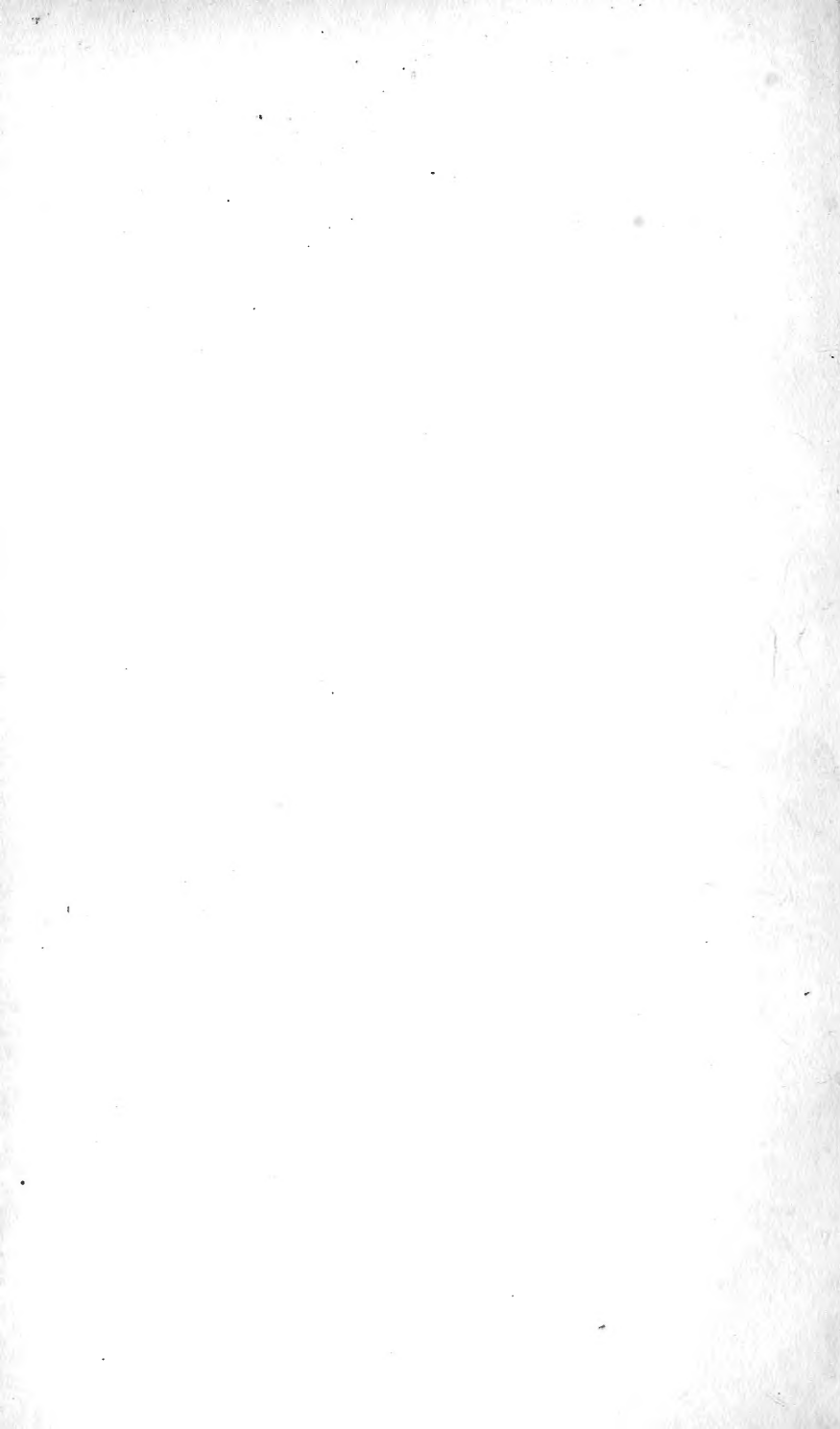
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THE SOUTH LONDON Entomological & Natural History Society

(ESTABLISHED 1872),

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.



151

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1901. - 1904

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S. EDWARDS, F.L.S., F.Z.S., F.E.S., &c. (*General Sec.*),
Kidbrook Lodge, Blackheath, S.E.

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

13, Drakefell Road, St. Catherine's Park, S.E.



THE SOUTH LONDON Entomological and Natural History Society,

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

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 invite the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting Specimens.

SUBSCRIPTION.

Seven Shillings and Sixpence per Annum, with an Entrance Fee of Two Shillings and Sixpence.

All Communications to be addressed to the Hon. Gen. Secretary,

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

Kidbrook Lodge, Blackheath, S.E.

PAST PRESIDENTS.

1872 ... J. R. WELLMAN.	1886 ... R. ADKIN, F.E.S.
1873 ... "	1887 ... "
1874 ... "	1888 ... T. R. BILLUPS, F.E.S.
1875 ... A. B. FARN, F.E.S.	1889 ... "
1876 ... "	1890 ... J. T. CARRINGTON, F.L.S.
1877 ... J. P. BARRETT.	1891 ... W. H. TUGWELL, Ph.C.
1878 ... J. T. WILLIAMS.	1892 ... C. G. BARRETT, F.E.S.
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1882 ... T. R. BILLUP, F.E.S.	1896 ... R. SOUTH, F.E.S.
1883 ... J. R. WELLMAN.	1897 ... R. ADKIN, F.E.S.
1884 ... W. WEST, L.D.S.	1898 ... J. W. TUTT, F.E.S.
1885 ... R. SOUTH, F.E.S.	1899 ... A. HARRISON, F.L.S., etc.
1900 ... W. J. LUCAS, B.A., F.E.S.	

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., Brandon House, Morden Hill, Lewisham, S.E.
l, orn.
- 1882 ADKIN, R., F.E.S., Wellfield, 4, Lingard's Road, Lewisham,
S.E. *l.*
- 1901 ADKIN, R. ARMSTRONG, 4, Lingard's Road, Lewisham,
S.E. *m.*
- 1901 ARMSTRONG, R., 55, Granville Park, Lewisham, S.E. *e, l.*
- 1895 ASHBY, SIDNEY R., 8, Canterbury Terrace, Maida Vale, N.W. *l.*
- 1895 ASHDOWN, W. J., Belmont Road, Leatherhead. *l. c.*
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Nor-
folk. *l.*
- 1887 BARCLAY, F. H., F.G.S., F.E.S., The Warren, Cromer, and
Knotts Green, Leyton, Essex. *l, orn, palæontology.*
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1896 BARNETT, THOS. L., 81, Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., Tremont, Peckham Rye, S.E. *l, m.*
- 1900 BARRETT, J. P., 3, St. John's Villas, Margate. *l.*
- 1889 BEAUMONT, A., F.E.S., Heath Villa, 7, Pond Road, Black-
heath, S.E. *l, c, orn.*
- 1888 BENNETT, W. H., F.E.S., 15, Wellington Place, Hastings. *h, c.*
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road,
Peckham, S.E. *h, o, c, d, he.*
- 1897 BISHOP, E. B., 79, Alexandra Road, Wimbledon, S.W.
- 1900 BLENKARN, S. A., Clifton House, E. Dulwich, S.E. *l.*
- 1898 BLISS, M. F., University School, Hastings. *l.*
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*
- 1898 BOUSKELL, F., F.E.S., Sandown Road, Knighton, Leicester. *l.*
- 1895 BOWMAN, K., 18, Victoria Road, Clapham Common, S.W. *l.*

YEAR OF
ELECTION.

- 1887 BRIGGS, C. A., F.E.S., Rock House, Lynmouth, N. Devon.
l, m, n, o, British fishes.
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, N. Devon. *l.*
- 1891 BRIGGS, H. MEAD, 8, High Street, Canterbury. *l, orn.*
- 1890 BRIGHT, P., F.E.S., Aston Lodge, Surrey Rd., Bournemouth. *l.*
- 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l.*
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l.*
- 1895 BROOKS, W., Grange Hall, Rotherham. *l.*
- 1898 BROOME, E. G., Hurst Vicarage, Twyford, Berks. *l.*
- 1890 BROWN, E. W., Capt., 2nd Royal West Kent Regiment. *l.*
- 1900 BROWNE, G. B., 43, Southbrook Road, Lee, S.E. *l.*
- 1899 BUCKSTONE, A. A., The Lodge, S. Norwood Park, S.E.
- 1897 BURR, MALCOLM B., F.Z.S., F.E.S., Bellagio, E. Grinstead. *o.*
- 1890 BUTLER, W. E., 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.*
- 1886 CARPENTER, J. H., F.E.S., Riverdale, Leatherhead, Surrey. *l.*
- 1899 CARR, F. B., 46, Handen Road, Lee, S.E. *l.*
- 1899 CARR, F. M. B., 46, Handen Road, Lee, S.E. *l.*
- 1877 CARRINGTON, J. T., 110, Strand, W.C. *l, cr.*
- 1900 CAVE, CASTEL, Bungaree, Calton Road, Dulwich. *l.*
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood, S.E. (*Hon. member*). *h, l, c.*
- 1897 CHAPMAN, T. A., M.D., F.E.S., Betula, Reigate, Surrey. *l.*
- 1898 CHATTERTON, F. J. S., F.E.S., 78, Clissold Road, Stoke Newington, N. *l.*
- 1888 CHITTENDEN, D., 98, Court Hill Road, Lewisham, S.E. *l.*
- 1896 CLARK, F. NOAD, *Vice-President*, Paddington Infirmary, Harrow Road, W. *mi.*
- 1887 CLARK, J. A., F.E.S., L.D.S., M.P.S., 57, Weston Park, Crouch End, N. *l.*
- 1898 CLARKE, H. SHORTRIDGE, F.E.S., 40, Athol Street, Douglas, Isle of Man. *l.*
- 1879 CLODE, W. (*Life member*).
- 1899 COLTHRUP, C. W., 127, Barry Road, E. Dulwich, S.E. *l.*
- 1899 CRABTREE, B. H., Oaklands, Levenshulme, Manchester. *l.*
- 1885 CROKER, A. J., F.E.S., 21, Church Street, Shoreditch, N.E. *l.*
- 1898 CROW, E. J., 26, Tindal Street, North Brixton. *l.*

YEAR OF
ELECTION.

- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l*.
- 1900 DAY, F. H., 6, Currock Terrace, Carlisle. *l, c*.
- 1889 DENNIS, A. W., 45, Park Street, Stoke Newington, N. *l, mi*.
- 1884 DOBSON, H. T., F.E.S., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn*.
- 1901 DODS, A. W., 61, Dynevor Road, Stoke Newington, N. *l*.
- 1898 DOWNING, JOHN W., F.E.S., 45, Trevelyan Road, Tooting Graveney, S.W. *l*.
- 1897 DRURY, W. D., F.R.H.S., F.E.S., Rocquaine, West Hill Park, Woking, Surrey. *l*.
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, Kidbrook Lodge, Blackheath, S.E. *l, e l*.
- 1886 ENOCK, F., F.L.S., F.E.S., 13, Tufnell Park Road, Holloway, N. *d, mi*.
- 1900 ENOCK, J. K., 658, Woolwich Road, Charlton, Kent.
- 1889 FARRANT, M., jun., 137, St. Thomas, Exeter. *l*.
- 1872 FICKLIN, A., Weston Villa, Elm Road, New Malden, Surrey. *l*.
- 1891 FILER, F. E., F.E.S., 58, Southwark Bridge Road, S.E. *l, mi*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor Sussex (*Life member*). *l*.
- 1889 FORD, A., Rose Mount, Hannington Road, Boscombe, Hants. *l, c*.
- 1891 FORRESTER, A. C., 42, West Kensington Mansions, W. Kensington. *l*.
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., *President*, Government Lymph Laboratories, Chelsea Bridge, S.W. *l, mi*.
- 1899 GADGE, S. W., 9, Longley Road, Tooting Graveney. *l*.
- 1901 GARRETT, H. E., 3, Brewers Green Mews.
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l*.
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Clifton, Bristol. *l*.
- 1895 GRIFFITHS, G. C., F.Z.S., F.E.S., 43, Caledonia Place, Clifton, Bristol. *l, e, l*.

YEAR OF
ELECTION.

- 1893 HALL, A., 16, Park Hill Rise, Croydon, Surrey. *l, e l, ool.*
- 1888 HALL, A. E., F.E.S., Norbury, Pitsmoor, Sheffield. *l.*
- 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., 52, St. Mary's Road, Oxford. *l.*
- 1892 HARRISON, A., F.C.S., F.L.S., F.E.S., F.R.M.S., Thames Sugar Refinery, Silvertown, E., and 72, Windsor Road, Forest Gate, E. *l, mi.*
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill, S.E. *l.*
- 1900 HEWITT, R. L., Ivydene, Felday Road, Lewisham, S.E. *l.*
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l.*
- 1888 HOPKINS, H. E., 5, Haseldean, Road, Brockley, S.E. *l.*
- 1889 HORNE, A., F.E.S., Ugie Bank, Aberdeen. *l.*
- 1886 JÄGER, J., 65, St. Quentin's Avenue, North Kensington, W. *l.*
- 1887 JENNER, J. H. A., F.E.S., Eastgate House, Lewes, Sussex. *l, c, d, m, b.*
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow. *l.*
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie House, Monaghan, Ireland. *l, mi, marine invertebrata.*
- 1898 KAYE, W. J., F.E.S., Worcester Court, Worcester Park, Surrey. *l.*
- 1900 KEMP, S. W., 80, Oxford Gardens, Notting Hill, W. *l.*
- 1884 KENWARD, J., 195, Hither Green Lane, Lewisham, S.E. *l.*
- 1900 KIRKALDY, G. W., S. Abb's, Worple Road, Wimbledon.
- 1888 KNIGHT, E., 2, Lichfield Grove, Church End, Finchley, N.
- 1894 LAMB, H., Acacia Place, Upper Faut, Maidstone. *b, orn.*
- 1898 LEMANN, F. C., F.E.S., Blackfriars House, Plymouth. *l.*
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l.*
- 1898 LITTLE, W. W., 17, Belgrave Street, King's Cross, N. *l.*
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L., F.R.S., F.L.S., F.G.S., F.E.S., &c., High Elms, Down, near Farnborough, Kent (*Hon. member*). *h, b.*
- 1896 LUCAS, W. J., B.A., F.E.S., *Vice-President*, 28, Knight's Park, Kingston-on-Thames. *l, o, n, m*

YEAR OF
ELECTION.

- 1900 MACGEE, W. H., 79, Lillie Road, S.W. *l*.
- 1890 McARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview,
Clarendon Road, Lewisham, S.E. (*Hon. member*). *n*.
- 1892 MAIN, H., B.Sc., F.E.S., 13, Windsor Road, Forest Gate, E.
l.
- 1886 MANGER, W. T., F.E.S., 100, Manor Road, New Cross, S.E.
l, c. cr.
- 1889 MANSBRIDGE, W., F.E.S., 49, Pendrill Street, Beverley Road,
Hull. *l*.
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l*.
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India.
mi, b.
- 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W. *l*.
- 1896 MONTGOMERY, ARTHUR M., 32, The Grove, Ealing, W. *l*.
- 1896 MONTGOMERY, EDMUND M., 32, The Grove, Ealing, W. *l*.
- 1880 MONTIERO, Senor A. A. DE C., F.E.S., 70, Rua do Alecrinar,
Lisbon.
- 1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E. *l, h,*
d, e l, e h, e d, mi.
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l*.
- 1900 NOTTLE, Edward, Lanyar Vale, Portland Road, South
Norwood. *l*.
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South
Woodford, Essex. *l*.
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton. *l*.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 1901 PEPPER, A. W., The Horniman Museum, Forest Hill, S.E.
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.
l, h, d.
- 1888 PERKS, F. P., 41, St. Martin's Lane, Charing Cross, W.C.
zoology, mi, pond life.
- 1889 PERRY, Rev. J. F., Oxford Road, Banbury. *l, c.*
- 1899 PICKIN, J. R., 2, Industry Terrace, Brixton, S.W. *l*.

YEAR OF
ELECTION.

- 1897 PREST, E. E. B.
- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Huddersfield. *l n.*
- 1896 POTTER, A. T., Whangarei, Auckland, New Zealand. *l, zoo.*
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 RICE, D. J., 24, Bruce Road, Harlesden, N.W. *orn.*
- 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
- 1894 ROBINSON, LEIGH, 13, Victoria Street, Westminster, London, S.W. *l.*
- 1888 ROBSON, H., 93, Watling Street, E.C. *l, b.*
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l.*
- 1900 ROWDEN, ALFD. OLIVER, 6, Eastgate, Exeter. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1898 RUSSELL, A., F.E.S., The Limes, Southend, Catford, S.E. *l.*
- 1886 SALWEY, R. E., F.E.S., Springbank, Wokingham, Berks. *l.*
- 1897 SANDISON, JOHN, 2, Francis Grove, Wimbledon, Surrey. *l.*
- 1888 SAUZÉ, H. A., *Hon. Librarian*, 11, Venner Road, Sydenham, S.E. *l.*
- 1898 SICH, ALF., F.E.S., "Brentwood," 65, Barrowgate Road, Chiswick.
- 1899 SMITH, E. W., 16, Tresco Road, Linden Grove, S.E. *l.*
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l.*
- 1890 SMITH, WALTER, 1, Arundel Villas, Hampton Road, Twickenham. *l.*
- 1882 SOUTH, R., F.E.S. 96, Drakefield Road, Upper Tooting, S.W. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Thorpe Hall, Colchester (*Life member*). *l.*
- 1872 STEP, E., F.L.S., 19, Fortune Gate Road, Craven Park, Harlesden, N.W. *b, m, orn.*
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l.*
- 1901 THORNTHWAITHE, W., Hersham, Surrey. *l.*
- 1895 TOLHURST, J., "Glenbrook," Beckenham, Kent. *l.*
- 1899 TOMLINSON, F., 10, Caversham Road, Kingston-on-Thames. *l.*
- 1899 TOOMBS, G. W., 40, Shrubland Grove, Dalston Lane, N. *l.*
- 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l.*
- 1895 TUNALEY, HY., F.E.S., 30, Fairmount Road, Brixton Hill S.W. *l.*

YEAR OF
ELECTION.

- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 13, Drakefell Road, St. Catherine's Park, S.E. *l, orn, c, n, he, b.*
- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Hill, Blackheath, S.E. *l.*
- 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., 2, Handsworth Wood Road, Handsworth, near Birmingham. *l.*
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., H.M.S. Katoomba, Sydney, N.S.W. *l, c.*
- 1888 WALLER, R., 2, Grand Parade, Upper Richmond Road, Putney, S.W. *l.*
- 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.*
- 1888 WARNE, N. D., 8, Bedford Square, W. *l.*
- 1888 WEBB, S., 22, Waterloo Crescent, Dover. *l.*
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road, S.E. *l, c.*
- 1878 WEST, W., L.D.S., 75, Lewin Road, Streatham Common, S.W. *l, mi.*
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l.*
- 1888 WINKLEY, M. H., 9, Glen Eldon Road, Coventry Park, Streatham, S.W. *l.*
- 1893 WOLFE, J. J., Skibbereen, co. Cork, Ireland. *l.*
- 1899 WOOD, Rev. FRANCIS HENRY, M.A., Brabourne Cottage, Bromley Park, Kent. *l.*
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *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 1900.

GENERAL FUND.

<i>Receipts.</i>		<i>Expenditure.</i>	
	£ s. d.		£ s. d.
By Balance ...	... 9 11 0	To Rent (1 year) ...	... 25 0 0
" Subscriptions received, 96 at 7/6	£36 0 0	" Attendance (1 year) ...	... 2 10 0
" " " 2 " 6/-	0 12 0	" Postage, Stationery, and Sundries ...	... 5 14 6
" " " 9 " 5/-	2 5 0	" Insurance of Library and Collections	... 0 8 3
" " " 18 " 2/6	2 5 0	" Entrance Fees carried to Suspense A/c	... 1 2 6
Entrance Fees, 9 at 2/6	41 2 0	" Vote to Library Fund	... 1 0 0
" Arrears of Subscriptions received	... 1 2 6	" " Publication Fund	... 20 0 0
" Subscriptions paid in advance	... 2 15 0		
" Balance from Horsley Field Meeting	... 0 12 6		
" " Banstead "	... 0 1 7		
" Debit Balance	... 0 2 5		
	... 0 8 3		
	<u>£55 15 3</u>		<u>£55 15 3</u>

SUSPENSE ACCOUNT.

<i>Receipts.</i>		<i>Expenditure.</i>	
	£ s. d.		£ s. d.
By Balance in Hand	... 11 5 0	By Balance in Hand	... 12 7 6
" Entrance Fees from General Fund...	... 1 2 6		
	<u>£12 7 6</u>		<u>£12 7 6</u>

LIBRARY FUND.

<i>Receipts.</i>	<i>£ s. d.</i>	<i>Expenditure.</i>	<i>£ s. d.</i>
By Balance ...	1 6 11½	To Binding Books ...	1 8 6
" " " General Fund ...	1 0 0	" Postages, Gum, etc. ...	0 1 0½
" Fines ...	0 9 0	" Balance in hand ...	1 6 5
	<hr/> £2 15 11½		<hr/> £2 15 11½

PUBLICATION FUND.

<i>Receipts.</i>	<i>£ s. d.</i>	<i>Expenditure.</i>	<i>£ s. d.</i>
By Balance ...	3 13 8	To Printing ...	39 19 0
" Donations ...	22 5 6	" Balance in hand ...	6 17 0
" " " General Fund ...	20 0 0		
" Sale of " Proceedings " ...	0 16 10		
	<hr/> £46 16 0		<hr/> £46 16 0

ASSETS AND LIABILITIES.

<i>Assets.</i>	<i>£ s. d.</i>	<i>Liabilities.</i>	<i>£ s. d.</i>
By Balance, Suspense Account ...	12 7 6	By Debit Balance General Fund ...	0 8 3
" " Library Fund ...	1 6 5	" Balance ...	25 7 2
" Publications Fund ...	6 17 0		
" Arrears of Subscription, £20 11s. 6d, valued at say ...	5 4 6		
	<hr/> £25 15 5		<hr/> £25 15 5

Audited and found correct, *January 17th, 1901.*

H. A. SAUZÉ,
ALFRED W. DENNIS, } *Auditors.*

REPORT OF THE COUNCIL, 1900.

THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-eighth Annual Report, is pleased to be able to state that the past year has been one of a satisfactory average character.

Since the last Annual Meeting twelve new Members have been admitted; six have resigned, and we have to deplore the loss of one by death, Mr. Herbert Williams, who at one time efficiently occupied the office of Secretary. The present Membership therefore stands at 170, consisting of four Honorary, five Life, forty-one Country, and one hundred and twenty Ordinary Members, a total somewhat in excess of the number at this time last year; but it should be noted that some two or three Members, who are greatly in arrear with their subscriptions, will probably have to be removed from the list, so that the effective strength may be taken as virtually the same as, or possibly slightly in excess of, that of last year.

The Treasurer's Balance Sheet, duly audited, is printed at page x, and calls for no special comment at the hands of the Council.

The meetings have been fully up to the average in point of matters of interest that have been brought forward, and the attendance, with the exception of the second August meeting, good throughout, the average number present being nearly thirty.

The Special Exhibition of Varieties held in November proved to be no exception to the uniform success which has

attended all previous attempts of a similar nature. Upwards of seventy members and friends were present, and the exhibits were extensive, varied, and interesting.

Seven Papers, five Lantern Demonstrations, accompanied by explanatory notes, and extended Reports of the five Field Meetings have been contributed to the Society, of which contributions the following eleven Members were the authors:—Mr. R. ADKIN, three ; Dr. CHAPMAN and Mr. W. J. LUCAS, two each ; Mr. E. B. BISHOP, Mr. F. N. CLARK, Mr. STANLEY EDWARDS, Mr. F. ENOCK, Mr. H. S. FREMLIN, Mr. E. STEP, Mr. H. J. TURNER, and Mr. J. W. TUTT, one each. Two of the series of lantern slides exhibited were kindly lent by the South Eastern Union of Scientific Societies and the Society for the Protection of Birds. Five of the Papers dealt with Lepidoptera, two with Botany, one with Ornithology, one with Orthoptera, one with Bacteria, and two with General Natural History. The Reports of Field Meetings, in addition to General Descriptive Matter, contained Lists of the Species noted in the various Orders, and were thus of more than passing interest. The Council desire to tender their most hearty thanks to the Authors of the Papers, and to all those who have in other ways rendered much valuable assistance in connection with the various matters above referred to.

Five Field Meetings were held during the summer season, viz. :

OXSHOTT, on May 19th, conducted by the PRESIDENT.

CHIPSTEAD, on June 16th, conducted by Mr. R. ADKIN, F.E.S., and Mr. B. ADKIN.

HORSLEY, on July 7th, conducted by Mr. E. B. BISHOP.

PAUL'S CRAY COMMON, on September 22nd, conducted by Mr. R. ADKIN, F.E.S., and Mr. B. ADKIN.

OXSHOTT, a Cryptogamic Meeting, October 20th, conducted by Mr. STANLEY EDWARDS, F.L.S.

Two of the localities selected, viz. Chipstead and Paul's Cray Common, had not been previously visited by the Society, and it is hoped that their inclusion in the season's programme may be the means of introducing members to districts that may prove profitable for future work. The

Council have pleasure in noting that the number of Members attending the Field Meetings were distinctly above the average.

The Society's Collections are still ably looked after by the Hon. Curator, Mr. W. WEST, who reports that—

“The Society's cabinets are much referred to by the newer Members of the Society, and are gradually becoming both more complete and more extensive. Messrs. ASHDOWN and LUCAS have undertaken to complete and arrange the Odonata, and the Society are much indebted to them for their kindness. There is still the want of a suitable cabinet for the ‘Tugwell’ Herbarium, so that the almost complete series of British plants may be rendered available for reference.”

The Donations to the Society's Cabinets during the year are:

Four specimens of *Nonagria brevilinica*, including var. *alinea* from Mr. C. G. BARRETT.

Six specimens of *Caradrina ambigua* from Mr. R. ADKIN.

A specimen of *Locusta viridissima* from Mr. F. N. CLARK.

A large number of species of *Hemiptera* from Mr. W. WEST.

A series of *Nyssia zonaria* from Mr. A. HARRISON.

And a number of species of *Odonata* and *Orthoptera* from Messrs. LUCAS and ASHDOWN.

The Library is still ably cared for by Mr. SAUZÉ, who reports—

“The books of the Library have been well consulted during the year, in proof of which, in addition to the evidence of the Librarian's list of borrowed works, it must be borne in mind that each night of meeting Members make a practice of referring to the books on the shelves for clearing up doubtful points, appealing to authorities, and even making short extracts for use in various ways.

“The Librarian is glad to mark, following on the Council's decision to permit the sale to Members of its publications at a reduction of 33 per cent., an increase in the demand for these, and he wishes to call the attention of those who have joined the Society more recently, and who have

therefore not been supplied with the earlier volumes of the series of 'Proceedings,' to the surprising amount of interesting information comprised in the notes of exhibits, and in the various original papers (not published elsewhere) which have appeared in the annual volumes since 1886, some of which are adorned with valuable plates, illustrating the more remarkable exhibits of the year."

The following books, pamphlets, magazines, etc., have been added to the Library during the year :

"Flowering Plants," (Anne Pratt), Vols. III. and IV., by E. STEP, from Messrs. W. F. and N. D. WARNE.

"British Birds," Vol. I—VI., illustrated by F. W. FROHAWK, from Mr. A. HARRISON.

"Materials for the Study of Variation," by W. BATESON, and "British Lepidoptera," Vol. II., by J. W. TUTT, from Mr. STANLEY EDWARDS.

"The Hemiptera of Colorado," from the Smithsonian Institute.

"British Lepidoptera," Vol. VI., by C. G. BARRETT, from the AUTHOR.

"Spiders of Burmah," from the BRITISH MUSEUM.

"Life and Memoirs of Agassiz," Vols. I. and II., from Mr. H. MOORE.

"Note-book Fauna and Flora of South Eastern Counties, with especial reference to Mollusca," MSS. compiled by T. D. A. COCKERELL, from the AUTHOR.

"Zoologist," 1900, from Mr. NEWMAN.

"Entomologist," 1900, from Mr. SOUTH.

"Entomologists Monthly Magazine," 1900, from Mr. M'LACHLAN.

"Science Gossip," 1900, from Mr. CARRINGTON.

"Knowledge," 1900, from the PUBLISHERS.

"Report of the Entomological Society of Ontario," 1899, from Mr. L. GIBB.

"Transactions of the Entomological Society of London," Part V., 1884, from Mr. H. J. TURNER.

"Transactions of the South Eastern Union of Scientific Societies," 1887—9; "Catalogue of the Booth Museum of Birds," from Mr. R. ADKIN.

"List of British Lepidoptera," by C. G. BARRETT, from the AUTHOR.

"Entomological Student," from Mr. T. D. A. COCKERELL.

"Canadian Entomologist," 1900; "Irish Naturalist," 1900; "Rochester Naturalist," 1900; "Entomologisk Tidskrift," 1900; "Journal of the City of London College Soc.,"; "South Eastern Naturalist," 1900; and "Transactions of the City of London Entomological Society," 1899, by exchange.

Early in the year the Abstract of "Proceedings" for 1899 was published with the financial assistance of a few very earnest workers for the Society, to whom the best thanks of the Society are due. It consists of a volume of 120 pages and one plate, generously presented by Dr. CHAPMAN. The Council regret that they have been obliged, owing largely to a tardiness of payment of some the annual subscriptions, to again delay the publication of PART I. of the Abstract for 1900; but they have good reason to hope that the volume for the whole year will be at once taken in hand, and that the means for its early publication will be forthcoming.

In conclusion, the Council desire to thank most fully all those gentlemen who come forward so readily and so generously to aid in the usefulness of the Society, either by bringing exhibitions, reading papers or notes, making arrangements for, and leading at field meetings, donating books to the Library, or specimens to the collections, and in various other ways enhancing the study of biological science.

On the Pupation of *Cossus Ligniperda*.

By ROBERT ADKIN. *Read February 22nd, 1900.*

For some years I had scented "Goats" in the neighbourhood of some rather dilapidated poplar trees that grow within the low fence of a garden adjacent to my home, and which I pass almost daily. Indeed, on one occasion I found a straying larva of the species on the pavement in front of the said fence, and on another an imago resting on the fence, but it was not until last summer that I fairly "came up with the herd." I was then fortunate in meeting with a considerable number of imagines, in batches of from one to four or five at a time, on various evenings between June 24th and July 18th, resting on the fence with wings still limp, and in almost every case I was able to find the empty pupæ skins from which they had just emerged, and was thus able to ascertain the exact situation where pupation had taken place. Taking them, or rather such of them as one cared to take—for my available setting space for such large insects would not accommodate all that I saw—was quite an interesting adventure. To box such fine fellows while their wings were limp would have been simply wanton destruction. I therefore hit upon the plan of inducing them to walk on to my coat sleeve, which they did readily enough, and soon settled themselves on some part of my clothing that appeared suitable to them, and were thus conveyed home without injury. No doubt I presented a picturesque appearance to my neighbours, but that was a matter of slight importance, considering that my chief object was satisfactorily attained. On reaching home a very slight amount of persuasion induced them to transfer themselves from my coat to the net curtains in front of an open window, where they rested quietly until their wings were fully hardened. In this way I secured many very fine specimens, and lost very few—one only, if I remember rightly. But I fear I am wandering somewhat from my subject, viz. the method of pupation.

If we consult the older authors we find, I think, without exception, if the matter is touched upon at all, that they took it for granted that the larva lived on the hard wood of the tree in which it burrowed, and when full-fed spun its pupal cocoon at the "entrance" to the burrow. Moses Harris, who wrote just over a century ago, gives the following detailed account of the habits of the species, which is perhaps as lucid a description as any to be found in the works of that period:

"The caterpillar feeds on the wood within the body of the willow tree; also on oak. It is not full-fed until the third year after it comes from the egg. When ready for transformation they spin a

strong web, within three or four inches of the entrance, wherein they change to a brown chrysalis. The case is composed of little bits of wood, which he bites off with his forceps : this he interweaves with his web. At the expiration of two months the moth appears. It must here be observed that when the moth leaves the chrysalis, the chrysalis appears half out of the tree ; being armed with strong spinules round every division of the tail part, it forces itself forward through the case, to the entrance to the hole, and is drawn further out before the moth can disengage itself."

This, I think, was the generally accepted history of the pupal methods of the species at that day, and so far as I can gather, no shadow of doubt appears to have been thrown upon this being its invariable habit until some sixty years later.

Then, however, records began to be made in the entomological journals that appeared to throw some doubt upon the question. Larvæ were reported to have been found during the winter under bark ("Zool.," 1858), in some cases of trees on which they did not appear to have fed ("Zool.," 1861, p. 7322), and there are many notes of them being dug up out of the earth ("Entom.," xxxii, pp. 17, 71 ; xxix, p. 194 ; xxv, p. 46 ; "Buckler's Larvæ," ii, p. 60), or detected in the act of burrowing into it ("Entom.," xxxii, p. 279). There are also numerous records, generally accompanied by expressions of surprise, of the pupa being found in the earth ("Entom.," vi, p. 487 ; xx, p. 274 ; xxi, p. 56), the empty shell protruding from a tennis court, the moth having just emerged ("Entom.," xx, p. 231), and in "sand-cops" ("Entom.," xxi, p. 110), which it is explained are low embankments used as a fence or boundary ; they are made of earth or sand, banked at the sides and top with grass or sods, and are often planted with dwarf willows ("Entom.," xxi, p. 156), and the method of finding the pupæ was to feel along the top of the "cop" for a soft place, caused by the cocoon being just under the surface ("Entom.," xxi, pp. 110, 155) ; and an instance is related of a dozen or more larvæ being put into a small brick house in a garden, with willow chips for food, and the following June the empty pupa skins were found protruding from the mortar *on the outside* ("Entom.," v, p. 456).

Westwood ("The British Moths and their Transformations," vol. i, p. 48) gives the following somewhat detailed account :—"It forms a rough cocoon of the chips of wood which it has bitten to pieces, fastening them together with a glutinous secretion, and lining them with silk. The pupa has the head-case acute, and each of the abdominal segments is furnished with several rows of reflex spiny hooks, which are of great service in enabling the pupa, shortly before arriving at the perfect state, to push itself through its cocoon and to the surface of the tree."

Coming to the more recent authors, Newman ("British Moths," p. 18), also speaking of the larva, tells us that "before changing to a chrysalis it spins a very large tough cocoon, composed of silk mixed

with fragments of gnawed wood." He does not tell us where this cocoon is placed, but the fact of it being made of "silk mixed with fragments of gnawed wood" evidently implies that it is within the tree. But in an editorial note published some ten years later ("Entom.," vi, p. 487) he says, "I have found this larva underground in a cocoon formed of silk and earth, without a particle of its home being made of sawdust." Wilson ("The Larvæ of the British Lepidoptera," p. 45) says, "Pupa: generally within the tree, but it has been found occasionally in a cocoon in the earth." Barrett ("The Lepidoptera of the British Islands," vol. ii, p. 149) describes the method of pupation, thus:—"In a tough, oval cocoon of silk and raspings of wood or earthy particles, being usually the hybernaculum within which the full-grown larva has passed the winter, and which it does not voluntarily leave, though the pupa state is not assumed until June or July."

Meyrick ("Handbook of British Lepidoptera," p. 560) contents himself with the simple statement, "Pupa subterranean;" while Tutt's ("The Common British Moths of England," p. 339) account—"In the autumn, when full-fed, it enters the ground and spins a cocoon in which it winters; this it leaves in the spring, spins another cocoon almost directly, in which it changes to a pupa, and emerges in about three or four weeks"—appears to be to the same effect.

In reviewing these records in their chronological order one is brought face to face with the fact that whereas the earlier authors regarded the pupation as invariably taking place within the tree, and are at some pains to point out that the structure of the pupa is singularly well suited to such a situation, some of the most recent are equally assured that pupation takes place only in the earth.

It is difficult to reconcile two methods so diametrically opposed to each other, and one is almost led to ask whether it is possible that the habits of the species have changed during the period mentioned. I do not, however, think there is any evidence to support such an hypothesis, and I am confirmed in this opinion by sundry cases that have come under my personal observation.

One of my earliest experiences was with a badly, indeed very badly, infested willow tree that stood in what is now the Hilly Fields Recreation Ground at Lewisham. In the spring or early summer of a year now long passed, this tree was either felled or blown down, and the rotten trunk afforded a rich harvest of *Cossus* pupæ. They were certainly in the wood of the tree, but whether in the tunnels in which the larvæ had fed or not I am unable to say with certainty, but my impression is that they were not, as the portion containing them was very rotten,—in fact, a mass of touchwood, a condition that would be unsuitable for sustaining the life of the larvæ.

During recent years I have frequently picked up straying larvæ *in autumn*, and holed them in a poplar tree that grows in my garden by boring a deep hole with an auger, inserting the larvæ and plugging the entrance with a thin piece of cork. The first larva experimented

upon in this way was holed in a growing, sappy limb of the tree, and in the following spring was found dead and mouldy. I then tried holing them in the stump of a stout limb, the upper portion of which was sawn off some years ago, and which, although a part of the growing tree, is to all intents and purposes dead and sapless, and from each of these the moth has duly appeared in the following summer. My most recent experiment was with a larva brought to me last autumn. It had been found wandering across a pavement, and was slightly damaged about the anal segment. Instead of holing it in the tree, I placed it on the limb where there were several holes that had been previously tenanted by other larvæ. After crawling about for some little time it found one of these holes, at once commenced to squeeze itself in, and ultimately disappeared within the hole, evidently having found what appeared to be a suitable place for pupation.*

Then there are the pupæ skins found last summer, and referred to at the commencement of these notes. The trees in which the larvæ had fed grow in a flower border, about a couple of feet inside a low park paling that divides the said flower border from an asphalt path. The bottoms of the staves of which the paling is composed, presumably having become rotten by their contact with the earth, a stout oak skirting has been placed along the bottom of the paling on its outer face, *i. e.* the side next the footpath and the furthest from the trees. Owing to the irregularity of the fence a space is left between it and the skirting, varying in width from about half an inch to perhaps a couple of inches, and some six inches deep. This space has in course of time become filled with rubbish of one sort and another that has been blown into it by the wind and fallen from the overhanging branches of the trees, etc. All the pupæ skins found were protruding from this rubbish between the paling and the skirting, or from rubbish similarly collected behind "spurs" that had been put in on the other side of the paling to support the posts, and in many cases I was able to trace a hole through the staves of the fence, just above the level of the flower-bed, by which the larva had made its way to the rubbish-filled space in which the cocoon was also found.

In considering the evidence that we have before us we should, I think, not lose sight of the affinities of the species that we are dealing with. The older authors appeared to consider *Cossus* in some way allied to the Bombyces. Recent investigation shows, however, that it has nothing in common with that group, but is closely related to a group of the Tortrices, or one very closely allied to them. The point is very clearly worked out by Dr. Chapman, who tells us in a paper on "Some Neglected Points in the Pupæ of Heterocerous Lepidoptera" ("Proc. Ent. Soc.," 1893, p. 112), "In *Cossus* I can find no character at any stage to distinguish it from Tortrices. The pupa

* Since writing the above I have had another opportunity for a like experiment with exactly similar result.

may be taken as (very conveniently from its large size) showing the *Tortrix* character. The larva, with its circles of hooks of alternate lengths on the prolegs, is of strictly *Tortrix* pattern. The imago agrees with *Tortrix* in every detail, the venation is almost identical with that of *C. pomonana*," etc. *Pomonana* here mentioned is a member of the genus *Carpocasca*, and it should not be surprising to find a species shown to be so closely allied, having similar habits to the members of that genus. The species of *Carpocasca* feed in various fruits, such as nuts, acorns, apples, etc., and are full-fed in the autumn, when they quit the fruit in which they have fed. So far as I am aware they do not really enter the earth, but spin up in any rubbish that they happen to meet with, or under loose bark or moss, where they remain until the spring before assuming the pupal stage.

This appears to me to be just what such evidence as we have regarding *Cossus* points to. We should expect it to leave the mines in which it has fed in the autumn of the year in which it attains full growth. If the tree in which it has passed its earlier life provided suitable dry, soft, rotten wood for its hybernation and ultimate pupation, the necessary conditions for shelter would be fulfilled. Experiment has shown us that the larvæ pupate readily in sapless timber. Our forefathers knew that the larvæ fed in trees; they found pupæ in trees, though possibly not in the burrows in which the larvæ had fed, and therefore did not search for them elsewhere. Coming now to the evidence as to subterranean pupation, the general drift appears to me, where definite particulars are given, to show that the sites selected are in earth of a light fibrous nature. The centre of a tennis lawn may certainly suggest something of a more solid character, but we are given no notion of what the lawn was laid on, or whether the cocoon was formed any deeper than the roots of the turf. But in the case of the pupæ found annually in the "sand-cops," we are clearly told that the cocoons were detected by feeling along the top of the "cop," with the fingers, for a soft place, showing that the cocoon was made in the turfy covering, and not in the harder soil beneath. Another case where larvæ were found some 8 or 9 inches below the surface of "soil that had been used for dahlias and sunflowers" is sufficiently suggestive of something akin to a loose rubbish heap; and the light, fibrous nature of the "earth" from which the pupæ skins were found last summer has already been demonstrated.

The conclusion, therefore, that I arrive at is that *Cossus* is not a purely "internal" species like *Zeuzera pyrina* or *Sesia sphegiformis*, for instance, nor is it truly subterranean as some of the *Sphingidæ*, but that in its habits it more closely follows its near allies. The larva, on leaving its food on becoming full-fed in the autumn, taking advantage of the first dry friable substance that comes in its way, enters it to make its final hybernaculum, in which it also pupates in the following spring.

Report of the Oxshott Field Meeting held on May 19th, 1900.

By W. J. LUCAS. *Read on June 14th, 1900.*

COOL, ungenial easterly winds preceded the first field meeting of the Society for 1900; and, though the morning of May 19th itself was bright, the wind was still keen in exposed situations. By the time, however, that the majority of the party reached Oxshott station it had fallen considerably, but its fall was accompanied by a practical disappearance of the bright sunshine of the morning. Of our party, twenty-four in all, a few made straight—at least, as straight as might be—for the Black Pond, the usual goal of a visitor to the Oxshott Woods, but a goal not always reached, as some of our party found out by experience. The majority, however, made their way towards the covers, which extend in the direction of Claygate.

Soon after passing the picturesque little group of silver birches at the foot of the sandy slope leading from the station, in a spot where birds are very numerous, and where the voice of the nightingale is usually to be heard at this season of the year, Mr. Turner discovered a nest of the whitethroat (*Sylvia rufa*)—the only nest of any consequence, I believe, that was found during the day.

Near this spot the Bagshot sand gives out, and the London clay comes to the surface, the change of soil being at once evidenced by the change in the vegetation. Firs, birches, and heather disappear, while oak, wild rose, and a herbaceous undergrowth take their place.

In a copse on our left, which had recently been cleared of the underwood, a purple mist that lay on the ground, on closer attention and by the sense of smell was found to be a profusion of wild hyacinths in full blossom. On our right was a field in which cowslips grow in large numbers. In fact, through the covers and along the bridle-path that leads to Abrook Common wild flowers were plentiful, but the same cannot be said of the insects, of which scarcely one was seen.

Those who formed the van of the party were somewhat dismayed at finding that the bridle-path they had been following so long ended abruptly in a large and muddy pond, whose slimy depths were hidden by a snowy carpet of white buttercups in full bloom. However, by a flanking movement to the right the difficulty was circumvented, and our party debouched on the level furze-clad expanse of Abrook Common.

Once the common was crossed the clay was left behind, and with the Bagshot sand we entered the region of birch, fir, and heather, amongst which the lepidopterists found a little, though certainly very little, to occupy their attention.

To the Black Pond the distance was a short one, but yet some of our party, who had strayed from the rest, failed to find it; and as the afternoon was wearing on, none were able to stay there any length of time, though the delicate green of the birches against the sombre tint of the firs makes a picture at this period of the year well worth the time occupied in examining it.

Leaving the pond by the corner near the large ants' nest, our path lay along a swampy hollow with a thick undergrowth of Spanish chestnut not yet in leaf, and tall tussocks of coarse grass. Here there is plenty to occupy the attention of the naturalist, but we were obliged to hurry on, stopping only to notice near the edge of a plantation on the right a very peculiar beech tree. Two straight, almost parallel trunks spring up from one root, and some yards above the ground two large branches effectually reunite, forming a kind of Siamese twins arrangement—the best instance of the kind that I know, though I once saw a much stranger freak of the same kind at Ashley Park, near Walton, where a large bough of a hornbeam had grown right through an oak, and come out on the other side in two places, where it could be recognised by the leaves it bore.

The swamp being left behind, the ground rose somewhat. We passed the large pits of yellow sand on our left, and approached the escarpment, from the edge of which we were able to look down on the little hollow in which stands Oxshott station, hidden, however, amongst the trees. Before descending most paused, no doubt to look around, if only to locate the spot where on the horizon in front can be seen distinctly the break in the hills, through which the Mole passes at Box Hill.

But the inner man was protesting against any further halt, for at the foot of the slope could be seen the well-known cottage where Mrs. Meikle had tea awaiting us. But a trying ordeal had to be gone through before we might enjoy our well-earned rest. Mr. Clarke had one plate left—a photographic one, I mean,—and as the light was failing we had to obey his orders, and group ourselves in front of a hedge close by. Needless to say the photograph was a success, of which fact Mr. Clarke was kind enough to convince the party in a very practical manner.

Tea over, it was time for those who intended to catch the earlier train to make for the station. A small number of the party, however, elected to stay for the later train to do a little "dusking." The wind had dropped and the evening was pleasant, but very little was moving, and the "bag," small enough before, was not sensibly increased by the longer stay; but the quiet stroll along the margin of the darkening fir-woods made a fitting ending to an enjoyable excursion.

Now to turn our attention for a short time to the results of the meeting from the collector's point of view. Mr. A. O. Rowden, who attended to the **Flora**, was able to compile a list of some fifty species found in blossom. There were five buttercups, *Ranunculus aquatilis*,

R. flammula, *R. acris*, *R. bulbosus*, and *R. ficaria*; and several crucifers—*Barbarea vulgaris*, *Cardamine pratensis*, *Sisymbrium officinale*, and *Capsella bursa-pastoris*. *Viola palustris* was found by the Black Pond, and *V. canina* in the covers. The milkwort was out, *Polygala vulgaris*; and, of course, chickweed, *Stellaria media*, and stitchwort, *S. holostea*. Three geraniums were noticed, *G. molle*, *G. robertianum*, and *Erodium cicutarium*. Next follow several of the Leguminosæ—*Genista anglica* (the petty whin), *Ulex europæus* (the furze), *Vicia sepium*, *V. angustifolia*, and *Lathyrus macrorrhizus*. Of the Rosaceæ were found *Fragaria vesca* (the strawberry), *Potentilla fragariastrum*, the strawberry-leaved potentilla, which is often taken for the last, *P. tormentilla*, *Pyrus aucuparia* (the mountain ash), *P. malus* (the wild apple), and *Cratægus oxyacantha* (the hawthorn). But one umbellifer, *Chærophyllum sylvestre*, appears on the list; and of composites there are but three—*Bellis perennis*, *Senecio vulgaris*, and *Taraxacum officinale*. Next follow the ash, *Fraxinus excelsior*; the primrose, *Primula vulgaris*; and two forget-me-nots, *Myosotis arvensis* and *M. collina*. Of veronicas there are three, *V. arvensis*, *V. serpyllifolia*, and *V. chamædrys*. We have three labiates, *Lamium purpureum*, *Nepeta glechoma*, and *Ajuga reptans*; and the lousewort, *Pedicularis sylvatica*, which looks like another. Of plants with inconspicuous flowers, *Euphorbia amygdaloides* and *Pinus sylvestris* were in flower, while *Salix repens* was still in bloom amongst the heather. The list concludes with four endogens, *Orchis morio*, *Scilla nutans*, *Arum maculatum*, and *Luzula campestris*.

Of the **Orthoptera**, one specimen of the little grasshopper, *Tettix bipunctatus*, was taken by myself, and a very young specimen of another species was captured by Mr. Ashdown. It had long antennæ and a whitish stripe along the mid-dorsal surface, and must no doubt be referred to *Platycleis brachyptera*, a short-winged species with long legs, which is found perfect on the heather about August.

Neuroptera.—In the earlier part of the day Mr. Kemp did a considerable amount of dredging in the Black Pond, and was very successful amongst the nymphs of the dragon flies. His captures included a number of *Libellula quadrimaculata* and *Cordulia ænea*, probably one *Sympetrum scoticum*, an *Æschna* (perhaps *grandis*), three *Anax imperator*, one of which, a male, passed into my possession, and produced an imago on June 13th; a number of *Pyrrosoma nymphula*, several of what, no doubt, are *P. tenellum*, some *Enallagma cyathigerum*, and perhaps one or more *Agrion puella*. The *Anax imperator* were magnificent creatures, whose energy and courage accorded well with their name. Two struggled fiercely when taken, one of them even attempting to seize my finger with the forceps at the end of its mask. The third was of a beautiful green tint, and had evidently but just cast its skin. The only imagines observed amongst the dragonflies were two or three *L. quadrimaculata*, a number of *Enallagma cyathigerum*, both ♂ and ♀, and one or two *Pyrrosoma nymphula*. All taken were in

the teneral condition, shewing that they had not long emerged. A *Libellula quadrimaculata* was noticed in the very act of emerging, and when first observed was taking the "rest," with head thrown back in the awkward position assumed by many dragonflies at that particular time. Three inconspicuous Perlidæ were captured, *Nemoura variegata*, *N. inconspicua*, and *Leuctra nigra* (?). The Planipennia were five in number—*Hemerobius stigma* (= *limbatus*), *H. nitidulus*, *Sialis lutaria* (the alder fly), *Raphidia maculicollis*, and *Coniopteryx aleyrodiformis*. But two Trichoptera (caddis-flies) were taken, *Glyphotælius pellucidus* and *Limnophilus centralis*; and but one of the Ephemeriidæ (May-flies), *Leptophlebia submarginata*.

Hymenoptera were not attended to, nor indeed were they much in evidence; but at the large nest of the horse-ant (*Formica rufa*), at one corner of the Black Pond, a great number of winged specimens were noticed.

There was need of a dipterist to identify the small flies (mosquitoes, perhaps) which, by the painful stings they give, cause so much annoyance in the moister parts of the woods, especially if a halt is made where they abound.

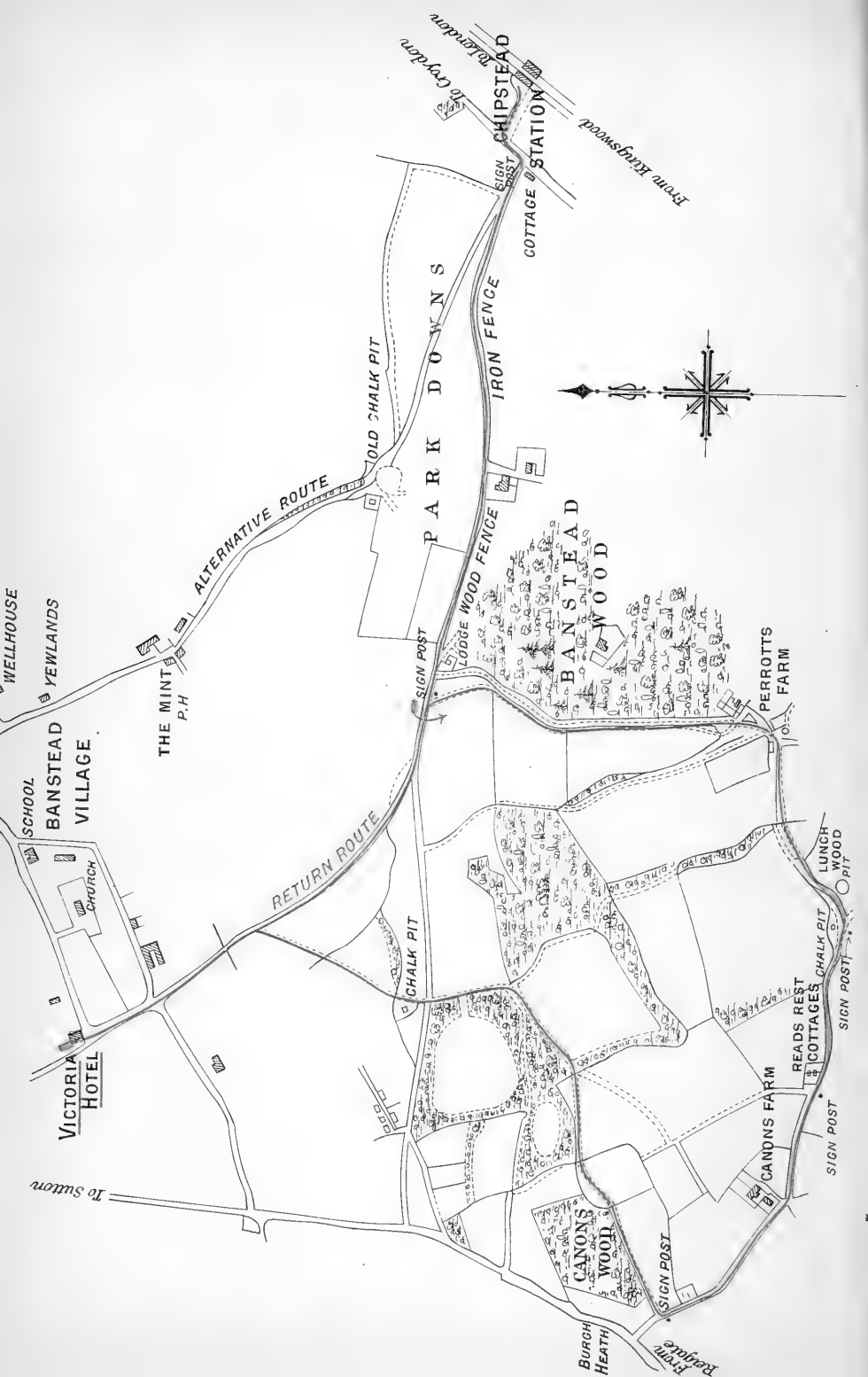
Amongst the **Heteroptera** Mr. Kemp reports *Acanthosoma grisea*; and of the water-bugs, *Notonecta glauca*, *Ranatra linearis*, *Naucoris cimicoides*, *Plea minutissima*, and two species of *Corixa*.

Coleoptera were neither very numerous nor particularly good. The ladybird division was well represented, and judging by the number of aphides beaten from the firs they have plenty of good work to occupy their attention. The list is as follows:—*Agabus bistriatus* (Black Pond), *Typhæus vulgaris* (dead), *Notiophilus biguttatus*, *Anchomenus albipes*, *Mysia oblongoguttata*, *Anatis ocellata*, *Halysia* 14-guttata, *H.* 18-guttata, *H. conglobata*, *Coccinella hieroglyphica*, *C.* 7-punctata, *C.* 10-punctata, *Adalia bipunctata*, *Micraspis* 16-punctata (var. 12-punctata), *Chilocorus bipustulatus*, *Dolopius marginatus*, *Malachius bipustulatus*, *Anaspis maculata*, *A. geffroyi*, *Strophosomus coryli*, *S. lateralis*, *Grammoptera ruficornis*, *Rhynchites æquatus*, *Phyllobius pyri*.

We must not forget the **Lepidoptera**, though judging by the number of lists sent in we shall soon have to class it amongst the "neglected orders." The list is as follows:—Butterflies: *Pieris napi*, *Euchloë cardamines*, *Lycæna argiolus* (seen only), *Syrichthus malvæ*, *Gonopteryx rhamni* (ova and very young larvæ). Geometers: *Rumia luteolata*; *Selenia bilunaria*; *Tephrosia punctulata*, and *T.* (probably *biundularia*) found at rest on tree-trunks; *Zonosoma porata*, *Z. punctularia*, two or three disturbed from undergrowth in the covers; *Z. pendularia*; *Cabera pusaria*, several in fine condition; *C. exanthemaria*; *Macaria liturata*; *Ematurga atomaria*, quite rarely seen on the heath; *Bupalus piniaria*, males just coming out; *Lomaspilis marginata*; *Eupithecia nanata*; *Thera variata*; and one Noctua, *Panolis piniperda*, at rest on a fir tree. Tineæ: *Adela viridella*, *Opostega crepusculella*, and *Swammer-*

damia pyrella. A few larvæ were also reported, chiefly by Mr. F. M. B. Carr:—*Epunda viminalis*, *Orthosia lota*, *Cheimatobia brumata*, *C. boreata*, *Hypsipetes elutata*, *Pseudoterpna cytisaria* (off broom), *Diloba cæruleocephala*, and *Hypena proboscidalis*.

Judging simply by the number of Lepidoptera taken, the meeting can scarcely be looked upon as a success; workers in other orders were not so much affected by the easterly wind, and so fared somewhat better. But, if I may be allowed to say so, the success of a field meeting must by no means be measured by the number of specimens secured. Do we attend here on Thursday evenings *simply* for the sake of the paper we may hear, or the slides and specimens we may see? I submit that the friendly intercourse and exchange of experiences—nay, even the very sight of the faces of those interested in similar pursuits to our own, are great factors in bringing us together. Such in a much greater degree must be true of field meetings. Led by some one who is acquainted with the neighbourhood, they should be besides the means of opening up fresh country and new localities to many members; and even those who are no strangers to the Oxshott district can have taken no harm from inhaling the pine-scented breezes off the Bagshot sand.



Report of the Banstead Field Meeting, June 16th, 1900.

By ROBERT ADKIN. *Read June 28th.*

ONE of the objects with which field meetings are held, and perhaps not one of the least of them, is to introduce members to little-known districts with a view to the investigation of their fauna and flora. It was therefore thought that the country opened up by the recently constructed Chipstead Valley Railway would form a suitable locality for holding the third field meeting of the season. The particular district selected is situated wholly on the lower undulating chalk downs of Surrey, well wooded in parts, in others comparatively bare of any large vegetation. And as the route that it was proposed to take consisted largely of byways and indifferently indicated footpaths, it was thought desirable that those attending the meeting should have some sort of a plan of the district, to which they might refer in case of missing the main party at any of the numerous turns of the road. This was adequately supplied in the form of a well-executed map very kindly prepared by Mr. B. W. Adkin, in which the route to be taken was clearly traced, and the chief features of the adjacent country and roads and footpaths abutting on the route fully indicated. A copy was supplied to each of those present, and it is believed that it was found useful by many during the meeting and it is hoped that it may be none the less so should any of them again visit the locality with a view to further individual investigation of its resources.

The party assembled at Cannon Street station (S.E.R.) to the number of twenty-two, and proceeded by the 3.20 train, in which accommodation had been reserved, to Chipstead station. It is feared that some two or three members may have suffered slight inconvenience, in that accommodation was not reserved for them, and that they were unable to avail themselves of the reduction in fare obtained by the others, and this is greatly to be regretted. As, however, these benefits could be obtained only by previous arrangement with the railway company for a party of a definite number, it was impossible to include those members who had not signified their intention of being present until their arrival at the station a few minutes before the departure of the train.

On alighting from the train at Chipstead the party was joined by three other members, and a start was at once made by way of a footpath which crosses the line at the end of the platform, and leads between a small wood and the station approach to the road. Here "first blood was drawn," one of the company securing a fine specimen of *Hadena genista* from a post and rail fence on which

it was resting. On reaching the road, a few paces to the left brought us to the turning on our right that leads to Banstead village, which was to be our ultimate destination, and immediately we were beside an open down.

An intermittent sunshine with a very light westerly breeze made ideal weather for our purposes, pleasant for walking, and yet bright enough to keep the butterflies on the wing; and, as might be expected, the "blues" were met with in goodly numbers, the species represented being *Lycaena icarus*, and *L. medon*, with a sprinkling of *L. bellargus*. One specimen of the first-named species secured by Mr. Kemp proved to be an interesting variety, a male having a bleached patch on one of its fore-wings, similar to the bleaching frequently met with in *Epinephele ianira*. But the length of the journey before us forbade our lingering on these delightful slopes among the rock-rose and wild thyme, then in full bloom, and, taking to the road once more, a park paling of some half-mile in length was reached, a casual search as we passed along producing, among other species, *Dianthæcia nana*, *Hadena dentina*, and *Anaitis plagiata*. A guide-post bearing the direction "Footpath to Burgh Heath," standing beside a gate in the fence, warned us that we had reached the point at which we were to leave the road, and take to the grass and woodlands. Passing through the gate and ascending a gentle slope across a wide belt of delightfully soft turf, our attention was arrested by one of those curious phenomena commonly known as fairy rings, a very perfect example measuring about six feet across, and consisting of the champignon or fairy-ring mushroom (*Marasmius oreades*), an edible species. A few minutes earlier we had passed a small group of the allied but acrid species, *M. urens*. At the top of the slope Banstead Wood was entered, a comparatively small fenced-off portion of which is, however, available, the greater portion being enclosed in the park that surrounds the mansion. The timber consists chiefly of beech, oak, and cherry, the last comprising some of the finest examples of the species to be found in the district. The undergrowth is scanty, and of the usual mixed character.

Leaving the wood, some meadows were crossed, in a couple of which large numbers of young pheasants were running about, and perching on hencoops in which they had recently been hatched. Then another wood with an old chalk pit and some waste ground adjoining was reached. Some little time was spent here, and a number of captures made. From this point the footpath bends somewhat abruptly, and assumes the proportions of a well-kept country lane with low hedges on either side, and here and there a cottage or farmhouse; and as such surroundings hardly suggested the probability of any great reward for time bestowed upon their investigation, we passed over this part of our route somewhat speedily until the signpost bearing the inscription "Footpath to Banstead Church" was reached. Unfortunately the time remaining at our disposal was getting short, and the tempting-looking woods which the footpath

skirts for nearly a mile had to be passed with little more than an occasional tap from the beating stick, or a moment's halt to net a stray moth that had started up at our approach, such species as *Hylophila prasinana*, *Melanippe montanata*, *Cabera pusaria*, and so forth, being common enough. Our path now turned sharply to the left, round the further corner of the wood, some grass land being on our right, and here some of the commoner *Crambi* were plentiful. Crossing a by-road, passing an old chalk pit on our left, now occupied by a cottage and some most odorous manure heaps, uphill through some corn-fields and down the other side, we arrived back again into the Banstead Road, which we had left some mile or so lower down when we took to the footpaths. Taking to the road again, we pushed on for the village, on our way falling in with our worthy treasurer and his wife, who, it seems, had been cycling around the neighbourhood in the hope of meeting the party at an earlier stage of its operations. Our numbers were thus increased to the respectable total of twenty-seven. The Victoria Hotel at Banstead was soon reached, and it is unnecessary to add that ample justice was done to the "tea" that there awaited us.

The return to the station was made by the road, the delightful freshness of the early evening being most enjoyable, the only regret being that that terrible tyrant time—for trains on these newly-made lines do run to time—would not allow us to linger by the way to listen to the song of the birds, and capture the numerous insects that were just coming on evening flight.

In conclusion, the thanks of the Society are due to the various members who have sent in notes of their captures and observations during the meeting, from which the following lists have been compiled, and not the least to Mr. Step for the very full list of plants observed in flower.

BIRDS.—Song thrush (*Turdus musicus*), blackbird (*T. merula*), house sparrow (*Passer domesticus*), and ciril bunting (*Emberiza cirilus*), nests and eggs. Nightingale (*Daulias luscini*a) in full song on our return to Chipstead station.

SPIDERS.—*Epeira cucubitina*, *Ergatis benigna*, *Clubiona brevipes*, *Dolomedes mirabilis* (mature ♂, ♀).

INSECTS.—Hymenoptera: *Cephus pygmaeus*. Coleoptera: *Notophilus biguttatus*, *Aleochara nitida*, *Sunius angustatus*, *Oxytelus inustus*, *Coccinella 11 punctata*. *Scymnus frontalis*, *Cychramus luteus*, *Byturus sambuci*, *Melanotus rufipes*, *Athous niger*, *A. haemorrhoidalis*, *A. vittatus*, *Telephorus rusticus*, *T. testaceus* v. *limbatus*, *T. pallidus*, *Malthodes fibulatus*, *Malachius bipustulatus*, *Malachius viridis*, *Priobium castaneum*, *Clytus arietis*, *Grammoptera ruficornis*, *Cryptcephalus hypochaerides*, *Luperus flavipes*, *Bruchus cisti* (on *Helianthemum*), *Tenebrio molitor*, *Cistela murina*, *Anthicus floralis*, *Edemera lurida*, *Barynotus obscurus*, *Strophosomus coryli*, *Polydrosus cervinus*, *Phyllobius oblongus* (and others of the genus), *Anthonomus pedicularius*, *Orchestes fagi*, *Ceuthorrhynchus asperifoliarum*, *C.*

quadridens, *C. sulcicollis*, *Ceuthorrhynchidius troglodytes*. Lepidoptera: *Pieris brassicæ*, *P. napi*, *Euchloë cardamines*, *Cænonympha pamphilus*, *Polyommatus phloas*, *Lycæna astrarche*, *L. icarus*, *L. bellargus*, *Nisoniades tages*, *Smerinthus tilie*, *Erias chlorana*, *Hylophila prasinana*, *Spilosoma mendica*, *Hepialus lupulinus*, *Drepana falcataria*, *Phalera bucephala* (♂, ♀ at rest on a fence), *Dianthocia nana* (*conspersa*), *Hadena dentina*, *H. genistæ*, *Tephrosia punctularia*, *Asthena candidata*, *Cabera pusaria*, *Bapta temerata*, *B. bimaculata* (*taminata*), *Lomaspilis marginata*, *Eupethecia oblongata* (*centaureata*), *E. castigata*, *Melanippe rivata*, *M. montanata*, *M. fluctuata*, *Camptogramma bilineata*, *Anaitis plagiata*, *Scoparia dubitalis*, *Crambus pratellus*, *C. culmellus*, *C. chrysonuchellus*, *C. hortuellus*, *Ptycholoma lecheana*, *Sciaphila subjectana*, *C. hybridana*, *Xanthosetia hamana*, *Gracilaria alchimiella*. Also larvæ of *Gonopteryx rhamni*, *Vanessa urticæ*, *Teniocampa incerta* (*instabilis*), *T. gracilis* (on *Artemisia*!), *Calymnia trapézina*, *Phigalia pendaria* (*pilosaria*), *Amphidasys strataria* (*prodromaria*), *Hybernia rupicaprararia*, *Anisopteryx æscularia*, *Triphosa dubitata*. Diptera: *Hematopota pluvialis*, *Platystoma seminationis*. Hemiptera: *Podops inunctus*, *Scolopostethus affinis*, *Nabis ericetorum*, *Miris levigatus*, *Calocoris striatellus*, *C. striatus*, *Lygus rubricatus*, *Cyllocoris histrionicus*, *C. flavonotatus*, *Psallus variabilis*, *P. varians*, *Philænus spumarius*, *P. exclamationis*, *Bythoscopus alni*, *Thamnotettix subfuscus*.

PLANTS.—*Reseda luteola*, *Helianthemum vulgare*, *Viola tricolor*, *Silene cucubalus*, *S. conica*, *Lychnis vespertina*, *L. diurna*, *Ononis spinosa*, *Lotus corniculatus*, *Prunus cerasus*, *Spiræa filipendula*, *Rosa canina*, *Bryonia dioica*, *Cornus sanguinea*, *Viburnum opulus*, *Specularia hybrida*, *Symphytum officinale*, *Myosotis sylvatica*, *Solanum nigrum*, *S. dulcamara*, *Veronica serpyllifolia*, *V. chamaedrys*, *Rhinanthus crista-galli*, *Thymus serpyllum*, *Lamium galeobdolon*, *Juniperus communis*, *Orchis maculata*, *Taxus communis*.

With one exception these are all common species throughout this district. The exception is *Silene conica*, which I do not remember having seen recorded for Surrey. Hooker gives "Kent, Norfolk, Suffolk, Haddington, Forfar, and Channel Islands" as its known areas, in which, however, it is merely local. It was not identified on the field, but an examination of my specimen at home left no doubt as to its identity; the ampulliform calyx with its thirty raised dark green ribs on a whitish ground clearly distinguishing it, even apart from its other characters. It was found growing in a field chiefly of *Trifolium incarnatum* adjoining a fallow.

A remarkable specimen of *Rosa canina* was noted in the grounds of the Victoria Hotel, Banstead, it having climbed almost to the topmost branches of a Scotch fir.

Report of the Field Meeting held at Horsley on July 7th, 1900.

By E. B. BISHOP. *Read September 13th.*

ABOUT twenty members and friends took part in this excursion, which turned out to be an enjoyable one in spite of an east wind and its corollary of empty boxes.

On arriving at the "Duke of Wellington," at East Horsley, half the party decided to work the Sheep Leas for *Cupido minima*, etc., whilst the remainder preferred to explore the chalk-pit, and stroll along the lane as far as Falcon Bridge.

The Sheep Leas party, undeterred by sinister rumours as to the relentless vigilance of keepers in that favourite entomological haunt, trespassed recklessly in all directions and thoroughly enjoyed themselves, but specimens of *Cupido minima* (as indeed of almost everything else) were few and far between. However, the bee orchis (*Ophrys apifera*) was found freely, whilst among Lepidoptera the species most worthy of note was *Asthena luteata*, which occurred sparingly. In one warm, sheltered corner, common butterflies, such as *Epinephele ianira*, *Polyommatus icarus*, etc., positively swarmed, in striking contrast to the prevailing scarcity elsewhere.

The other party were successful in securing several species of Mollusca, and noticed many of the characteristic and interesting plants peculiar to the chalk, some of which are enumerated later on. Amongst Lepidoptera they also found a few *Asthena luteata*, one specimen of *Melanippe procellata*, and some "plumes."

The two parties met near Falcon Bridge, and strolled back to a capital tea at the "Duke of Wellington," returning home by the 9.13 p.m. train from Horsley.

The detailed list of insects, plants, Mollusca, etc., observed is as follows:

LEPIDOPTERA.

Epinephele hyperanthus (a few just out), *Cupido minima* (a few), *Metrocampe margaritaria*, *Zonosoma lincaria*, *Cabera pusaria*, *Corycia bimaculata* (*taminata*), *Asthena luteata* (about a dozen in all), *Acidalia aversata*, *Melanippe procellata* (one only), *Scoparia dubitalis*, *Crambus pascuellus*, *C. percellus*, *C. pratellus*, *C. hortuellus*, *Oxyptilus parvidactylus*, *Aciptilia baliodactylus*, *Eupacilia dubitana*, *Euchromia purpurana*, etc.

The larvæ of *Depressaria heracleana* were common on flowers and seeds of chervil, and the larvæ of *Botys urticalis* were unusually abundant on nettle.

COLEOPTERA.

Amara similata, *Dromius linearis*, *Halysia 22-punctata*, *Micraspis 12-punctata*, *Meligethes rufipes*, *Athous niger*, *A. longicollis*, *Agriotes pallidulus*, *Rhagonycha fuscicornis*, *R. fulva*, *R. limbata*, *Malthinus punctatus*, *Malthodes minimus*, *Malachius bipustulatus*, *Dasytes ærosus*, *Anobium fulvicorne*, *Leptura livida*, *Grammoptera ruficornis*, *Bruchus luteicornis*, *B. loti*, *Clythra quadripunctata*, *Cryptocephalus moræi*, *Chrysomela staphylea*, *C. polita*, *C. orichalcia*, *C. hyperici*, *Luperus rufipes*, *Crepidodera ferruginea*, *C. rufipes*, *Lagria hirta*, *Ædemera lurida*, *Rhynchites æquatus*, *R. minutus*, *Apion violaceum*, *Otiorrhynchus picipes*, *O. sulcatus*, *Sciaphilus muricatus*, *Polydrusus cervinus*, *Phyllobius viridicaris*, *Sitones suturalis*, *S. lineatus*, *Orchestes alni* (and var. *ferrugineus*), *Miccotrogus picirostris*, *Mecinus pyraister*, *Anthonomus pedicularius*, *Cionus hortulanus*, *Ceuthorrhynchus pollinarius*, *Magdalis armigera*.

HEMIPTERA.

Eusarcocoris melanocephalus (about six specimens), *Anthocoris sylvestris*, *Leptopterna dolabrata*, *Calocoris fulvomaculatus*, *C. bipunctatus*, *Oncognathus binotatus*, *Lygus pratensis*, *Rhopalotomus ater*, *Cyllocoris histronicus*, *Heterocordylus tibialis*, *Psallus varians*, *Cixius pilosus*, *C. nervosus*, *Aphrophora alni*; and Mr. Kemp took a specimen of *Ranatra linearis* at Ockham Common.

Mr. Lucas took at Falcon Bridge a large Trichopteron, and also some large *Myriapoda* of genus *Lithobius*, apparently of two species.

The shells, found chiefly near Falcon Bridge by Mr. Lucas and Mr. Adkin, junior, were several species of *Zonites*, including apparently *Z. cellarius*, *Z. glaber*, *Z. nitidulus*, *Z. crystallinus*, and perhaps *Z. alliarius*, *Helix pomatia*, *H. aspersa*, *H. hortensis*, *H. cantiana*, *H. rufescens*, *H. hispida* (probably), *H. caperata*, *H. rotundata*, together with var. *alba*, *Bulimus obscurus*, *Clausilia rugosa*, *C. rolphii*, *C. laminata*, *Cochlicopa lubrica*, and *Cyclostoma elegans*. In some cases dead specimens only were found.

Flowers in blossom were numerous, and many were interesting; among the latter may be noted *Ophrys apifera* (the bee orchis), perhaps the most striking of the orchids that can be said to be common; *Listera ovata* (twayblade); *Reseda lutea* (wild mignonette), scentless, unfortunately, in a chalk-pit and elsewhere; *Galium cruciatum* (crosswort bedstraw), in chalk-pit; *Valeriana officinalis* (great valerian); *Melampyrum pratense* (yellow cow-wheat); *Helianthemum vulgare* (common rock-rose), one of the richest tinted of our many yellow flowers; *Anthyllis vulneraria* (kidney vetch), of which the downy calyces form so striking a feature; *Campanula trachelium* (nettle-leaved bell-flower), not yet fully out; and *C. glomerata* (clustered bell-flower). Some of the party said this was a gentian, but it appears as a *Campanula* in the London Catalogue, 9th edition, 1895.

Report of the Paul's Cray Common Field Meeting, September 22nd, 1900.

By ROBERT ADKIN, F.E.S. *Read September 27th, 1900.*

If a fine autumn day be an essential to a successful field meeting we were certainly favoured on Saturday last, September 22nd, when the members met for the fourth outing of the season. A party of about twenty assembled at Cannon Street station shortly after two o'clock, and took train at 2.30 to Chislehurst, and were ultimately joined by others, bringing the total attendance to twenty-four, a very respectable number for so late in the season.

Taking the main road from the station, and passing under the archway at the top of the hill, the party soon arrived on Chislehurst Common, a pleasant enough looking piece of well-wooded land, that at one time was worthy the attention of the naturalist, but now, unfortunately, much overrun. It was therefore thought well not to loiter here, so taking the St. Mary Cray and Orpington road past the "Bull's Head," we pushed on to Paul's Cray Common, reached in something under a mile and a half from the railway station. The feature of this common, a feature for which it is justly renowned, is its wealth of birch trees; they grow all over it, and are of all sizes, from mere saplings to fine stately trees, their slender branches waving in the autumn breeze; and the ground beneath them is carpeted with heather (*Calluna vulgaris*) and bracken (*Pteris aquilina*), whose varied tints at this time of the year add greatly to the beauty of the scene. No wonder so picturesque a locality should attract numerous picnic parties, as we found was the case on the occasion of our visit; but, fortunately, one of the necessary adjuncts to these *al fresco* entertainments, hot water for the brewing of the indispensable tea, is obtainable only at one small cottage on the far side of the common, and there of necessity such parties congregate, leaving the greater part of the common available for those more interested in the lesser objects of nature to wander unmolested at their own sweet will, even on a fine Saturday afternoon; how much more so on those occasions which, though less attractive to the general public, are perhaps more profitable for the collection of insects! For it is to this spot that the Londoner journeys on a mild evening in the early part of November to obtain his series of *Chematobia boreatu*; and if he be fortunate in hitting upon a favourable night he should have no difficulty in completing not only his own series of the species, but those of all his friends into the bargain, by searching the birch trees with a lantern, and will doubtless meet with many other late species while so engaged. Earlier in the year *Macaria notata* may be taken from the same trees, while they and the heather beneath them are attrac-

tive to many dusk and night-flying species. But the promise that we were also to explore Pett's Wood, or, at any rate, so much of it as is open, forbade us to linger, so taking a footpath on the right hand that crosses the common diagonally, we were soon at the entrance to the wood. The wood is strictly preserved, but a broad footpath, a public right-of-way to Orpington, leads through it. This is bordered on either side by well-grown trees, chiefly oak, whose trunks bore evident signs of recent "sugar," and at intervals by a mixed underwood, which becomes more dense towards the railway, which the path crosses by a level crossing about half a mile from its commencement. Just beyond the railway the path runs through an alder swamp, which is intersected by a small stream. Here honey-suckle was still in full blossom, and besides the alder there is a considerable growth of dogwood (*Cornus sanguinea*), spindle (*Euonymus europæus*), maple (*Acer campestre*), and so forth; while patches of wild mint (*Mentha aquatica*) were blooming in the more open spaces near the stream. Beyond this the path enters the fruit fields; it was therefore thought well that from this point we should retrace our steps. A return was accordingly made to the common, "beating" being indulged in by the way, but it is to be feared only in a half-hearted manner, the beauties of the scene having apparently more attraction for the members than any serious attempt at collecting. It was, however, evident, from the little work that was done, that larvæ were fairly numerous, such species as *Lophopteryx camelina*, *Pygæra pigra* (*reclusa*), *Acronycta aceris*, *Hylophila prasinana*, *Cabera exanthemaria*, and a species of *Caradrina* being among those noted.

On returning to the common, it being still daylight, the members set themselves to its further exploration, and thus filled up the interval until it was time to adjourn to the "Bull's Head" to tea; to which having given their earnest attention, they made the best of their way home, except two, more arduous workers than the others, who returned to the wood to reap the harvest from the "sugar" that they had put on earlier in the evening.

The following is a list of species noted during the meeting:

COLEOPTERA.—*Notiophilus biguttatus*, *Leistus spinibarbis*, *Chilochorus bipustulatus*, *Crepidodera helxines*, *Cassida viridis*, *Strophosomus coryli*.

LEPIDOPTERA.—*Asphalia diluta*, *Hydræcia nictitans*, *Agrotis saucia*, *Anchocelis pistacina*, *A. lunosa*, *A. litura*, *Xanthia fulvago* (*cerago*), *X. flavago* (*silago*), *X. circellaris* (*ferruginea*), *Hadena protea*, *Hypena proboscidalis*, *Pterophorus monodactylus*, *Alucita hexadactyla* (*polydactyla*). Also larvæ of *Hylophila prasinana*, *Drepana lacertinaria*, *D. falcatoria*, *Lophopteryx camelina*, *Phalera bucephala*, *Pygæra pigra* (*reclusa*), *Acronycta psi*, *A. leporina*, *A. aceris*, *Mamestra persicarie*, *Hadena pisi*, *Amphidasys betularia*, *Geometra papilionaria*, *Zonosoma linearia* (*trilinearis*), *Cabera pusaria*, *C. exanthemaria*.

Report of the Cryptogamic Field Meeting at Oxshott on Saturday, October 20th, 1900.

By Mr. STANLEY EDWARDS. *Read October 25th, 1900.*

When the preliminary arrangements for the Field Meetings were made, it was intended that the meeting at Paul's Cray Common on September 22nd should be largely devoted to Fungi, but owing to the exceeding dryness of the weather just preceding that date it was thought that the chances of success in this branch would be remote, and that portion of the programme was accordingly abandoned, the energy of the members present being devoted chiefly to the collection of larvæ instead. It was then decided that a special fungus gathering should be held at a later date, and the somewhat "softer" weather of the early days of October appeared to suggest that the time was arriving when such a meeting might be held with good chances of success. Saturday, October 20th, was accordingly fixed, the scene of action being Oxshott, and the results obtained—no less than seventy distinct species being collected—appear to fully justify the alteration.

The journey from town was made by the 2.22 train from Waterloo to Oxshott station, whence a party of fourteen set out, shortly after 3 o'clock, through the pine wood by the direct route for the "Black Pond." Fortunately the afternoon was bright, and the daylight held while an investigation of the productive banks in the neighbourhood of the "Black Pond" was being made; but long before the return journey was completed the "hunt" was brought to a close by the advent of darkness, or doubtless many other species might have been added. The party having partaken of tea at the cottage, and filled in a spare half-hour by a stroll to Oxshott village and back, returned to town by the 7.44 train, all having thoroughly enjoyed a most interesting, and so far as weather was concerned perfect, autumn afternoon. The Society is indebted to Dr. M. C. Cooke for the verification and in several instances the identification of the species mentioned in the following list; some few of which, it may be noted, are somewhat rare and local in their occurrence:

Amanita phalloides, *A. rubescens*, *A. spissus*, *A. muscarius*, *Lepiota granulosus*, *Tricholoma columbetta*, *T. imbricatus*, *T. rutilans*, *Clitocybe laccatus*, *C. tuba*, *C. ditopa*, *Collybia radicans*, *C. butyracea*, *C. maculata*, *C. tuberosa*, *Mycena galericulata*, *M. galericulata* (var. *calopus*), *Entoloma sericella*, *E. sericea*, *E. nidorosa*, *Hypholoma sublateritia*, *H. fascicularis*, *Hebeloma crustuliniformis*, *Stropharia subglobosa*, *Psilocybe ericæa*, *Cortinarius cinnamomeus*, *C. caninus*, *C. elatior*, *C. paleaceus*, *Paxillus involutus*, *P. atrotomentosus*, *Marasmius peronatus*, *Lactarius turpis*, *L. quietus*, *L. pallidus*, *L. subdulcis*,

L. rufus, *L. glyciosmus*, *Russula nigricans*, *R. granulosa*, *R. ochroleuca*, *R. fellea*, *R. fragilis*, *R. queletii*, *R. alutacea*, *Cantharellus cibarius*, *C. aurantiacus*, *Boletus badius*, *B. sulphureus*, *B. elegans*, *B. flavus*, *B. bovinus*, *B. scaber*, *Polyporus schweinitzii*, *P. annosus*, *Polystictus perennis*, *P. versicolor*, *Dedalea quercina*, *Thelephora laciniata*, *Stereum hirsutum*, *S. spadiceum*, *Sparassis crispa*, *Lycoperdon perlatum*, *Scleroderma vulgare*, *S. verrucosum*, *Dacrymyces deliquescens*, *Rhytisma acerina*, *Sepedonium chrysospermum*, *Galera hypnorum*, *Naucoria sobrinus*, *Hypholoma appendiculata*.

Desultory Days at Dawlish.

By H. J. TURNER, F.E.S. *Read November 22nd, 1900.*

SOME years ago, when going down to Penzance, I made a mental note that I would at a future time visit that beautiful portion of Devonshire where the Great Western Railway is the boundary line between land and sea. Brunel, the great engineer, said that he would make one of the most beautiful rides in England, and certainly that portion of the railway from Starcross through Dawlish and Teignmouth to Newton Abbot, running along the shores of the rivers Exe and Teign and the sea, is a lovely ride, particularly in the early morning. Of these places Dawlish seemed the most attractive. It was secluded, there was an absence of the Ramsgate or Brighton element, there were elevated coigns of vantage, there was the sea with beach and sand, but without the niggers and such like pests, and above all, to an entomologist, there was the chance of personally becoming acquainted with a brilliant rarity, viz. *Callimorpha hera*.

This paper is styled "Desultory Days," and certainly, although I always carried an old net about with me, only on one day did I devote my whole time to collecting, and on that occasion I took no less than nineteen "Tigers." The only species which I worked at continuously was *Bryophila muralis*, and that was only in the early morning, from 5.30 a.m. to about 7. No night work was attempted, although, from what my friend Mr. Jäger has told, such collecting, if persevered in in that neighbourhood, is very productive. The number of insects collected was less than four hundred, of which the two species mentioned contributed more than half. I do not think I took a single specimen at more than a mile from the sea, and not more than four miles along the Starcross side of Dawlish, and two miles along the Teignmouth side.

The most attractive spots for collecting are the lovely lanes, long, deep, with wide banks and hedges, most varied in vegetation, and teeming with insect life. Then there is the Ladies' Walk, an elevated green ride above the cliffs of about a mile long, leading to the Warren, the sandy spit of land quite another mile in length, and half a mile broad, lying across the mouth of the Exe towards Exmouth and where a very different class of collecting is afforded. Then there are the beautiful woods about Cofton, where Rev. A. Benthall, who has given us many notes on *C. hera*, lives; and still further towards Starcross are the low, marshy meadows, no doubt productive of an extensive and peculiar insect fauna. In the other direction towards Teignmouth I only went once, exploring a few lanes and meadows, and finally going down the lovely gorge known as

Smugglers' Lane, on to the footpath which runs between the rail and sea for a mile and a half to Teignmouth.

Trips inland I did not take, although I believe there are extensive areas of open land, woods, etc., which are good collecting grounds, such as Haldon. Anyone staying at Dawlish is within easy reach of various well-known and interesting places. Exmouth and Exeter are readily visited. One can make day trips to Torquay, Dartmouth, Totnes, and the trip down the Dart at high water is an outing which should undoubtedly not be omitted. Even a portion of Dartmoor may be included in the explorations of an active entomologist.

NYMPHALIDÆ.

Dryas paphia, one or two worn specimens.

Argynnis aglaia; I caught a momentary glance of one example.

Vanessa io, *Pyrameis cardui*, and *Pyrameis atalanta* were fairly common in one place at valerian bloom on walls bordering gardens, and almost out of reach of the net.

Aglais urticae fairly common. Numerous pupæ were found on walls in the town, and along the footpath on the railway-containing wall towards Teignmouth a considerable number of pupæ were taken hanging on the rough weather-beaten dark granite blocks. The larvæ fed on the railway bank or cliffs crawled across the railway, up the dividing wall on to the sea face bordering the path, and pupated in the full glare of the sun. None of those, however, produced imagines, although several were alive when taken. Some were tenanted by Chalcids.

Eugonia polychloros; one seen sitting on a post with *P. atalanta* two inches above it, both flapping their wings, and well protected by a projecting bolt and adjoining barbed wire. However, *E. polychloros* entered an uninjured net.

SATYRIDÆ.

Pararge megæra; a few seen, no doubt members of a second brood.

Epinephele ianira was also noted, but very worn.

Cenonympha pamphilus must, I think, be more or less continuous brooded; it was in some number.

Pararge egeria; one was noted, also no doubt of a second brood.

LYCÆNIDÆ.

Chrysophanus phlæas was worn.

Polyommatus icarus was fairly common, and *P. astrarche*.

Cyaniris argiolus was everywhere most abundant. I scarcely went out without seeing numbers. Most were females, and all were much worn. Wherever there was ivy—and ivy occurred in every lane—at intervals there was *C. argiolus*.

Zephyrus quercûs was also in numbers, but, of course, worn.

HESPERIDÆ.

Thymelicus thaumas (*linea*), the only member of the family seen.

PIERIDÆ.

Pieris brassicæ and *P. rapæ* were seen, the former not infrequent in fields flying with *Colias edusa*.

P. napi; one exceedingly small example was taken.

Colias edusa was abundant, and the females in very good condition. The var. *helice* was also common. Only two fell to my lot, but Mr. Jäger took four, Mr. Edwards of Worcester four, and I heard of several others being taken.

Colias hyale was completely absent, nor have I heard of any being seen in that part of Devonshire.

SPHINGIDÆ.

Sphinx ligustri in the larval stage and a few imagines of *Macroglossa stellatarum* were the only members of the family noted.

I have since wondered if *Deilephila euphorbiæ* ever occurs on the sand-hills. The food-plant is there in abundance.

ANTHROCERIDÆ.

Anthrocera filipendulæ was very nearly over on the Ladies' Walk. Another *Anthrocera* was said to be found in the marshes, which it was suggested might be *A. trifolii-palustris*, but neither Mr. Jäger nor myself came across it.

LITHOSIIDÆ.

Lithosia luridiola, *L. griseola*, and the rare *L. caniola*; one specimen of each. The last, *L. caniola*, was not recognised until after I reached home, or—well, there might have been more.

EUCHELIIDÆ.

Euchelia jacobææ; a few late larvæ were seen, and traces of others in many places.

Callimorpha hera; this, as all know, is the species of the district. Where is it found? Everywhere! Do not be surprised if it turns up in any place, whether likely or unlikely. My son saw the first *C. hera*. His remark was, "There's a foreign insect," so unlike anything usually seen in this country is it. It was flying from bush to bush above a wall. Of course, my net was not put up. However, it waited for me, and my first capture I recognised as the terra-cotta or intermediate form. The spot is marked in one of the pictures I am passing round, and you will see it is right in the town. From that spot I afterwards took four more specimens; that is a characteristic of it. Wherever one has been taken, there others are sure to occur on subsequent days, and Mr. Jäger tells me in sub-

sequent years even. Energetic beating is not necessary; they fly from their cover at the slightest rustle, and will flit along about twenty yards, when they can be marked down, disturbed gently, and captured. If you rush after them at first, you will startle and then lose them, for they can fly both fast and furious. They are particularly fond of ivy, holly, evergreen oak, and any bushes overhanging a wall. The dusty road-sides will be sure to produce them; the sunny sides of the lanes are the best; one I captured was at rest on a wall. In eight days I had secured forty specimens, a number far beyond my expectations. Another entomologist, Mr. Edwards, of Worcester, also took forty, so that the insect certainly is by no means rare, and is well holding its own in spite of being worked year after year. In those I captured, 50 per cent. were of the red typical form, about 25 per cent. of the yellow var. *lutescens*, and the rest intermediate. In fact, the variation in colour showed an almost complete gradation from bright rich red to intense yellow. My specimens are, I believe, all females, and a few were not in the best condition, but produced a number of ova, some of which I handed to Mr. Montgomery, keeping a few for myself. No doubt I was a little late for the species, or I should have met with males.

LACHNIDÆ (BOMBYCIDÆ).

Lasiocampa quercis: one female was taken at rest, and a few eggs were obtained, but were infertile.

DREPANULIDÆ.

Cilix glaucata; this snowy gem was common in the blackthorn on the verge of the cliff, and readily fell to the ground at the stroke of the beating stick.

BRYOPHILIDÆ.

Bryophila perla; only one worn specimen seen.

B. muralis (glanäifera).—This species I should say occurs in thousands in the neighbourhood, for no wall that I examined but contained abundant traces of its ravages. But on not one other wall than that pointed out in the photographs did I find even a single specimen. This wall was about 100 yards long, and very high. The south side was a garden wall, with, I believe, a large greenhouse backing on to it. The north side was somewhat shaded and protected from all sun after about 6.30 a.m. Fortunately it was situated some two minutes' walk from where I was lodging, so that soon after five o'clock in the morning I was at work on it. Most of the imagines were difficult to see, only the dark green and the brightest yellow forms were conspicuous. They were found from an inch above the gutter to high above one's head, and it was necessary to search each stone carefully from various points of view. One morning I be-thought myself of looking for the pupæ, and around one stone I found several. This set me next morning to a thorough search, and

along about one third of the wall I secured no less than sixty. The next morning I elected to get sixty more, and I did so easily. They, too, occurred at all heights above the ground line. I believe that with a really thorough search, and the aid of a ladder for the upper regions, I could have got 500. They are delicate pupæ, and want gentle handling. They lie at all angles, with the wall often placed end-ways, in the defective joints of the stones. They are enclosed in a tough cocoon spun in the hollowed-out bunches of moss, which grows on the wall in abundance, and which has become the colour of the stone by the accumulation of dust. To this cocoon there is invariably an antechamber containing more or less frass, and which is often open to the ingress of beetles, although the orifice is very small and difficult to notice. In several I noticed a small *Bembidium* (I believe), but in no instance did I find that the tough inner cocoon had been assailed successfully to destroy the pupa. I presume that the larvæ fed on the moss as well as the lichen, for I found numerous single chambers in the moss untenanted by pupæ, not even containing frass. There were also a very large number of small pockets in the lichen, all open and untenanted, evidently the resorts of the larvæ when young. Does the larvæ feed on the moss as well as the lichen, or are the single chambers only day hiding-places for the larger larvæ, as the patches of lichen would not be sufficient cover for any but the small larvæ?

With regard to the variation in the imagines, I feel quite incompetent to deal. Speaking generally, the whole of those taken and exhibited, some 160 in number, are very dark. There is not a typical specimen among them. In nearly all of them the black markings are much intensified and increased in number, and one or two examples are extremely suffused with black. There are a considerable number of a very rich dark green suffusion, while a large proportion are of a very deep yellow or olive colour with black markings. Only a very few show any trace of the delicate dove-colour which characterises so many of the more eastern forms of the south of England. The dwarf specimens all emerged late in September or in early October, and I suggest that the larvæ of those were feeding during the excessively dry and hot spell which occurred in the summer, and the imagines in consequence suffered. It will be noticed that these small ones are all characterised by a greater amount of black covered area. I had almost forgotten to mention that not a single pupa was tenanted by an ichneumon.

LEUCANIIDÆ.

Leucania albipuncta, *L. vitillina*, and *L. putrescens* are notable inhabitants of the district, but none fell to my share, nor were they looked for. In fact, my list contains notes on very few Noctuæ, as the group was not collected even in a desultory fashion. No doubt at some future holiday I shall specially attempt this group, and,

given favourable weather, I do not doubt a very successful bag may be obtained.

Nonagria typhæ.—I am indebted to the kindness of Mr. Jäger for the opportunity for the first time of making acquaintance with the pupæ of this species. It was in a very secluded spot on private ground that Mr. Jäger took me, and in about half an hour I had cut out no less than twenty-eight pupæ in an area not more than three yards square. The bulrushes were very large; indeed, to take the rushes, as some collectors suggest, would have been a big task. With constant care, and painting the pupæ with water, etc., I succeeded in getting out twelve perfect imagines, and about ten others which either damaged themselves or were cripples. I rather closely examined the remaining pupæ the other day to look for a frontal process, such as Dr. Chapman described to us a short time ago in the case of the Processionary Moth (*Cnethocampa pityocampa*). Finding a strong double, short frontal spine, I submitted them to him, and he writes to this effect:

These processes are found more or less in all the *Nonagrias*. Guenée years ago called attention to these structures, but he (Dr. Chapman) does not think that they have hitherto been pointed out to British entomologists. More recently an article on the same subject, with numerous rather poor figures, appeared in the "Zietschrift." The apparatus in the present species consists of a double, short frontal spine, obviously of use for forcing the prepared window of plant epidermis with which the larva supplies the puparium. It is somewhat notable that a structure which occurs so commonly in the pupæ of the *Incompletæ* should here occur in the imago of one of the *Obtectæ*.

APAMEIDÆ.

Miana bicoloria was as usual near the coast in absolute abundance on every slope facing the sea, just at dusk, but not so apparent by day.

CARADRINIDÆ.

Caradrina ambigua; the district produces this species, and I have no doubt one's series could be made here.

NOCTUIDÆ.

Agrotis ripæ; the larvæ of this species were common when searched for under the *Chenopodium* plants, which were scattered over those portions of the sand-hills out of reach of the highest tides. The text-books give hound's-tongue as the only food-plant, but my larvæ feed readily on the *Chenopodium*, and there was certainly no hound's-tongue on the Warren. These larvæ are easily found. By turning over the sand under and around the plants to the depth of two or three inches, the green caterpillars, rolled in a ring, are exposed. In a short time I had found three dozen. They are arrant cannibals, and will feed readily on each other, especially

when away from their native food. After reaching home I fed them on carrots cut into slices. They invariably buried themselves in the sand by day, coming up at night to feed, often under the pieces of carrot, and feeding on the under sides. After feeding on carrot they lost their green colour, and took on a vitreous, shiny appearance somewhat transparent, for the colour of the particles of carrot in their alimentary canal was very apparent. But they became more and more lethargic as they grew and fattened, until I thought it was time to turn them out into the garden to hibernate. There they are now in deep flower-pots and buried in sand. Occasionally they have had portion of carrot supplied them, but they do not seem to have eaten it. A few were ichneumoned, but the resultant grubs died after breaking out from the larvæ and spinning a considerable amount of silk in a pad on the top of the sand. Whether luck will attend the full development of these difficult insects to breed I do not know.

HADENIDÆ.

Eremobia ochroleuca ; I was too late for this beautiful species, which occurs somewhat freely on scabious heads along the Ladies' Walk.

Phlogophora meticulosa ; a green mottled larva feeding on ground ivy later on produced a somewhat small specimen of this species.

PLUSIIDÆ.

Habrostola tripartita (urticæ) ; a specimen came in the house.

Plusia gamma ; fairly common.

COSMIDÆ.

Calymnia trapezina ; a very ordinary form.

GEOMETERS. UROPTERYGIDÆ.

Uropteryx sambucaria ; occasional specimens noted.

ENNOMIDÆ.

Crocallis elinguaris ; a form with a very pale band.

BOARMIDÆ.

Gnophos obscuraria ; common but worn. The form taken here is peculiar in being brown and almost uniform in coloration, instead of black or white.

EPHYRIDÆ.

Zonosoma porata and *Z. punctaria* ; both these species were seen.

ACIDALIIDÆ.

Acidalia marginepunctata ; one specimen only taken.

A. emarginata ; also a single example.

FIDONIDÆ.

Ematurga atomaria ; fairly common, worn.

Aspilates ochrearia (citraria) ; very common, and just emerging. No females were seen. They always seem less common than males.

ZERENIDÆ.

Abraxas grossulariata ; common as usual elsewhere in all the hedges.

LARENTIIDÆ.

Larentia olivata ; was to be had fairly commonly, but I secured none.

Emmelesia affinitata ; one example.

Eupithecia subfulvata ; occurs locally in some numbers : one odd specimen was taken.

E. centaureata ; one specimen.

Melanthia ocellata ; odd specimens continually met with.

Melanippe galiata ; was very common, and in good condition : beaten from every hedge, a very good series might have been obtained.

M. fluctuata and *M. sociata* were also common ; indeed, the latter species I have found this year to vie with *C. bilineata* in its ubiquitous appearance.

Anticlea rubidata ; locally common, but worn and almost unrecognisable.

Coremia designata and *C. unidentaria* were both common.

Camptogramma bilineata ; certainly not the pest one usually meets with it.

Cidaria picata was reported as fairly common, but none were secured.

C. prunata (ribesiaris) was noted.

EUBOLIIDÆ.

Eubolia plumbaria and *E. bipunctaria* were both observed.

Mesotype virgata (lineolata) was very common on the sand-hills, and from ova sent to Mr. Montgomery a few have been bred. The imagines were most difficult to detect, and especially to get in good condition.

PYRALIDÆ.

Pyralis costalis and *P. farinalis* were represented by single specimens.

Scoparia angustea ; one and *S. murana* several.

Nomophila noctuella was, as usual near the sea, fairly common.

BOTYDÆ.

Scopula ferrugalis ; common in places.

PTEROPHORIDÆ.

Platyptilia ochrodactyla ; one specimen, and one *P. gonodactyla* ; small, no doubt a specimen of the summer brood.

Pterophorus monodactyla ; of course was noticed.

ALUCITIDÆ.

Alucita hexadactyla ; was very common in places, on the top of the cliffs near its food plant, honeysuckle.

CRAMBIDÆ.

Crambus pinellus ; one specimen.

C. geniculeus ; was abundant on the sand-hill in good variety of light and dark, flying in company with *M. virgata*.

C. culmellus was also noted.

GALLERIDÆ.

Galleria mellonella ; one specimen.

TORTRICES.

This group was abundant, but I paid no attention to it. Solitary specimens of *Peronea comparana* and *Teras contaminana* were found in the net.

TINEÆ.

Also might have been worked to advantage. I noted several species of *Depressaria*.

DIPTERA.

Asilus crabroniformis was common in one lane.

COLEOPTERA.

Brosicus cephalotes ; a pair taken on the sand-hills, while searching for larvæ of *A. ripæ*.

Timarcha lœvigata was still to be found.

ODONATA.

Sympetrum striolatum was the only species taken or seen.

HETEROPTERA.

Capsus laniarius ; one specimen taken.

Phytocoris tilie ; very common on the trunks of trees on Lea Mount.

HYMENOPTERA.

Wasps were exceedingly abundant ; no lane or road was without its quota of nests. One evening towards dusk, while passing a nest which had been well battered in front, I saw a beetle, *Necrophorus* sp., crawling with impunity among the numerous wasps, who were in no way put out by it. As my shadow crossed the nest the beetle to my surprise took flight as easily as would a common house fly. The yellow bands of the beetle seemed certainly to disguise its presence among the wasps.

SHELLS.

A marine shell, *Bulla hydatis*, was in some numbers below the high-tide mark on the river side of the Warren. I am told it is a very local species. It is a most delicate shell and also of a curious and unusual form.

There were several other species I picked up, but have not yet identified them.

A very large perfect specimen of the razor-shell I found on the shore.

PLANTS.

Vegetation was most abundant and varied everywhere, but I saw scarcely a fern. On one evening I crossed to Exmouth, and found on the eastern shore of that place a greater profusion of the beautiful sea-holly than I ever remember to have seen before. The golden-rod was very plentiful in many of the lanes.

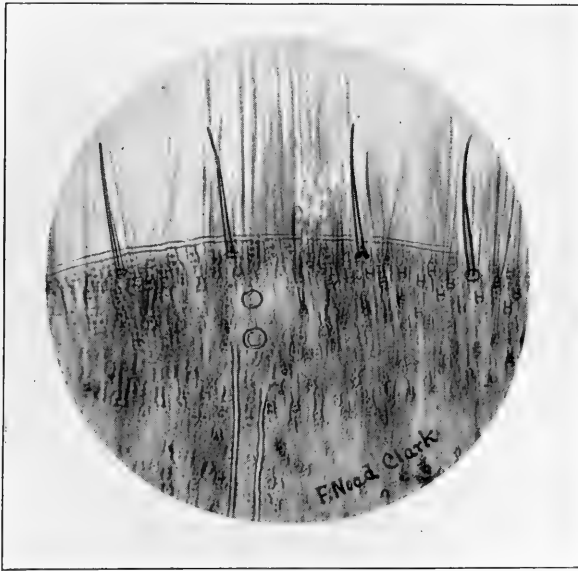
Enumeration of the species met with brings my rambling remarks to a close. I fear that I have noted very few scientifically useful facts, but at any rate I have recorded one of the pleasantest holidays I have ever had, and a holiday made doubly pleasant by the personal guidance and most kindly hints of one of my fellow-members, our old friend Mr. Jäger. It is to his unstinted kindness that I am indebted for much that this paper contains, and I take this opportunity of thanking him.



EXPLANATION OF PLATE I.

Wing margin of *Xylophasia monoglypha* $\times 150$, showing an extremity of a nervure where it meets margin, with the two circles.

The scales of the wing surface can be made out in the photograph, but in this reproduction are too hazy to appear. Those of the fringe are visible. Four bristles are very distinct, as they do not bleach like the scales do. The scale sockets are sufficiently distinct.



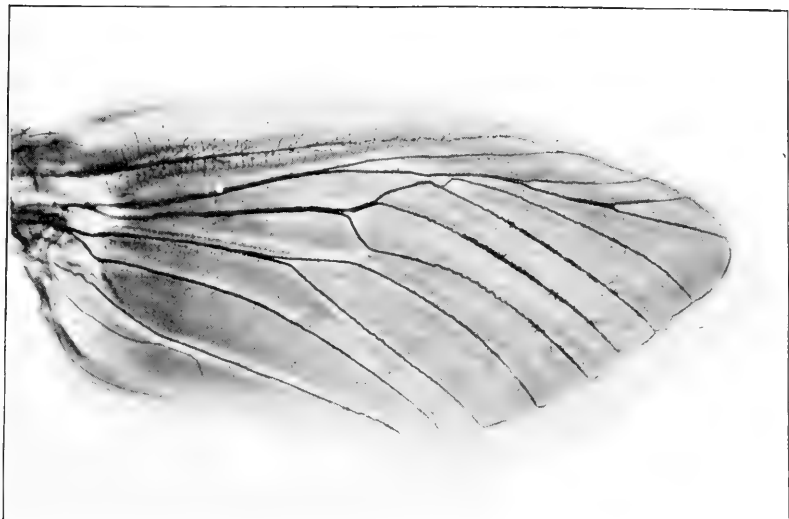
HIND-WING OF XYLOPHASIA MONOGLYPHA $\times 150$.

EXPLANATION OF PLATE IA.

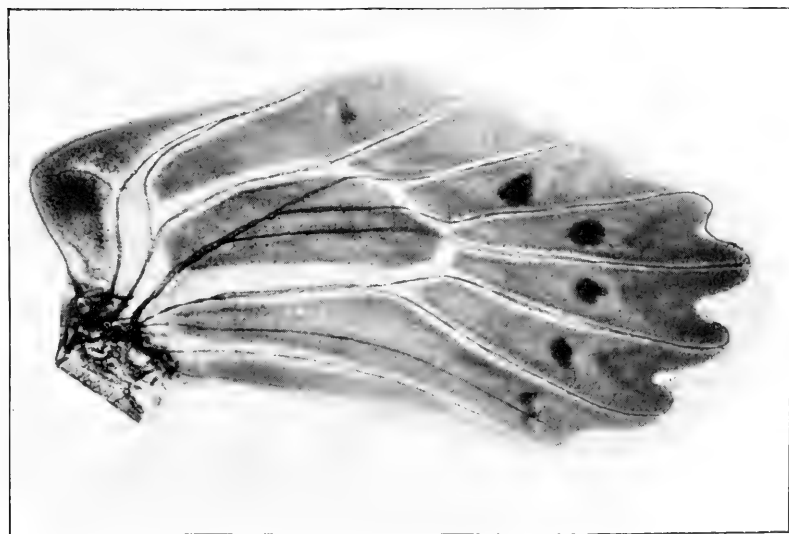
A fore wing of *Pygæra anachoreta* and a hind wing of *Thais polyxena* at a certain stage of pupal development.

They both show the marginal trachea (Poulton's line), the portion of the wing tissue beyond this, and the cilia, which arise chiefly from the area outside the marginal trachea.

In *T. polyxena*, the marginal trachea is seen to be slightly out of position at two points. A result either of injury in mounting, or to some contraction occurring after mounting the specimen.



Fore wing. *P. anachoreta*. $\times 13$.



Hind wing. *T. polyxena*. $\times 12$.



On some Wing Structures in Lepidoptera.

By T. A. CHAPMAN, M.D. *Read December 13th, 1900.*

THE wing structure of Lepidoptera is a very wide subject, with a very considerable literature, which I propose to touch at only a few points, chiefly because they are some that have interested me and may perchance have some interest for you. I have selected a few items on which I can report to you entirely from my own observations; not by any means that I have more than an odd point or two perhaps that is at all novel. Still those that are not new may be none the worse for being presented as a result of observations that confirm or modify well-known conclusions. I have avoided as far as possible matters that are treated in British text-books, or which you may have found expounded more intelligibly than I can pretend to in some of our magazines.

In discussing the Lepidopterous wing from any aspect it is always an assistance to first consider that aspect in those families that are most nearly related to the probable earliest Lepidopteron or its immediate ancestor. If we examine a wing of almost any Neuropteran of the family *Hemerobiidae*, or better of the *Panorpidæ* as probably still nearer to the Lepidoptera, we find it possesses two forms of clothing.

The wing is clothed all over by a number of fine points, often prolonged into minute hairs. A careful examination of them, however, shows them not to be what we usually understand by hairs in insects, viz. a tapering, usually hollow process attached to its base by a joint, that permits its being moved to different angles with the surface. These are, on the contrary, processes of the surface of the wing itself, without joints and permanently fixed in one attitude. The other form of clothing consists of true hairs or bristles. There are no scales or hair-scales.

Let us discuss, in the first place, the small spicules that clothe the wings entirely in *Panorpa*. My attention was first called to these by a paper by Professor Kellogg, that appeared in the Kansas "University Quarterly" for July, 1894, and later in the "American Naturalist." The central matter of that paper was the existence of these spicules on the wings of the Jugatæ of Comstock, and their non-existence on the wings of other *Lepidoptera*, showing the much closer relation of the Jugatæ to the *Neuroptera* than of other *Lepidoptera*, which is correct; and adding another character by which they may be distinguished from other *Lepidoptera*. The latter idea, however, does not accord with the facts on further research. On examining the matter I met with other Lepidoptera that possessed them, all belonging to the family *Adelidæ*, which I always have believed to be very directly derived from the *Erio-*

cranidæ, with the single exception of *Nepticula*, which also possessed them, and which I have also supposed to be derived from some other Jugate, nearer to *Micropteryx* than *Eriocrania*.

On looking into the matter I find, however, that my observations had all been made already and duly recorded in the Jena "Zoological Year-book" in July, 1895, by Dr. Arnold Spuler, who has done so much good work in researches on wing structures. He states that these spicules are found in *Adela*, *Incurvaria*, *Nemotois*, *Nemophora*, and the *Nepticulidæ*.

His paper gives no indication that he was aware of Professor Kellogg's paper of the previous year, and he makes this statement in no way as extending or correcting Professor Kellogg's observations, but simply as recording an observed fact.

I think that the occurrence of these spicules on the wings of certain *Lepidoptera* will prove of some systematic value. I have been unable to find them in *Tinea*, in the lowest *Psychidæ*, in *Cochlididæ*, or in any families that I have been used to regard as low down, except the two lowest, the *Adelidæ* and the *Nepticulidæ*. In the *Adelidæ* I have always believed the *Prodoxidæ* to be included, the definition of *Adelidæ* being *Neo-Lepidoptera* with piercing ovipositors. We accordingly find these spicules also exist in *Prodoxus*.

Attention to this character (that of the ovipositor) might have prevented Meyrick from placing *Incurvaria æhlmanniella*, and *Lampronia capitella* in the genus *Tinea*. Those who are inclined to follow him in this matter may perhaps hesitate on finding that they have the spiculate structure of the wing membrane, which is not found in *Tinea*.

Phylloporia bistrigella also possesses these spicules, confirming the position in the *Adelidæ* which its habits and the structure of the ovipositor forces one to assign to it, notwithstanding that it has up to the present been associated with the very different true *Tineæ*.

It is curious that species of the genus *Adela*, which is certainly the highest of the group, are least favourable for observing these spicules, and I think some species have actually got rid of them.

In this paper of Spuler's to which I have alluded he describes a certain area of the inner base of the anterior wing beneath, where in a large majority of *Lepidoptera* these spicules persist and are even more prominently developed. This area he calls the "Haftfeld," holding area. I gather that this structure had been previously noticed, but have been unable to discover where. Nor do I find any reference in his paper to the corresponding area of the meta-thorax, and I fancy that the name "Haftfeld" refers to some theory that it holds together the fore and hind wings; but about this I am by no means certain.

We next come to a paper published in July, 1896, one year later, in "Psyche," by Mr. R. A. Cooley, who does not appear to

have known anything of Spuler's paper, and describes the "Haftfeld" as a new structure, under the name of "spiny area." So far, however, as I am aware, Mr. Cooley first pointed out the correlation of the spiny area with another on the metathoracic dorsum, and showed that the use of these structures was to hold the wings in position when they were closed.

There is no doubt that the spicules of the "spiny area" or "Haftfeld" are survivors of the spicules of the *Neuroptera*, as we see them already differentiated to some extent in the Micropteryges. They exist also in certain *Phryganidæ*. Spuler and Cooley agree in the distribution of the Haftfeld amongst the Lepidopterous families; they exist, in fact, everywhere, except in a few families and exceptional species in others that usually have them. They exist in all the families that close the wings over the back when at rest, not in those that do not.

Those that want them are chiefly the *Sphingidæ*, *Saturnidæ*, *Bombycidæ*, *Geometridæ*, *Ceratocampidæ*, *Endromidæ*, *Brephidæ*, *Platypterygiidæ*, and *Pterophoridae*. Many Sphinges fold their wings over the back, and ought by rule to have a haftfeld. Probably it is absent owing to an ancestry related to *Saturnidæ* and represented in Sphingids by *Smerinthidæ*, which clearly have no use for the structure. They are also wanting in the butterflies.

Cooley says they exist in the *Bombycidæ*, but I imagine he applies this term to the *Lasiocampidæ*, which have them.

In Meyrick's *Notodontina* all are without "haftfeld" except *Notodontidæ* and *Polyplocidæ*; this adds another item to my argument against *Notodonta* being associated with this group. As to the *Polyplocidæ*, they seem out of place here, yet they have many characters in common with the rest of the group, especially the form of the egg, as well as the neurulation. This haftfeld, however, must add another straw to the indications that they are somehow related to the Noctuids (Caradrinina). In making use of this as of any other character, we may note that, since it exists in all the lower groups, families that have no haftfeld must be derived from forms that possessed it, but that no family without it can be ancestral to one that possesses it.

I may refer here to a modification of the scales that often occurs in a region close to the "Haftfeld," sometimes over a considerable diffused area, sometimes on very defined and circumscribed spots, in the latter case often suggesting patches of Androconia; but as they occur in both sexes this is not so. *Acherontia atropos*, from its large size, exhibits these patches both on upper and under wings very plainly. Their use is perhaps not difficult to guess. They consist of very strong, smooth scales, with often inflexed tips and packed closely together, and are well calculated to resist the wear and tear of the wings against each other, and especially to obviate friction between them.

They exist also in many butterflies, as in sundry Vanessids.

Taking next the bristles or sensory hairs, we find these in many *Hemerobiidae* confined to the nervures and wing margins; in *Panorpa* they are found also on the general area of the wing. It is generally assumed that the scales on *Lepidoptera* arose by modification of these hairs or bristles, and there is much to be said for this hypothesis. For example, in *Culicidae*, *Diptera* that usually possess scales like those of *Lepidoptera*, there are many species that resemble the *Hemerobiidae* in possessing spicules all over the wing surfaces and, on the nervures—not bristles but scales; in other species of *Diptera*, especially Cecidomyiads, scales of a rather hair-like structure, but certainly not bristles, occur all over the wing amongst the spicules. In one *Culicid*, at any rate, I have noticed the marginal scales become more and more bristle-like towards the base of the wing. The evidence from the *Diptera* is therefore very strong that scales arose by modification of bristles. When we come to *Lepidoptera*, it is necessary to note a very common misapprehension. Many *Lepidoptera* possess abundantly, a majority possess some, so-called hair-scales, and it is implied, often distinctly stated, that these hair-scales are an intermediate form between hairs and scales. That some so-called hair-scales are in an intermediate state between hairs and scales seems nearly certain, but the immense majority of “hair-scales” are really much modified scales—are, that is, less, instead of more, allied to hairs than scales are; they are scales that are developed, or degenerated, if you prefer it, by becoming very long and very slender. Such are the hairs on the wings of the higher *Psychidae*, where typical scales are rare, whilst the usual positions of scales over the wing surfaces are occupied by hair-like structures that are evidently, however, scales, and not hairs.

How, then, shall we distinguish a bristle from a scale, that we may be able to judge whether a given hair-scale is a bristle modified in the direction of a scale, or a scale still further modified?

A typical bristle is easily distinguishable from a typical scale. A bristle is circular in cross-section, tubular, conical, tapering regularly from base to apex, usually sharp-pointed, has no pigment, but consists of a brown chitin, not bleached so readily as are scales coloured with pigment. Its attachment is by a delicate membrane to a superficial circle on the chitinous surface, and thus it has considerable freedom of movement.

A scale is flattened, often striated, colourless apart from pigment, attached usually by a specially narrow process, which is enclosed in an hour-glass-shaped cup, through the open top of which it proceeds downwards, then through the central constriction, and terminates some way below the surface in the lower globe, and so it possesses very little or probably no mobility.

If we examine a wing of *Micropteryx*, as the earliest stage of a Lepidopterous wing that is available, we find unmistakable scales, broad, flat, pigmented, and typically attached to the wing, over the whole of the wing surface and forming the ciliæ; if we ask

what structures in *Panorpa* they represent, we find nothing like them in that genus; and if we say then they are no doubt the bristles modified, we look again at the *Micropteryx* wing to see if any traces of bristles exist; we at once find along the margin of the wing amongst the cilia a certain number of unmistakable bristles typical in every respect, and placed so that they are not in range at all with the scales, but evidently another structure altogether. On looking at the nervures we find also a series of bristles, placed at intervals solitarily and not in line with the rows of scales, but following a separate order of distribution quite independent of that of the scales. A close examination of them shows that they are bristles in all respects but one, and in that they are slightly modified in the direction of scales, that is, in their attachment to the wing. They do not possess the ordinary scale-cups such as scales possess, and their attachments look extremely different to that of the surrounding scales; still the bristles are slightly contracted at their bases, and penetrate a little below the surface into their circle of attachment, which has not, however, the hour-glass constriction of a typical scale-cup. On returning to the marginal bristles these do not present quite the same modification, but looking at them with one's suspicions aroused in this way, they do present a slight modification of the ordinary bristle attachment. Such bristles do not occur anywhere between the veins on the general wing surface; towards the base of the costa of the hind wing they become larger and more evident, and culminate in the little row of bristles that represents the frenulum. Hair-scales that occur freely towards the wing bases are seen to be true scales, by their pigmentation, by their cylindrical form, their length, and especially by their attachment to typical scale-cups.

Seeing, then, that we find these bristles persisting along the nervures, along which they have a remote ancestry in the earlier insects, and that on the wing membrane, where hairs have been less frequent, we find a new structure, the scales, it seems more probable that scales are a new development from the hypodermic cells, and that the bristles have resisted (instead of originating) the new movement, except in having been compelled to accept some trace of the scale-cup structure.

When we examine other Lepidoptera, we do not always find ourselves able to say so easily as in *Micropteryx* what is a veritable scale, what is a modified scale, and what is a slightly modified bristle, since the variations that occur are so numerous and various.

What we may actually observe; however, is, in the first place, that almost everywhere we meet with bristles scattered along the ciliary margins, and in many of the highest Lepidoptera these are as distinct from any form of scales and have their attachments as little modified as in *Micropteryx*. I have observed these in almost all families I have examined, and when in some of the smaller *Incomplete* (micros) I have failed to observe them, I have

supposed the failure was in my power of demonstrating them rather than in their being really absent.

The presence of these bristles is hardly if at all noticed by our authorities* on these structures, and they are sometimes difficult to observe; they are hidden amongst the scales, and the removal of the scales often means the removal of the bristles also. The bristles do, however, sometimes remain after the removal of the scales, having apparently a firmer attachment. I find the best way to demonstrate them is to decolorise the wing and mount it transparently; the scales then become hardly visible, whilst the bristles retain enough brown chitinous colouring to be observable. In the more delicate structures of the minuter moths it is obvious that it must be difficult to sufficiently assault the scales without damaging also the bristles.

The Noctuæ perhaps display these marginal bristles as well as any family, but they are present in all the other families of larger moths, and I am inclined to say in all species.

The bristles along the nervures are less universally present; at least I have failed to detect them in many species.

In *Hepialus* they appear to be absent in some species; when present they are almost typical bristles, but some slight modification of their attachment appears.

In *Cossus* they are very typical, though sparse; in *Z. pyrina* they are more numerous and as free from scale characters as in *Micropteryx*. I was somewhat surprised to find that in *Acherontia atropos* they occur with hardly any modification. In *Vanessa* (*io*, *urtice*) they have rather more scale-like attachments, and their bases are longer and more tapering, but in all other respects they remain bristles.

In *Anthrocera transalpina* they are very bristlelike, but in *A. minos* they have progressed a considerable way towards being scales; their attachments differ, but only a little from those of the scales; they are a little swollen at about a third from their origin, and look as if striation was even indicated.

The point, then, to which I wish to direct your notice about these bristles is simply this, that we have throughout the Lepidoptera a persistence, with very little modification, of the bristles that exist along the nervures and margins of the wings of *Hemerobiidae* and other *Neuroptera* and other earlier insects. That these bristles are distinct from the scales phylogenetically, and though they have slightly submitted to the strong tendency of all cutaneous structures in the *Lepidoptera* to become scales, they have much more largely resisted it, even in some of the highest Lepidoptera.

* They are referred to as occurring in the gipsy moth in the report on that insect by Forbush and Fernald, 1896, and as this is going through the press are called attention to by Mr. Ambrose Quail in the "Entomologist" for February, 1901.

There is a curious structure that I have not been able to find any references to in the numerous papers and authorities that I have looked up, and so provisionally call attention to it as something new, but with a strong suspicion that some reference to it exists somewhere, and that my claim to novelty may be no better than Mr. Cooley's in the case of the "holding area."

If a wing be decolorised or denuded of scales, and the wing margin examined as a transparent object, it will be found that where each vein reaches the margin, two circles occur on its surface. Sometimes these circles are within the wing margin that forms the seat of the cilia, sometimes they are just clear of this, and in a few instances they are distant from the wing margin several times the width of the ciliary base.

They are almost always, one nearer the base than the other, that is, a line joining them is substantially the line of the vein to which they belong, and the further they are from the wing margin the further they are, as a rule, from each other.

On first observing these circles they appeared to me to be circular openings into the lumen of the vein, bounded by raised and thickened edges. I have, however, concluded that the supposed opening does not exist, chiefly because I can detect no passage of air or fluid through them, under any experiment, in emptying the veins of air or filling them with other fluids.

The circle is, however, just like the thickened rounded margin of an aperture, and in some cases very obviously is at the summit of a conical elevation, with slightly wrinkled slopes. I have been able also, in stripping off the wing membrane on the side on which they are, to leave them intact beneath it, and the stripped-off membrane shows no corresponding structure or aperture.

This process I have only attempted in *carpini* and *atropos*, but in these two cases the result appears to be as I have stated.

These circles occur in every Lepidopteron I have examined, the exceptions to there being two at the extremity of each vein, are very few indeed.

I am not quite sure, but I think I have seen one only in some exceptional instances (as *Megalopyge crispata*), and once or twice I have met with three, purely as a matter of local variation on an odd vein. More frequently they appear to be wanting altogether in the anal veins, and rarely on vein two or vein three.

In *Zeuzera* (*pyrina*), however, the normal number appears to be four, and in *Cossus* (*ligniperda*) five, and in these they are decidedly further from the margin than usual.

In another species of *Cossus* (*Duomutus leuconotus*) there are only two of these circles, but their position is very variable, close together, wide apart, nearer or further from the margin, transversely or longitudinally placed. One might almost take them to be any two taken haphazard of the five that occur in *ligniperda*, since these variations all occur in one specimen. In the case of *Macrogaster*

castaneæ there are two circles, with little more than ordinary variability as to position.

Their size is by no means proportional to that of the insect or of the vein they are on. They are, for instance, small in the *Sphingidæ* and *Saturnidæ*. The longest, I think, occur in a species of *Cryptophaga* (*Xyloryctinæ*). In some *Pyræles* they are also large, as in *S. prunalis*.

I found also that in at least a majority of species similar circles existed on veins in the area of the wing, most frequently near the transverse vein and on branches of the radial vein, and occasionally on the surface of the wings, where, or close to where, veins had disappeared or dwindled. When they so occur they have a tolerably constant position in the same species; thus in *H. prasinana* there are on the fore-wing three on the radial vein before its first branch, one beyond this, and two on the combined stem of 7—8. On the transverse vein one between three and four, and one between four and five, and one on the base of four.

In *Vanessa urticæ* they are numerous along a number of veins. They are less abundant, but still frequent in other *Vanessids* that I have examined.

When once the wing is mounted transparently, it is practically impossible, in most instances, to say which side is uppermost, and in many slender wings it is equally difficult to distinguish one side from the other when under the microscope. With a very wide margin, therefore, for error, I regard them as being always on the under surface of the wing, since that has been their position whenever I have been quite certain as to which side of a wing I was looking at.

I have already alluded to their structure; they seem to exist in the thickened wall of the vein, as distinct from the included tracheæ or the superficial hypodermis.

I have not met with them at all in the few *Trichoptera* and *Neuroptera* I have examined. Though in some *Hemerobiidæ*, there are some circles that I am not absolutely positive are the sites of bristles that have been rubbed off, but I believe they are. Nor have I seen them in any *Diptera* I have examined.

On the question as to what these circles really are, what they represent, or what are their functions, I am up to the present time unable to make more than a suggestion.

That they have some useful function seems highly probable from the simple fact that they occur throughout the whole order, since there can be little doubt but that, if useless, they would have been eliminated, at least in the higher families, even if they have, as I have not ascertained, a long genealogy somewhere amongst the more ancient insects.

The only guess I can make is that they are perhaps affected, as diaphragms, by variations of pressure, and so by communicating such variations of pressure along the fluid or air in the veins, give

some assistance in the management of the wings during flight. In the Lepidoptera we have seen that the wings are largely without the tactile (or other sensory) bristles that are so abundant on the wings of many other insects, and which are no doubt chiefly useful in keeping the directing nervous centres fully informed of the movements of the wings, and of the varying air pressures they meet with, and consequently precisely what work they are doing, and what variations in their movements are necessary to produce any desired result.

It is certainly easy to see that if the centres of these circles are moveable diaphragms, they would admirably serve this purpose, acting much in the same way as the rubber bags and tubes that have been utilised in many instruments of research for recording variations of pressure and movement.

Such a function for them has not, perhaps, much doubt thrown upon it by the circumstance that we are inclined to regard the wing, but perhaps without any good reason, as in a manner dead—dead in the sense that superficial cuticular structures are dead: an idea that is perhaps largely originated by the fact that butterflies seem incommoded to a very slight degree by loss of scales from the wings and by their being more or less tattered and torn, and aided by what we know of the active circulation and other vital processes that go on in a wing up to the time of its complete expansion, when they apparently cease.

I do not think, however, because no further growth or development takes place, that we can jump to the conclusion that the wing may not be provided in one way or other with the necessary sensory apparatus for guiding its control during flight.*

Another wing structure is one that Professor Packard called our attention to twenty years ago, but with which you may not be familiar. This is the "Cocoon-cutter," which is especially developed in *Attacus luna*, and according to Professor Packard's own observations is used by that insect to cut through the silken threads of the cocoon when the moth emerges. It is a structure that exists apparently in all the Saturnian group, but is best developed in some of the North American species. It is one of the separate chitinous pieces that lie between the wing and the thorax, rather behind the middle line of the fore-wing. It is a piece that exists probably in most Lepidoptera and moves nearly with the wing, but with some little restriction. But in these Saturnians instead of, so to speak, coming to the surface only, it projects above it as a sharp point, and in *Attacus luna* as a knife or saw, and when the wings are yet unexpanded and folded down, easily projects laterally in a very effective manner.

* It has been pointed out that the wings are certainly sensitive, as evidenced by a moth moving away with symptoms of discomfort when sunlight is concentrated by means of a lens on a portion of wing where it would not affect the insect's body.

It is well developed in *Antherea pernyi* and in *Saturnia pyri*, less so in our *carpini*, specimens of which I have selected to illustrate this structure. In none of these is it useful as a cutter, though it comes to a rather sharp edge in *pyri*, at least, no observations have been recorded, and the empty cocoons in *pyri* and *carpini* show that the provision made by the caterpillar is sufficient for the emergence of the moth, as well also as in *pernyi*, though of a different character, the softening of the cocoon by a fluid allowing the threads to be pushed aside in such a way as to show that they are spun each to its own side without crossing, just as by *carpini* or *pyri*, although the full cocoon looks precisely the same all over, just like that of *Lasiocampa quercus*, or *Limacodes*.

In these cases, then, the "cocoon-opener" does not open the cocoon, but it may very well act as an efficient lever to assist the moth in climbing out of the cocoon. I have noticed in *pyri*, *pernyi*, and *luna* that there is on the side of the thorax against which the "cocoon-opener" impinges when the wings are closed, a groove to receive the opener, with an overhanging flange. The groove is obviously a sheath to receive the rather formidable weapon, and prevent the thorax being injured, but I have also a suspicion that the flange locks on the opener in the closed position of the wings, and helps to hold them in the closed position. Experiments with a living specimen are necessary to determine whether this is so, but such as were possible in *pyri* by relaxing the specimen were rather confirmatory.

Not only the "cocoon-opener" but the hollow and ridge on the thorax that correspond to it exist in many other species if not in all, but have no special development, showing that the "cocoon-opener" and its sheath are not new structures, but parts of the ordinary arrangements specially elaborated and developed.

In the "Transactions of the Linnean Society" (May, 1891) Professor Poulton called attention to a pupal structure, which for that reason I have called "Poulton's line."

The actual matter that Professor Poulton concerned himself with in that paper in regard to this line seems to me to be treated with perfect correctness, and in fact his idea that the pupal traces of the imaginal wing are less specialised than the wing of the imago itself, if not fully proved, is at least fully and soundly supported by his facts.

It is nevertheless the case that his starting-point has always seemed to me to be in some way erroneous, and I have neglected no opportunity of observing any facts bearing on the subject.

Poulton's line is a line that may be observed on almost any pupa, though much more easily on some than others. It runs round the inner and hind margin of the pupal wing, at some little distance from its margin. What is it? Why has the pupal wing a double margin, and what do they severally represent in the imaginal wing, in its development and evolution? Professor Poulton in the paper

referred to says that the outer line, as is obvious enough, is the margin of the pupal wing; the inner one (Poulton's line) is the margin of the imaginal wing.

This can hardly be the case for several reasons. We talk of imaginal and pupal wings, and the phrases are useful to describe certain things and stages of things; but we must remember that there is in reality no such thing as a pupal wing, only imagines have wings. What pupæ have are not wings, but what are to be imaginal wings, or simply wings; the word imaginal being in this view of the words tautological and superfluous.

The wings of pupæ are not, then, pupal wings, but imaginal wings at a certain stage of their development.

This undeveloped imaginal wing is enclosed in a chitinous covering which is pupal strictly, but what it encloses belongs purely to the imago, whether it be inside or outside of Poulton's line. Now, I have stated that all Lepidopterous pupæ possess Poulton's line, and if that line be really the margin of the mature wing of the imago, we must conclude that throughout the whole order a strictly imaginal structure exists in the pupæ, but is atrophied before the imaginal stage is reached. Now there are imaginal structures in many pupæ that have precisely this history, like the expanded antennæ of many female moths, or the maxillary palpi of Sesiids and some other *Incompleteæ*. It would not, therefore, be at all improbable for some Lepidoptera to have an imaginal wing apparently developed from only the basal portion of the imaginal wing of the pupæ, as in fact occurs in apterous females, treated by Professor Poulton in the same paper.

The difficulty is in the present case that this condition affects the whole order, whilst it is certain that within much smaller limits selection would have reduced the pupal outline to the imaginal limits.

For the sake of avoiding confusion I have omitted in what I have just said a very important consideration, which makes the statements inaccurate, but enables one thing to be considered at a time, and, therefore, may conduce to clearness. The omitted circumstance is this, that though the mature imaginal organ is apparently wanting or much smaller than it is in the pupal stage, such as it is each part of the pupal organ provides a portion of the imaginal one.

I believe this to be absolutely true, even in such a case as the maxillary palpi of the Sesiids, where a pupal six-jointed palpus is represented in the imago by an inappreciable stump. Perhaps the most apposite illustration will be found in the pupæ of apterous female Lepidoptera, of which *Orgyia antiqua* is not only a convenient example, but happens to show the necessary details very plainly, and Professor Poulton happens to have figured it in illustration of his paper, though he does not appear to have noticed that the pupa shows Poulton's line very distinctly. The wing of the imago is not

only much smaller than the wing in the pupa, but than the portion of the wing within Poulton's line.

It follows, therefore, that, admitting for the moment that Poulton's line marks off the imaginal wing, and still more if we do not admit it, the imaginal wings contain parts of the wing in the pupa lying outside the position to which it reaches when mature.

In *Orgyia antiqua* the female pupa shows Poulton's line tolerably close to its margin; it has retained it as a normal and constant structure of the wing in the pupal state, and not as marking off the imaginal wing. Were that its real meaning we should expect it to coincide with the limits of the mature imaginal wing, and that the space outside it would be enlarged. The wing of the pupa does not diminish so rapidly as that of the imago, as it atrophies in these apterous female moths; therefore the margin of the pupal wing ought to be a long way outside that of the imaginal wing. Therefore, if Poulton's line were that margin, we should find it far inside its present position, and the total pupal wing would probably have its margin outside its present position.

It is not, however, in these pupæ of apterous moths that we find a great space between Poulton's line and the margin of the pupal wing, but in certain butterflies which have very ample wings and in which there is no reason at all to suppose that the wings have dwindled in size in the imagines. Perhaps the most remarkable of these are in various *Pieridæ*. In *Euchloë* the wing beyond Poulton's line extends to a great distance, and helps to form the point at the angle where the pupa appears to be so curiously bent. It has been suggested that this extended area beyond Poulton's line represents the wing of some ancestor who had very prolonged hooked tips to the wings; if this be so, we shall of course find in *C. rhamni* considerable correspondence of Poulton's line with the wing margin. As a matter of fact it is much the contrary; we have in the pupa of *C. rhamni* a very similar general form to that of *Euchloë*, and a very similar prolongation of the wing to form the angle. Poulton's line is, however, very distant; it marks out the form of the wing as we see it in the imago, but the point of the hooked tip in no way corresponds with the apex of the pupal wing.

With regard to the butterflies, we must recognise that their pupæ have varied immensely and developed various remarkable spines, processes, &c., entirely in view of the exigencies of their environment; and the immense development of this extreme portion of the pupal wing in many species is no doubt more related to this circumstance than to any condition directly concerning the wing itself. In any case, in order to fall smoothly on to the rounded surface of the fourth abdominal segment, it was necessary that the wing margin should preserve a regular curve and avoid all angulation, and so we never in any pupa find a sharp angle on the hind margin of the wing. So far as I am able to suggest, we must take it as an ultimate fact that this wing margin was able to vary for pupal purposes to the

extent it does in *Euchloë*, *Callidryas*, etc., just as we have to do in the case of the nose and eye spines of Nymphalids, Papilionids, etc., of various species on Papilionidæ, the remarkable processes of the White Admirals, etc.

We may just glance at the pupa of *Sc. libatrix*. We see here that Poulton's line gives us the form of the wing of the imago, and that the pupal wing margin is tolerably close to it at either angle, but is much behind it where the hind margin of the wing is hollowed out. The pupal wing margin does not here follow a regular sweep from apex to anal angle, but is slightly hollowed out where the imaginal wing marked by Poulton's line is much hollowed. The fourth abdominal segment has assumed some little irregularity to accommodate itself to this excavation of the wing margin. This shows that the wing margin and Poulton's line have a strong tendency to work together when they are relieved from the pressure of the environment to which the exposed pupæ of butterflies are subjected. It appears also to prove that since they can vary together so much, they would have absolutely coincided throughout the mass of the Lepidoptera had the one been the pupal reminiscence of a former stage of the other, or a mere pupal part having no direct relationship to the imago, one or other of which must be the meaning of Poulton's assumed basis.

In the case of *Sc. libatrix*, I do not mean to be understood to regard the marginal portion of the pupal wing as having been left by Poulton's line, because it could not follow it at the rate at which it moved, but that its failure to follow it absolutely was due to the pupal necessity of a proper apposition to the fourth abdominal segment in order to a due outline to the pupa, and that the present position is a compromise between the desire of this margin to retreat and the reluctance of the abdominal surface to supply all the necessary modification.

These considerations, I think, enable us to see what is the question before us. Professor Poulton is right as to the inner line (Poulton's line) corresponding to the outline of the imaginal wing, blurred and simplified, either by the less development of the pupal structures, and by no means improbably, as he shows, by corresponding rather to that of an ancestor of a simpler structure than to its own imago. If we interpret the Professor's phrase "the hind margin" loosely and conversationally as equivalent to the general outline of that portion of the wing, we must agree with his position entirely. It happens, however, that he expressly notes the region outside it as affording nothing to the imaginal structures, and so we must take "hind margin" to mean the actual limit of the wing structure.

If Poulton's line is not such a limit, what is it? An examination of many pupal wings at various stages of development have satisfied me that it is precisely what it looks like, viz. a vein, of a nature exactly like that of the longitudinal veins that terminate at it.

Professor Poulton points out that the pupal tracheæ at an early

stage do not correspond to these outlined veins, and that the latter correspond more nearly to the veins of the mature wing. This is so. The tracheæ at first have a very generalised disposition, and extend beyond Poulton's line to the wing limit. As development goes on, the tissues between them diminish or increase in relative extent, so that the tracheæ, from being nearly straight and parallel, become bent or curved, approach one another or fall more widely apart, and thus take up gradually the positions of the longitudinal veins of the wing. This is a fair description of what occurs in all cases, though to be complete it would have to refer to veins forming where there are no tracheæ; to the coalescence or actual disappearance of the latter in many cases. Whilst the wing is still in a somewhat early stage, and before scales are fully formed, each persistent trachea becomes furnished near its extremity with two lateral branches that meet those of the next trachea, and form a continuous line of tracheal tube completely round the wing. These are formed by the expansion of some of the finer tracheæ with which the wing is largely permeated. At the same time the wing, beyond the line of marginal tracheæ, which is to the developing wing in precisely the same relation as Poulton's line to the pupal surface, contracts just as the wing tissue does between two tracheæ that are approaching each other, the tracheæ it contains disappear, and it becomes represented by a line of wing tissue outside the marginal trachea. This portion of the wing is much narrower proportionally than the area outside Poulton's line in those cases in which, from exigencies of pupal form or other causes, it is widely expanded. It is, however, fairly related as regards extent to that area in the larger proportion of species, those, viz., in which Poulton's line occurs close to the margin of the pupal wing. There can be little doubt that the hypodermis covering this wing margin is that which lined the chitinous covering of the wing in the pupa, which has no doubt undergone many changes, but has preserved throughout structural continuity. The only developmental interpretation that I can give to the picture suggested by Professor Poulton would be that at Poulton's line the upper and lower hypodermis met by a kind of cicatrising process, cutting off the tissues beyond Poulton's line, and that these were afterwards eaten or digested by the developing cells of the cilia. Besides its inherent, might I say, absurdity, this would not explain the fact that when the wing has developed, this space contains only fluid, even in those cases in which the wing retreats basally from Poulton's line instead of going beyond it, both these cases occurring in different instances.

That a marginal nervure is a normal constituent of all Lepidopterous wings is proved, in the first place, by the marginal tracheæ I have already mentioned as occurring during the development of the wing, and often to be discovered in the perfect wing, by the structure in many imagines, when it exists as a hollow tube, and further, by the

fact mentioned earlier in this paper, that, like the other nervures, it carries sensory hairs or bristles.

Poulton's line is therefore the pupal indication of the marginal nervure or trachea. The space between it and the pupal wing margin represents the portion of wing outside this trachea, a normal and constant portion of the wing, present in all cases, and therefore always present in the pupa also.

We may call this the ciliary margin, although the actual base or origin of the cilia is not always accurately marked off by the marginal trachea.

On the Ova of Lepidoptera.

By FREDERICK NOAD CLARK. *Read January 10th, 1901.*

It will be perhaps as well at the commencement of my paper to make a few remarks on the methods I have employed in photographing the eggs exhibited, and at the same time to express my obligations to those gentlemen who have so kindly supplied me with material, amongst whom are Dr. Chapman, Messrs. Tutt, Montgomery, Carpenter, and R. M. Prideaux, of Reigate. To Mr. Tutt I am especially indebted for notes on the application of oval structure to the principles of classification.

In every case the eggs have been photographed at precisely the same magnification, and thus a good idea of their relative size is conveyed. Whenever possible they are represented as they were laid on their natural support, food-plant, etc.; but as it is most important for correct definition that the eggs should be all in one plane of focus, I have in several cases been obliged to detach them from their support and place them on a flat surface having a white or black background for contrast, according to the colour of the egg in question. The larger spherical eggs for the same reason present some difficulty in photographing. It is desirable to photograph the egg as soon as possible after being laid, so as to avoid changes in shape or colour, which occur sooner or later in most cases, and to obviate which some efficient method of preserving lepidopterous ova as permanent specimens is very much needed.

I am unable through lack of specimens to show typical examples of all the families, but hope to do so at some future time.

So far as I am aware no theory except that of natural selection has been advanced to account for the variation in structure of the egg.

"The eggs of Lepidoptera are developed in the ovaries of the female, and after passing down the oviduct into the vagina, are impregnated or fertilised with the male element or spermatozoa which is stored after copulation in one or more pouches called the receptacula seminis. A single spermatozoid is sufficient for this purpose, and enters the egg at an orifice called the micropyle. This is of microscopic size, in some cases hardly perceptible, in others it consists of a distinctly depressed area. Minute channels communicate with the interior of the egg and convey thereto the fertilising element.

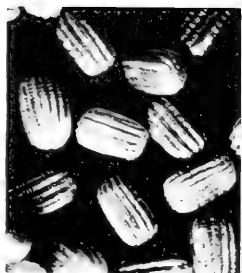
"The base of the egg is, strictly speaking, that portion opposite the micropyle, but in those eggs that are laid on their sides the term base is sometimes misapplied; as for instance when it is described as that portion of the egg which is attached to its support or food-plant.

EXPLANATION OF PLATE II.

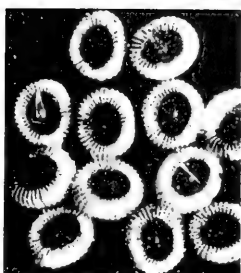
EGGS OF LEPIDOPTERA.

Magnified 20 diameters.

FIG. 1.	FIG. 2.	FIG. 3.
<i>Crambus</i> <i>chrysonuchellus</i> .	<i>Nola</i> <i>cucullatella</i> .	<i>Lomaspilis</i> <i>marginata</i> .
FIG. 4.	FIG. 5.	FIG. 6.
<i>Iodis vernaria</i> .	<i>Acidalia</i> <i>holosericcata</i> .	<i>Spilosoma</i> <i>menthastri</i> .
FIG. 7.	FIG. 8.	FIG. 9.
<i>Hadena</i> <i>genistæ</i> .	<i>Heliophobus</i> <i>popularis</i> .	<i>Chrysophanus</i> <i>phlæas</i> .
FIG. 10.	FIG. 11.	FIG. 12.
<i>Gonepteryx</i> <i>rhamni</i> .	<i>Pyrameis</i> <i>atalanta</i> .	<i>Polyommatus</i> <i>bellargus</i> .



1



2



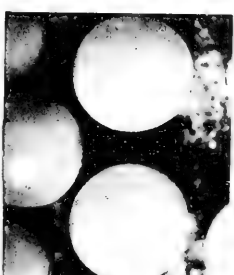
3



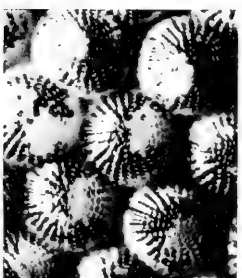
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5



6



7



8



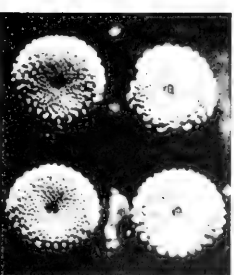
9



10



11



12

PLATE 2.

"The larva sometimes emerges at the micropyle, but there is no rule for this, for it frequently emerges at any other portion of the egg; indeed, among the *Nepticulides* it eats its way through the base of the egg into the leaf on which it is laid."* It is possible that the point of emergence selected by the larva is that portion of the shell which is the thinnest.

Eggs are, broadly speaking, of two kinds—"upright" and ovoid, or so-called "flat." Dr. Chapman first separated the eggs of *Lepidoptera* into these two distinct groups: the "upright" egg having the micropyle at the apex, and the micropylar axis perpendicular to the surface on which the egg is laid; and the "flat" egg with the micropyle at one end of the egg and the micropylar axis parallel to the surface on which the egg is laid.

Mr. Tutt has used these characters as one of the tests which he applied in formulating his advanced system of classification; and thus we find in his "*British Lepidoptera*," Vol. I. (a work I can strongly recommend to any lepidopterist who makes the ova a study), the arrangement of the *Lepidoptera* under three stirpes or main divisions, two of which are flat-egged stirpes, viz. the *Micropterygo-Sphingid* and the *Eriocranio-Geometrid*, and one upright-egged stirps, the *Hepialo-Noctuid*. By this test many hitherto anomalous positions for certain families were proved to be erroneous, and one finds the *Notodonts* carried over to the *Hepialo-Noctuid* stirps in this classification, the *Cymatophorids* attached to the *Geometrid* stirps, whilst the position of many other families may be more or less accurately checked by the peculiar structure of the ova.

It will be observed that the "upright" eggs have a more elaborate sculpturing than the "flat" eggs, the surface being ornamented with longitudinal ribs and transverse bars, whilst the "flat" eggs are usually oval in shape, yellow in colour, often very soft, with a depression on the upper surface, and the sculpturing slight and shallow. Some of the lower forms of these latter are devoid of markings, and one is led to believe that they represent in some measure the primeval form of egg.

At this point it would be interesting to observe the difference in the position of the insect in the act of depositing a flat egg and an upright egg; one would imagine that in the latter case the egg is deposited when the abdomen is in a position more or less perpendicular to the surface on which the egg is laid, whilst in the former case a horizontal position seems to be the more probable, or some structural differences may exist in the ovipositing organs.

The flat-egged stirpes comprise the following families:—The so-called *Micro-Lepidoptera*, *Geometrids*, *Anthrocerids*, *Tachneids* (*Lasiocampids*), *Saturniids*, *Sphingids*, etc.

The upright-egged stirpes:—The *Cossids*, *Notodonts*, *Noctuids*, *Liparids*, *Arctiids*, *Hesperids*, and *Papilionids*.

* "*British Lepidoptera*," J. W. Tutt, vol. i, p. 168.

Of the Micropterygo-Sphingid stirps which Mr. Tutt has worked out in the early volumes of his "British Lepidoptera" I have no type, either of the Anthrocerids, Psychids, Lachneids, Saturniids, or Sphingids; but of the second flat-egged stirps—the Eriocranio-Geometrid—we have—

Crambus chrysonuchellus.—Illustrating the Crambids. For flat eggs the longitudinal ribs are unusual, the transverse depressions cross the ribs and are coarse and indefinite. These eggs were sent to Dr. Chapman by Lord Rothschild.

Phibalocera quercana.—Laid on oak leaf; empty shells only shown. The network is stellate and the cells triangular. From Dr. Chapman.

Halía vauaria.—A typical Geometrid egg, laid on gooseberry stem.

Lomaspilis marginata.—A Geometrid, laid in rows on paper.

Melanippe sociata.—On *Galium verum*.

Ematurga atomaria.—Laid in box.

Anticlea derivata.—On rose stipule.

Hibernia marginaria.—From Mr. Montgomery. Spaces between the ribs are composed of indistinct depressions.

Emomos quercinaria.—Laid on box. Larva is a general feeder.

Eubolia cervinata.—These ova are scattered broadcast, which is unusual for a Geometrid. Note the depressions on both sides of the egg. From Mr. Montgomery.

Acidalia holosericeata.—A local species from Mr. Griffiths, of Clifton. Eggs of this section of the genus Mr. Tutt calls "slipper-shaped," and are laid loose.

Ennomos fuscantaria.—A very specialised egg and quite unlike the typical Geometrid; they are laid side by side, of a brick-like shape, and the margins at the micropylar end are corrugated. From Mr. Prideaux, of Reigate.

Iodis vernaria.—Another specialised egg, and I should say unique. It exhibits a very peculiar form of deposition, the eggs being laid in rouleaux of five or six on a twig of clematis. The larva emerges at the side of each egg in the same position. There are minute pits on the lateral surfaces. Specimen sent me by Mr. Prideaux.

These complete my list of the available flat eggs, and I will now commence with the Hepialo-Noctuid or upright eggs, finishing with the Rhopalocera.

Cossus orc.—Mr. Tutt informs me that this egg illustrates well the point at which the flat become upright eggs. This is an American species which I photographed specially for him, to show the varying scale of size of the network, and is very different in structure to our Cossid (*Cossus ligniperda*) egg.

Hepialus.—Species unknown; is a type of the loose, oval, almost spherical egg, which is presumed to be the generalised form of egg for this stirps. These are deposited loosely among herbage, and it is noteworthy that the egg-shell changes from white to black. From Mr. Prideaux.

Nola cucullatella.—Characteristic of the *Nolidæ*, Dr. Chapman describes this as unique, being “apparently an upright egg with an oval outline.” The upper and inner margin of the zone of ribs stand out as in the *Vanessids*.

Nola cucullatella.—Empty shells showing how the larva emerges, leaving a lid in the centre. Specimen sent me by Dr. Chapman.

Pygæra bucephala.—Represents the *Notodonts*. Laid on oak-leaf, the micropylar area has a reticulated surface, the lower zone is of a pale blue colour having the appearance of glazed porcelain, and slightly pitted with minute holes. The basal zone is dark brown in colour.

Notolophus (Orgyia) antiqua.—Represents the *Liparids*. Hatching takes place irregularly and spreads over a long period. Eggs are invariably laid on the cocoon, and instances of parthenogenesis have been supposed to occur in this species.

Spilosoma menthastri.—Represents the *Arctiids*. This shows the spherical eggs in outline. The surface of these eggs is reticulated.

Polia chi.—A typical *Noctuid* egg, hemispherical in shape; specimen given me by Mr. Moore.

Panolis piniperda on *Pinus sylvestris*, from Mr. Tutt.

Agrotis agathina on *Erica tetralix*, from Rev. C. D. Ash, Selby, Yorks. The micropyle is well defined; the surrounding cells are in the form of a rosette.

Heliofobus popularis laid loosely. The network is quite superficial; the transverse ribs are distinct lines extending over the surface of the longitudinal ribs. The base of the egg has an uniform network, with no visible point of attachment; this is no doubt due to the eggs being deposited broadcast. The micropylar structure is similar to that of *Agrotis agathina*.

Hadena geniste.—A typical *Noctuid*. The dark markings are due to the state of maturity of the larva inside.

Gotyna ochracea (flavago).—Superficially is unlike a *Noctuid* egg, owing to the way in which it is laid; it is pressed out of shape, but has all the characteristic structure on close examination.

Thyris fenestrata.—A fine upright egg, which Mr. Tutt informs me cannot belong where the authorities have placed it. Dr. Chapman sent me these specimens.

RHOPALOCERA.

These naturally belong to the upright eggs, and are specialised in various directions. There is the long fusiform or ninepin-shaped egg of the *Pierids*, the barrel-shaped egg of the *Nymphalids*, and the *Echinus*-like eggs of the *Lycænids*. Of these I exhibit—

Gonopteryx rhamni.—Laid separately on twigs of buckthorn. This form of egg is common to the *Pierids*. Their bases appear in most cases to have flattened out and spread slightly; this probably would not occur if the eggs were laid free. Note the dotted transverse markings.

Euchloë cardamines.—On hedge-garlic, yellow when first laid, but turns scarlet after a day or so. The transverse ribs are distinct lines.

Colias edusa.—On clover, from Mr. Prideaux.

Pyrameis atalanta.—Represents the Nymphalids, together with the two following examples. Specimens from Mr. Prideaux. The larva emerges at the micropyle. The egg is very beautiful under the microscope. It has nine ribs, and traces of transverse ribs.

Argynnis aglaia.—Very finely pitted between the transverse ribs, and resembles a Noctuid egg in the manner in which the longitudinal ribs run into each other towards the apex.

Brenthis selene on *Viola odorata*.

Chionobas jutta.—Represents the Satyrids. From Mr. Tutt's specimen.

We now come to twelve photographs of eggs of the *Lycænidae*. Although they present, at least in some species, apparently but slight difference in structure, I think it is quite possible for a careful observer to name the species from the egg, bearing in mind also that difference in size is of material help.

Polyommatus bellargus.—Laid on *Hippocrepis*.

Polyommatus corydon.—On a *Lotus* leaf. Sent by Mr. Tutt from Abriès; laid on August 12th, hatched on September 14th.

Polyommatus icarus.—On rest-harrow. From Mr. Prideaux.

Plebeius ægon.—On *Erica cinerea*. Is a large egg, has a waxy appearance, and the angles of the network very indistinct.

Cyaniris argiolus.—On holly. From Mr. Montgomery.

Cupido minima.—On *Anthyllis vulneraria*. The smallest of the *Lycænids*.

Nomiades semiargus.—On red clover. From Dr. Chapman. Taken at Guarda.

Chrysophanus phlæas.—On *Rumex*.

Callophrys rubi.—On gorse buds.

Thecla w-album.—On elm twig. This egg was exhibited at a meeting in 1898 by Mr. Dennis. In shape it resembles a meat pie; the central portion is of a greenish colour, and is provided with minute hairs.

Zephyrus betulæ.—From Mr. Montgomery. The base of the network is a circular depressed hole, and, contrary to the usual run of the *Lycænid* ova, the protuberances are larger as they approach the micropyle, which latter is much depressed. The base of this egg also has a fine network, the angles of which are not prominent and do not form protuberances.

Zephyrus quercûs.—From Mr. Carpenter. Is the largest of all the *Lycænid* eggs. The area surrounding the micropyle is raised, and in this respect is unlike the other *Lycænids*.

AN ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History
Society.*Read January 24th, 1901.*

GENTLEMEN,—As year, succeeding year, has run its course, a custom has grown up and is now well established that the President should deliver a parting address before vacating the Chair, and this custom no doubt commends itself as eminently praiseworthy, except, perhaps, to the mind of the retiring President himself. But be this as it may, I certainly have no desire to break through a custom having the sanction of long-continued observance.

There is another well-recognised rule of this Society, which bids fair to become the established custom also, and is certainly very convenient in operation, that a Vice-President shall be chosen, in order that by sequence he may proceed to the office of President in the following year. You will doubtless recollect how the established order came to be set aside in my case. Dr. Chapman, one of the Vice-Presidents of the previous year, who, from his extensive knowledge of the Lepidoptera, and the unremitting zeal he displays in observing and experimenting in the same field, was so prominently fitted to take the lead in this Society, to the great regret of the Council, felt that he did not see his way to undertaking the duties of President. When at this point the Council approached me with a view to allowing myself to be nominated, though I consented, it was with considerable diffidence as to my suitability for the position. The President, however, has always this fact to support him, that his chief duty is to be regular in his place, and that the brunt of the work falls upon the other, hard-working, officers,

whose willing services our Society so fortunately commands ; further, if by chance he cannot speak with any authority on matters lepidopterous, there are still many others who can, and it is not altogether a disadvantage for the Chairman to leave the discussion of points that may arise chiefly in the hands of the members assembled around him.

With the commencement of the new century our Society has completed an existence of twenty-nine years, and during that period I think I may safely say it has done much to advance the knowledge in this country of Natural History in general and Entomology in particular, and at the same time to raise the status of its advocates and students. It is for us who are members to-day to carry on its career of usefulness into the century that lies before us.

Numerically we stand almost exactly where we did at this time last year. We have lost one member by death—Mr. H. Williams, a comparatively young man, who was formerly Secretary of the Society, but who has not often been present since he went to live at Southend. Mr. Williams' death took place but a few weeks since, and the Council no doubt expressed the feeling of the rest of the Society when it passed a unanimous vote of condolence with his relatives at their loss.

Our pecuniary position, as shewn by the Balance Sheet, is sound, but the Treasurer has always before him the annually recurrent difficulty with regard to the publication of the "Proceedings." My predecessor in the Chair in his address last year hoped that during the year some scheme might be devised by the Council to meet the difficulty. Though the matter has not been lost sight of, nothing quite practicable seems at present to have been suggested, and the position therefore is the same as last year ; but it certainly does not appear to be quite the right thing that the body of the members should be indebted to the generosity of a few for their copy of the "Proceedings," and that is what it really comes to, for the Treasurer assures me that the cost of publication amounts to about eight shillings per member, leaving a deficit of sixpence per member to carry on the business of the Society. Perhaps the members at large may be able to suggest some better scheme than that at present in vogue.

It is with the greatest pleasure that I notice an increase in the average attendance. Last year, according to the attendance-book, it was about twenty-five ; this year it has reached over twenty-six, and this, from notes I have made from time

to time, probably represents an actual average attendance of close upon thirty. The highest total was on the evening of the Varieties' Exhibition, when about seventy were present, although but sixty signed the book, and on that occasion, for the first time in my recollection, the numbers exceeded the seating accommodation provided.

Though the exhibits on that occasion consisted to a very great extent of Lepidoptera only, yet I think I may say that our Society is quite awake to the fact—and seems to be becoming more convinced of its truth year by year—that Entomology embraces orders other than Lepidoptera. Nay, it is inclined to go further and admit that Natural History includes other branches even than Entomology, though perhaps it does not seem quite so well assured of the latter fact at present, or, at any rate, seems hardly prepared to embrace it with any great enthusiasm. But, to speak seriously, I believe the Society has widely extended its value as a scientific body, since there has been a gradual and quite spontaneous enlargement of its field of work and observation in the direction I have mentioned.

If it were well understood that the latter part of our title—I refer to the words "Natural History"—was not an embellishment only, but had been adopted because the work of the Society covered all branches of Natural History, not only Entomology, or Zoology, but Botany also, and even the study of Inorganic Nature, it would do something perhaps to bring about an increase in our numbers, which it seems to me is a thing to be desired.

During the year eleven papers were read—five relating chiefly or entirely to Lepidoptera, two to other orders of insects, one to Ornithology, and three to Botany. In addition the reports of the five field-meetings were presented, one evening early in the year was given up to exhibits with short notes, and another to the special exhibition of varieties already mentioned. High on the list must be placed the two papers by Dr. Chapman, on the "Relation of the Larval to the imaginal Legs in Lepidoptera," and on "Some Wing-Structures in Lepidoptera," which contained a large amount of original work, and which we are looking forward to reading in the "Proceedings," to whose value they will greatly add. Mr. Tutt's paper on the Lasiocampid Moths was another of very high value. Mr. Turner's chatty paper on "Collecting at Dawlish," though of an entirely different nature, was most certainly not less interesting on that account. We have still in our minds the excellent paper

and demonstration with which Mr. Clark favoured us, and I am confident that I am but giving utterance to the opinion of you all when I say that the Society has only shewn a little of its obligation to him, not only for his scientific use of the camera, but also for his management of the lantern, by electing him as one of the Vice-Presidents for the ensuing year.

Passing to other orders, I am afraid your President treated but very inadequately so venerable a group of insects as the "Cockroaches"; but the same cannot be said of Mr. Enock's delightfully vivid revelation to us of the economy of the "Dragonflies and Fairy-flies." Those who saw Mr. Step's beautiful pictures of "Wild Flowers at Home," will agree with me in expressing a hope that he may shew us another series at no distant date. Mr. Fremlin's carefully prepared paper on "Bacteria" introduced to the Society a phase of vegetable life, with which we are all very familiar in name, but about which most of us probably know very little in reality. Mr. Fremlin, I am aware, possessed the idea that, because the subject was new to our list of papers, he had not done well in introducing it; but I feel sure I am speaking for all when I say that he is mistaken, and that we hope, during the coming year, that he will reveal to us more of the wonders connected with the more hidden methods of Nature's work. Though her agents are often small, their influence on our well-being or otherwise may be enormous. I might just instance the micro-organism whose connection with malaria has now been proved. The association of malaria, the great scourge of the Tropics, with mosquitoes, through the work of Dr. Patrick Manson and Major Ross, is one of the most important of recent discoveries in medicine. The disease has long been known to have been caused by a certain parasite, which lives on the blood-corpuscles. Ross found that this organism lived part of its life in the body of a mosquito, and, when ready to leave its insect-host, passed into the salivary gland and was discharged by means of the proboscis of the insect while feeding, and so entered the blood of its second host, man, producing in him the disease called "malaria." The mosquitoes that carry the germ of this disease belong to the genus *Anopheles*; but it is a curious fact that mosquitoes belonging to the genus *Culex* are quite harmless in this respect, though they transfer a parasite to the blood of birds.

In connection with papers, it has occurred to me that it might be a useful experiment to set apart one or two evenings

during the year for short papers, such, that is, as would not occupy more than ten minutes or so in the reading. There are, doubtless, many who have not the necessary time to prepare a lengthy paper, but who at the same time may have much valuable information that should not be too long hidden away in their note-books. Three or four such papers, with the discussion that might be expected to arise in connection with them, would, I feel sure, provide enjoyable occupation for a meeting. These should, of course, be arranged before the commencement of the session, and their titles should be entered on the syllabus in the same way as are those of the papers to which a whole evening is devoted.

It is often the case that a paper might be made much more interesting if every one present did what he could to bring up exhibits bearing on it. Those who are not well up in the subject to be introduced—and we do not all work at the same thing—would often welcome a good number of examples in illustration of it.

With regard to the exhibits at ordinary meetings, is it not a fact that it has become the custom to exhibit in the majority of cases only varieties, aberrations, and abnormal forms generally, although I admit that some exhibitors are good enough at times to shew the ordinary forms for comparison? In some species we see so many varieties that it may possibly come to be expedient, for the sake of those unacquainted with the insect, or whatever it may be, to shew the normal form as a curiosity. How often, too, interesting exhibits might be made of all the species of a genus for the sake of comparison, for not a few of us are learners, and in some orders especially. You must understand that I do not make these remarks in a querulous spirit, but the wish has been expressed that there should be more exhibits at ordinary meetings, and I thought I might make a suggestion to those who have large collections to their hand.

I have already referred to the success of the Varieties' Exhibition last year—a success greater even, perhaps, than that of the preceding year—possibly in consequence of that success. Such an exhibition will no doubt become an annual feature of our syllabus. But need it be of varieties always? How interesting, for instance, would be an exhibition of life-histories of various insects in various orders! Nor need it be confined to insects only by any means, for, as I have said before, we are not an Entomological Society simply.

Last year five field-meetings took place—an increase of

one on those of the previous year, and although the weather, over which unfortunately we have no control, was not always all that could be desired, they were decidedly successful. Of course the various localities selected are not available for everyone, and consequently an attendance of some five-and-twenty members is really good. It may be asked, What is the use of a field-meeting, seeing that it is seldom possible for the party to assemble till well into the afternoon, and consequently that the list of captures, unless we have very favourable weather, is not usually great, except, indeed, for those who are able to get away in the morning and do the bulk of their collecting before the party assembles at the appointed place of meeting. This is no doubt true; but ask those who attend the field-meetings whether they enjoy them or not! You will receive, I doubt not, an emphatic and unanimous answer in the affirmative. While speaking of field-meetings, it is with pleasure that I call to mind how that during the last two years we have had by the leaders lengthy, carefully compiled, and in some cases valuable reports on these gatherings, whose perusal at future dates will call to mind many a pleasant ramble with congenial spirits, and whose insertion therefore in the "Proceedings" will add greatly to their interest for ourselves. For there is no doubt that these excursions, even more than the meetings here on Thursday evenings, conduce to that friendly feeling and good fellowship which should, and no doubt, as a rule, does connect those whose study is Nature in her various manifestations. Of course there is also the utilitarian feature of the field-meeting, whereby, under a suitable leader, new localities, fresh beauties, and the many interesting productions of the delightful districts on the fringe of South London become better known to our members. In future seasons the excellent departure in the matter of reports will no doubt be continued, while I see no reason why there should not be a further increase in the number of such meetings. Seeing how successful was the Fungus-foray last October, led by Mr. Edwards, *that* certainly ought not to be forgotten in the new century. I might mention that the Banstead excursion added a new plant, *Silene conica*, to the Surrey list.

While on this point, there is one thing that I have often had in mind, whether, as in some sort representing Natural History in East Surrey, it is not our duty to work out and collate, as other societies have done elsewhere, its productions in the various departments in which we as a Society

are concerned. I am aware that preparations were made for this work some years since, but that little was done in the matter. Whether insurmountable difficulties were found I cannot say, but, with small committees working in the several branches, it does not appear to me that the work would be burdensome, while of its utility surely there can be no doubt.

Looked at entomologically the last year of the nineteenth century was no doubt a somewhat abnormal one. Following a mild winter came a late ungenial spring, and the earlier insects were in many cases (perhaps not always, however) behind their time. Then came the tropical weather of July, and the reverse was the case. Though the first part of August was wet and cool, the weather in the latter part of the summer and the autumn was on the whole good, and the season was late in closing. Perhaps the most noticeable feature was the immigration of various insects from the Continent, of which we have not only the circumstantial evidence derived from their presence here, but in some cases the direct evidence of those who saw them arrive. To one or two of these insects I shall refer in a moment, for though the President's address scarcely seems the place for it, I think I must follow the usual custom and say something of what is new or most noticeable during the year, at any rate as regards the insects in Britain. I shall touch on this matter very lightly, but cannot pass it by entirely, seeing that so much of the work is due to members of this Society, as indeed has been the case in the past.

Amongst the Coleoptera five species seem to have been added to the British list—*Orocharis angustatus*, *Trogophlæus anglicanus*, *Dinoderus minutus*, *D. pilifrons*, and *Anthonomus rufus*, though the last alone seems to be a genuinely new British beetle. Others have been reinstated, or have had their position on the list more clearly established. To Mr. J. J. Walker we owe a paper on the "Formation of a Collection of Coleoptera," and a "List of the Coleoptera of the Rochester District."

In connection with the Diptera the event of the year is the publication of the first volume of Mr. G. H. Verrall's "British Diptera." It is a bulky tome, well got up, and containing a large number of illustrations. When the fourteen volumes are completed it will no longer be just to complain that this order of insects has been inadequately treated in Britain. Another contribution to the Diptera literature is the "Life-history of the Harlequin fly," by Miall and

Hammond. Four species of Diptera at least were brought forward in 1900 as new to the British list—*Xylota confinis*, *Calobata stylifera*, *Leucophenga maculata*, and *Hyetodesia aculeipes*.

Some additions to the literature of the British Hemiptera have been made in the form of articles by Messrs. G. W. Kirkaldy, J. J. Walker, F. Enock, and W. Evans, to which must be added Mr. R. Newstead's article on "Injurious Scale Insects and Mealy Bugs of the British Isles," in vol. xxiii. of the "Journal of the Royal Horticultural Society." In this natural order *Elasmotethus ferrugatus*, *Nabis brevis*, *Typhlocyba candidula* and *T. cruentata* were brought forward as British during the year. To our Curator, Mr. W. West, we owe the addition to our list of the last but one.

The number of British Hymenoptera has been increased by no less than eight species—*Tenthredopsis thornleyi*, *Prosopis palustris*, *Osmia incrimis*, *Ellampus truncatus*, *Odynerus tomentosus*, *Pompilus sanguinolentus*, *Crabro carbonarius*, and *Blacus armatulus*, while *Nomada atrata* has been reinstated. To the literature of the order has been added Part I. of Mr. Claude Morley's "Hymenoptera of Suffolk."

There has of course been a large addition to the literature of the Lepidoptera, of which two works relating to the British representatives of the order are of pre-eminent value—Vol. II. of Mr. Tutt's "Natural History of the British Lepidoptera" and Vol. VI. of Mr. Barrett's "Lepidoptera of the British Isles." Five species seem to have been added to the British list—*Bacotia sepium*, *Tinea richardsoni*, *Tortrix musculinana*, *Zelleria phillyrella*, and *Eriocrania fimbriata*, the last being due to Mr. A. H. Hamm, a member of our Society. While speaking of the Lepidoptera I should refer to the immigration of *Acherontia atropos*, *Charocampa nerii*, *Colias edusa*, and especially of *C. hyale*. Many members, no doubt, have taken the opportunity of enriching their collections in these species, or some of them, while Mr. Montgomery and others have been breeding the last two—a much more important proceeding scientifically. Mr. Montgomery has indeed been doing remarkably good work in the matter of breeding our Rhopalocera, of which hardly sufficient notice seems to have been taken, and I am glad to see that we are to have a paper from him on the subject shortly.

As regards the Orthoptera little seems to have been done in Britain during the past year, and no new species has been added to the British list. Abroad we have Mr. M. Burr's "Essay on the Eumastacidæ," De Bormans and Krauss'

some-time-expected "Forficulidæ and Hemimeridæ," and Redtenbacher's "Austro-Hungarian and German Dermaptera and Orthoptera."

Our knowledge of the Collembola and Thysanura has been increased by the paper on those insects in the Edinburgh district, by G. H. Carpenter and W. Evans, published in the "Proceedings of the Royal Physical Society of Edinburgh."

To turn now to the Neuroptera, in the sense used by Linnæus, into which I must beg you to excuse my entering a little more fully. Mr. C. A. Briggs has added a Psocid—*Bertkausia prisca*—from Lynmouth, to the British list. The British Trichoptera have been increased by two species—*Beræa articularis* and *Plectrocnemia brevis*, both from South Devon. A new British *Chrysopa*—*C. dorsalis*—has been taken at Oxshott by Mr. Beaumont.

As regards the Dragonflies, the season was a good, and in some respects a remarkable, one. By the capture in Strathglass, in the north of Scotland, on June 28th, by Colonel Yerbury, of a single specimen of *Agrion hastulatum*, the meagre list of British species has been increased by one—the total now standing at forty-one. In the Introduction to my book on "British Dragonflies," I ventured to state that "in all probability the future changes in the total number of species of British dragonflies must be looked for in the way of decrease only. But six months had elapsed, and a new species was added to our lists—a fact which brings to my remembrance a prediction made by Mr. Briggs, that no sooner is an attempt made to try to bring a subject into line with the times, than something happens to put it out of date. When I say that the British list had scarcely been added to during the century, I think it will be admitted that Mr. Briggs' statement was a bold one, and that I had ample justification for my gloomy foreboding.

But this is not all. One little dragonfly on our list, *Ischnura pumilio*, had scarcely been seen since the first half of the century, and it is safe to say that previous to last year no one knew where it could be taken in England. Early in the year, however, another of our members, Mr. S. Blenkarn, brought up to one of our meetings a number of dragonflies that he had taken during the previous season, and amongst them were a few specimens of the long-lost little *pumilio*. Of the small number he had brought away, he was good enough to give me two (one being headless) which, with the greatest pleasure, I added to my collection. We are often

told that it is the unexpected that happens, and, as far as last dragonfly season was concerned, it was perfectly true, for, while spending a few days in the New Forest, at Whitsuntide, Mr. Carr and myself found the same species in a very restricted spot there, and between us secured, after lengthy search, eleven specimens, two only being females, and those both of the variety *aurantiaca*. They were just coming on the wing at the time, and possibly may have been more common later, but they were apparently over by the end of July. Nor even was this all, for, stranger still, Mr. Blenkarn met with the species again, securing at Abbot's Wood two specimens, which he brought up and exhibited at one of our meetings.

For the third year in succession *Sympetrum flaveolum* was with us, and we seem forced to conclude that in each case their presence here was due to a migration, for during the three seasons but one female was noticed, and that, taken on the coast of Essex, was clearly an immigrant.

Another striking feature of the past season was the plentifulness of a generally extremely scarce dragonfly, *Æschna mixta*. Quite a large number of the members of our Society have taken the species, and brought up specimens for exhibition, though, owing to the wariness of the insect, few captures were made compared with the numbers seen. There may have been an immigration in this case, though I am inclined to think not. In two localities where I have met with it for several years, there seems to have been a gradual increase in numbers during the last two or three seasons. Have the hot summers had anything to do with this?

One more matter I must refer to in this connection is a migration of *Libellula quadrimaculata*. This migration was observed in Belgium in June, and recorded somewhat fully in a Belgian magazine, and in the "Entomologist's Monthly Magazine" Mr. McLachlan has given an abstract of it. It seems that in Belgium they were inclined to think that the migration came from England. This was not the case; but it is clear from the observation of Messrs. H. Stocks at Margate, G. Bolam at Berwick, G. T. Porritt at Huddersfield, and A. J. Mann between Margate and Broadstairs, that part of it reached England during the same month. It seems, too, that a migration of *Leucorrhinia dubia*, a more northern species, arrived at Scarborough about the same time.

Some attention has been paid to the earlier stages of

dragonfly life by several members of our Society, and also by the Rev. A. East, who breeds annually a large number of one of the larger species, *Æschna cyanea*. His observations enable him to assert that normally this species requires two years (not three, as was once thought) from the laying of the egg to the assuming of the imaginal condition, though very exceptionally growth seems to be delayed, and three years are required. Whether as much as two years is required for the smaller species is at present unknown. A lucky accident enabled Mr. East to get some idea as to the number of times the skin is cast by the nymph of the same species. An isolated nymph 10 mm. long was found with three cast skins, the smallest being $3\frac{1}{2}$ mm. in length. By the time the nymph had attained a length of 20 mm. it had cast seven more, and we shall doubtless be told next year how many more are cast before the imago appears. We next want to know how many skins smaller than the one $3\frac{1}{2}$ mm. long were thrown off. Recollecting that the egg is about $1\frac{1}{2}$ mm. in length, we should hardly expect more than one. But in this connection Mr. P. P. Calvert, a well-known American writer on the Odonata, reminds us that the nymph leaves the egg in an embryonic condition, the legs not being free, and that it changes its skin almost immediately. So in all probability there were two ecdyses at least before Mr. East began his observations. It is curious to note two statements of Swammerdam, the Dutch naturalist, in 1680 about nymphs of dragonflies. He says in one place that the "limbs come out of the egg imperfect," and in another that he does not know how long the eggs are before they hatch, nor how long the nymph stage lasts, but he thinks two years are occupied by the latter. (I have made use of Dr. Hill's English translation of Swammerdam's "*Biblia Naturæ*," published in 1758.)

By breeding a large number of specimens of the same species Mr. East was able to find out that the two sexes are produced in almost the same numbers, and that one sex is never much before the other in the order of emergence. Imagines were produced as a rule in the night. When ready to fly they were set free, and they went straight away; but a month or more afterwards a small fraction returned to the pond to breed. Mr. East made some observations on nymphs of more than one species kept, out of water, but in damp air, and found that they suffered no apparent inconvenience, although they were so kept without food for a month at a time, and that they fed again readily when put

back into the water. On one occasion the same observer was able to watch a nymph casting its skin in the water—a process that has not, I believe, been previously described. The method is given on p. 257 of the “Entomologist” for last year.

For several years past I have been trying to breed so as to identify the nymphs of the British dragonflies, and perhaps you will allow me to occupy a few moments in pointing out our position with regard to them, and I might say that any assistance during the coming season would be much appreciated.

The dragonflies have always been a more or less neglected order, and they have received even more scant attention as nymphs than they have as imagines. Thomas Mouffet, writing in the reign of Charles the Second says (I am quoting from Topsel’s translation of the “Insectorum Theatrum” in 1658):—“Countrymen, for the most part of them, are of opinion that these flies are ingendered out of the worms that grow from the water bullrush putrified, which, if I should yield to be true, yet doth it not take away copulation, and putting forth of worms from their own bodies, whereby they might from time to time increase and perpetuate their propagation.” Mouffet evidently does not put much faith in the vulgar idea, and when treating of water insects, gives a figure which closely resembles an *Æschnid* nymph, but there is no reference to it, unless it is this figure he means when he speaks of “water grasshoppers.”

Even in 1712, Cyprian, in his “*Historiæ Animalium*,” speaks of a water insect, which evidently was accustomed to be looked upon as “*Scorpium aquaticum*,” but which, he says, Redi affirms to be no other than the nymph of *Libella*.

But in 1680, some thirty years before Cyprian’s book, Swammerdam had given a very good life-history of a dragonfly, which from the well-executed figures in the various stages, from egg to imago, must be a species of *Gomphus*. (I have made use of Hill’s translation of 1758). Here we find an accurate description of a cylindrical egg, and a correct figure and description of the method of copulation. But Swammerdam makes a strange mistake when he says “the food of the nymph is soft mud and a fine earthy substance wherein they live.” His full description of this *Gomphus* is followed by a shorter notice of a nymph belonging to each of four other sub-families.

Roesel, too, in 1749, in his “*Insecten-belustigung*,” gives a considerable space to his account of the dragonflies, and

gives illustrations of about nine species, some of the figures being very good.

Under the title of the Flat Blue-tailed Libella, Moses Harris in the "Aurelian," in 1778, gives a good description and two accurate figures of *Libellula depressa*, one of the figures shewing the imago in the act of emerging. In his "Exposition of English Insects," he figures three nymphs, but very poorly compared with those in his earlier book.

Linnæus, in his "Systema Naturæ," mentions their preying on aquatic insects, and De Villers in his edition of Linnæus, in 1789, compares them to crocodiles among the water insects.

Then we find a nymph or two in Donovan (1792-1813), and Evans (1845), but I do not intend now to go fully into the literature of the subject, and shall only refer further to one or two writers who have attempted to classify certain of the nymphs. Dufour made a slight attempt in 1852, treating, however, of seven nymphs only; and the first really useful work done was in Brauer's "Neuroptera Austriaca" (1857), though his descriptions are mostly generic.

In 1872 Mr. L. Cabot, with the assistance of Dr. Hagen, commenced a systematic account of the dragonfly nymphs, and in that year fully described the known species of the sub-families, *Gomphina* and *Cordulegasterina*, accompanying his descriptions with beautiful figures. In 1881 he similarly treated the *Æschnina*, and in 1890 the *Corduliina*. Too much praise cannot be bestowed on these productions of the Museum of Comparative Zoology at Harvard College.

Almost equally good is the treatment of several of the *Calopterygina* and *Agrionina* by Roster in the "Transactions of the Italian Entomological Society" in 1886 and 1888. Here then, the matter stands, for Nunnery's articles in "Science Gossip," in 1894, being little more than a short collation of the writers, especially Cabot and Roster, of whom I have just spoken, helps us but little upon our way.

Of course it is well-known that to obtain many of the nymphs is not an easy matter, and their identification is often more difficult still. Three methods are available:—
1. Isolating them, and carrying them through to the perfect state; 2. Finding empty skins by the side of recently-emerged imagines; 3. Finding skins under such conditions that they can only belong to insects that are on the wing in the neighbourhood. The first method is most satisfactory, the second fairly so, while the third will nearly always

leave on the mind of the observer an element of doubt. My position with regard to British species is as follows:— I have specimens of about twenty-four species, but have not yet been able to get drawings or descriptions of many of them while alive. Cabot or Roster have excellent figures and descriptions of six others. Of the remaining eleven, two or three are with little doubt migrants. Of six it will probably be difficult to obtain British specimens in any case, but the remaining three ought to be obtained next season if carefully sought.

I must not draw this address to a close without thanking you all for the kindness and consideration I have always received at your hands. My inexperience I fear has been against my conducting the business of this Society in the brilliant manner to which you have grown accustomed; but then I have been unfortunate in following such Presidents as have held the chair of late. I have, however, been excellently backed up by the working officers, and you are to be congratulated on having again secured the services of all of them. Than our Secretary, Mr. Stanley Edwards, no member, I am sure, has the welfare of the Society more at heart; while the capacity for work of the Report Secretary, Mr. Turner, is a thing to be admired—and envied. The holder of the purse should be a man of undoubted courage—not indeed that he will have a weighty balance to defend—but for the very opposite reason; and in our Treasurer we have the very man for the post. In the hands of Mr. Sauzé, our courteous and obliging Librarian, the valuable array of books is in safe custody, and he appears to have but one cause of complaint—the want of room to house his charge. The unceasing and almost affectionate care that Mr. West bestows upon the collections, over which he has so long presided, is as well known as his kindness in helping members to make use of them. It is pleasant to know that additions to the cabinet, some of which lately have been of considerable value, are well looked after and freely consulted. There is one member not now holding an official position, but who in a quiet unostentatious manner has done during the year—and always does—a vast amount of work for the Society, much of which must be unknown to many members. As this can scarcely be adequately acknowledged in the Council's report, I think it is my clear duty to mention it here. The member I refer to is, of course, Mr. Adkin. And now but one duty remains—to introduce to you your newly-elected Chairman. In Mr. Fremlin you have a

gentleman whose scientific training cannot but have given him a nice discrimination and mature judgment, which will stand him in good stead in the office you have called upon him to hold. Quiet and unassuming in manner, Mr. Fremlin has at the same time a deep reserve of energy, and with him as President will be assured the dignity of the Chair and the well-being of the Society. Into his hands at your bidding I resign the former; while you may with confidence entrust the second to his care.

W. J. LUCAS, B.A.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 8th, 1900.

Mr. W. J. LUCAS, B.A., *President*, in the Chair.

Mr. Ashdown exhibited, and presented to the Society's collections, male and female specimens of the local dragon-fly *Gomphus vulgatissimus*, taken by himself in the New Forest.

Mr. Montgomery exhibited a long series of *Picris rapæ*, and a very long series of *Chrysophanus phlæas*, and contributed the following note:

The specimens of *C. phlæas* were bred from four females taken at Greenford, near Ealing, on August 5th. They emerged continuously from September 13th to November 7th. The last of the parents died on August 31st, two days after the first of the progeny spun up for pupation. Over fifty per cent. of the ova produced imagines; a large number of the remaining larvæ and pupæ died of a fungoid disease, and the balance of the larvæ are hybernating about half grown.

"The first lot of *P. rapæ* were bred from a ♀ received from Enniskillen in the spring of 1898, and emerged (with the exception of a pair in the summer of 1898) in the spring of 1899. The next were all bred from Ealing parents, and represented three emergencies, viz. spring, a partial summer, and a very limited autumnal brood from summer parents."

Mr. Carpenter remarked that bred specimens of *C. phlæas* were, in his experience, often dark, except in years when the summer was extremely hot. He stated that Mr. Frohawk had bred several specimens with the red margins of the hind wings absent. Mr. Tutt stated that there was a well-known summer race found in the south of Europe named var. *eleus*.

Mr. H. Moore exhibited 150 species (named) of Coleoptera collected by Prof. W. S. Blatchley in Indiana, U.S.A., also *Calosoma luxatum* (Say) from Utah, and an unidentified species taken at an altitude of 14,000 feet on Mt. Orizaba,

Mexico. Amongst the *Geodephaga* were five species of *Calosoma*, including *C. scrutator* (Fab.), the North American representative of *C. sycophanta* (Lim.), *Anophthalmus tenuis* (Hom.), the blind cave-beetle from Wyandotte Cave, and *Brachynus fumans* (Fab.), one of the numerous Bombardiers. The species from other divisions included *Megilla maculata* (De G.), a gregarious Coccinellid, which herds in thousands for the winter, *Ellychnia corrusca*, the fire-fly, *Cernichus piceus* (Web.), a diminutive stag-beetle, *Lachnosterna fusca* (Fröh.), as great a pest in North America in certain seasons as *Rhizotrogus solstitialis* (Linn.) in England. *Boletotherus bifurcus* (Fab.), with its curious thoracic processes, and many other interesting and representative species.

Mr. Lucas exhibited the following insects :

1. A fine male specimen of *Gryllus campestris*, perfect except for the antennæ. It was taken last year under a slab of wood in a temporary bathing-shed erected on the beach near Hastings. It made its presence known by its shrill cry. Records of the capture of this insect in Britain are not numerous.

2. A female dragonfly of the genus *Sympetrum*, captured with another by Mr. H. S. Fremlin last summer at Stornoway, in the Island of Lewis. It must probably be referred to the species *striolatum*, though it differs in many ways from the type form. In some respects it resembles *S. scoticum* in general appearance. It is perhaps a Hebridean race, and may possibly be new.

Mr. Robert Adkin exhibited a series of *Melanippe fluctuata* taken in a small wood and in his garden, both at Lewisham. Those from the wood were, as a rule, darkly marked, large-sized specimens, which, he said, was the prevailing form in this particular locality.

Messrs. Hall and Turner had both repeatedly met with the dark form in the environs of London. Mr. Tutt said that it was a species which readily responded to its environment, and referred to the well-known var. *neapolisata* of South Europe, and to a somewhat similar form found at Pitcaple. He had seen a few dark examples in the Alps.

Dr. Chapman exhibited a large number of slides, prepared to illustrate his paper entitled "On the Relation of the Larval to the Imaginal Legs in Lepidoptera" (see 'Ent. Record,' xii, pp. 141, etc.).

FEBRUARY 22nd, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. J. W. Enock, of Charlton, and Mr. S. Kemp, of Notting Hill, were elected members.

Mr. Tomlinson exhibited a specimen of *Eristalis tenax* and its pupa, contributing the following note:

The maggots were observed in the sludge tank of the Kingston Sewage Works, and afterwards were found in the crude sewage. They possessed fairly rapid swimming movements in the liquid, but in the semi-solid they appeared to crawl without movement of the tail. The temperature at which they developed most rapidly was 10° C. It is hoped that if the development of these flies can be fostered, they will take an important place in the purification of sewage from putrescent organic matter. At present the arrangement at the works do not permit of the developed fly being allowed to live or feed freely. Perhaps the worms and maggots do more in the matter of sewage purification than the much-talked of bacteria and micrococci.

Mr. Lucas exhibited several species of dragonflies from Sumatra, Ceylon, and the United States, to show striking ornamentation of the wings.

Mr. Colthrup exhibited an empty cocoon tenanted by a species of spider, and also a mass of Ichneumon cocoons, which had been formed under a larva (probably Geometrid).

Major Ficklin reported that a friend had found and forwarded him a specimen of *Macroglossa stellatarum*, which had hibernated in the heart of the city, and had been taken early in February. Mr. Adkin said that the interesting fact was, that the insect was found here alive in midwinter.

Mr. Robert Adkin exhibited a series of *Cossus ligniperda*, taken at Lewisham in June and July last, and read a paper entitled "Notes on the Pupation of *Cossus ligniperda*" (page 1).

MARCH 8th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

The President, on behalf of Mr. Harwood, of Colchester, exhibited a macropterous form (the first noticed) of the rather uncommon grasshopper, *Xiphidium dorsale*. It was taken near Clacton.

Mr. Colthrop exhibited a specimen of *Euchelia jacobæ*, in which the red areas were unusually pale with a tendency to xanthic coloration; an unusually marked variety of *Eurrhyncha urticata*, in which the spots on all the wings were confluent, forming bands; and small specimens of *Pieris rapæ*, including an example of the "yellow" form.

Mr. Lucas exhibited living specimens of the immature stage of *Blatta australasiæ* from Kew, and also a case containing examples of all the species of the British cockroaches, together with detailed drawings of several of them.

Mr. Main exhibited living specimens of *Blatta americana* from Silvertown, where it is very common, with cast skins of the species.

Mr. Edwards exhibited living specimens of *Phyllodromia germanica*, male, female, and immature.

Mr. H. Moore exhibited the following cockroaches:

Stilopyga orientalis and oöthecæ; *Periplaneta americana* (Florida); *Periplaneta australasiæ* (Kew); *Phyllodromia germanica* (Cadiz and Corfu); *Ectobia livida* (Dorking); *Blaberus gigantea* (Brazil); *Brachycola sexnotata* (Brazil); *Derocalymna*, sp. (Transvaal); *Heterogamia ægyptiaca* (Malta).

Mr. Tutt exhibited a long and varied series of *Epunda lutulenta*, taken by Rev. E. Burroughs at Mucking, Essex, in 1898-9, and referred to the best-known forms, *lüneburgensis*, *tripuncta*, *sedi*, and *albidilinea*, of Scottish and Irish origin: the specimens exhibited did not show the intense black ground colour peculiar to the named forms from west and north, but were liberally sprinkled with grey scales. Yet the variation was exactly on parallel lines with those forms.

Mr. Lucas read a paper on "British Cockroaches—Natives and Aliens," which was illustrated by numerous lantern slides.

Having first referred to the trivial names under which cockroaches (*Blattodea*) are known in Britain, Mr. Lucas stated that the typical cockroaches bear but little resemblance to any other group of insects, even in their own order—*Orthoptera*,—the earwigs perhaps approaching them most nearly. After the general appearance of a cockroach had been noticed, the external anatomy and life-history were treated somewhat fully, and well illustrated with lantern slides.

Before entering on an account of the recent British representatives of the *Blattodea*, the history of the group in Geologic ages was passed in review, especially as regards its

remains in Britain, and the conclusion arrived at was, that the cockroaches had had their day, having been apparently at the zenith of their existence in the carboniferous age. An important difference between past and recent cockroaches was found in the fact that in the former the wings and elytra were similar in appearance, both being transparent. It may have been that in some cases the females had ovipositors, and so did not deposit oöthecæ (egg-capsules) as now.

Of British cockroaches, using the term "British" in the widest sense, there were eleven, which were arranged in three groups: (a) three "natives,"—*Ectobia lapponica*, *E. livida*, and *E. panzeri*; (b) four "naturalised aliens,"—*Phyllodromia germanica*, *Blatta orientalis*, *B. americana*, and *B. australasica*; (c) four "casual visitors,"—*Nyctibora holosericea*, *Rhyparobia maderæ*, *Leucophaea surinamensis*, and *Blabera gigantea*. Each species was then treated separately with regard to its size, appearance, and peculiarities, and its range in Britain and throughout the world. These points were illustrated by a number of slides of the insects, while the lantern was also utilised to put on the screen a table of the Geologic ages, a list of the British cockroaches, a comparative diagram of wing-expanses, and a map of the world shewing the various zoo-geographical regions.

MARCH 22nd, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. MacGee, of Lillie Road, S.W., and Mr. J. Platt Barrett, of Margate, were elected members.

Mr. Montgomery exhibited a series of *Coremia designata*, Hufn., being a partial third generation, which emerged from September 18th to October 9th. They were without the usual grey transverse lines on both fore- and hind-wings, and the central band of the fore-wings had only one black transverse line in addition to its usual black margins. The central bar of the fore-wings was continued across the hind-wings in a more marked degree than in the type. He also exhibited specimens of the second generation, which emerged from August 1st to 7th, and from which parents of the above specimens were taken.

Mr. F. M. B. Carr exhibited a varied series of *Hybernina leucophæaria* from Lee.

Some five dozen lantern slides on ornithological subjects,

kindly lent by the Society for the Protection of Birds, were then exhibited. They consisted of coloured copies of the plates in Lord Lilford's "British Birds," many admirable studies of the nests and habits of birds by Mr. E. B. Lodge, together with a few palæontological and artistic slides.

APRIL 12th, 1900.

Mr. F. NOAD CLARK, in the Chair.

Mr. Browne, of Lee, was elected a member.

Mr. Edwards exhibited a living specimen of a scorpion, *Scorpio europæus*, sent him by Dr. Chapman from the neighbourhood of Cannes. It fed readily upon cockroaches.

Mr. Sich exhibited several larvæ of *Coleophora lincollea* found feeding on *Ballota nigra* at Chiswick. The lozenge-shaped hairy cases were well developed.

Mr. Clark exhibited photomicrographs of: (1) the ova of *Eugonia fuscantaria*, received from Mr. Prideaux, of Reigate, and called attention to the serrations, which were particularly well shown; (2) the ova of *Geometra vernaria*, and remarked on the curious method of deposition in piles, one side of the pile showing a row of pits from whence had issued the larvæ; and (3) the ova of *Neuronia popularis*, which were irregularly strewn when deposited.

Mr. Colthrup exhibited a specimen of *Bombyx quercûs*, which resembled var. *callunæ*. It was bred from a larva obtained at Addington in Surrey.

Mr. Tutt gave a short lecture on the Lachneids (Lasiocampids), and pointed out the peculiarity of the superfamily as a whole, in the oval, larval, pupal, and imaginal stages. He entered into considerable details on those questions, which presented difficulties in the true appreciation of their relationships, and pointed out the peculiarities of the egg-laying of the Malacosomas, Lachneids (*sens. strict.*), and stated that in his opinion our British species all belonged to different genera except *neustria* and *castrensis*, and possibly to several different families. He stated that the genus *Metanastria* as used in the British Museum, appeared to cover several genera, and included the majority of the most generalised genera at the base of the Eutrichid and Lasiocampid stems, and that the present arrangement of the genera in the British Museum collections was from the modern standpoint deplorable. He also discussed the

synonymy, the relationship, and the chief structural peculiarities of the families comprised in the superfamily (see Tutt, "Brit. Lep.," ii, pp. 434, etc. etc.).

APRIL 26th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Rowden, of Kingston Hill, was elected a member.

Mr. Buckstone exhibited specimens of *Triphæna fimbria*, bred from ova by Mr. Lawrence. The larvæ had fed exclusively upon cabbage, which was noted as an unusual food for the species.

Mr. Turner exhibited the following Longicorn Coleoptera : (1) *Saperda populnea*, from Carlisle, an insect attached to the aspen, and of which only one other record was known of its occurrence so far north ; (2) *Rhagium bifasciatum*, from the New Forest ; (3) *Clytus arictis*, from Lewisham, a beetle which mimics the wasps ; (4) *C. mysticus*, beaten from old whitethorn bushes in Brockley. He also exhibited living larvæ : (1) *Callimorpha dominula*, from Deal, where they were not so common as two years ago ; (2) of *Bombyx quercûs*, from Deal, feeding on garden rose ; (3) of *Pericallia syringaria* from Bexley.

Mr. Lucas exhibited specimens of the "snake's head," *Fritillaria meleagris*, including a pure white variation, from near Oxford. The latter appeared annually, but was most sparing.

Mr. Moore exhibited a Kaffir necklace made out of the "eggs" of the white ant, *Termes bellicosus*. These so-called eggs were really the encysted pupæ of a species of Coccid of subterranean habits belonging to the genus *Margarodes*.

Mr. Robert Adkin exhibited a series of *Eugonia fuscantaria* reared from Lewes ova. He said that his earlier attempts at rearing the species from the egg had been singularly disappointing ; the young larvæ were supplied with the very freshest possible ash leaves, but absolutely refused to feed, and consequently all died. He then tried placing them on the growing tree, and found that they at once began to feed. Guided by this he had, in his more recent attempts, attached the eggs to a small growing branch of an ash tree directly they showed any signs of hatching, and enclosed the whole in a fine muslin bag. On the larvæ attaining a sufficient size they were transferred to a larger branch, and a bag of coarser material used. Again, when approaching full growth they

were removed to a still larger branch of the tree, which was then enclosed in a large bag of green leno, the larvæ ultimately forming there loose cocoons and pupating among the leaves, in which the pupæ were removed with the greatest of ease to a suitable cage for the moths to emerge in. He had found this method eminently successful, and it had the advantage of entailing a minimum of attention.

Mr. Lucas exhibited a specimen of the dragonfly, *Sympetrum vulgatum*, closely related to the common *S. striolatum* and with difficulty distinguished from it. It was a male, taken by Mr. A. H. Hamm, of Oxford, at Torquay, on August 15th, 1899. This is the second authenticated British specimen. The other is also a male, taken by Mr. C. Briggs on Bookham Common. He stated that the more prominent distinguishing points were that *S. vulgatum* had the principal nervures reddish, and the black line in front of the vertex usually produced downwards along the side of the eyes. There is also an important difference in the genital organs of the male and the vulvar scale of the female.

Mr. Clark said that he had received ova of *Gonepteryx rhamni* from Reigate, which were deposited on the stems, the leaves not being yet developed. Mr. Carpenter had noticed a similar occurrence in the spring of 1893, a very early season. Several members stated that the species was common this year, and Dr. Chapman had seen both *G. rhamni* and *G. cleopatra* very abundant in South France, but remarked that they seemed to disappear when a period of very hot sunshine set in.

Under the title of "Wild Flowers at Home" Mr. E. Step F.L.S., exhibited a series of lantern slides from his own photos of indigenous plants amid their natural surroundings, and made a running comment upon them as they appeared, calling attention to those special points in their structure that have direct relation to their habit and habitat, their friends and enemies among insects, birds, and mammals.

MAY 10th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Adkin exhibited a series of *Cabera exanthemata*, showing considerable variation in the position of the transverse lines; in some instances the first and second lines coalesced. These latter specimens he had received from Mr. Harwood,

of Colchester, under the name of var. *approximaria*, and he understood that it was a recurrent form in that district, though by no means a frequent one.

Mr. W. J. Lucas exhibited specimens of the flowers of *Viola palustris* from Esher Common, and observed that it was remarkable how quickly the blossoms developed when once the leaves had begun to appear.

Mr. F. M. B. Carr exhibited eggs of *Sternus minutus*, the lesser tern, and contributed the following note :

“ While staying at Hythe, Kent, in June, 1894, we found a large colony of the lesser tern on the big expanse of beach between Hythe and Dymchurch. A soldier, with whom my father had a chat, said that he had never been able to find any eggs, though he had searched for them several days. We therefore determined to have a good look for them, but after spending several hours we almost gave it up as a bad job. A few days afterwards, however, my father hit on a new plan of campaign, which was for both of us to sit down in different places, and when we saw the bird settle to make for the place. We were much encouraged to find the tactics successful at the first trial, but even when we were on the spot, so perfectly were the eggs protected by the exactly similar colouring to their surroundings, that for a few minutes we could not see them. Possibly, had there only been *one* it would have remained undiscovered, but as there were three, they naturally would attract the eye, all being of the same shape. After this we found about thirteen nests, or rather lots, for the bird makes no nest at all, laying its eggs on the bare stones, sometimes in a slight hollow. When once one had ‘got one’s eye in’ the eggs did not seem so difficult to see, but of course on a large expanse of flat country it is extremely difficult to mark a spot, and in many cases, when the bird flew up too soon, we were unsuccessful. It seems marvellous how the parent birds can remember where their eggs are. The young bird is a very pretty little creature, much resembling the eggs in colour, yellow spotted with black. I came across one which could not have been very old, as there was an unhatched egg with it, but it immediately began walking away, and seemed quite active. It struck me that if there were a dozen or two of these youngsters wandering about away from their homes, the mother birds would have some difficulty in finding and identifying their offspring. The stones, amongst which the eggs are laid, are for the most part of almost exactly the same colour, and speckled with brown and grey.”

Mr. Turner exhibited flowers of the early purple orchid, *Orchis mascula*, which he had met with abundantly in the North Kent woods.

A long series of lantern slides, the property of the South Eastern Union of Scientific Societies, illustrating the British Orchids was exhibited, and the accompanying lecture read by the Secretary.

The subject matter dealt with the peculiar and distinctive structure of orchidaceous plants, and the methods of their growth and fertilisation. Among the species described and illustrated in more or less detail were:—*Orchis mascula*, *O. latifolia*, *O. maculata*, *O. pyramidalis*, *Gymnadenia conopsea*, *Habenaria bifolia*, *H. chlorantha*, *Aceras anthropophora*, *Ophrys apifera*, *O. aranifera*, *O. muscifera*, *Epipactis latifolia*, and *Cephalanthera grandiflora*.

MAY 24th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. F. M. B. Carr exhibited the eggs of *Turdus musicus* (common thrush). Two eggs without spots were taken from a nest found at Sandling, Kent; the other two eggs in the nest were spotted in the usual way. Two with purple spots were from Hythe, Kent; the remaining egg in the nest was similar to these two. Four other examples, which were pretty ordinary, were from Maidstone, Grove Park, Hythe, and Jevington.

Major Ficklin reported having seen a moorhen's nest with seven eggs, built on a bough partly in the water, quite open to the view of anyone passing.

Mr. Enock had seen a pied blackbird for two successive seasons near his house in North London. The head and shoulders were white.

Mr. F. Noad Clark exhibited a sawfly and cocoon found in deal staves used for making barrels. The cocoon was from Mr. Humphreys, of Northwich, and was received by him in September, 1899. "The insect, which emerged on May 1st this year, was soft, and gradually hardened. The wings appeared full grown about May 6th, and the body was then black, with white bands." The cocoon was a most remarkable and delicate network of thin fibres.

Mr. Enock gave a series of interesting notes, illustrated with admirable lantern slides, on various incidents in insect

economy, including :—(1) A long series of slides showing all stages in the closing of the wings in the earwig. (2) A series showing the gradual unfolding and growth of the wings of *Papilio machaon* after emergence. (3) All stages in the emergence and hardening process of *Æschna cyanea*. (4) Several species of the curious minute egg parasites of the Mymaridæ. (5) A few slides illustrating the curious swimming Hymenopteron, *Cataphractus cinctus*.

JUNE 14th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. West exhibited the following three species of Hemoptera :

Harpocera thoracica, obtained by beating oak ; *Berytus minor*, sweeping grasses ; *Salda cincta*, at the sides of ponds under refuse. All three species were taken in Hither Green Lane, Lee.

Mr. H. J. Turner exhibited a twig of red currant from his garden at Hatcham, infested with a large scale, *Pulvinaria ribesiæ*, Signoret, and contributed the following note :

“ The female specimens of scale exhibited were found on a red currant bush much overshadowed by vigorous growth of *Clematis vitalba*. I consulted that useful series of notes to all interested in economic entomology, viz. ‘ Reports and Observations on Injurious Insects,’ by Miss Ormerod, and found in the number for 1889 that the pest was in all probability *Pulvinaria ribesiæ*, a somewhat rare occurrence in this country. I then submitted specimens to Mr. R. Newstead, F.E.S., of Chester Museum, whose work in this group is well known, and he writes me as follows :

“ ‘ Yes, *Pulvinaria ribesiæ*, Signoret. Thank you very much for the specimens. I am delighted to have them, and shall find them very useful. Did you observe the small and now untenanted ♂ scales? They are glossy white. . . . I have never seen a male, and as these have not been described, perhaps you would look out for them next season? ’

“ According to the account given in ‘ Injurious Insects,’ 1889, pp. 43–48, the scale is known as the white woolly currant scale ; it is a native of France, and is allied closely to the well-known and destructive vine-scale, *Pulvinaria*

vitis. At that time it had only been observed at Wakefield and Huddersfield in this country, but on the east coast of Scotland it had been reported from several localities."

Mr. Rowden exhibited thirty-five species of dried plants, representative of the fifty kinds noted in flower during the Field Meeting of the Society at Oxshott on May 19th.

Dr. Chapman exhibited bred specimens of *Orgyia antiqua* from the South of France, and noted that the black markings were much more intense than in the English form.

Mr. Turner exhibited a cactus plant, *Mammillaria minima*, showing about twenty heads. He stated that the genus *Mammillaria* derives its name from the stem being covered by mamma-like tubercles, each surmounted by a rosette of spines, which in the 500 or more species contained in the genus showed infinite variety in form, size, and arrangement. The headquarters of the genus was Mexico, a few only being found in adjacent countries. They always grow where the sunlight is intense.

Mr. Clark exhibited microphotographs of the ova of *Cyaniris argiolus*, *Polyommatus bellargus*, *Euchloë cardamines*, *Hadena genistæ*, and *Ematurga atomaria*. The ova were kindly given to him by Mr. Montgomery.

Mr. Fred. Enock exhibited living specimens of *Ranatra linearis*, together with a leaf-stem of *Alisma*, in which were laid 107 eggs, the work, no doubt, of several *Ranatra*; the other stem on the same plant had 97 eggs in it.

Mr. Enock had several times observed the *Ranatra* ovipositing in leaves of water ranunculus, *Potamogeton*, and *Alisma*, but they seem to prefer the stems of the latter, living and dead. The *Ranatra* crawls upon a leaf, and taking hold firmly with her second and third legs, she raises the head three quarters of an inch from the leaf. The raptorial legs being placed flat together and held in a line with the abdomen, the tip of which is depressed until it almost touches the leaf. The ovipositor is then extruded and pressed against the surface; a forward and downward movement being given, it is slowly driven right through the leaf, and then almost withdrawn, the egg, which is over an eighth of an inch long, being then extruded and forced into the hole until the head end just projects above. Each egg has two long filaments, which, immediately the egg is fixed into position, spring open, and so form with the egg the letter "Y," thus preventing the egg, which projects through and underneath the leaf, from slipping through.

From the eggs of *Ranatra* Mr. Enock has bred both male

and female hymenopterous parasites, *Prestwichia aquatica* (Lubbock).

The act of copulation takes place sideways, though the male at first crawls on to the back of the female, whose raptorial leg he seizes with his own,—the abdomen is then twisted round, and the connection made.

Mr. Lucas read the report of the Field Meeting at Oxshott on May 19th, illustrating his remarks with a large number of lantern slides showing all the well-known points in the district, beautiful views in the woods and around the Black Pond, remarkable growths to be observed, and various biological pictures from objects taken in the district (see page 6).

Mr. Adkin gave a short account of the doings of the South Eastern Union of Scientific Societies at their Annual Congress at Brighton in the first week in June.

JUNE 28th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Kemp exhibited a fine variety of *Bombyx rubi* in which the band on the fore-wings was bifurcated for about half its length towards the costal end; a specimen of *Polyommatus icarus* having a large bleached blotch at the anal angle of the left fore-wing; and several specimens of the water boatman *Notonecta glauca*, including the var. *maculata*.

Mr. Main exhibited the nest of the solitary wasp, *Polistes gallica*, from Switzerland, together with a living example of the species recently emerged from one of the cells.

Mr. Lucas exhibited plants and flowers of *Mimulus luteus* from Weybridge, and stated that this immigrant had established itself at several places in the neighbourhood, being often found in large masses. He had also seen it at Dovedale growing wild. He also exhibited specimens of the rare dragonfly *Ischnura pumilio* from the New Forest, where Mr. Carr and himself had recently rediscovered it. Two of the specimens captured were var. *aurantiaca* ♀. The species had been obtained by Mr. Blenkarn in Norfolk last year. Previously it had not been taken in this country for many years, and of its capture there were only a few vague records.

Mr. West (Greenwich) exhibited specimens of *Monanthia amplicata* and *M. cardui* (Heteroptera) from Lewisham. Mr.

Edwards and Mr. Turner recorded having found the latter species at Chipstead and Wisley respectively.

Major Ficklin and several other members recorded how troublesome the mosquitoes had been this season.

Mr. R. Adkin read a Report on the Field Meeting held at Banstead on June 16th (page 11).

JULY 12th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. R. Adkin exhibited pupa cases *in situ* of the four following *Sesias*:—*S. scoliiformis*, *S. asiliiformis* (*cynipiformis*), *S. culiciformis*, and *S. ichneumoniformis*, and contributed the following note:

“The cocoons and pupa-skins of *Sesiidæ* exhibited illustrate the various methods of pupation of this interesting group, I think, fairly well. *S. scoliiformis*, it will be seen, forms a tough cocoon just under the bark of the birch tree in which the larva has fed. *S. asiliiformis* appears to similarly affect the oak, but is more often found in the stumps of trees that have been recently felled than in the stems or branches. *S. culiciformis* burrows in the solid wood of the birch, forming its cocoon with the head just within the bark; it is very partial to the stumps of bushes that have been cut a couple of years. *S. ichneumoniformis* feeds in the roots of the bird's-foot trefoil, and pupates in the crown of the root, as does *S. musciformis* in thrift and *S. chrysidiiformis* in dock and sorrel, this latter insect sometimes throwing up a tower above the root in which to pupate. *S. sphegiformis* I am unfortunately unable to exhibit; but this species, I believe, differs from all the others of the group in having a free pupa, with the power of travelling up and down the burrows in which the larva has fed in the stems or branches of the alder.”

Mr. Tutt said that very little was known as to the method of oviposition of most of the species in this group. Even the habit of the most common *S. tipuliformis* was unknown, and it had been suggested that the ova of this species were laid on the leaves as in the case of *Trochilium crabroniformis* (*bembeciformis*).

Mr. Hall had had considerable experience of *S. sphegiformis*, but had never observed the species ovipositing. In fact the perfect insects were scarcely ever seen in nature,

except the males, which could readily be obtained by assembling. The larvæ took three years to feed up. During the first year they fed in the bark, and it was an easy matter to tell this stage by the character of the frass. In the second and third years, however, the frass was indistinguishable. It was found upon splitting the affected stems, that during the second year the larvæ burrowed without approaching the sides. In the third year their burrows always tended to go towards the side. Mr. Tutt suggested that in this species it was probable that the ova were laid exteriorly on the stems.

Mr. Tutt was inclined to think that the first meal of the larvæ of several of the *Sesias* was on the leaf. He was also in want of some definite information as to where the eggs of *Cossus ligniperda* were deposited.

Mr. Adkin said that he had found ova of *C. ligniperda* on the bark of a poplar tree; they were deposited in patches of various sizes, from perhaps three quarters of an inch in diameter down to clusters of not more than half a dozen eggs together; they were fully exposed to view, no attempt being made to conceal them. *Zeuzera pyrina*, which was also a wood feeder, he believed from observations that he had made, deposited its ova very carefully under the bark and so out of sight.

Mr. Tutt said that these two species were associated together by most systematists with very little reason, as they were in no way related. The ova even were remarkably distinct. The latter species had small, weak, flesh-coloured ova suitable for placing in cracks in the bark; while the former species had large, strongly-ribbed ova comparable to those of noctuæ and butterflies, yet they were deposited on their sides and retained their oval shape. He strongly urged the great importance of egg characters in classification.

Mr. West exhibited the Hemipteron, *Graphocrærus ventralis*, obtained by sweeping at Lee. It was a somewhat uncommon species.

Mr. F. M. B. Carr exhibited and presented to the Society's collection an undetermined specimen of a Hymenopteron taken in the flower of a yellow azalea at Rhinefield, New Forest, June 1st, 1900.

He also exhibited: (1) A typical female of *Pyrrhosoma nymphula* and two female specimens of a variety in which the red colour of the abdomen was replaced by bronze-black, the segmental divisions being yellow; all three taken

in the New Forest, June, 1900. (2) A series of *Angerona prunaria*, from Hailsham, taken between June 25th and July 1st. This moth commences to fly before sunset, but is very difficult to see after dusk. The variation in the series was very considerable. (3) A series of *Melitæa athalia*, from Hailsham, taken on June 27th and 28th. This insect seemed to be fairly common in the neighbourhood of the cow-wheat (*Melampyrum*), which was in full flower, and which also attracted *Macraglossa fuciformis* (one), *Plusia gamma*, etc.

Mr. Lucas exhibited a specimen of the sweet-flag, *Acorus calamus*, which was found growing near Weybridge, and a female specimen of the somewhat rare dragonfly *Orthetrum cancellatum*, taken at Wisley. He referred to the blue colour which appeared on the male of this and other species some considerable time after emergence, and stated that even the female developed this colour if she lived long. Mr. Tutt compared this colour in appearance to the waxy bloom to be found on many pupæ.

Mr. Turner exhibited a short series of a rare Hemipteron, *Eusarcocoris melanocephalus*, taken by beating and sweeping at Horsley on July 7th. Previous captures of this species in the district had been recorded by Mr. G. C. Champion.

JULY 26th, 1900.

Mr. A. HARRISON, F.C.S., F.L.S., *Vice-President*, in the Chair.

Mr. F. M. B. Carr exhibited a specimen of *Cosmia pyralina*, and stated that the specimen was beaten from elm, near Oxshott, on July 14th, 1900, by Mr. W. J. Lucas, with whom he was collecting at the time. When beaten it had only just emerged and the wings were not inflated, so it was regarded as an example of either *C. affinis*, or *C. diffinis*. Later on however, on looking in the chip-box, he found the insect's wings fully expanded, and identified it as *C. pyralina*. The locality appears to be a new one for the species.

Mr. Adkin remarked that odd specimens of this species had been found in numerous places during the last season or two. It was remarked that *Caradrina ambigua* was another species which was apparently spreading its range.

Mr. Harrison exhibited a series of *Nyssia zonaria* taken at Wallasey this season on the portion of the sandhills used as golf links. It was abundant, and numbers of both males and females were being crushed under the roller.

Mr. West exhibited a series of the Heteropteron, *Meconema ambulans*, taken at Lewisham, in damp situations.

Mr. Ashby exhibited a series of *Aromia moschata*, including a living specimen from the banks of the Lea at Tottenham. He said they were abundant, but confined to a few willow trees, and called attention to their strong aroma, which he said was very distinguishable in the neighbourhood of the trees. Most of the specimens were obtained quite ten feet from the ground.

Several members had seen *Colias edusa* this season, and Mr. Clark had received ova from Ivybridge in Devon. *Pyrameis cardui* had been observed in numerous places, and *Plusia gamma* was reported as occurring everywhere. *Colias hyale* had been seen at Eastbourne.

AUGUST 9th, 1900.

Mr. A. HARRISON, F.L.S., *Vice-President*, in the Chair.

Mr. H. Moore exhibited a specimen of *Sirex gigas* taken in Rotherhithe, and no doubt bred in the timber brought to the docks; also three species of Orthoptera taken by himself in Folkestone Warren, viz.:—*Leptophyes punctatissima*, *Thamnortizon cinereus*, and *Platycleis grisea*.

Mr. Adkin exhibited a series of *Melanippe fluctuata*, taken this year at Lewisham, and commented on the variation in the central band. The three main types were:—(1) A strong band, very complete. (2) A half band, strongly marked. (3) A distorted band, approaching somewhat to var. *costovata*.

Mr. Carpenter exhibited two nests of a leaf-cutting bee found in the folds of an old sack. Each consisted of a string of cells one behind the other, and it was questioned, if the first cell made and tenanted produced an imago first, how the insect escaped. Dr. Chapman said that all the bees in one nest would emerge about the same time, and that among the Hymenoptera individuals often remained in their cell fully developed, until suitable weather occurred.

Mr. Blenkarn exhibited a very fine-bred smoky specimen of *Cosmotriche (Odonestis) potatoria*, from Eastbourne.

Mr. F. M. B. Carr exhibited a series of *Psilura monacha*, and contributed the following note:

"The larvæ were beaten from oak in the New Forest, June 8th and 9th, and were then quite small. They fed up very rapidly on oak, and the first one pupated June 22nd. The first imago, a male, emerged July 9th. The emergence of the others was:

	Males.	Females.		Males.	Females.
July 10	3	1	July 21	1	1
„ 11	2	1	„ 22	0	2
„ 12	1	1	„ 23	1	1
„ 13	3	5	„ 24	1	1
„ 14	1	3	„ 25	0	0
„ 15	3	3	„ 26	0	1
„ 16	3	3	„ 27	0	2
„ 17	1	2	„ 28	0	0
„ 18	2	2	„ 29	1	0
„ 19	2	1	„ 30	1	0
„ 20	0	1			

making a total of 58 moths—27 males, and 31 females.”

AUGUST 23rd, 1900.

Mr. A. HARRISON, F.L.S., *Vice-President*, in the Chair.

Mr. R. Adkin sent for exhibition a box containing some flower-heads of ivy, and contributed the following note:

“I am sending in the enclosed box for exhibition some flower-heads of ivy having eggshells of *Cyaniris argiolus* on them, showing the positions in which they are deposited. There are some very small larvæ on the heads, but I fear these will get shaken off and lost on the way, but yet the traces of their first meals will be evident. The imagines have been very common here, flitting over the ivy patches both on the sea-front and about the town, and the great ivy-covered walls of the old castles at Pevensey and Hurstmonceux were quite alive with them a few days ago. The species is, however, not without its enemies. One small larva that I found this morning, sunning itself on a head of flower-buds, carried the egg of a parasite on its shoulders. The larva I should judge from its size was less than a week old, yet it had been attacked; the egg which it carried looked curiously out of proportion on so small a creature, and one wondered how the resulting larva would find room to secrete itself in its miniature host.”

He also exhibited the flowers of the common *Euonymus*, and sent the following note:

“The common *Euonymus* of our gardens is, I believe, not often seen in blossom, I therefore enclose a small head of bloom just gathered from a bush that is blossoming freely in a garden at South Cliff, Eastbourne.”

Mr. West exhibited the following Hemiptera, all taken at Lee:—*Oliarus panzeri*, on willows; *Idiocerus tremulæ*, on aspens; *I. vitreus* on poplars; *I. albicans* on white poplar; *I. confusus* on willows; *I. laminatus* on Lombardy poplar; and *I. populi* on aspens. He also exhibited a larva of *Dicranura bifida* from West Wickham.

Dr. Chapman exhibited specimens of *Melanippe fluctuata* from Red Hill, and from the Southern Alps, all uniform and typical.

Mr. Blenkarn exhibited specimens of *Cosmotriche* (*Odonestis*) *potatoria* and *Lasiocampa* (*Bombyx*) *quercûs*, var. *callunæ* from Eastbourne, *Spilosoma lubricipeda*, var. *radiata*, from Yorkshire, *Mesotype virgata* (*lineolata*) from Margate, and *Triphosa dubitata* from East Dulwich.

SEPTEMBER 13th, 1900.

Mr. W. J. LUCAS, F.E.S., *President*, in the Chair.

Mr. F. Noad Clark exhibited a specimen of *Locusta viridissima*, taken at Deal.

Mr. South exhibited a series of *Zygæna trifolii*, bred from cocoons taken in a marshy place near Oxshott. They were found both well up the stems of grasses, as well as close to the earth. About half the number taken emerged, and the rest were either attacked by parasites or were attempting to lie over. The specimens were by no means large in size. The variation showed the same range as in a series he had obtained from a meadow at Northwood, in Middlesex. Mr. Lucas had noticed among those obtained by himself from the same locality that the females had a much greater tendency to confluence of spots than the males.

Mr. Lucas exhibited several specimens of *Thamnotrizon cinereus*, an Orthopteron which he had taken in the New Forest.

Mr. Colthrup exhibited a short series of *Lasiocampa* (*Bombyx*) *quercûs* from Margate.

Mr. Kemp exhibited a specimen of *Aplecta occulta*, taken at sugar near Cromer. It was remarked that it was an unusual occurrence for this species to be taken so far south. It had been, however, taken some years ago in Tilgate Forest. [It has since been reported by Mr. Porritt from South Devon.]

Mr. Turner exhibited series of the following Coleoptera

taken this year:—*Crioceris asparagi*, from Petersfield; *Liopus nebulosus*, from the New Forest; *Strangalia armata*, from the New Forest; *Strangalia armata*, var. from Abbott's Wood; *Clytus arietis* from Abbott's Wood. The two latter were received from Mr. F. B. Carr.

Mr. West exhibited the Hemipteron *Derophysa foliacea*, beaten from ivy at Blackheath. Mr. Edwards stated that he had found the same species in his garden.

Mr. Lucas exhibited a series of the white variety of *Helix ericetorum*, taken near Oxford.

Mr. Main exhibited a species of *Myxogaster*, a parasitic growth of amœboid clusters of cells, which crawl about and finally congregate and spore.

Mr. Barnet exhibited a specimen of *Polyommatus corydon*, of a curious brown coloration.

Mr. Buckstone exhibited a female specimen of *Æschna mixta*, taken at Shoreham, in Kent, where he had met with a number. Mr. Lucas said that this usually rare species had been found this year in numerous localities over a very considerable area.

Mr. H. Moore exhibited several species of Lepidoptera, and contributed the following note:

“Near Le Portel, a fishing village some two or three miles from Boulogne, on August 19th last, I came across two small patches of vetches and one of clover, which seemed to be the rendezvous of all the butterflies of the neighbourhood. Whites (*brassicæ* and *rapæ*), of course, were numerous, but amongst the crowd I failed to detect any *daphidice*. *Colias edusa* was not much in evidence, and very wild; *C. hyale* was common; *Pyrameis cardui* was fairly plentiful, but I only saw one *atalanta*. *Vanessa io* and *Aglais urticæ* were in good numbers. The only “Blue” was *P. icarus*. The chief feature of the spot was the abundance of *Papilio machaon*—my experience of this insect had been confined to solitary specimens going at an unapproachable rate, but here I had as many as four around me within striking distance at one time. Of course I made many misses, but by careful stalking managed to net five.”

Mr. Tutt noted that there had been several reports this year of *P. machaon* occurring far from its accustomed haunts in the Fens, and considered that Mr. Moore's observation would suggest the probability that an immigration across the Channel had occurred.

Mr. Sauzé exhibited various species captured by him during

his holiday in August, including *Colias edusa*, from Deal; *C. hyale*, from Deal, St. Margarets, and Margate, both species being at clover, but the latter much predominated; *Polyommatus corydon*, from St. Margarets; *Pyrameis cardui*, from the South Foreland; *Calamia phragmitidis*, *Agrotis puta*, *Noctua plecta*, *N. c-nigram*, *Bryophila perla*, *Pyralis costalis*, *P. glaucinialis*, *Hypsipetes sordidata*, *Aspilates ochrearia* (*citraria*) and *A. gilvaria*, from Deal. Among the Coleoptera he showed *Broscus cephalotes*, from Sandwich; *Molytes germanus*, from Mongeham; *Opatrum sabulosum*, from Folkestone; *Carabus monilis*, and *Heliopathes gibbus*, from Deal. Among Hemiptera he exhibited *Chorosoma schillingii*, *Coranus subapterus*, and *Piestodous lituratus*. Among the Odonata, *Æschna mixta*, from Kingsgate; and among Orthoptera, *Labia minor*, from Walmer.

Mr. Bishop read the report of the Field Meeting held at Horsley on July 7th (see page 15).

SEPTEMBER 27th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Edwards exhibited a specimen of *Polyporus squamosus* taken from a tree on Paul's Cray Common during the Field Meeting on Saturday 22nd.

Mr. Ashby exhibited (1) a striking variety of ♀ of *Rhagium bifasciatum*, from Rickmansworth, taken on June 24th, 1900, having a large yellow patch across the elytra instead of the four spots as in the type specimens. (2) A series of *Sinodendron cylindricum* from a beech stump at Rickmansworth, May 27th, 1900. (3) A series of a small *Clavicorne* taken at last Saturday's Field Meeting from fungi. (4) A small ♂ specimen of *Pieris rapæ* taken at Rickmansworth, May 27th, 1900. (5) An asymmetrical variety of *Abraxas grossulariata* taken in North Paddington, July 18th, 1900, having the right wings typical, while the left fore-wing was much radiated with black.

Mr. Carpenter exhibited a series of *Colias hyale* from Sheerness, including a pale form, and suggested that a name be given it, since it is so constant. He also reported that Mr. Joy took sixty-five *C. hyale*, nineteen *C. edusa*, and two var. *helice* on one day, and on the next, seventy-one *C. hyale* and four var. *helice*, while typical *C. edusa* was in numbers. He stated that both *C. hyale* and *C. edusa* had oviposited, and

that the latter species was now in pupa, while the former was not yet full grown.

Mr. Montgomery exhibited larvæ of *C. edusa*, and stated that in 1895 the larvæ of this species averaged about twenty-eight days in reaching the pupa state, while this year forty-two days had elapsed, and many had not yet pupated.

Mr. Lucas exhibited two female specimens of the Orthopteron *Platycleis grisea* from the neighbourhood of Lulworth, and a specimen of *Tettix subulatus* from Milford.

Mr. F. M. B. Carr exhibited some of the larger species of British dragonflies, all taken this year:—*Sympetrum striolatum*, *Sympetrum sanguineum*, and *Sympetrum scoticum* from Ockham, August 16th, 1900; *Libellula depressa* from the New Forest, June 6th, 1900; *Libellula quadrimaculata* from the New Forest, June 3rd to 6th, 1900, and Black Pond, Esher, July 14th, 1900; and *Libellula quadrimaculata*, var. *prænnubila* from the Black Pond, Esher, July 14th, 1900; *Orthetrum cærulescens*, *Gomphus vulgatissimus*, *Cordulegaster annulatus*, and *Brachytron pratense* from the New Forest, June, 1900; *Æschna grandis* from Wisley, August 16th, 1900, and *Æschna mixta* from Loughton, August 22nd, 1900.

Mr. Hy. J. Turner exhibited a short series of *C. edusa* from Dawlish, including var. *helice*, one of two taken, and reported numerous others; a small female of the same species, and remarked that many specimens were small; also another female with the costa of a much lighter yellow than the rest of the wing. He further exhibited a pair of *Æschna mixta* taken with two other specimens at Pitsea, and a specimen of *Sympetrum sanguineum* taken with others at Wisley. He reported that the latter species was very common at Horsham on September 23rd.

Mr. Chittenden exhibited a pale yellow variety of *Chrysophanus phlæas*, taken at Ashford; two very dark forms of *Gnophos obscuraria* from Shirley Hills; a specimen of *Bupalus piniaria* from West Wickham, with the left pair of wings coloured as in the male, and the right pair of the female coloration; a dark form of *Agrotis corticea* from the last locality; and a dark *A. aquilina* from the Shirley Hills.

Mr. Gadge exhibited several fruits from Cape Colony, and a branch of the "silver-tree."

Mr. Colthrup, on behalf of Mr. Hills, of Folkestone, exhibited a long series of *Colias hyale*, and contributed the following note:

"The series was taken in the neighbourhood of Folkestone during July of this year. They are arranged showing

the variation in the depth of the marginal band of the hind-wings, which in some cases has gone to vanishing point; also there are three without any markings on the apical patch of the fore-wings. The two forms of the female are represented, viz. the white and the yellow, and one female has very dark hind-wings, approaching *C. edusa* var. *helice*."

Mr. Adkin read the Report of the Field Meeting held at Paul's Cray Common, on September 22nd (see page 17).

OCTOBER 11th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Robert Adkin exhibited series of the spring and summer broods of *Zonosoma porata* and *Z. punctaria*, all bred from Sussex ova. He remarked upon the much greater difference between the two broods in the latter than in the former species, and the consequent nearer resemblance of the summer broods of the two species than their spring broods. This resemblance, although superficial, had he said, frequently in his experience led to a confusion of the two species. He thought, however, that apart from the numerous minor characters, the presence of the white dark-bordered dot on the wings of *porata* should at all times be sufficient to identify that species. He also mentioned with regard to *punctaria* that, although the larva was an inveterate oak feeder, he had found that it would eat beech fairly well, and will not altogether refuse birch when no other food is to be had.

Mr. Lucas, on behalf of Mr. Jennings, exhibited the Hemiptera, *Ptilophorus perplexus*, beaten out of oak at Edmon-ton, and the rare *Monanthia ciliata*, taken near Dorking, in August; also a very dark small male of the earwig, *Forficula auricularia*, from Box Hill, which had the legs and wing-cases almost black.

Mr. B. Adkin exhibited several finely varied specimens of *Boarmia repandata* bred from New Forest larvæ, two bred examples of *Cleora glabraria*, one of which was a nice suffused variety, and various forms of *Noctua castanea* (*neglecta*) from Aberdeen and the New Forest.

Rev. H. Wood exhibited a fine specimen of the rare Longicorn, *Astynomus ædilis*, taken at Northampton, and doubtless bred from foreign timber.

Mr. Jäger exhibited the following species taken in South Devon in August and September :—three *Stilbia anomala*, four *Lithosia caniola*, five *Noctua castanea*, eight *Laphygma exigua*, one *Epunda lichenea*, one *Leucania albipuncta*, one *L. vitellina*, one *Heliothis armigera*, six *L. putrescens*, and two *Colias edusa* var. *helice*, one of which was a large specimen measuring $2\frac{1}{4}$ inches in expanse. He remarked that during his stay the days were mostly fine, but that the nights were cold.

Mr. W. J. Lucas exhibited a typical ♂ and ♀ *Pyrrhosoma tenellum*, a female with abdomen bronze, and another with abdomen crimson except circlets at the junctions of the segments which were black; also a nymph-case which produced a normal male, and another which produced a bronze female. All varieties were from the New Forest. Mr. A. H. Hamm had taken bronze varieties at two places in Devonshire. The bronze ♀ nymph-case was darker than the other, but probably only by chance.

Mr. Jäger exhibited specimens of a dragon fly he had seen in South Devon and which it was thought might be *Sympetrum vulgatum*. Mr. Lucas, however, said it was only the common *Sympetrum striolatum*, and stated that the former could be distinguished by the absence of a brown band between the second and third black stripes on the sides of the thorax, the absence of yellow dots on the abdomen, the presence of a longitudinal black line on each side of the first three abdominal segments, the very prominent vulvar scale, the generally more olive colour, the black line in front of the vertex being produced along the side of the eyes, and by differences in the structure of the male genital organs.

Mr. Kaye exhibited series of several species of *Lycænids* from Japan with British examples of the same or allied species for comparison :

1. *Chrysophanus phlæas*.—This species exhibits very markedly the influence of temperature. In Japan the bright copper form occurs in the spring, while the darker forms (cf. var. *eleus* of South Europe) occur in the late summer. The latter generally have the coppery band of the hind wings unchanged. The spring brood in both countries are practically indistinguishable on the upper side, but on the under side of the fore-wings of the Japanese specimens the white rings round the spots are more pronounced, and the blotches on the hind margins are five or six in number instead of three, as in the British examples. On the undersides of the hind wings the ground colour is of a silvery brown and the

black spots edged with white are more pronounced. The colour of the red band, too, is much more vivid. In the black form the red band is much widened and very brilliant.

2. *Polyommatus argia*.—This species is almost indistinguishable from our *P. icarus* except in being larger.

3. *Plebius ægon*.—The colour and markings agree most accurately with British specimens, but these latter are miniatures.

4. *Cyaniris argiolus*.—The points of difference are to be found mainly on the under side. The delicate blue has given way to a grey tint with a faint tinge of blue. All the spots are more decided, and not mere spots, as in British examples. The two broods are, as in Britain, dimorphic, but the summer brood is of a much darker colour.

5. *Everes argiades*.—These were similar to the average European specimens.

Mr. MacArthur exhibited a long series of *Argynnis aglaia* taken near Brighton, all bright and well-marked specimens.

Mr. West exhibited a series of the Homopteron *Typhlocyba candidula*, beaten from white poplar on Blackheath. It had not previously been found in Britain.

Mr. Turner exhibited, on behalf of Mr. Edwards, a long series of *Saturnia pavonia*, bred from ova laid by a female captured at Digne in April, 1898. The first contingent of twenty-one specimens emerged between March 11th and April 17th, in 1899, and were all males. The remainder, nine specimens, did not emerge till April of this year, 1900, and consisted of two males and seven females.

Mr. Blenkarn reported that he had taken *Ischnura pumilio* in Abbot's Wood.

Dr. Chapman exhibited specimens and drawings illustrating the structures which exist in the imago of *Cnethocampa pityocampa*, by means of which it manages to escape from the papery but tough silken cocoon (Plate III). "These structures have been described before, but any reference to their uses has not been found. They consist of an armature of the head and spines of the first tibia, by means of which the cocoon is penetrated and torn or cut in a somewhat ragged but fairly straight line across the summit of the cocoon and for some distance down one side. The head armature consists of a dense chitinous plate occupying the whole front of the head from the palpi to the vertex, and rising into a broad or rather double ridge of fairly equal width throughout its whole antero-posterior extent. The sides of the ridge fall vertically to the surface of the head, except where a slight spreading

EXPLANATION OF PLATE III.

Fig. 1.—*Cnethocampa pityocampa*.

1. Head showing double serrated horny crest.
2. First leg, showing great strength of femur and tibia, compared with second and third legs (3 and 4), and the sharp point of the tibia for penetrating cocoon, and behind the point sharp hollow for cutting cocoon, which cannot slip off owing to point behind. Tarsus bending back out of the way.

Fig. 2.—Head of *Nonagria typhæ*. Dorsal and lateral views.

This breaks down a silken diaphragm, and much resembles the cocoon opener of many chrysalides. (See page 93).

Sketched under camera. × 12 diams.

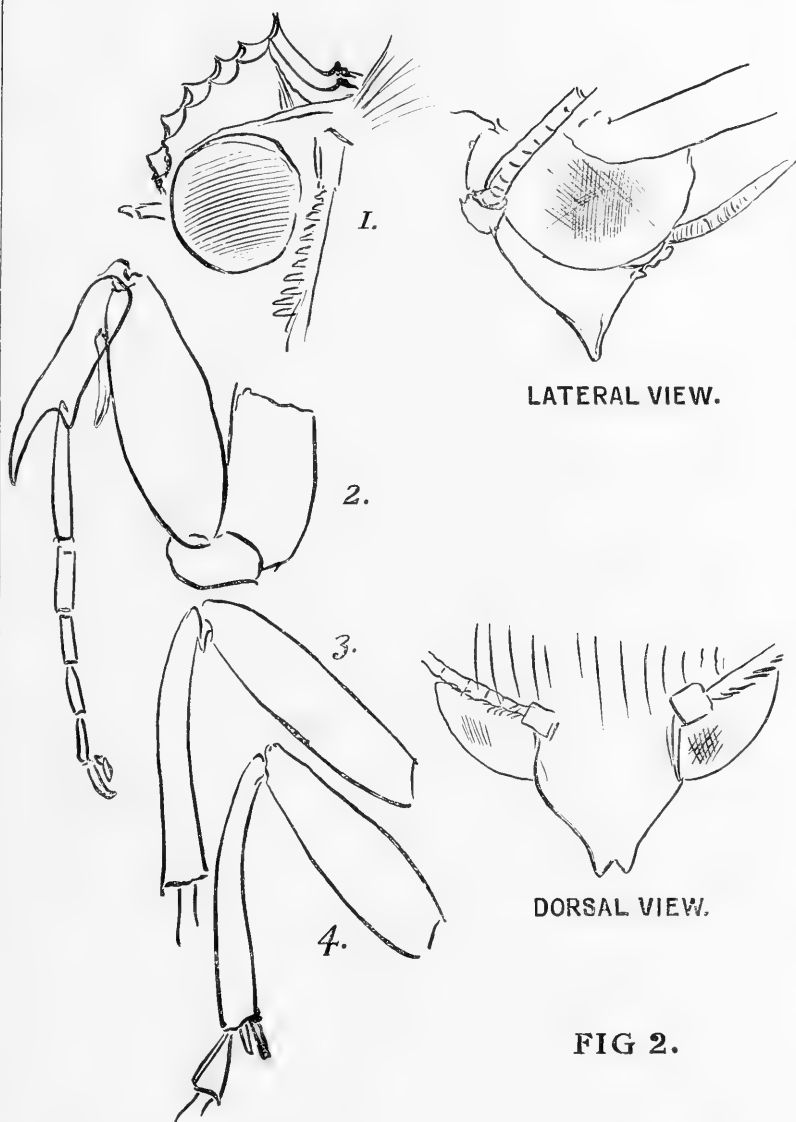


FIG 1.

LATERAL VIEW.

DORSAL VIEW.

FIG 2.

buttress rises to the apex of the ridge. The crest is hollowed above from before backwards, leaving the margins rather sharp, or forming, as above described, a double ridge. These edges rise into a series of teeth, a small and low one near the palpi, then four of about equal prominence, but each higher above the head than the previous one, so that the last is a prominent spine over the vertex. The ridge then falls rather abruptly and terminates with a final spine close to the back of the head against the prothorax. The corresponding spines on the two margins are connected across the intervening groove by ribs that break the groove up into a series of hollows or basins.

“The other portion of the apparatus is the first tibia. This is short—just half the length of the second and third tibia. The usual tibial spur arises at about one third of its length from its base, and is fairly long (half length of tibia), but it is curiously pale and flimsy-looking, and it is doubtless quite functionless as far as regards the special use for which the tibia itself is modified. Beyond the origin of the tarsus, the tibia is prolonged into a long (half length of tibia) and a short spine, with a sharp knife-edge running from the one to the other. The long one is anterior and very sharp. The tarsus flexes in the tibia readily, but admits of very little extension, thus avoiding getting in the way in the special use for which the tibia is designed. The femur is very thick and short, obviously strong and muscular for the exertion of the necessary power in cutting the cocoon.

“I have not seen the apparatus at work, but taking its structure in connection with the form of the slit in the cocoon, it is obvious that the cutting is done chiefly by the tibia, both apparently acting together, as the slit is single, except that it sometimes divides into two branches at its lower end; the long sharp spine penetrates the cocoon and the short one prevents the tibia passing too far through, and the cocoon is then cut against the short ridge joining the spines as the tibia is forcibly pressed downwards. I ought to have said for clearness that these two spines are prolongations of the tibia itself, and not jointed appendages, as one usually understands by tibial spines or spurs. The even more remarkable armature of the head presents a series of points by which the cocoon is firmly held and steadied against the strain of the tibial pressure. The tibiæ are thus able to cut the cocoon instead of pressing it before them. These spines also probably do some cutting. It is worth noting that the most dorsal of these spines is so placed that,

should the head spines cut the cocoon, or if, as is possible, they always do so, the groove or hollow in front of it will catch the cut margin and hold it against the tibial pressure, whilst the spine itself is a ridge preventing the cut margin of the cocoon passing backwards and cutting into the neck. When the opening is large enough the tibiæ are brought forward, all strain is removed, and the moth freely emerges. As the moths often or usually spin up gregariously, these structures are also probably of use in clearing a way out amongst the cocoons and their loose surrounding silk."

OCTOBER 25th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. MacArthur exhibited three specimens of *Leucania vitellina*, taken this year at Shoreham, near Brighton; a specimen of *Amphipyra tragopogonis*, having a series of light marginal patches and blotches on the fore-wings; and an example of *Thymelicus (Hesperia) thaumas* of a straw colour, but much paler towards the base.

Mr. Lucas exhibited a specimen of the cockroach, *Rhyparobia maderæ*, taken in a desk in Covent Garden Market.

Mr. T. D. A. Cockerell sent for exhibition a photograph of a hollyhock plant, showing the ravages of the larvæ of *Pyrameis cardui*, and contributed the following note:

"I send for the Society a photograph of hollyhock leaves injured by *Pyrameis cardui* at Raton, New Mexico, this year. The hollyhock is a favourite garden flower at Raton, but this year all I saw were thus injured by *P. cardui*. It is not often that we hear of this butterfly as a pest, though it is very common in New Mexico."

Mr. West exhibited a series of the Homopteron, *Acocephalus brunneo-bifasciatus* taken at Blackheath. They were all males, and were taken at the roots of grass and by sweeping.

Mr. Robt. Adkin exhibited a series of plain and banded forms of *Acidalia aversata*, bred during September last from ova deposited by a banded female taken at Lewisham on July 1st, and made the following remarks:

"Many of the species of the genus *Acidalia* will, especially in confinement, produce brood after brood so long as the summer lasts, the limit to their continuous broodedness being fixed apparently only by the advent of cool weather in autumn; but this is not so with *A. aversata*, at any rate

within my own experience. I have reared many broods during the past ten years or so, and have frequently tried to induce them to produce a second or summer emergence, but have signally failed in the attempt, the larvæ most persistently hibernating, the only exception previously to the present instance being the emergence of a single individual on October 7th, in the exceptionally hot year, 1899—one out of close upon two hundred larvæ that I then had feeding up. The parent from which the series now exhibited was bred was taken in my garden (where, I may say, I have obtained all similar moths from which the former broods have emanated) on July 1st; the ova hatched on 12th of that month, the time occupied being from two to three days longer than is often the case. For the next fortnight the larvæ grew at about the usual pace, being then quite small, and all of apparently just the same size. During this period the weather had been unusually hot, the screened thermometer registering day temperatures of from 80° to 92°, and night seldom so low as 60°. On 27th a series of thunderstorms passed over, leaving unsettled and much cooler weather in their wake, day temperatures failing to reach 80°, and often but little exceeding 60°. Despite this sudden drop in temperature, more than half the brood of larvæ commenced to grow rapidly, and by August 12th were pupæ; the remainder have grown but little, and have now settled themselves down for hibernation.

“The first moth emerged on August 31st, and the last on October 1st. Rather more than half of this emergence followed the female parent, in that they were of the banded form; the density of the colour of the band, however, varies considerably, being in some of them much paler than in others; the other portion were of the ordinary form without band. The dates of emergence were as follows:

1900.	Banded.	Plain.	1900.	Banded.	Plain.
Aug. 31	0	1	Sept. 8	3	1
Sept. 1	4	2	„ 10	1	0
„ 2	3	5	„ 14	1	0
„ 3	3	2	„ 23	1	0
„ 4	5	4	Oct. 1	1	0
„ 5	5	4		—	—
„ 6	3	2		31	22
„ 7	1	1			

Dr. Chapman said that Mr. Turner had called his attention to a structure in the pupa of *Nonagria arundinis* (*typhæ*).

similar to that in *C. pityocampa* exhibited by himself at the last meeting. It consisted of a single or double frontal spine, obviously of use for forcing the prepared window of plant epidermis with which the larvæ supplies the puparium,—a structure here occurring in the imago of an object species that occurs so commonly in the pupæ of the Incompletæ. This structure occurs in various species of *Nonagria*.

Mr. Edwards exhibited a number of specimens and species of the fungi found during the Field Meeting at Oxshott on October 20th. Dr. M. C. Cooke had identified the species for the Society. At the same time Messrs. R. Adkin and Edwards gave a report of the gathering (see page 19).

Mr. Mera exhibited several specimens of *Colias edusa*, *C. edusa* var. *helice*, and intermediate varieties; very pale specimens of *C. hyale*; and a very well-marked specimen of *Smerinthus populi*, with the suffused area at the base of the hind-wing yellow instead of dull red.

Dr. Fremlin then read a short paper on "Bacteria," illustrating his remarks with a varied exhibit, showing the methods of culture, and the apparatus used by bacteriologists.

NOVEMBER 8th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

SPECIAL EXHIBITION OF VARIETIES.

Mr. H. McArthur exhibited a long series of *Melanippe hastata*, showing local and extreme variation, from Sussex, Kent, York, Rannock, Isle of Lewis, Orkney, Shetland, and Iceland; and *Triphæna comes* (*orbona*) showing local and extreme variation, from South of Ireland, North Devon, Isle of Lewis, and Orkney. Orkney is the most northern British locality known for this species, and specimens from that locality are, like those exhibited, of the extreme dark form.

Mr. B. Adkin exhibited a specimen of *Eugonia polychloros*, with very pale ground colour, bred from a New Forest larva, 1900; a specimen of *Triphæna fimbria* having the black band extending along inner margin,—it was bred from a New Forest larva, 1900; and two specimens of *Catocala promissa* having pale upper and hind wings, with narrow and straighter medium band, one taken at Hythe, 1895, the other in the New Forest, 1900.

Mr. Winkley exhibited the specimen of *Catocala nupta* var. *cærulescens*, captured by him at Mitcham, Surrey, August

27th, 1892. The usual red colour of the hind wings is replaced by a very delicate warm brown, and a purplish glow covers the entire area of the wings (see "Ent.," vol. xxv., p. 243).

Mr. Robert Adkin exhibited the following varieties of *Argynnis aglaia*, all captured near Brighton in July last:— (1) A male example, having the basal two thirds of all the wings black, with the exception of a small irregular tawny blotch in the neighbourhood of the discoidal cell and another near the base of the forewings, the black coloration being continued to the outer margins along the veins, and having a black spot on each of the spaces between the latter. The pattern of the under side followed that of the upper in general contour, but the silver spots were reduced to two on each hind wing. The specimen was taken at rest, shortly after emergence from pupa. (2) A male, having a greenish-white blotch on each of the wings on the left side, similar to the blotches found not infrequently in specimens of *Argynnis paphia*. (3) A male, having some of the black spots on the central portion of the under side of the fore-wings run together into irregular zigzag bands. (4) Two unusually dark coloured females, one of them being very large, and having an imperfectly pigmented patch on the outer margin of each of the wings on the left side.

Mr. R. Adkin also exhibited long series of *Melanippe galiata*, from Eastbourne and Brighton, showing extreme variation in the intensity of colour of the central band, and read the following notes in explanation of his exhibit:

"The series exhibited represent three emergences from Eastbourne parents, and one from ova obtained at Brighton. The moth from which the Eastbourne series resulted was taken on July 25th, 1899 ("Proceedings," 1899, p. 49). From the ova thus obtained a brood was fed up which pupated between August 18th to 20th. Moths emerged from September 5th to 10th, and consisted of a number of very ordinary individuals, together with a few each of very darkly banded and pale bluish-grey banded examples. The remainder of this brood passed the winter as pupæ, the moths from which came forth from May 27th to June 13th. About one half of them were of the ordinary form, while the other half was made up of the intensely dark banded and pale banded examples in about equal proportions, but some of the pale banded specimens had the blue-grey colour of the band even lighter than any of the autumn emergence. From the moths reared in September ova were obtained;

the larvæ fed up somewhat slowly, and pupated between November 5th and 18th. The moths from these emerged between May 25th and June 25th, 1900, namely, at the same time as the later portion of the earlier brood; some few of them were of the dark-banded form, but the majority were very ordinary specimens, and none of them at all approached the pale examples of the earlier brood. The Brighton parent was taken on June 10th, 1900, the larvæ pupated from July 8th to 15th, and the moths emerged between July 23rd and 27th of the same year, a very ordinary brood. The pale form was therefore confined to the emergences of the one brood, fed up in August, 1899.

Mr. W. F. Urwick exhibited varieties of the following species :

Abraxas ulmata, a graduated series of nine varieties, from a suffused smoke-coloured specimen to forms resembling *A. pantaria*, taken near York from 1897—1899.

Argynnis paphia, an hermaphrodite variety. Right wings, female var. *valesina*; left wings, male ordinary type, with the exception of a dark splash toward the base (vide "Entomologist," for October, 1900). This specimen was captured on July 28th, 1900, near Lyndhurst, New Forest. A male variety of same species, taken by G. Tate, Boldre Wood, New Forest, in July, 1898, showing considerable dark suffusion.

Lithosia quadra, one male variety with light and dark colouring of the fore-wings transposed. Three female varieties, one with the spots on inner margin absent, two others with extra large spots. All were bred by G. Tate, Lyndhurst, in August, 1900.

Epinephele hyperanthus, two varieties, one with a grey fore-wing, the other with very large spots (under side). All were taken in the New Forest in July, 1900.

Agrotis agathina, one variety, bred by G. Tate, Lyndhurst, August, 1898.

Ephyra pendularia, a fine, richly-banded form, bred by G. Tate, Lyndhurst.

Chelonia plantaginis, sixteen very striking varieties bred from male var. *hospita*, and female of the ordinary type from South Wales, during 1897 to 1900. A complete gradation was shown between the type form, and var. *hospita* with pure white ground colour and black markings.

Mr. E. B. Nevinson exhibited *Malacosoma (Bombyx) castrensis* from Essex, showing much variation in colour; *Macrothylacia (Bombyx) rubi*, females, from Argyle and

Hartlepool, for comparison; *Lasiocampa trifolii*, a light form, from Romney Marsh, bred by Mr. Mitford; *Cosmotriche* (*Odonestis*) *potatoria*, light and dark females; *Arctia caia*, a most uncommon form with radiated hind wings, from Wicken Fen.; *Notodonta chaonia*, a fine suffused form; *Pygæra curtula*, *P. pigra*, hybrids. *Heliothis peltigera*, light and dark bred forms, from Swanage; *Gnophos obscuraria*, light and dark forms; *Zonosoma linearia*, banded form from the New Forest; *Melanippe fluctuata*, extreme light and dark forms.

Mr. F. M. B. Carr exhibited—

A series of *Noctua festiva* taken at Hailsham, June, 1900.

A series of *Diloba cæruleocephala*, bred this year. In one the 8-mark is very distinct, in another it is only represented by two small pale spots.

Two specimens of *Diphthera orion* taken on treacle at Hailsham, 1900.

A specimen of *Coremia propugnata* (*designata*) with a very narrow brown bar across the wing, and without a trace of the flame colour. New Forest, June, 1900.

Six male *Bombyx neustria*; one with scarcely any sign of the pale transverse lines. Four were bred, and others taken at Hailsham, in 1899.

Mr. Colthrup exhibited varieties of the eggs of the following birds:

1. Blackbird (*Turdus merula*), variations in density and distribution of the spots.

2. Starling (*Sturnus vulgaris*): (1) a pure white egg; (2) an intensely blue egg, like the blue in a thrush's egg.

3. Thrush (*Turdus musicus*), with spots bunched at the smaller end.

4. Common fowl, two extremely small eggs, and a curious malformed egg deficient in lime, showing a uniformly rugose surface.

5. House sparrow (*Passer domesticus*), a pure white specimen, a large-sized elongated example, and several small specimens.

6. Greenfinch (*Ligurinus chloris*), with markings collected at the smaller end.

7. Robin (*Erithacus rubecula*), a variety with pure white ground colour.

8. Chaffinch (*Fringilla cælebs*), with markings collected at the small end in the form of a ring, and two specimens with larger ends blotched very much with red-brown. These two eggs were taken from a typical chaffinch's nest very early in

a cold season, and which were abandoned by the parent bird.

9. Common bunting (*Emberiza miliaria*), two clutches from Beachy Head, showing great extremes in size, shape, ground colour, and intensity of markings between the clutches.

Mr. Henry J. Turner exhibited a series of some three dozen specimens of *Callimorpha hera*, taken by himself in the neighbourhood of Dawlish in mid August, 1900. The ground colour of the hind wings exhibited an uninterrupted gradation between the rich red of the type through the terra-cotta form to the brilliant yellow of the form known as var. *lutescens*. About one half were of the type form. The markings of all the specimens were as uniform as if produced by a stencil plate. He also exhibited a very long and varied series of *Bryophila muralis* (*glandifera*) from the same neighbourhood, taken on, or bred from pupæ from, a single wall. The series was a very remarkable one, in that it contained but a few isolated examples of forms which are typical of eastern localities like Freshwater, Eastbourne, or Folkestone. A considerable proportion were of a rich yellow-brown ground colour; the black markings of most were conspicuous and even intensified. In all, the hind wings were dark and in some very dark, and a number of examples of a deep green were very noticeable. A few specimens were very small, and were bred late in September or in the beginning of October.

Mr. R. Adkin exhibited a series of *Bryophila muralis* to compare with Mr. Turner's exhibit, and mainly composed of forms typical of Eastbourne, Folkestone, Brighton, Poole, Co. Cork, Scilly Isles; the form known as *impar* from Cambridge.

Mr. Colthrup exhibited a series of *Bryophila muralis* from Folkestone, also to compare with Mr. Turner's exhibit, and contributed the following note:

"The specimens I exhibit came from Eastbourne, Brighton, and Isle of Wight, with four specimens from Dawlish this year, and were mostly bred. They included a black variety with white ground colour, a yellow-pink variety (bred), a very dark green variety, and a number of the varieties *suffusa* (Tutt) and *par* (Hübner). The black variety has a white spot at the base of the fore-wing, near the hind margin, in the place of the usual mark, which resembles a clover leaf.

"What struck me most was the large percentage of imagines I had emerge, viz. 90 per cent., whereas last year a friend

had quite 50 per cent. ichneumonized. This I put down to the backwardness of the season in the earlier part of the year, which delayed the emergence of the ichneumon fly, as they were only just out when I was taking this year's pupæ, and I frequently came across last year's pupæ with the fly ready but not yet emerged. They also seemed subject to attack by earwigs, spiders, and woodlice, which, after eating the pupæ, take up their abode in the cocoons. Some of last year's pupæ in my cages produced ichneumons in the second week in June. My first *B. muralis* emerged on July 17th and the last on August 16th, although I took thirteen fresh specimens, drying their wings on walls in the Isle of Wight, on August 21st."

Mr. Lucas exhibited a series of nine specimens of *Libellula quadrimaculata*, showing a complete gradation between the type form and an extreme example of the variety *præ nubila*.

Mr. Chittenden exhibited the following captured or bred varieties, mostly from Kent:—*Nemeophila plantaginis*, with red under-wings, var. *hospita*; *Spilosoma lubricipeda*, var. *radiata*, *eboraci*, etc., bred; *Spilosoma menthastri*, var. one with buff fore-wings; *Phigalia pædaria* (*pilosaria*), two blackish varieties; *Boarmia repandata*, black variety; *Bupalus piniaria*, right side female colour, left wings male colour; *Abraxas grossulariata*, dark varieties; *Hybernia marginaria* (*progemmaria*), and var. *fuscata*; *Cheimatobia brumata*, with small hind wing; *Lobophora carpinata* (*lobulata*), banded form; *Larentia cæsiata*, dark and banded forms; *Hypsipetes sordidata* (*elutata*), reddish and light varieties; *Cidaria truncata* (*russata*), red and white varieties; *Cidaria immanata*, dark and light varieties.; *Xylophasia monoglypha*, black and light forms; *Pachetra leucophæa*, dark and light forms; *Triphæna comes* (*orbona*), red and dark varieties.; *Tæniocampa gothica*, a varied series; *Tæniocampa gracilis*, red, dark, and light forms; *Tæniocampa munda*, one with no spot; *Orthosia suspecta*, red varieties; *Cerastis vaccinii*, dark; *Dianthæcia nana* (*conspersa*), a dark variety; *Aplecta prasina* (*herbida*), dark and light variety; *Drepana falcataria* (*falcula*), brown varieties.

Dr. Chapman exhibited a few *Erebias* collected this season, to illustrate how, in the genus, the most well-marked forms tend to have black spots with white pupils in each marginal wing cell, set in a bright brown or rust-coloured band, which may invade a large part of the wing, and in the other extreme, the dark ground colour may cover the whole wing to the exclusion of all spots or rust colour. *E. glacialis* perhaps covers in one species the widest range in this

variation ; other species are confined within certain portions of it.

"The species exhibited are *E. manto* from the Val Tuoi, lower Engadine. Few of these are as fully marked as the average of these taken at St. Anton, a spot some thirty miles to the north. The most frequent form has two rusty dashes, with a black spot each. Sometimes there are one or two more brown dashes, and one on the hind wing is very exceptional. In some specimens the rusty dashes persist and the spots are wanting ; in others the spots persist with hardly a trace of rusty spots ; in some both are wanting.

"*E. ephiphron*, the series is short, but no two specimens are precisely alike.

"*E. melampus*, a specimen with comparatively little variation. Two of the specimens are *almost* without the black dots.

"*E. pharte*, there is considerable range in the amount of the rust-coloured dashes. None approach the well-marked forms taken in Carinthia. The dashes are reduced in one or two specimens to two mere points, so that a spotless form probably occurs at this locality.

"*E. gorge* ; those from Val Tuoi are chiefly the usual form varying from spotlessness to var. *triopes*, both rare. At Pontresina *triopes* was abundant, type-form rare, and any further approach to spotlessness was not met with.

"*E. mnestra*, the spotless form the more usual. One from Val Tuoi is distinctly tending to the loss of the rusty blotches.

"The close resemblance of some of the *manto* and *pharte* is very striking, and is to be taken with the fact that they flew abundantly together on the same ground, and could rarely be distinguished on the wing."

Mr. J. P. Barrett exhibited (1) to show variation in size, *Colias hyale*, a specimen exactly two inches and one eighth in expanse, and another exactly one inch and a quarter. Both were captured in the same field at Margate (where they were undoubtedly bred) on August 17th, 1900. Also *Ennomos alniaria* (*autumnaria*), one specimen two inches and one eighth, and another one inch and five eighths. Both were females, from a similar batch of eggs, and similarly treated as to food, etc.

2. A variety of *Aspilates citraria* (*ochrearia*), a male specimen, pure yellow, with no lines ; the only variety noticed this season amongst hundreds taken. *Agrotis putris*, a specimen of the spring brood.

3. Species struggling to settle in the Margate district. Two specimens of *E. lichenæa* and five specimens of *Leucania vitellina*. A female of the latter species laid a dozen eggs, but up to the present these have not hatched. Together with *Leucania albipuncta* and *Heliothis armigera*, all were captured on the 21st and 22nd of September, 1900, at sugar.

Mr. H. Moore exhibited a series of *Papilio machaon*, from Greece, light varieties; India, large dark forms taken at an altitude of 9000 feet at Kulu; Amur, small dark-veined variety; Japan, var. *hippocrates*, etc. 2. A series of *P. xuthus*, from China and Japan.

Mr. A. Harrison exhibited long and varied series of *Xanthia aurago*, *Scopelosoma satellitia*, and *Miselia oxyacanthæ* with v. *capucina*, all taken at sugar at Chingford in October this year.

Mr. Main exhibited two specimens of *Colias edusa* var. *helice*, bred from ova laid by a female *helice* taken at Hanwell. They emerged in October.

Mr. Mera exhibited several very dark varieties of *Abraxas grossulariata*, bred and captured at Forest Gate, and also from Aberdeen. He also exhibited a specimen of *Cænonympha pamphilus*, having the under surface of the left hind-wing of the colour of the upper wing.

Rev. J. E. Tarbat exhibited Lepidoptera:—(1) a very dark specimen of the banded form of *Hybernia defoliaria* (bred). (2) *Stauropus fagi*, female, bred August 18th, 1900, from spring ova.

Birds eggs:—(1) Blackbird (*Turdus merula*), two pale blue varieties; (2) Chaffinch (*Fringilla cælebs*), five pale blue varieties made up of two different clutches taken in two successive years in same garden at Reading, second year's smaller than first; (3) Bullfinch (*Pyrrhula europæa*), five white varieties made up out of different clutches taken two successive years in the same hedge at Weybridge. (4) Blackheaded gull (*Larus ridibundus*), four specimens of a pale blue variety, three with more or less markings, and one without markings. All from Scoulton Mere, Norfolk.

Mr. R. Armstrong Adkin exhibited British land-shells, viz. a series of *Helix caperata* taken near Otford, Kent, on Sunday last, which showed much variation for one locality. Also of *Helix virgata*, from various localities, showing considerable variation, some of a horn-colour, with very faint bands, from Greenwich Marshes, being especially remarkable.

Mr. S. W. Kemp exhibited a variety of *Epinephele ianira*,

taken at Chalfont Road, Bucks, in which the apical ocelli were wanting; a bleached variety of the same species, taken at Swanage, Dorset; and a bleached variety of *E. tithonus*, taken near Cromer, Norfolk, with normal specimens for comparison.

Mr. C. Nicholson exhibited a specimen of *Catocala sponsa* having the left upper wing entirely suffused with umber brown, the right wing being of the grey and ochreous-brown form; the left hind-wing was rather dwarfed. Two specimens of a brood of *Pararge egeria*, bred from Dawlish eggs. One of the specimens was very thinly scaled and the markings obscure; the other was not so thinly scaled and the markings were almost normal. As the remainder of the specimens bred were small and seemed very weak, it was probable that the aberrations were due to bad nutrition. A bred female specimen of the summer brood of *Pieris rapæ* having a somewhat indistinct dark spot on the disc of each hind wing. A bred specimen of *Geometra papilionaria* from the New Forest, the green colour having been apparently bleached out of each hind-wing from the hind margin to about the centre; other specimens bred from the same brood were normal. A specimen of *Mamestra brassicæ* in which the whole of the fore-wings was of a uniform leaden-grey colour, rather shiny; the subterminal line and stigmata being lighter and tolerably distinct. The specimen was captured at treacle in the exhibitor's garden at Clapton. A series of *Melanippe fluctuata*, also from Clapton, two being clearly banded with dark and light grey, like *M. sociata*, and the other two having the central band reduced to a wedge-shaped costal blotch; in one of the two this was very small.

Mr. A. F. Cole exhibited a *Catocala nupta*, var. *cærulescens*, similar to the specimen exhibited by Mr. Winkley. It was caught at sugar at Brondesbury. He also exhibited a variety of *Colias hyale* having a broad elongated splash of black on the under side of the fore-wings. It was caught near Great Missenden, Bucks.

Mr. Kirkaldy exhibited a large number of specimens in illustration of colour variation in *Notonecta*, and contributed the following note:

“The species of *Notonecta* are the most brightly-coloured of water-bugs, but in this genus colour is almost entirely unreliable, although a red and black abdomen in *N. insulata*, and a yellow and black one in *N. glauca*, var. *maculata*, seem to be distinctive of these forms. In many species,

viz. *glaucia*, *undulata*, *indica* (from America only !), *shooterii*, etc., practically perfect transitions from immaculate pale yellowish individuals (or pearly white as in *undulata*)—leucochroic—to almost immaculate black individuals—melanochroic—are found in the same locality and at the same time. These colour variations appear to be casual, and in no way affected by the operations of natural selection. It may be remarked that the dark *N. irrorata* is very common in the United States, while the usually pale *N. glauca* of Europe and *N. undulata* of America are exceedingly common throughout their area of distribution, the general conditions being apparently much the same in all cases. The species do not as a rule vary very greatly in size, except the protean *N. undulata*.

“Note specially the three forms of *N. mexicana*, red, black, and pale olive; also the very rare immaculate form of *N. glauca*, var. *maculata* from North Africa. This has the usual yellow and black abdomen of var. *maculata*.”

Mr. W. J. Kaye exhibited a specimen of *Papilio machaon* from Wicken, with the submarginal band of the fore-wings internally edged with a broad black band, and with the discoidal spot enlarged into a black blotch, which united with the black band; and a specimen of *Hydrocampa stagnalis* with the basal black line obsolete, the inner edge of the double submedian line strongly indicated, and the outer edge very faintly marked; also the cross band between the two transverse bands almost obsolete.

Mr. A. Buckstone exhibited two varieties of *Polyommatus icarus* (*alexis*): (1) Female, taken at Dorking, August 12th, 1900. With the right upper wing of the male colour. (2) Female, a very small specimen, smaller than several *Cupido minima* (*alsus*) in his possession, the under side of both upper wings having two of the spots joined by a black line.

Mr. Newman exhibited a specimen of *Smerinthus ocellatus*, from a larvæ taken in the Bexley Woods, August, 1899, feeding on sallow. It emerged June 2nd, 1900. Unfortunately a beetle larvæ got at the body, and then grease set in. A specimen of *Noctua neglecta*, a red form received from Dr. Freer (Rugeley), and captured by him this season at Cannock Chase; and a dark form of *Ennomos fuscantaria*, one of some 400 examples of the species which he bred this year. It emerged this morning (8th). The first imago of the broods emerged at the end of July, and others continued

to appear daily till about September 30th. The larva producing the dark specimen did not pupate till October.

Mr. W. Brooks exhibited a series of *Acherontia atropos*, bred this year, together with varieties of the same species: (1) A particularly fine example, with all the light markings double their usual size, the normally dark parts being considerably lighter, and the whole insect dusted as if with a fine white powder, so that when looked at sideways it gave the appearance of being a white specimen. (2) A fine and very dark example with unusually broad and dark markings on the hind wings. He also exhibited examples of the *radiata* form of *Spilosoma lubricipeda* without any perceptible trace of fringes to the naked eye, the specimens being nearly black, with the rays running quite out of the fringes. A specimen of *Pyrameis atalanta* with the marking or colouring of the right hind-wing replaced with a light or creamy tint instead of the usual red; but unfortunately the left wing was damaged when caught.

Mr. W. Bateson exhibited a series of ♂ specimens of *Hybernia progemma*, which had been lent to him by Mr. H. B. Prince, of Birkenhead, to illustrate the progressive melanism of the species. They were all from the sandhills between the Mersey and the Dee. Fuscous varieties, previously unknown in this locality, were first noticed in 1893 and have become increasingly common, though the normal light form is still found. According to Mr. Prince the light form is fairly distinct. The fuscous varieties range from a dark form with fore-wings a unicolorous dark brown, and hind-wings largely irrorated with brown, to an intermediate in which the yellow of the type is largely sprinkled with brown scales. The very dark variety elsewhere found has not yet appeared in the locality.

In connection with this exhibit, Mr. Bateson ventured to appeal to entomologists to aid in the attempt now being made by the Evolution Committee of the Royal Society to watch and record the progress of melanism among several families of British moths, especially Geometers. It was well known to all present that during the latter half of this century melanic forms, previously unknown, had appeared, in many localities entirely replacing the previous normal forms, in other places existing side by side with them. There was no reason to doubt that this process is still continuing, and that the melanic forms are yearly appearing in new districts and becoming more and more abundant. An exceptionally good opportunity is thus provided of watching the progress of an

evolutionary change. If records had been made even ten years ago of the exact areas already affected, or of the proportions of dark and normal forms in the affected areas, they would be now of great value. The Evolution Committee hoped to be able to collect some of the facts still known to collectors respecting the progress of the change, and to induce many to begin to record the present state of things in their own districts. It was not necessary that such records should be of an elaborate character, and negative statements based on personal knowledge, that in a given district melanic forms had *not* yet appeared, were of high importance. A list had been drawn up of species likely to be of special interest in connection with this inquiry, and schedules for recording had been prepared. Mr. Bateson would be glad to send these papers to any one who would write for them to him at Grantchester, Cambridge.

NOVEMBER 22nd, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Cane, of East Dulwich, was elected a member.

Mr. R. Adkin exhibited six specimens of *Abraxas grossulariata*, which, he said, were the most strongly marked examples bred from some two thousand larvæ collected from *Euonymus* in the West of London. In all of the specimens exhibited the black markings of the outer portions of the fore-wings were much intensified, while in two of them the whole area of the fore-wings was black, with the exception of a few small, irregular white blotches and faint indications of the usual yellow lines. The hind-wings showed little variation from the type.

Mr. Ashby exhibited a fine, long, and very varied series of the Coleopteron, *Onthophagus vacca*, taken at Willesden, April, 22nd, 1900.

Mr. Turner exhibited a number of species of Lepidoptera, and a few specimens of other orders, to illustrate his notes on the Natural History of Dawlish. He also read a paper entitled "Desultory Days at Dawlish in August, 1900" (p. 21).

DECEMBER 13th, 1900.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Nottle, of Lower Sydenham, and Mr. R. L. Hewett, of Lewisham, were elected members.

Mr. Turner, on behalf of Mr. Tunaley, exhibited a specimen of *Spilodes palealis*, taken in the Isle of Wight in July. Mr. Adkin remarked on the sporadic appearance of this species; in one year numbers would be taken, while for several years in succession it often happened that not a specimen was obtained. Mr. Turner also exhibited five specimens of *Acherontia atropos* bred from larva taken at Porlock in North Devon; together with bred specimens of *Ocneria dispar* of large size.

Mr. Clark exhibited a specimen of *Locusta viridissima* from Deal, and afterwards presented it to the Society's collection.

Mr. Alfred Sich exhibited a specimen of *Oporabia autumnata*, bred November 7th, 1900, from larva taken off elm at East Hoathly, Sussex. It was somewhat malformed, having the termen of each fore-wing notched triangularly below the apex.

Mr. Manger exhibited a number of butterflies taken in and around Ladysmith, Natal, including *Pieris hellica*, *Colias electra*, *C. hyale*, *Pyrameis cardui*, *Precis sesamus*, *Teracola johnstoni*, *Junonia chlorantha*, etc.

Mr. McArthur exhibited a large number of *Arctia caia*, bred as a second brood this year, one specimen having very pale hind-wings.

Mr. Tutt exhibited specimens of an alpine form of *Polyommatus dorilis*, and stated that the species was double-brooded in most places; he also pointed out the characters of the alpine form, and made remarks on the two broods.

Mr. Kemp exhibited the Psocid, *Clothilla studiosa*.

Mr. Moore exhibited a specimen of *Ophion luteum*, and said that he frequently took this species of ichneumon in October and November.

Dr. Chapman exhibited a considerable number of specimens, so prepared as to illustrate his paper entitled "Some Wing-structures of Lepidoptera" (p. 31).

JANUARY 10th, 1901.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

Mr. Robert Adkin exhibited a specimen of *Hepialus sylvanus* together with its pupal skin, which he took on the Downs near Birling Gap, Sussex, on September 4th, 1900, while drying its wings at rest on a plant of viper's buglos (*Echium vulgare*), from the root of which the pupa skin that it had just vacated was protruding. There was very little vegetation on the part of the Down where it was taken, and he had no doubt that the larvæ had fed in the root of the *Echium*, which he thought was an unusual food-plant for the species.

Dr. Chapman exhibited a nice series of *Argynnis thore* taken at Pontresina, some six thousand feet above the sea level in the Italian Alps.

Mr. Henry J. Turner exhibited specimens of the locust, *Locusta vividissima*, which had been taken at Ventnor two years ago, where it was very common, together with a dried specimen of the milk thistle, *Carduus* (*Sylibum*) *marianum*, found growing wild on the southern slope of the chalk ridge near Swanage. This plant is a native of Spain and the South of France, but has become naturalised in places in this country.

Mr. Montgomery exhibited a long series and contributed the following notes on *Colias edusa*, Fb. and its var. *helice* in 1900:

"A typical female, taken at Hanwell by Mr. A. U. Battley, August 19th, and presented to me, deposited about 180 ova on cut sprays of *Lotus corniculatus* between August 20th and 27th, and died August 28th. The ova began to hatch August 26th, twelve being infertile.

"The larvæ (167) at first did well; moulted—1st, September 2nd; 2nd, September 6th; 3rd, September 14th; and the last, September 19th. After the final moult their condition was most unsatisfactory; many refused to recommence feeding, others became full fed and would not spin up, whilst the majority spun up and refused to pupate. The first larvæ spun up on September 30th, and pupated on October 3rd. Pupæ were placed on sides and top of larva cage, but in not a single instance on the food-plant. Many pupæ died, most soon after changing, others just as the pigment was visible through the wing-cases,

"Only one of the pupæ in my possession produced a butterfly, a rather undersized *helice* with the spots of the marginal band reduced to a minimum. Mr. Battley bred four, one male and one female typical, and two *helice*, and Mr. Harrison bred two males and two females, the latter var. *helice*. About a dozen more were either crippled or made no attempt to emerge.

"A specimen of the variety *helice* was taken at Dawlish by Mr. H. J. Turner and generously presented to me. It deposited ova August 24th to 30th, which began to hatch on August 31st, all being fertile. The larvæ (80) proved to be very vigorous; moulted first September 6th, and last September 21st. They began to spin September 28th, and pupated September 30th; many died without spinning. The pupæ with two exceptions situated as in the previous case. Fifty-two imagines (thirty males and twenty-two females) emerged from October 30th to November 29th, of which eight (four males and four females) were crippled. Seven females (two crippled) were referable to var. *helice*, one intermediate (lemon colour) and the rest, though paler than usual, might be said to be typical.

"A typical female, also taken at Dawlish by Mr. Turner, deposited ova August 24th to 30th, about sixty per cent. of which proved to be infertile. The larvæ (seventy-seven) fed up slowly and straggled on till mid-December. Over fifty per cent. of the larvæ pupated, but numbers of the pupæ died. Twenty-four (thirteen males and eleven females) imagines emerged from November 10th to December 1st, of which eleven (eight males and three females) were crippled."

Mr. Lucas exhibited specimens of the land-shell *Clausilia laminata*, including examples of var. *albinos* from Streatley, near Reading.

Mr. F. Noad Clark exhibited, with the aid of the lantern, a large number of Photo-micrographs of lepidopterous ova. The result showed great skill and care, and the most useful point was that the whole of the photographs were done to one scale. He also read a number of most interesting notes on the exhibit (see page 46).

January 24th, 1901.

ANNUAL GENERAL MEETING.

Mr. W. J. LUCAS, B.A., F.E.S., *President*, in the Chair.

The Report of the Council and Officers was read, and the balance-sheet was received and adopted. The following Officers and Council for the ensuing year were elected.

President.—H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S.

Vice-Presidents.—F. Noad Clark, and W. J. Lucas, B.A., F.E.S.

Treasurer.—T. W. Hall, F.E.S.

Librarian.—H. A. Sauzé.

Curator.—W. West.

Hon. Secretaries.—Stanley Edwards, F.L.S., etc. (*Corresponding*), H. J. Turner, F.E.S. (*Report*).

Council.—Messrs. R. Adkin, F.E.S., W. J. Ashdown, Dr. T. A. Chapman, F.Z.S., A. Harrison, F.L.S., A. M. Montgomery, E. Step, F.L.S., J. W. Tutt, F.E.S.

The President read an Address, and exhibited: (1) a large number of nymph-cases of British dragonflies; (2) specimens and drawings of *Agrion hastulatum*; and (3) drawings of the terminal segments of the abdomen of *Ischnura elegans* and *Ischnura pumilio*.

Votes of thanks were passed to the retiring Officers and Council.

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- 1888 HOPKINS, H. E., 5, Haseldean Road, Brockley, S.E. *l.*
- 1889 HORNE, A., F.E.S., Ugie Bank, 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.*
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow. *l.*
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie House, Monaghan, Ireland. *l, mi, marine invertebrata.*
- 1898 KAYE, W. J., F.E.S., Caracas, Ditton Hill, Surbiton, Surrey. *l.*
- 1900 KEMP, S. W., 80, Oxford Gardens, Notting Hill, W. *l, c.*
- 1884 KENWARD, J., 195, Hither Green Lane, Lewisham, S.E. *l.*
- 1900 KIRKALDY, G. W., S. Abb's, Worple Road, Wimbledon. *he.*
- 1888 KNIGHT, E., 2, Lichfield Grove, Church End, Finchley, N.
- 1894 LAMB, H., Acacia Place, Upper Faut, Maidstone. *b, orn.*
- 1898 LEMANN, F. C., F.E.S., Blackfriars House, Plymouth. *l.*
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l.*
- 1898 LITTLE, W. W., 17, Belgrave Street, King's Cross, N. *l.*
- 1901 LOWE, F., Polruan, Clarendon Road, Putney, S.W. *l.*
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L., F.R.S., F.L.S., F.G.S., F.E.S., &c., High Elms, Down, near Farnborough, Kent (*Hon. member*). *h, b.*

YEAR OF
ELECTION.

- 1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *l, o, n, m.*
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l.*
- 1900 MACGEE, W. H., 79, Lillie Road, S.W. *l.*
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview, Clarendon Road, Lewisham, S.E. (*Hon. member*). *n.*
- 1892 MAIN, H., B.Sc., F.E.S., 131, Windsor Road, Forest Gate, E. *l.*
- 1886 MANGER, W. T., 100, Manor Road, New Cross, S.E. *l, c, cr.*
- 1889 MANSBRIDGE, W., F.E.S., 133, Park Grove, Hull. *l.*
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l.*
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
- 1888 MITCHELL, A. T., 594, High Road, Chiswick, W. *l.*
- 1896 MONTGOMERY, ARTHUR M., F.E.S., 32, The Grove, Ealing, W. *l.*
- 1896 MONTGOMERY, EDMUND M., 32, The Grove, Ealing, W. *l.*
- 1880 MONTIERO, Señor A. A. DE C., F.E.S., 70, Rua do Alecrinar, Lisbon.
- 1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l, e h, e d, mi.*
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1901 NEWNHAM, C. E., The Eyot, Hersham, Surrey. *l.*
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l.*
- 1900 NOTTLE, EDWARD, Lanyar Vale, Portland Road, South Norwood. *l.*
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South Woodford, Essex. *l.*
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton. *l.*
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 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., 41, St. Martin's Lane, Charing Cross, W.C. *zoology, mi, pond life.*
- 1889 PERRY, Rev. J. F., Catholic Church, Brixton Hill, S.W. *l, c.*
- 1899 PICKIN, J. R., 2, Industry Terrace, Brixton, S.W. *l.*
- 1897 PREST, E. E. B.

YEAR OF
ELECTION.

- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Huddersfield. *l, n.*
- 1896 POTTER, A. T., Whangarei, Auckland, New Zealand. *l, zoo.*
- 1902 RAYWARD, A. L., Lessington, Grosvenor Gardens, Walsington, Surrey. *l.*
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. *orn.*
- 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
- 1894 ROBINSON, LEIGH, 13, Victoria Street, Westminster, London, S.W. *l.*
- 1888 ROBSON, H., 93, Watling Street, E.C. *l, b.*
- 1887 ROUTLEDGE, G.B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l, c.*
- 1900 ROWDEN, ALFD. OLIVER, 6, Eastgate, Exeter. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1898 RUSSELL, A., F.E.S., The Limes, Southend, Catford, S.E. *l.*
- 1886 SALWEY, R. E., F.E.S., Springbank, Wokingham, Berks. *l.*
- 1897 SANDISON, JOHN, 2, Francis Grove, Wimbledon, Surrey. *l.*
- 1888 SAUZÉ, H. A., *Hon. Librarian*, 11, Venner Road, Sydenham, S.E. *l.*
- 1898 SICH, ALF., F.E.S., Brentwood, 65, Barrowgate Road, Chiswick. *l.*
- 1899 SMITH, E. W., 16, Tresco Road, Linden Grove, S.E. *l.*
- 1890 SMITH, WALTER, 1, Arundel Villas, Hampton Road, Twickenham. *l.*
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l.*
- 1882 SOUTH, R., F.E.S. 96, Drakefield Road, Upper Tooting, S.W. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex (*Life member*). *l.*
- 1872 STEP, E., F.L.S., *Vice-President*, 19, Fortune Gate Road, Craven Park, Harlesden, N.W. *b, m, orn, cr.*
- 1902 STONELL, B., 25, Studley Road, Clapham, S.W. *l.*
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, oo.*
- 1901 THORNTHWAITHE, W., Hersham, Surrey. *l.*
- 1895 TOLHURST, J., Glenbrook, Beckenham, Kent. *l.*
- 1899 TOMLINSON, F. *l.*

YEAR OF
ELECTION.

- 1902 TONGE, E., Aincroft, Grammar School Hill, Reigate. *l*.
- 1899 TOOMBS, G. W., 40, Shrubland Grove, Dalston Lane, N. *l*.
- 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l*.
- 1895 TUNALEY, HY., F.E.S., 30, Fairmount Road, Brixton Hill, S.W. *l*.
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 13, Drakefell Road, St. Catherine's Park, S.E. *l, c, n, he, b*.
- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Hill, Blackheath, S.E. *l*.
- 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.F.S., 2, Handsworth Wood Road, Handsworth, near Birmingham. *l*.
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., H.M.S. Katoomba, Sydney, N.S.W. *l, c*.
- 1888 WALLER, R., 2, Grand Parade, Upper Richmond Road, Putney, S.W. *l*.
- 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*.
- 1888 WARNE, N. D., 8, Bedford Square, W. *l*.
- 1888 WEBB, S., 22, 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., 75, Lewin Road, Streatham Common, S.W. *l, mi*.
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l*.
- 1888 WINKLEY, M. H., 9, Glen Eldon Road, Coventry Park, Streatham, S.W. *l*.
- 1893 WOLFE, J. J., Skibbereen, co. Cork, Ireland. *l*.
- 1899 WOOD, Rev. FRANCIS HENRY, M.A., Brabourne Cottage, Bromley Park, Kent. *l*.
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *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 1901.

GENERAL FUND.

<i>Receipts.</i>	£	s.	d.	<i>Expenditure.</i>	£	s.	d.
By Subscriptions received, 98 at 7/6 ...	£36	15	0	To Debit Balance ...	...	...	...
" " " 2 " 6/- ...	0	12	0	" Rent (1 year) ...	...	...	...
" " " 9 " 5/- ...	2	5	0	" Attendance (1 year) ...	...	...	...
" " " 14 " 2/6 ...	1	15	0	" Postage, Stationery, and Sundries ...	...	...	...
" Entrance Fees, 12 at 2/6 ...	4	1	7	" Insurance of Library and Collections ...	...	...	...
" Arrears of Subscriptions received ...	...	...	10	" Entrance Fees carried to Suspense A/c ...	...	...	...
" Subscriptions paid in advance ...	...	...	4	" Reading Lamp ...	...	...	...
	...	...	1	" Transfer to Library Fund ...	...	...	...
	...	...	2	" Sub. to South-East Union ...	...	...	...
	...	...	5	" Balance ...	...	...	...
	£49	3	0		£49	3	0

SUSPENSE ACCOUNT.

<i>Receipts.</i>	£	s.	d.	<i>Expenditure.</i>	£	s.	d.
By Balance in Hand ...	...	...	12	To Balance ...	...	...	...
" Entrance Fees from General Fund...	...	...	7		...	...	...
	...	...	6		...	...	...
	...	...	1		...	...	...
	...	...	10		...	...	...
	£13	17	6		£13	17	6

LIBRARY FUND.

<i>Receipts.</i>	£ s. d.	<i>Expenditure.</i>	£ s. d.
By Balance ...	1 6 5	To Ray Society Subscription ...	1 1 0
" Vote from General Fund ...	1 0 0	" Postages (Hon. Librarian) ...	0 1 3
" Fines ...	0 5 2	" Bookbinding ...	1 3 6
		" Balance ...	0 5 10
	<u>£2 11 7</u>		<u>£2 11 7</u>

PUBLICATION FUND.

<i>Receipts.</i>	£ s. d.	<i>Expenditure.</i>	£ s. d.
By Donations ...	43 10 6	To Printing ...	49 4 6
" Sale of "Proceedings" ...	1 18 6		
" Debit Balance ...	3 15 6		
	<u>£49 4 6</u>		<u>£49 4 6</u>

ASSETS AND LIABILITIES.

<i>Assets.</i>	£ s. d.	<i>Liabilities.</i>	£ s. d.
By Balance, General Fund ...	12 12 6	To Debit Balance Publication Fund ...	3 15 6
" Library Fund ...	0 5 10	" Balance ...	30 11 10
" Suspense Account ...	13 17 6		
" Arrears of Subscription, £26 16s., valued at say ...	7 11 6		
	<u>£34 7 4</u>		<u>£34 7 4</u>

Examined, compared with vouchers, and found correct this 16th January, 1902.

H. A. SAUZÉ,
ALFRED W. DENNIS, } *Auditors.*

REPORT OF THE COUNCIL, 1901.

THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-ninth Annual Report, is pleased to state that the Society continues to maintain a satisfactory condition, both as to its membership and as to the educational and scientific value of the work it does.

The present membership is somewhat more than at the corresponding time last year. Nine new Members have been elected, while two resignations have been accepted, and three names have been removed from the list under By-law 10, section 2. Thus the actual number of Members is 174, made up of 4 Honorary, 5 Life, 40 Country, and 125 Ordinary Members.

The Hon. Treasurer's Balance-sheet is printed on page x., and from its perusal it will be seen that the Society has again satisfactorily met its liabilities, under the skilful management of Mr. T. W. HALL.

The Council greatly regret that the President for the year, Mr. H. S. FREMLIN, met with a very serious accident in July, and since that time has been unable to attend the meetings of the Society. They wish to offer him their hearty good wishes for his speedy recovery.

The ordinary meetings of the Society have been very well attended throughout the year, and the exhibits have been numerous and varied, but the accompanying notes have been somewhat scanty. Through the kindness of Mr. HALL, one evening was devoted to a lecture on "Bird Life," by Mr. W. R. KEARTON, and was well attended and appreciated.

The usual Exhibition of Varieties was held in November, and was again a successful meeting.

In order to add to the usefulness of the meetings, our President, Mr. FREMLIN, at the beginning of the year kindly placed a microscope in the Society's rooms, so that it should be available at any meeting for Members to examine objects which might be brought up. Several members have availed themselves of the opportunity thus afforded to illustrate their remarks, and sets of slides have been lent by Messrs. CLARK and WEST.

Mr. A. HARRISON has again shown his kindly feeling to the Society by donating a new patent Lantern Screen, which will much facilitate the preparation for the Lantern Demonstrations by the simple manner of its arrangement. Not least in usefulness have been the kind offices of Mr. F. NOAD CLARK in so ably taking charge of the Lantern on each of the six occasions when it was used.

During the year eleven Papers have been read, together with five Reports of Field Meetings. These Papers and Reports were contributed by the following gentlemen, to whom the Council wish to express themselves much indebted:—Mr. STEP, four; Mr. LUCAS, two; Mr. MANGER, two; Mr. R. ADKIN, one; Mr. BATESON, one; Mr. BISHOP, one; Mr. CLARK, one; Dr. CHAPMAN, one; Mr. KEARTON, one; Mr. MONTGOMERY, one; Mr. PERCY SMITH, one; and Mr. WEST (Streatham), one.

These Papers were of a most varied nature, five being accounts of general Field Work, three were especially relative to Lepidoptera, two to Ornithology, two to Conchology, two to Botany (including Fungi), one to Arachnology, one to Geology, and one to Experimental Biology.

Five Field Meetings were held during the summer and autumn. In point of interest, and in the large attendance of members and their friends, they were the most successful the Society has ever held. The weather was on each occasion exceptionally propitious, and no doubt was a large factor in their success. On the occasion of the Mickleham Meeting, under Mr. ASHDOWN and Mr. STEP, no less than forty met at tea; and at Brasted, under Mr. R. ADKIN, the number was thirty-

six. The Council consider that this is a very gratifying recognition of the kindly efforts of those gentlemen who organised and led at the outdoor gatherings. The following is a list of the Field Meetings :

OXSHOTT, on May 18th ; Conductor, Mr. W. J. LUCAS, B.A.

BYFLEET, on June 1st ; Conductors, Messrs. BISHOP and LUCAS.

MICKLEHAM, on June 22nd ; Conductors, Messrs. ASHDOWN and STEP.

BRASTED, on July 6th ; Conductor, Mr. R. ADKIN.

OXSHOTT, on October 5th ; Conductors, Messrs. LUCAS and STEP.

The Society's Collections still continue under the able care of Mr. WEST (Greenwich), the Hon. Curator, who reports as follows :

"During the past year the cabinets have been consulted at every meeting, and I hope that those members who can do so will donate specimens and series to complete, so that no student of any order may fail to find the species he is in search of."

These Collections have been enriched by the following donations, for which the best thanks of the Council are due :

Specimens of *Anax imperator* and *Ischnura pumilio* from Mr. ASHDOWN.

Nearly ninety species of Homoptera (British) from the Hon. Curator.

A series of *Caradrina ambigua* from Mr. R. ADKIN.

Various species of Lepidoptera from Mr. F. M. B. CARR.

And various species of Lepidoptera from Mr. H. HARRISON.

The Library has been increased during the year by the following books, periodicals, reports, etc., for which the Council desire to express their thanks to the several donors :

"In Nature Land," by Messrs. GRANT ALLEN and ENOCK, from Mr. ENOCK.

"Reptiles," Cambridge Natural History, Vol. VIII., from Mr. STANLEY EDWARDS.

"Shell Life," by Mr. STEP, from Mr. N. E. WARNE.

“British Lepidoptera,” Vol. VII., by Mr. C. G. BARRETT, from the AUTHOR.

“With Nature and a Camera,” by Messrs. KEARTON, from Mr. T. W. HALL.

“Entomologist’s Monthly Magazine,” 1901, from Mr. MAC-LACHLAN.

“Entomologist,” 1901, from Mr. SOUTH.

“Science Gossip,” 1901, from Mr. CARRINGTON.

“Zoologist,” 1901, from Mr. NEWMAN.

“Knowledge,” from the PUBLISHERS.

“Irish Naturalist,” 1901 ; “Canadian Entomologist,” 1901 ; “Entomologische Tidskrift,” 1901 ; “Rochester Naturalist,” 1901.

“Journal of the City of London College,” “Report of the City of London Entomological and Natural History Society,” 1900 ; “Report of the Entomological Society of Ontario,” 1900 ; “Reports of the Smithsonian Institute,” 1898-99 ; “Transactions of the Norfolk and Norwich Natural History Society,” 1900-01 ; “Proceedings of the Croydon Microscopical and Natural History Society,” 1900 ; and “South Eastern Naturalist,” 1901, by exchange.

“Larvæ of British Lepidoptera, Vol. IX., Ray Society, by PURCHASE.

Numerous Pamphlets and Magazine articles, by Mr. COCKERELL, from the AUTHOR.

Under the careful guardianship of Mr. H. A. SAUZÉ, the Hon. Librarian, the Library continues to be of great service to the members, especially for reference at the meetings. His report is as follows :

“With respect to the Library, which has a steady number of consultants, the feature of 1901 has been the thoughtfulness and liberality of one of our proved friends, Mr. STANLEY EDWARDS, who has generously provided an additional mahogany cupboard of goodly capacity for storing the stock of unsold ‘Transactions’ of the Society, and leaving the Library free for housing the books. Concerning these ‘Transactions,’ there has been a slight demand for copies from the Continent during the year, which has improved the balance of the Library Fund, but the accumulation must be

estimated at a few thousands. It is allowed that our publication could not be continued from the ordinary income, and every year kind donors specially supplement the available sum by subscribing to a 'Publication Account.' This is done because they feel that the JOURNAL is vital to the well-being of the Society, and without it our meetings would be merely a pastime with no history or progress. But while we get the JOURNAL year by year, after a little anxiety to our able Treasurer, does it not seem that this accumulation of 'Transactions,' for which there is an inadequate demand, points to an apparent waste of capital? We know the remedy does not lie in printing fewer copies each year, as the saving thereby would be infinitesimal. Will the donors, having gained their prime object in the fact of publication, consent to them being offered at such a reduction as to tempt demand? Any business-like suggestion for re-converting this stock into cash I am sure would be carefully considered by the Council."

The Council would much like to see the Society's Albums enriched by the addition of the portrait of every Member who has not yet contributed to it. During the year that has just passed only two additions were made, viz. Messrs. ASHDOWN and ENOCK.

They also much regret that the publication of PART I. of the Abstract of "Proceedings" was again postponed, and would urge that the prompt carrying out of this regulation lies in the hands of the Members themselves, who, by paying their subscriptions early in the year, can facilitate this much-desired punctual issue. It is hoped that the Abstract for the past year will at once be put in hand, and be ready for issue much earlier than the last volume was.

In bringing this Report to a conclusion your Council desire to thank all those gentlemen who have so ungrudgingly come forward to aid in the great object of the Society, viz. the spread of Biological Science. They hope that in the future this hearty and kindly assistance may be still more apparent, especially in exhibiting all objects of interest, as well as by introducing new members.

Fossil Insects.

By W. WEST, L.D.S. *Read February 14th.*

THE subject I have the pleasure to bring before your notice this evening is that of fossil insects, with special reference to those contained in amber, but I must apologise for including some specimens of another order, the Arachnida, as I think they will be equally as interesting to the entomologist, although not coming within the range of his particular study.

This globe upon which we live and have our being has been built up in successive stages or epochs. These epochs have been classified by geologists into four large divisions. The lowest, and necessarily the oldest, is called the Palæozoic or Primary, then follows the Secondary or Mesozoic, then the Tertiary or Cainozoic, and finally the Quaternary. These four divisions are again divided into various systems.

The Palæozoic contains the following divisions:—Laurentian, Cambrian, Silurian, Devonian, Carboniferous, and Permian.

The Mesozoic is divided into Triassic, Jurassic or Oolite, lower, middle, and upper, and the Cretaceous.

In the third division, the Tertiary, we have the Eocene, Miocene, and Pliocene, and in the Quaternary the Recent.

All these systems are again subdivided into various strata, too numerous to mention this evening.

The earliest traces of insect life are found in the Devonian, or old red sandstone rocks, and consist of a few broken wings of Neuroptera (Pseudo-neuroptera), allied to Ephemera. In the Carboniferous epoch following the Devonian, ninety species, mostly Neuroptera and Orthoptera, were discovered. An insect was found in Permian strata intermediate between Neuroptera and Hemiptera, and placed in a new order of the name Dictyoptera. Of the Orthoptera more than fifty species are represented, and a few others, referred to a special order by Goldenberg, and called Palæodictyoptera, except five classed amongst the Coleoptera and three to Hemiptera. These latter orders came on later. Only five species have been found in the British coal measures. In the Permian rocks (named by Murchison on account of being more developed in the province of Perm in Russia) about thirteen species are found, mostly in Germany, and consist of two Palæodictyoptera, two Hemiptera, and nine Orthoptera (Blattidæ). The vegetation of the Devonian epoch consisted mostly of Gymnosperms and Cryptogams and numerous Algæ.

In the Secondary or Mesozoic epoch, called the age of reptiles, we find the Triassic and Jurassic period, the latter named after the mountain range of the Jura, on the western borders of Switzerland. They consist of the two formations, the Lias and Oolite.

The Lias contains the following remains:—Neuroptera, six species; Orthoptera, three; Coleoptera, 116; various Hemiptera, and one or two doubtfully referred to Diptera. The Oolite formation is divided into lower, middle, and upper. The insects obtained from the lower Oolite have, with two exceptions, been classified as Coleoptera and Neuroptera. An interesting wing of a large species was considered by Mr. Butler to belong to a Lepidopteron, and named by him *Palæontina oolitica*, and confirmed by Professor Westwood and other distinguished entomologists, but Mr. Scudder considers the wing belonged to an insect allied to the Cicada. It is in the upper Oolitic formation that fossil insects have been discovered in abundance, so that the Purbeck beds in Dorsetshire, Wiltshire, and Buckinghamshire have been named the "insect limestone." They belong mostly to the orders Coleoptera, Neuroptera, Orthoptera, Hemiptera, and Diptera, which last order is more numerous than in any preceding formation. In the Solenhofer slate of Bavaria 114 species have been discovered, consisting of the following:—Coleoptera, 29 species; Neuroptera, 46; Orthoptera, 11; Hemiptera, 16; Diptera, 5; Hymenoptera, 5; and Lepidoptera, 2.

In the Cretaceous period, although we are ascending the scale of rock formation, very few insect remains have been found, and those very imperfect; there are about sixteen species of Coleoptera recognised. Wood has been discovered perforated, supposed to have been done by some Longicorn beetle of the period.

Vegetation seems to have developed into new forms, thus heralding the evolution of more numerous insect life.

In the Tertiary or Cainozoic time, which is divided into Eocene, Miocene, and Pliocene, there was a rapid development of dicotyledonous plants, and insects increased in abundance; orders which in previous ages were sparsely represented were now firmly established (but mostly in the upper Eocene); about 120 genera are known, and were distributed as follows:—Coleoptera, 50; Neuroptera, 3; Orthoptera, 6; Hemiptera, 20; Diptera, 25; Hymenoptera, 11; Lepidoptera, 10.

In the Miocene period, which is divided into lower, middle, and upper Miocene, insects of nearly all orders have been found. I will not weary you with enumerating the species known of each order; suffice it to say, that from one district in the valley of the Rhine upwards of 5000 specimens have been obtained, consisting of 844 species.

The Post-tertiary or Quaternary period, sometimes called the Diluvial period, on account of the similarity of its flora and marine fauna to the present age, would necessarily result in the evolution of insects closely allied to our existing species, but, of course, the

Coleoptera, by virtue of their hard and less perishable elytra, are found to be more numerous than other orders.

When we speak of a fossil insect we generally picture an insect, or parts of one, embedded in a sedimentary rock, rather difficult to see, and only found when the rock happens to split where the insect is entombed. They must necessarily be very imperfect on account of their fragile nature, and it is usually only the harder parts that are preserved; fortunately Nature has preserved some in a better material—the gum which exuded from the trees around which they flew or crawled. I refer to amber, and before showing you some specimens of the insects it would, perhaps, be well to make a few remarks upon the subject of that curious fossil. It is the gum of an extinct coniferous tree (*Pinites succinifer*) found in the Tertiary and Diluvial formations. According to Pliny it was called by the Greeks “Electron,” whence we derive our modern word electricity. It is found principally on the southern shore of the Baltic Sea after stormy weather, being washed up from the bottom, and occasionally round our own coasts. A very fine specimen was fished up last November, and when sold in London realised the sum of £27 10s. for the fortunate fisherman.

The enterprising German has found out a way of obtaining amber in larger quantities than searching for it on the beach, and that is by mining for it, and now a very extensive industry is carried on in various parts of the coast, principally in Königsberg. It will not interest us much to inquire into the statistics of the annual output, which is very extensive and of considerable value. It is found in a kind of blue clay-like earth into which, when in a semi-liquid state, it dropped. Whilst in this condition, and exuding from the trees, various insects came into contact with it, and on account of its adhesive nature became fixed and unable to make their escape; of course they would struggle to get away, and damaged themselves considerably, therefore I am unable to show you any very perfect specimens, and moreover all parts of the insect will not be equally in focus like a modern microscopic slide. This fact must be my excuse for the imperfection of some of the pictures.

In obtaining these photos., which, by-the-bye, are taken through the microscope, I have aimed at getting the focus of the most striking and interesting parts. To get the best effect I have in my own specimens cut and polished the piece of amber parallel to the part of the insect to be shown, but several of my pictures are taken from borrowed specimens, which, of course, I was not permitted to cut up. For some of my best I am indebted to Mr. Weingott the well-known amber merchant, who very kindly lent me his beautiful collection for this purpose.

There are various gums which to the uninitiated look like amber. I have a specimen of gum anime; it is a fossil gum, but not true amber. It is not the exudation of a pine, but comes from the locust tree (*Hymenæa martiana*) and other species of *Hymenæa*.

growing in tropical America. Insects are frequently found enclosed in it.

Gum copal is another which is often passed off as genuine amber, and fraudulent individuals have enclosed insects in it to increase the deception, but of course the entomologist can soon see that they are modern types.

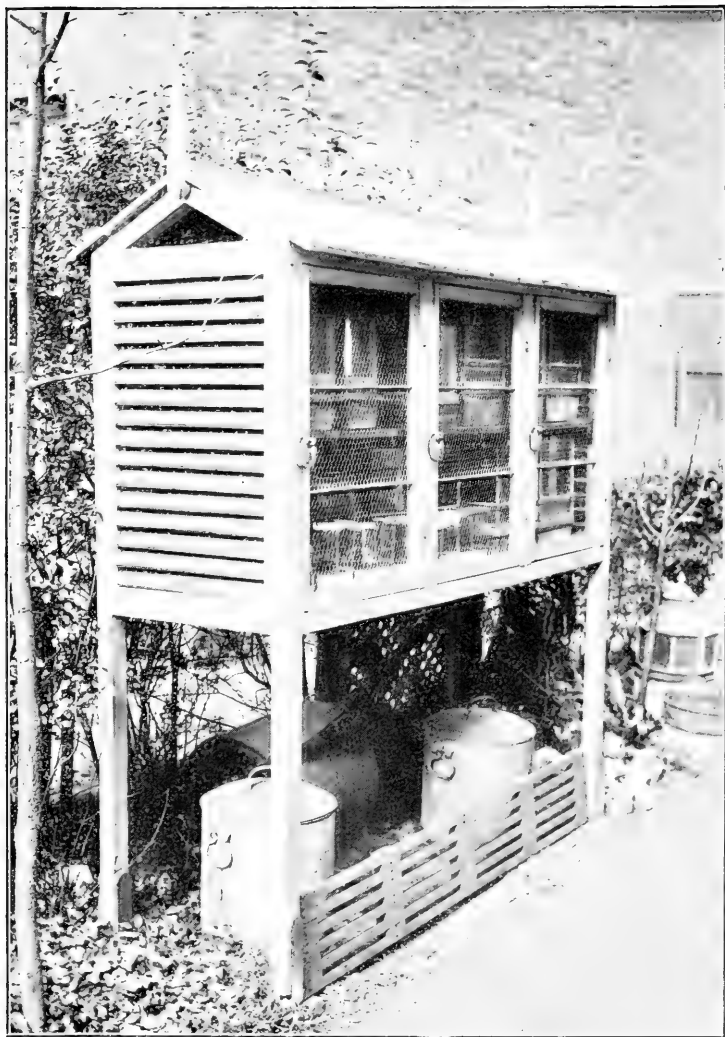
The way to detect genuine amber from spurious is by friction ; when the real article is rubbed vigorously the scent of the pine is distinctly noticeable. Another means is by heating. Copal catches fire and runs into drops which flatten by falling. Amber burns with spitting and frothing, and the liquid drops rebound from the surface on which they fall. Still another means of testing is by distillation. Amber yields a volatile oil and an acid called succinic acid. The other forms do not yield succinic acid.

Flies in amber have always provoked a certain amount of surprise and curiosity, and one of the poets has given expression to his surprise, and remarks them being—"Neither rich nor rare, The wonder's how the devil they got there."

There are no less than thirty-one species of spider found in the Primary formation, and 285 in the Tertiary.

I will now ask Mr. Clark, who has kindly taken charge of the lantern, to show us some of these insects that must have lived ages before man inhabited this globe ; in the epochs when the land was covered with profuse vegetation, which vegetation first became peat, then lignite, and finally coal. It is from the lignite, coal beds in process of formation, that amber comes.

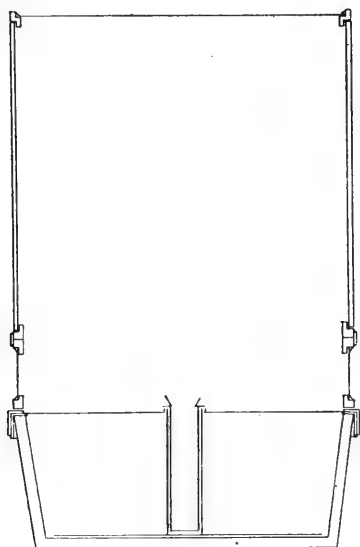
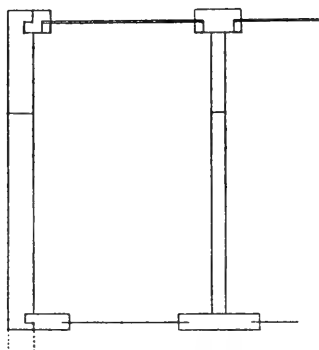
PLATE I.



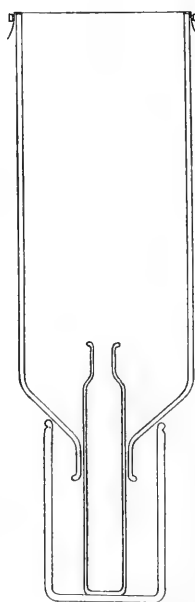
LARVA HOUSE.

PLATE II.

PUPA
CAGE



LARVA CAGE



BOTTLE CAGE

LARVA CAGES.

Notes on Rearing Lepidoptera.

By A. M. MONTGOMERY. *Read February 28th.*

I FEEL I ought to make some explanation and apology for my presumption in contributing a paper on the rearing of Lepidoptera to such a society as ours. However, if you will have the patience to listen while I explain the methods I adopt, and then freely criticise them, I shall benefit by the discussion as much as any one.

First, a few words on eggs and means of obtaining them from brood females. Butterflies, as is well known, require sunshine and the presence of their larval food plant to induce them to oviposit. For the smaller species I use a bottle cage, such as I first saw used by our friend Mr. Mansbridge. A pint white glass circular bottle with the bottom cut off, and a slice of the cork (say $\frac{1}{4}$ inch thick) thrust into the neck, is placed neck foremost into a gallipot of a suitable size. A spray of the food plant is plugged with cotton wool into a hole in the cork, so that the end reaches some water in the gallipot. Put in two teaspoons of sand, covering the cork and shoulders of the bottle, and damp it slightly. Next put in the butterfly, and cover with mosquito net or leno, secured with a new black india-rubber band (12, Faber's). If a red or old black band is used the sun will melt it, and the insect escape. Place the cage on a sunny upstairs window-ledge out of the way of cats and inquisitive errand-boys. For the larger species I use a larva cage, which I shall refer to later on. The base is filled with sand, the food plugged into the well, and the perforated zinc lid replaced with mosquito net. It must be borne in mind that too much sun under these conditions will kill the butterfly and the ova as well, so if the weather is hot and the sky cloudless the cage must be exposed for short intervals only, and care taken to keep the sand damp. In the evening, or sooner if necessary, feed the butterfly, and either remove it to a fresh cage or take out the food plant on which are ova, and insert a fresh spray. I have kept *Chrysophanus phlaas* alive in the bottle cages for twenty-six days, the first of her progeny pupating the next day, and in the larva cages have kept *Argynnis paphia* for a month. The Satyridæ may be induced to oviposit in a white glass 3-lb. jam jar, in which is a tuft of grass (such as comes up with praiseworthy persistency in flower beds) set in damp sand, a piece of mosquito net keeping the butterflies in and vermin out. As long as the sand is not too wet the grass will flourish for weeks in the jar. When the butterflies are dead replace the mosquito net with linen (old handkerchief), and keep the jar in a light but not sunny place, and the resulting larvæ will need no more attention till they are well advanced in life.

The bottle cages can be used with great success with *Eupithecia*,

and the larva cages for such large and restless moths as *Catocala*, the mosquito net being replaced with linen or old calico, and the cages kept out of the sun. For moths generally I use airtight white-metal glass-topped boxes (Janneke's patent, two sizes, 3 inches by 2 inches and $2\frac{3}{4}$ inches by $1\frac{1}{2}$ inches) in preference to the usual chip and card pill box. Cut a spray of the food, which should be dry, and curl it round in one of the boxes so that it cannot shift and injure the insects, place the brood females in it, and you will probably get all the ova they have. I have kept moths as different in size as *Virgularia* and *Porcellus* in these boxes with uniform success; the latter, indeed, lived for thirteen days, and deposited eighty-two fertile ova. I cannot help contrasting this method to the usual chip-box treatment, with which I have had some unpleasant experiences. Very few ova are obtained, and these do not always hatch, even when perfectly fertile. For instance, some *Acidalia remutaria* I collected laid a number of ova in a chip-box on the way home, where the moths were transferred to a G.T.B., and the chip-box containing the ova placed in another. None of the eggs in the chip-box hatched, and every one in the G.T.B. produced a larva. Some moths, such as *Halia wavaria*, *Melanthia bicolorata*, *Cidaria fulvata*, etc., which pass the greater part of their existence in the ovum, may, with the aid of these boxes, be reared in large numbers. The leaves become mildewed, and the interior of the box thickly coated with scales, but every fertile egg will hatch. At intervals during the winter I put a drop of water in the box, which gradually evaporates and prevents undue dryness of the contents. If ova are deposited in the chip-boxes on the way home from an expedition, place them in a G.T.B. and paint the chip-box with water at intervals till the eggs hatch. Ova taken from the food plant may be placed on a piece of damp rag in these boxes. I well remember my disappointment the first time I took *Cherocampa porcellus* ova; they were perfectly fertile, the larvæ could be seen moving in them, but nearly all failed to make an exit. Last year I placed the ova on the damp rag, and 98 out of 110 hatched, and none of the twelve failures contained a larva.

Butterflies, and moths too, when physically capable of taking any, require food when ovipositing. This may be conveniently managed by taking a lump of sugar, dipping it in water, and shaking it as dry as possible; take the insect by the wings in the left hand, hold it so that it can grasp the sugar, and stretch out its proboscis with a fine needle. As a rule, as soon as the trunk is extended the insect begins to feed, and may be gently released and left to take its fill. Refractory species can sometimes be induced to feed by placing the sugar close to the insect and gently blowing over the sugar towards it. After feeding once or twice they become used to the treatment, and will extent their trunks as soon as one picks them up or even blows into the cage. A specimen of *Miselia oxyacanthæ* I had alive for some time would run zigzag towards the sugar from

one end of the table to the other, waving its antennæ in great excitement.

Brood females travel well by post in these G.T.B. A culm of green wheat or coarse grass to which they can cling is curled round in the box, and if they can be induced to feed before they start, so much the better. It is important that no green stuff that will become flabby should be put in the box. It flaps about and makes the insect so restless that the chances are it will arrive with broken wings and legs, and so reduce the chance of getting ova. I have had some cardboard cases made to take these boxes. They cost 5s. per gross, and as they can be used without paper, the string is supplied, and the boxes are not smashed, they must be considered very cheap. I do not know how long the butterflies will live in these G.T.B., but last autumn I kept a *Pieris rapæ* for eight days without food in one of them, and afterwards obtained ova from her.

Newly hatched larvæ (except Satyridæ) I keep indoors, and for their management keep within reach of my table the following apparatus:—A drawing board covered with cartridge-paper, an enamelled iron basin, a tin of dry sand, a lump of cotton wool, a box of rubber bands, bottle cages with spare covers, and G.T.B., together with scissors, forceps, brushes, and a teaspoon.

When the larvæ make their appearance, if butterflies (except Satyridæ) or Geometers, I transfer them to bottle cages, making a careful note of the number hatching from day to day. Extreme care must be taken not to put too much food in the cage, or the moisture condensing on the glass will drown your larvæ, and not to put too many larvæ in one cage. A small quantity of food keeps admirably in these bottles by snipping the ends of the stems and exposing a fresh surface, and changing the water in the gallipots. Some plants may be kept fresh till devoured to the very last atom by the larvæ, a no small advantage when the amount of time and handling is considered. For some Noctuæ and Bombyces in their earlier larval instars I have used G.T.B. with some success. Noctua, Tæniocampa, and Hadenæ do admirably in them; they require, however, by this treatment daily attention. The plan I adopt is to put fresh food in on the top of the old every morning, and remove the old and rub the box clean and bright every evening. This is not so much trouble as it looks, provided too much food is not put in. The food to which the larvæ will be clinging is gently lifted out with the forceps, the box cleansed with a stiff paint brush and duster, new food replaced, and stray larvæ rapidly put in by means of a teaspoon and camel's-hair brush. Great care is to be taken that these boxes are never exposed to the sun, or disaster will follow.

As soon as the larvæ are big enough they are transferred to larva cages in the garden. The cages are in a larva house, which I will describe; I designed it many years ago, and have from time to time altered it. It much resembles a shelter for meteorological instruments. The back and two ends are louvred shutters, the front three

doors covered with $\frac{1}{2}$ -inch wire net to exclude cats, etc., and to allow the sunshine to enter. An ordinary penthouse roof covers a flat roof, the triangular space at each end being left open. A shelf composed of bars with equal spaces between divides the interior. The ends of the house are north and south, the doors face east, and a thick hedge behind shelters it from the glare of the afternoon sun. For about a couple of hours every morning the sun shines right across the face of the house, and every north and east wind blows through it, effectually preventing hibernating larvæ from feeling hungry and ova from hatching prematurely. Underneath are two bins, one containing sifted loam, which is occasionally watered, and the other silver sand. In one or other I keep a bag full of scalded moss, an enamelled iron basin, cotton wool, and spare wells.

The larva cages I use are all on the same principle, and are, in fact, copies (as near as I can go) of the admirable cages made by the late Mr. J. N. Young, of Rotherham, who was for many years prior to his death a member of our Society. His cage consists of a shallow red earthenware pan (diameter 7 inches, depth $3\frac{1}{2}$ inches), with the drainage hole enlarged and fitted with a zinc tube ($1\frac{1}{4}$ inches diameter), which comes up flush with the rim of the pan. Into the tube drops a zinc bottle or well with a flange at the shoulder which completely closes the tube. On the rim of the pan and extending (2 inches) above it is a band of fine perforated zinc closely fitted to the lower rim of a glass cylinder (diameter 6 inches, depth 6 inches), which rests on three brackets soldered inside the perforated zinc band ($\frac{1}{2}$ inch from top edge). A perforated zinc lid closes the cage. My cage consists of a square seed pan (14 inches by 10 inches), to which is fixed a stout rim of angle zinc. The tube is soldered to a square of perforated zinc which covers the drainage holes. On to the rim is fitted another rim of angle zinc which bears a perforated zinc rim framed in wood. Between the two frames of angle zinc is shut a diaphragm with a round hole in the centre to take the upper rim of the tube. The hole is bordered with a flange, which is covered by the flange at the shoulder of the zinc well that drops into the tube. The top of the cage consists of a six-sided frame of Oregon pine fitted on four sides with (20-ounce) glass, and the top with perforated zinc, while the remaining side fits exactly on to the frame containing the zinc rim, and kept in its place with strips of oak. Any part of these cages being broken can be replaced without much trouble and expense in a few minutes. They are so strong they can be piled three high without danger. I have used with considerable success cages on the same plan with leno taking the place of glass and zinc. The leno is glued into the rebates and protected with squares of $\frac{1}{2}$ -inch wire net kept in place with wooden fillets. Hairy larvæ did better in these than any cage I have used; the leno soon becomes soiled, however, quickly rots into holes, and is difficult to renew.

The diaphragm is used until larvæ are full-fed; if they happen to

be of a species which spins on the surface or above ground it is not removed. It is covered with sand, damped if necessary, and greatly assists in keeping the cages in a good sanitary condition. When cleaning them out I proceed as follows:—Place top of cage zinc downward, and in it put the food and larvæ, covering them with a spare diaphragm, flange downward, take off perforated zinc frame and brush it well, remove diaphragm and knock off sand and loose leaves into the iron basin, fit parts together, fresh sand and food, and it is done in less time than it takes to tell. With larvæ requiring earth, remove diaphragm when they are ready, fill with loam from the bin, and cover with a thin layer of sand. By this means the earth does not become too dry before the larvæ use it, no mildewed grass is mixed with the earth, and the weight of the cage is reduced during the time it is most handled. For surface spinning larvæ I place a ($\frac{1}{2}$ -inch) layer of scalded moss on the diaphragm, and cover it with sand.

When living plants are required the diaphragm and tube may be removed and the plants raised in the seed pans. I have found this a good plan with Satyridæ, having a succession of pans of grass raised from seed by a local nurseryman, as I have no greenhouse. Turfs contain too much vermin for the purpose.

It is a saving of much time and trouble in the end to go through all the cages every day and fill the wells. This I effect by means of an apparatus my relatives call the “feeding bottle.” It consists of a long narrow pickle jar, three quarters of a yard of elastic tubing, and a piece of glass tubing drawn out to a fine point. (N.B.—After drawing the tubing out, hold it point downwards in a clear fire; the glass will run and make the point as strong as any other part of the tube.) When filled with water this forms a syphon, the flow being regulated by pressing the elastic tube between thumb and bottle. When not in use both ends of the tube are stuck in the bottle, and it is ready for instant service. This apparatus I also use for spraying the surface of the earth or moss in cages when too dry, and for watering the food for larvæ that require it.

With regard to hybernating larvæ I can say little. General rules seem to be to feed whenever possible, and take care they do not dry up. Small hairy larvæ I have taken through in bottle cages arranged thus:—A glass phial plugged into the neck of the bottle, the bottle filled up to the mouth of the phial with, first, a layer of sand and moss packed tightly round the phial and damped, and second, a layer of loose moss, and the larvæ secured with leno and an elastic band. The small quantity of food obtainable during winter is thus made the most of; it is easily renewed, and the larvæ are readily cleansed by renewing the loose moss and putting in a little clean sand. The larger hairy larvæ I keep in an ordinary cage, the base filled with sand covered thickly with moss. The notorious *B. rubi* does well thus, but requires to be put on a sunny window-ledge where the rain can reach them till they spin up.

Species that cling to the leafless stems of trees and shrubs do well in the ordinary cages, the twigs being plugged into the wells and the base of the cage filled with damp sand. Acidalidæ do extremely well on damp sand covered with moss and dead leaves, on which is sprinkled such food as is available, and watered once a week. I have taken many Noctuæ through most successfully in flower-pots half filled with sand covered with moss, tied over with leno, and placed on a window-ledge.

Pupæ I remove to a pupa cage kept indoors. This cage consists of a box 1 foot square and 6 inches deep, with a lid 3 inches deep. It is divided from top to bottom into four compartments, the bottom of each of which is formed of a square of perforated zinc in a wooden frame, the top of each being also a frame with a piece of calico glued into a rebate and protected inside with a square of $\frac{1}{2}$ -inch wire net secured with wooden fillets. The whole interior is left unplanned. Some gravel is baked, and the larger stones packed over the perforated zinc, and the smaller stuff over them. Some sifted earth, also baked, is placed over this, and some scalded moss pressed well down on it. On the moss the cocoons or pupæ are placed, and covered with more moss. In this cage all pupæ, from the smallest to the largest, do well. The larger species very much appreciate the wire net, making for it at once and, hooking themselves up by their tarsal claws, swing clear of everything, the result being wonderfully few cripples. I make a practice of spraying the moss once a week during winter, and oftener, whenever necessary, in summer. The only drawback is the pupæ are sometimes attacked by fungus, but I have not yet ascertained if the fungus attacks living pupæ; my impression is that only the dead pupæ are liable to it as a rule. I have removed mildew from pupæ with a paint brush moistened with dilute carbolic, and reared the moth from them.

Subterranean pupæ, as a rule, I leave *in situ* till they are due to emerge. I then dig them up and separate the cocoons, which are often in such close masses that a number of insects would be unable to emerge if left in the larva cage. Cocoons spun in the food I cut out and place on the surface of the moss in the pupa cage. I make it a rule to remove all pupæ above earth to the pupa cage as soon as they are hard enough to handle. They are there out of the way of Chalcids, which I have found to be most destructive, having lost whole broods from these little pests making their way through the perforated zinc and attacking the pupæ in their cocoons.

To combat the difficulty of damping the pupæ I have been trying the experiment of placing such as are without cocoons in shallow porcelain dishes containing a little sand. The dishes are embedded in moss in the pupa cage, and the moss freely damped. When due to emerge the pupæ are covered with a layer of moss.

Report of the Oxshott Field Meeting, May 18th, 1901.

By W. J. LUCAS, B.A., F.E.S. *Read June 13th.*

ON Saturday, May 18th, took place the first field meeting of the new season, when twenty-seven members and friends visited the fir woods near Oxshott. On former excursions to Oxshott the weather has not always been everything that one might desire, but on that occasion, at any rate, no complaint could fairly be raised against it. Still, owing no doubt to the season being a backward one, insects and other objects of quest were by no means numerous. But whether insects were numerous or not, a ramble through the fir woods in May cannot fail to be a source of delight, if only to find our inner being in the fresh spring-time beating in unison with the pulsations of Nature when rousing herself in all the youthful vigour of another year. For there does seem to be some subtle influence pervading Nature at that season which makes itself felt, though we may not be able to analyse it or trace it to its source. This experience I hope we were able to secure, although we may have taken but little to fill our boxes and enrich our cabinets.

As some of our members were new to the district it was agreed that the Black Pond should be the limit of our rambles, and accordingly by various routes most of the party made for that well-known hunting ground, where Mr. Enock and others who had come down much earlier in the day had been working with great success for some hours. On leaving the pond a slightly different route was taken back to Oxshott, and a move was at once made to the village to discuss the all-important matter of tea.

Amongst the plants noticed in flower one of the most interesting was an American weed—*Claytonia perfoliata*—found on a bank close to Oxshott station. This plant with its curious perfoliate leaves, which has already a trivial name—the American chickweed,—seems to have come to stay. *Viola palustris* was nicely in blossom at the Black Pond, and *V. sylvatica* elsewhere. *Myosotis versicolor* was abundant by the road-sides. Other flowers were *Scilla nutans* (the bluebell), *Genista anglica* (the badge of the Plantagenets), *Sarothamnus scoparius* (the broom), *Ulex europæus* (the furze), *Geranium molle*, *Erodium cicutarium*, *Anthriscus sylvestris*, *Lysimachia nemorum* (one of the creeping moneyworts), *Anemone nemorosa*, *Lychnis vespertina* (which smells so sweet at night), *Nepeta glechoma* (ground-ivy), *Prunella vulgaris*, and *Stellaria graminea*. *Eriophorum polystachyon* (the cotton-sedge) was coming into blossom at the margin of the Black Pond and elsewhere, and of it Mr. Step obtained a very good photograph. Of the may (*Cratægus oxyacantha*), which seems to have borne very few blossoms this year, a

little was found; I believe I saw it for the first time the previous evening.

Nests of the willow warbler (*Phylloscopus trochilus*) and of the redstart (*Ruticilla phoenicurus*) were discovered by Mr. Turner and photographed by Mr. Step. The common lizard, *Zootoca vivipara*, was taken by Mr. Sich.

At various times I have found about half a dozen species of shell-bearing Mollusca in the woods, but on this occasion the only species obtained was *Zonites nitidulus*, found by Mr. Step.

Turning now to the insects. Of the **Orthoptera** none seem to have been taken,—few, of course, being mature so early as May. Several representatives of the Neuroptera were obtained. The only example of the **Ephemeriðæ** was a sub-imago of *Leptophlebia submarginata*, which soon disclosed the imago. The **Perlidiæ** beaten from the firs were *Nemoura variegata* commonly, and specimens of the small *Leuctra fusciventris* (perhaps the form *nigra*). By Messrs. Enock and Kemp attention was given to the **Odonata**, and they took in the nymphal form *Sympetrum scoticum*, *Libellula quadrimaculata*, *Cordulia aenea*, *Anax imperator*, *Pyrrhosoma tenellum*, and *Enallagma cyathigerum*; while the imagines were *Lib. quadrimaculata*, *Cor. aenea*, *Pyrr. nymphula* (one), *En. cyathigerum*, and *Brachytron pratense*. Of the last, one only was seen by Mr. Enock; it is a new record for the pond, and we might have hesitated to enter it had not Mr. Enock secured a nymph of the same species there a week or two before. Of the **Planipennia**, several of one of the smaller snake-flies, *Raphidia maculicollis*, were beaten from the firs, and by the same means were obtained *Hemerobius stigma* (= *limbatus*) commonly, and a few *H. nitidulus*. But one specimen of the tiny insect with blue-powdered wings, *Coniopteryx* (? *psociformis*), was obtained. *Sialis lutaria* (the alder-fly) does not seem to have been noted, but must have been seen. Apparently the only caddis-flies were two small ones—*Limnophilus centralis* and *Lim. griseus*,—both taken at the Black Pond.

Of the **Coleoptera** a good number were noted; the common green tiger beetle, *Cicindela campestris*, and one specimen at least of the rarer dark purple species of *Cicindela sylvatica*. A number of the Coccinellidæ, *Mysia oblongo-guttata*, *Anatis ocellata*, *Halysia conglobata*, *H. 14-guttata*, *H. 18-guttata*, *Coccinella 10-punctata*, *C. 11-punctata*, and *Adalia bipunctata*; *Leistus rufibarbis*, *Hylobius abietis*, *Crepidodera aurata*, *Donacia typhæ*, *Exochromus quadripustulatus*, *Deporaus betule*, *Anthonomus pedicularius*, *Phyllobius pyri*, *Otiorrhynchus picipes*, *Phyllobius argentatus*, *Agriotes pallidulus*, *Cyclo-notum orbiculare*, *Anisotoma calcarata*, *Pityophagus ferrugineus*, *Helops striatus*. [The next day, the 19th, Mr. Kemp took the rare *Elaeter balteatus* in the same locality.] Of the aquatic beetles Mr. Kemp took *Ilybius fenestratus*, *Saccophilus obscurus*, *Hyphydrus ovatus*, *Noterus capricornis*, and *Rhantus exoletus*.

Mr. Kemp reports of the **Hemiptera** one *Ranatra linearis*,

Nepa cinerea, *Naucoris cimicoides*, *Corixa mæsta*, *Notonecta glauca* in the nymphal state, *Geris lacustris*; and of land species *Acanthosoma dentatum*, *A. griseum*, and *Gastrodes ferrugineus*. Of the Homoptera there is but one—*Tomaspis* (*Triecphora*) *vulnerata*, a single specimen beaten from birch.

Although complaints were made of the scarcity of insects a considerable number of Lepidoptera seem to have been observed. Mr. South took a *Pieris rapæ* with very yellow underside, *P. napi* was common, *G. rhamni* was seen, and both sexes of *Euchloë cardamines*, Dr. Chapman noticing two males together, from which he concludes that the species was fully out. Mr. Montgomery came across fresh males of *Cænonympha pamphilus*. Of moths we have *Bombyx rubi*, *Saturnia carpini*, including one fine dark male taken by Mr. Browne, *Scodiona belgiaria*, both sexes, *Ematurga atomaria*, including a very dark one captured by Mr. South, *Bupalus piniaria*, *Asthena candidata*, *Tephrosia punctulata* (Adkin), *Ephyra punctaria*, *Coremia unidentaria*, *Eupisteria heparata*, *Macaria liturata*, *Pionea forficalis*, *Hemerophila abruptaria*, *Melanippe substriata*, *Eupithecia nanata*, *Panolis piniperda*, *Anarta myrtili*, and *Alucita polydactyla*. Larvæ found chiefly by Mr. Carr were *Pseudoterpna pruinata* on *Genista* and *Ulex*, *Pseudoterpna cytisaria*, *Miselia oxyacanthæ*, *Oporabia dilutata*, *Phigalia pilosaria*, *Bombyx neustria* (a web), and *Coleophora genistæ*.

Mr. Sich and Dr. Chapman worked amongst the micros., and the interesting notes sent in by them I reproduce *in extenso*. Mr. Sich says that his first capture proved to be *Gelechia ericetella*, which was netted on the way up the heather-clad hill at the start. The species was abundant, flying up from the heather at every few paces. Those taken belonged rather to the dark form. *Laspeyresia ulicetana* flew out of every furze-bush. A long search for larvæ of *Coleophora pyrrhulipennella* resulted in one solitary case only, found at the top of a shoot of *Erica*, and on this a parasite had unfortunately been at work. However, it proved the presence of this species on the heath, and also led to the finding of a dark grey "geometer" larva, which Mr. South subsequently named *Gnophos obscurata*. On the birches the larvæ of two species of *Coleophora* were feeding, the dark "pistol" cases containing probably *C. ibipennella*, and the commoner light-coloured ones probably *C. fuscedinella*. There were also a few larvæ of a species of *Micropteryx* mining the birch leaves, and an imago of *Lithocolletis ulmifoliella* was boxed off a leaf of birch, the food-plant of the species in spite of its name. On a whitethorn a male of a species of *Adela* (probably *viridella*) was seen, and a female of that species was afterwards taken. In the lane on the way from the village after tea a male *Elachista rufocinerea* was netted as it flew along over the grassy bank *more suo*. On the fence near the railway station was found an old case, which Dr. Chapman said belonged to *Talæporia tubulosa* (*pseudo-bombycella*).

Dr. Chapman reports as follows :—In places larvæ of *Fumea casta*

were climbing the fir trunks, and some were already fastened for pupation ; last year's cases were still strongly in evidence. Year-old cases of *Taleporia pseudo-bombycella* were also seen. Two cases (♀) of *Solenobia lichenella* (or possibly *inconspicuellu*) were seen with the empty pupa case attached ; one of these contained eggs. Other similar cases containing larvæ are most probably *Narycia monilifera* ; these were frequent. The birch trees were full of larvæ of Eriocranias. Some small trees were really seriously blighted, having one or two mines of *E. semipurpurella* in each leaf. *E. purpurella* was not nearly so abundant, and *E. sangii* was comparatively rare. *E. subpurpurella* was seen on the wing.

Report of the Byfleet Field Meeting, June 1st, 1901.

By W. J. LUCAS. *Read July 11th.*

ABOUT twenty-five members and friends assembled for the field meeting at the Byfleet Canal on Saturday, June 1st, but, except in the case of those few who came down in the morning, they could scarcely form a just estimate of the resources of the district as a collecting ground, owing to the rain which commenced to fall almost as soon as the afternoon train arrived. Those who had come down earlier in most cases proceeded to Woking, and worked their way back to Byfleet. These experienced the fine weather of the morning, and were able to gauge the capabilities of the district from the point of view of a naturalist. Mr. Enock expressed this in his usual vivid style when he told me that "*Step* would not go more than one at a time, as shells were fine and large." Insects, of course, dragonflies especially, were as plentiful as the shells.

Notwithstanding the rain some collecting was done, the results being as follow:

Flowers most worthy of note were the buckbean (*Menyanthes trifoliata*) and *Sedum telephium*. Mr. Enock could not find the beautiful orchid *Epipactis palustris*, which used to occur near "Bunker's" Bridge.

Birds' Nests reported by Mr. F. M. B. Carr were a wood warbler's, with two eggs, and a robin's, also with eggs.

Mr. R. A. Adkin gives a list of fourteen **Mollusca**, all but one aquatic:—*Arion ater*, *Planorbis albus*, *P. vortex*, *P. complanatus*, *P. contortus*, *Limnæa peregra*, *L. auricularia*, *L. stagnalis*, *Paludina vivipara*, *Bythinia tentaculata*, *Unio pictorum*, *Sphæreum corneum*, *S. rivicola*, and *Pisidium amnicum*.

Turning now to the insects, no **Orthoptera** were reported, but the **Neuroptera** (Linnæus) were well represented. Of the **Psocidia** none were captured, and there was but one of the **Perlidia**, viz. *Nemoura variegata*. Of the **Ephemeridia**, *Ephemera vulgata* was common, and the little *Centroptilum pennulatum* was also secured. Of the **Odonata** were taken *Brachytron pratense* commonly, *Libellula depressa*, *Cordulia ænea*, *Calopteryx splendens*, *Erythromma najas* (Carr), *Pyrrhosoma nymphula*, *P. tenellum* (Kemp), *Ischnura elegans*, accompanied by the ♀ var. with orange thorax, *Agrion puella*, *Agrion pulchellum*, of which Mr. Turner gave me a nice female, and *Enallagma cyathigerum*. The **Planipennia** were represented by *Sialis lutaria*, of which Mr. Step saw one ovipositing, and whose eggs I made use of as a copy from which to obtain a coloured figure, *Osmylus maculatus* (Kemp), *Hemerobius humuli*, *Panorpa communis*, and *P. germanica*. **Trichoptera** were *Phryganea grandis*,

Lymanophilus flavicornis, *Glyphotælius pellucidus*, and *Mystacides azurea*.

Mr. Kemp contributes a long list of the **Coleoptera**, in the capture of the members of which Mr. Enock assisted. A variety of *Rhagium bifasciatum*, *Donacia bicolora*, *D. cinerea*, *D. semicuprea*, *D. discolor*, *D. sericea* (with a black var. taken by Mr. Enock), *Luperus rufipes*, *L. flavipes*, *Telephorus lividus*, *T. pellucidus*, *T. nigricans*, *T. lituratus*, *T. bicolor*, *Anisosticta 19-punctata*, *Lacon murinus*, *Galerucella sagittaria*, *Malachius bipustulatus*, *Athous hæmorrhoidalis*, *Agnotes obscurus*, *Othosis salicaria*, *Rhagonycha pallidus*, *Campylus linearis*, *Anaspis frontalis*, *Cassida equestris*, *Meligethes viridescens*, *Cryptocephala aureola*, *Phyllobius calcaratus*, *Hypera rumicis*, *Notoxus monoceros*, *Phædon armoracia*, *P. cochliaræ*, *Deporaus betula*, *Polydrusus cervinus*, *Pogonocherus dentatus*, *Apion hydrolapathi*, *A. geniste*, *Rhynchites nanus*, *Thryogenes festuæ*, *Bagous alismatis*, *Phytodecta olivacea*, *Coccinella 10-punctata*, and *Coccinella bipunctata*.

Turning now to the **Lepidoptera**, ova of *Dicranura vinula* were found by Mr. South on aspen and willow, and one of *Smerinthus populi* on aspen. For the list of larvæ I am chiefly indebted to Mr. F. M. B. Carr:—*Thecla quercus* one, *Pacilocampa populi* one, *Hylophila bicolorana* (*quercana*) one, *Bombyx neustria* abundant, *Porithesia similis* abundant, *Cerura vinula*, *Asphalia flavicornis* one, *Orthosia lota*, *Tæniodampa stabilis*, *T. instabilis*, *Calymnia trapezina*, *Phigalia pilosaria*, *Hypsipetes elutata*, *Anisopteryx æscularia*, *Cheimatobia brumata*, *Hybernia defoliaria*, *H. marginaria*, *Pseudoterpnucytisaria*, *Oporabia dilutata*, and *Thecla quercus*.

Imagines.—*Gonopteryx rhamni*, *Pieris rapæ*, *P. napi*, *Cænonympha pamphilus*, *Lycæna argiolus*, *Smerinthus ocellatus* (Carr) one, *Hepialus lupulinus*, *Euchelia jacobæ*, *Drepana falcatoria* (Carr) one, *Hypsipetes impluviata* (Carr) four, *Lobophora sexualisata* (Carr) one, *Ephyra pendularia*, *Ephyra porata*, *Zonosoma punctaria*, *B. consortaria* (Turner), *Eupithecia castigata* (South), *E. vulgata* (South), *Eupisteria oblitterata* (*heparata*), *Tephrosia punctulata*, very abundant, five from one tree trunk, *Lomaspilis marginata*, *Melanippe montanata*, *M. subtristata*, *M. fluctuata*, *Bapta taminata*, *B. temerata*, *Cabera pusaria*, *C. exanthemaria*, very common, *Rumia cratægata*, *Ematurga atomaria*, and a well-marked female (South), *Cidaria corylata*, *Venilia maculata*, common, *Acidalia remutaria*, *Erastria fuscata* (Adkin), *Phytometra viridaria cænea* (Adkin), *Emmelesia alchemillata* (Adkin), *Pardia tripunctana*, *Phoxopteryx mitterpacheriana*, *P. diminutana*, *Catoptria albersana*, *Dicrorampha plumbana*, *Choreutes myllerana*, *Alucita hexadactyla* (*polydactyla*),—last seven from Mr. South's list.

Major Ficklin took up his position on one of the lock gates, and made a very effective sketch.

In conclusion, I have heartily to thank those members who were good enough to send me lists of captures, viz. Messrs. Enock, Kemp, South, Carr, R. Adkin, and R. A. Adkin.

Report of the Mickleham Field Meeting, June 22nd, 1901.

By W. J. ASHDOWN and E. STEP, F.L.S. *Read August 8th.*

It is probable that the large attendance of members at this field meeting was mainly due to the fact that eleven years had elapsed since our last visit to the same ground. The meeting-place was Ashted Station, and several members who had gone thither by an earlier train spent the interval on the common, beating the hawthorns and blackthorns for larvæ and getting many *Thecla betule* among other species. The train by which the majority travelled was late, so that it was nearly 4 p.m. when a start was made for Ashted village. Hence, by the lane to the right of the "Leg of Mutton and Cauliflower," we proceeded to the higher land of the chalk downs.

At a little distance from the village our lane became a narrow track between tall, untrimmed bushes of hazel, wayfaring-tree, sweet chestnut, beech, and a few walnuts. Here, on the seed-pods of hedge-garlic, the larvæ of *E. cardamines* were fairly plentiful. Our foot-path soon brought us to an expanse of rough, uncultivated land, where the greater knapweed (*Centaurea scabiosa*) was the most conspicuous plant. A note from Mr. Turner (whom we had not yet seen) was found here directing attention to the abundant broomrapes, of which some fine specimens were found, including the great broomrape (*Orobancha major*), its sub-species (*O. elatior*), and the small broomrape (*O. minor*). Here were also the two wild mignonettes (*Reseda lutea* and *R. luteola*), the wild parsnip (*Peucedanum sativum*), the rock-rose (*Helianthemum vulgare*), etc. Young partridges and pheasants were noted, and a nest with eggs of the meadow pipit (*Anthus pratensis*) was photographed.

A little further and we turned into the ancient Ermyn Street, which we followed southward, now between wood and copse of beech, hazel, and dogwood, where wild hop (*Humulus lupulus*) and traveller's joy (*Clematis vitalba*) scrambled over the bushes, and where in one place we saw the two bryonies (*Bryonia dioica* and *Tamus communis*) twined together, and both flowering. Peewits were screaming over the uplands, and a robin's nest with two young birds was discovered in a bank. A steep section of the path now brought us to the more open land of Leatherhead Downs, and a corresponding rise introduced us to fir plantations, between which the ground was carpeted with heath bedstraw (*Galium saxatile*), wild thyme (*Thymus serpyllum*), yellow stonecrop (*Sedum acre*), more rock-rose and milkwort (*Polygala vulgaris*). Here, too, were barberry (*Berberis vulgaris*), pepperwort (*Lepidium campestre*), which afforded a few more *E. cardamines* larvæ, and an abundance of sombre-hued junipers (*Juniperus communis*) and yews (*Taxus baccata*). There

were many plants of deadly nightshade (*Atropa belladonna*), several, of considerable size, in flower.

A rough piece of Mickleham Downs, much mined by rabbits, afforded very large patches of stonecrop in profusion, fine examples of viper's-bugloss (*Echium vulgare*), a large colony of hound's-tongue (*Cynoglossum officinale*), and the remarkable ground-pine (*Ajuga chamæpitys*), which, however, was not flowering. Over Juniper Hill we passed through the beech wood, finding more broomrapes and some stinkhorns (*Phallus impudicus*), and descended into Headley Lane. Time would not permit of an exploration of the classic hunting-ground on this occasion, so we made our way direct to the Burford Bridge Hotel, where a dining-room opening upon the well-kept gardens had been prepared for us, and where forty members and friends sat down to an admirable tea.

After tea a portion of the party walked through Norbury Park to Leatherhead, others proceeding direct from Box Hill station. The following lists of insects and molluscs are compiled from information supplied by various members, to whom the thanks of the conductors are due.

About sixty species of Lepidoptera appear to have been noticed, including those that were found in the larval state. The list is as follows:

RHOPALOCERA.—*Pieris rapæ*, *P. napi*, *Euchloë cardamines*, *Vanessa atalanta*, *Epinephele ianira*, *Cænonympha pamphilus*, *Lyceus icarus*, *L. argiolus*, *Hesperia sylvanus*.

HETEROCERA.—*Euchelia jacobæ*, *Porthesia similis*, *Acronycta psi* (?), *A. aceris*, *Leucania comma*, *Caradrina morpheus*, *Agrotis segetum*, *Triphæna pronuba*, *Dianthæcia nana*, *Hecatera serena*, *Hadena dentina*, *H. thalassina*, *Cucullia umbratica*, *Plusia gamma*, *Acontia luctuosa* (in a chalky field near Ashted), *Hypena proboscidalis*, *Amphidasys betularia*, *Phorodesma pustulata*, *Iodis lactearia*, *Asthena luteata*, *A. candidata*, *Cabera pusaria*, *C. exanthemata*, *Panagra petraria*, *Ligdia adustata*, *Eupithecia venosata*, *Melanippe procellata*, *M. sociata*, *M. montanata*, *M. fluctuata*, *Camptogramma bilineata*, *Phibalapteryx vitalbata*, *Scoparia ambigualis*, *Eurrhypara urticata*, *Scopula olivialis*, *Botys pandalis*, *Pionea forficalis*, *Aciptilia pentadactyla*, *Crambus pratellus*.

LARVÆ of *Euchloë cardamines*, *Gonopteryx rhamni*, *Vanessa urticae* (full-fed), *Thecla betulae* (common on sloe bushes near Ashted Station), *Porthesia similis*, *Bombyx neustria*, *Cilix glaucata*, *Acronycta psi*, *Diloba ceruleocephala*, *Teniocampa incerta*, *T. stabilis*, *Iodis lactearia*, *Hybernia defoliaria*, *Hypsipetes sordidata*, *Anticlea badiata*, *Triphosa dubitata*.

The Coleoptera met with were, with one or two exceptions, of the commonest description, and numbered thirty-three species, namely:

Harpalus punctatulus, *Demetrias atricapillus*, *Tachinus humeralis*, *Stenus speculator*, *Necrophorus humator*, *Choleva cisteloides*, *C. chrysomeloides*, *Saprinus nitidulus*, *Coccinella 10-punctata* (var. *12-punctata*),

Lucanus cervus, *Dorcus parallelipipedus*, *Telephorus hæmorrhoidalis*, *T. flavilabris*, *Malthinus punctatus*, *Malachius bipustulatus*, *M. viridis*, *Toxotus meridianus*, *Grammoptera tabacicolor*, *G. ruficornis*, *Cryptocephalus labiatus*, *Batophila rubi*, *Crepidodera transversa*, *C. ferruginea*, *Cistela murina*, *Ædemera lurida*, *Nacerdes melanura*, *Apion difforme*, *A. pisi*, *Sitones puncticollis*, *Liparus coronatus*, *Balaninus nucum*.

The Orthoptera taken were *Forficula auricularia* and *Tettix bipunctatus*. *F. lesnei* was searched for, but without success, although it occurs near this locality.

A Psocid, *Elipsocus unipunctatus*, and *Chrysopa phyllochroma*, one of the lace-wing flies, are the only Neuroptera to record.

In consequence of everything being so dry, and time not allowing of much search, the only Mollusca noticed were *Helix pomatia*, *H. cantiana*, *H. virgata*, *H. aspersa*, *H. nemoralis*, *H. caperata*, *Cyclostoma elegans*, *Buliminus obscurus*, and *Clausilia bidentata*.

Report of the Brasted Field Meeting, July 6th, 1901.

By ROBERT ADKIN. *Read October 24th.*

WHEN I accepted the leadership of one of the Society's field meetings for the current year I had no very fixed notion of what locality I should suggest, but having in mind the desirability of again breaking new ground, if such might be available within the limited area that can be conveniently worked in the short time allowed by a half-day outing, I thought it well to run through the list of places that had been visited by the Society during the past few years before coming to any definite conclusion. I therefore tabulated the meetings of the past seven years under the heads of counties and places, and was not a little surprised to find that out of a total of twenty-four meetings held during that period no less than fifteen of them, or just five eighths of the whole, had been held in the county of Surrey, five others were at places that may be considered by some of our members as being outside the sphere of the Society's influence, namely, Chalfont Road and the New Forest, thus leaving four only to the credit of the county of Kent.

Although I have not a word to say against Surrey as a suitable collecting ground, its wild heaths and pine woods, its open chalk downs and well-watered valleys afford most excellent opportunities for the holding of field meetings, still, has not the adjoining county, Kent, an equal claim to our attention?

With these thoughts in mind I decided upon the last-named county, and that no part of it would be more suitable for our present purpose than the fine stretch of hills running eastward from the village of Westerham through Sevenoaks, and set about finding the best point from which to attack them.

After consulting maps and time-tables, in conjunction with what little knowledge I had of the district, I came to the conclusion that Brasted would form a good base for operations, and finding on visiting the place that suitable accommodation was forthcoming finally decided upon that district. Little had I reckoned upon the vagaries of the railway company by whose trains we were to travel, and although we have every reason to be satisfied with the accommodation they provided for us and the fares at which they carried us, the withdrawal of the particular train by which it was my intention that we should make the return journey reduced the time at our disposal so considerably as to make the meeting little more than a walk over the ground, yet what we were able to see of the country and the captures that were made in the very limited time available for collecting, suggest that the district may be well worthy of further investigation.

Brasted is a typical Kentish village, consisting of a number of houses and shops scattered along something under a mile of more or less straight road, some half-dozen public-houses, a couple of gentlemen's seats surrounded by park-like grounds, and a church at a respectful distance ; the river Darent flows beside it, turning the village mill, and the place is somewhat exceptionally favoured in being not more than about half a mile from the railway station that bears its name. The village is situated in the river valley on clay and gravel soil, chalk hills rise to the north of it, and to the south the long range of greensand and "Kentish ragstone" hills which formed the object of our present visit.

The party left Cannon Street Station by the 2.30 train, arriving at Brasted about an hour later, and at once made their way by the meadows and through the churchyard to the "Stanhope Arms," and having deposited such *impedimenta* as could be dispensed with, took the road to the village, reached in about half a mile from the railway station. Now turning to the left along the main street for a couple of hundred yards or so, the road leading to Brasted Chart is on the right, exactly opposite the "King's Arms." The first part of this road is bordered on either side by steep grassy banks which do not suggest the probability of advantageous collecting, but beyond this, for a considerable distance, an open wooden fence forms the western border, and on this moths are sometimes to be found fairly commonly at rest. On this occasion, however, a fresh easterly breeze was blowing, and, as might be expected, the fence was bare, of Lepidoptera at any rate. At the end of about a mile, the whole distance being a gentle ascent, Brasted Chart village, a colony of perhaps a score of houses, with a branch post office on which the name of the place is displayed, and a public-house which does not put out a signboard, is reached, and it is here that the open ground of Brasted Chart commences. It consists of a spacious, well-wooded valley on the left hand of the road, and undulating heaths with scattered timber on the right. These heaths extend in a westerly direction almost to Westerham, and in a southerly, or parallel with the road, from which they are divided by enclosures and an occasional cottage and its garden, to Toy's Hill, a place that I shall have occasion to refer to later. Some few of the members took the opportunity of shortening the walk by spending an hour on the Chart and picking up the remainder of the party on their return. It was there that Mr. Enock fell in with a huge mass of that most striking wild flower the French willow, or rose-bay (*Epilobium angustifolium*), in full bloom ; it was growing on old gravel heaps in a pit, and Mr. Enock, who took rough measurements, assures me that the tallest plant exceeded six feet in height, and that the flower spike alone measured fully three feet.

The majority of the party, however, continued their walk along the road for nearly another mile to the southern brow of Toy's Hill, the "Fox and Hounds" being passed on the left hand a couple of hundred yards before the road dips down the side of the hill to the

plain below. On either hand more or less wooded heaths stretch away for some miles, and it was in this neighbourhood that the greater part of the collecting was done; but even those who had hurried along the road in order to spend what time they could in this promising spot had little more than half an hour there, and it is to be feared that the greater number of the party did little more than reach the brow of the hill just in time to return.

This point is just 600 feet above sea level, and on a clear day the views obtainable are among the finest in the southern counties. Unfortunately on the occasion of our visit a heavy mist hung over the lowlands, obliterating the distant hills and rendering objects in the immediate foreground blurred and indistinct.

The timber of the neighbourhood consists chiefly of beech, oak, a certain quantity of fir and birch, the latter growing in all sizes, from old trees with gnarled trunks to mere seedlings. Sallow and holly are both common, and a few juniper bushes are to be found here and there, and the presence of whitebeam suggests the probability of a certain amount of chalk or limestone in the soil. Of the lower plants heather and bilberry are the most common, with patches of galium and wood-sage growing among them, while along the roadsides in many parts cow-wheat is to be found in quantity.

The return was made by the same road by which we had come, and on reaching the "Stanhope Arms" a substantial tea was in readiness, to which thirty-four sat down, and having partaken of it somewhat hurriedly the party—with the exception of some three or four members, who elected to spend the evening in working the slopes of the chalk hills near the railway, and to take their chances by the last train—returned to town by the 7.35, an inconveniently early train, but the latest that would ensure those who had to catch other trains in town reaching their destinations without difficulty.

The thanks of the Society are due to those members who sent in lists of their captures, from which the following has been compiled:

BIRDS.—Night-jar (*Caprimulgus europæus*), two eggs.

INSECTS.—Orthoptera: *Ectobia livida*. Neuroptera: *Enallagma cyathigerum*. Coleoptera, ten species, viz.: *Coccinella bipunctata*, *C. 11-punctata*, *C. 7-punctata*, *Chilochorus bipustulatus*, *Micraspis 12-punctata*, *Malthinus punctatus*, *Nacerdes melanura*, *Straphosomus coryli*, *Halysia conglobata*, *Rhagonycha fulva*. Lepidoptera, eighty-one species, viz.: *Pieris napi* (larvæ), *Euchloë cardamines* (larvæ), *Argynnis aglaia*, *Vanessa urticae*, *V. atalanta*, *Epinephele ianira*, *Cænonympha pamphilus*, *Macroglossa stellatarum*, *Lithosia mesomella*, *Calligenia miniata*, *Spilosoma lubricipeda*, *Saturnia pavonia* (carpini), *Phalera bucephala*, *Acronycta psi*, *Leucania lithargyria*, *L. pallens*, *Mamestra sordida* (anceps), *Miana bicoloria* (furuncula), *Agrotis strigula* (porphyrea), *Triphaena pronuba*, *Tæniocampa stabilis* (larvæ), *Scopelosoma satellitia* (larvæ), *Plusia chrysitis*, *P. gamma*, *Anarta myrtilli*, *Rumia luteolata* (cratægata), *Metrocampa margaritaria*, *Eurymene dolobraria*, *Boarmia repandata*, *B. cinctaria* (larvæ),

Tephrosia consonaria, *T. luridata* (larvæ), *Pseudoterpna pruinata* (cytisaria), *Geometra vernaria*, *Iodis lactearia*, *Zonosoma linearia* (trilinearia), *Asthena luteata*, *Acidalia dilutaria*, *A. virgularia* (incanaria), *A. remutaria*, *A. aversata*, *A. imitaria*, *Timanæra amataria*, *Cabera pusaria*, *C. exanthemaria*, *Macaria notata*, *M. liturata*, *Ematurga atomaria*, *Bupalus piniaria*, *Lomaspilis marginata*, *Larentia viridata* (pectinitaria), *Emmelesia affinitata*, *Eupithecia nanata* (larvæ), *Hypsipetes sordidata* (elutata), *Melanthia albicillata*, *Melanippe procellata*, *M. rivata*, *M. sociata* (subtristata), *M. montanata*, *M. fluctuata*, *Camptogramma bilineata*, *Phibalapteryx tersata*, *P. vitalbata*, *Cidaria fulvata*, *Hypena proboscidalis*, *Zanclognatha grisealis*, *Bomolocha fontis* (crassalis), *Scopula olivalis*, *S. prunalis*, *Pempelia palumbella*, *Rhodophæa tumidella*, *Tortrix xylosteana*, *Dictyoptyryx læflingiana*, *Olindia ulmana*, *Retinia buoliana*, *R. pinicolana*, *Catoptria ulicetana*, *Symæthis oxyacanthella* (fabriciana), *Blabophanes ferruginella*, *Elachista luticomella*.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 14th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Garrett, of Brewer's Green, was elected a member.

Mr. Moore exhibited a sparrow found dead in Southwark Park, having a most abnormal development of the lower mandible, which was between two and three inches long, curved downwards, and forming a V-shaped trough. The upper mandible was of the normal size.

Mr. Colthrup, on behalf of Mr. Hills, of Folkestone, exhibited a pencil drawing of a variety of *Polyommatus icarus*, in which the spots on the under surface were united into longitudinal and radial streaks.

Mr. Wyandotte exhibited a large number of specimens of amber in which were various species of insects.

Mr. W. West (Streatham) read a paper entitled "Fossil Insects," in which he especially referred to insects in amber. He afterwards exhibited a very large number of lantern slides, many of them being photographs of various insects embedded in amber (page 1).

FEBRUARY 28th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. F. N. Clark exhibited a specimen of *Pieris rapæ*, which emerged indoors on February 22nd, and several other members also mentioned instances of unseasonable emergence.

Mr. McArthur exhibited a specimen of *Arctia caia* with smoky hind wings; this was an example of a third brood which emerged in December, 1890.

Mr. Harrison exhibited a long and very varied series of *Luperina testacea* taken at Wallasey. Two specimens were very dark examples, and referable to var. *nigrescens*.

Mr. Edwards referred to the ravages of the larvæ of

Zeuzera pyrina, a species at the present time causing an immense amount of damage to the trees and shrubs in the London parks and squares.

Mr. Montgomery, to illustrate his paper on "Rearing Lepidoptera," exhibited a number of cages for rearing Lepidoptera. Some were for rearing larvæ from ova, others were for hybernating larvæ, and one was a cage specially made for the treatment of pupæ. He also showed a travelling box for conveying the cages of young larvæ and a photograph of the penthouse he had had built to contain all his cages and other material (page 5).

Mr. Adkin considered the paper most useful and practical, and he referred to the Tugwell method (see "Abs. Proc. S. Lond. Ent.," 1889), which he had found very successful, but with this method care must be taken not to moisten the soil too freely, or mould would result.

Mr. Sich wished that some member could give practical hints as to dealing with the larvæ of micro-Lepidoptera, which he had found so very difficult to rear successfully.

The President considered that, where it could be done, "sleeving" was one of the best methods of rearing micro-larvæ.

Mr. Montgomery, in replying, mentioned that he always removed mould with a brush and carbolic acid.

MARCH 14th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Colthrop exhibited a long series of females of *Polyommatus icarus* and *P. bellargus*, most of which partook in a greater or lesser degree of the male coloration. Some of the former species were prettily splashed with a considerable amount of whitish colour. They were all from Eastbourne. Mr. Adkin said that the splashed forms were all of the type usually obtained from the chalk downs of Sussex.

Mr. Routledge exhibited a specimen of what he supposed to be a male of *Hydrilla palustris*, taken on the wing June 10th, 1899, by Mr. Thwaites, near Carlisle. He called attention to the fact that the female of that species had on two previous occasions been taken in that neighbourhood. Several members were doubtful whether the specimen was *H. palustris* or an example of a species new to Britain. Mr. McArthur said that the males of *H. palustris* that he had seen were not so large as the insect exhibited, and the fore-

wing was narrower and paler. (Subsequently the identification was verified.)

Mr. Harrison exhibited a long series of *Aplecta nebulosa* from Delamere Forest, including some very dark specimens referable to var. *robsoni*, together with a very dark form of *Xylophasia monoglypha* from the same locality, referable to var. *æthiops*.

Mr. Robert Adkin exhibited a series of *Caradrina ambigua* bred in December last from South Devon parents, and read the following notes:—"On September 15th last I received from Mr. G. T. Porritt a batch of eggs of this species that had been laid by a moth that he had taken in South Devon a few days previously. They hatched on the 18th, and the young larvæ were put into a wide-mouthed glass bottle with a supply of narrow-leaved plantain and dandelion leaves and some knotgrass. The mouth of the bottle was covered with a piece of calico, secured by an elastic band, and kept in a warm room. Within a few days it was evident that the larvæ were feeding, and an examination of the food showed that they were taking very kindly to the knotgrass, and eating the dandelion sparingly, but the plantain appeared to remain untouched by them. As the larvæ increased in size they were shifted to larger bottles. Some time, however, before they were full-grown the supply of knotgrass failed on account of the rapidly approaching winter, and it was necessary to find some other pabulum; dock, groundsel, chickweed, and a species of crepis (*Crepis virens*, I believe) were offered them, all of which they ate, but preferred the last named. On approaching full growth they were removed to a small cage consisting of an earthen pot containing sandy peat, a glass cylinder, and perforated zinc cover, to enable them to undergo pupation. On November 4th two or three of them made fairly hard 'sand cocoons' on the surface of the earth, and by the 11th all but about a dozen had pupated. These were of various sizes, from quite small to others that looked as though they were on the point of full growth; but as they would neither feed nor pupate, they were removed out of doors for hybernation, but very soon succumbed to such treatment. The moths emerged between December 6th and 15th."

Mr. McArthur exhibited preserved larvæ of *Abraxas grossulariata*, *A. ulmata*, and *Pachnobia alpina*, together with a specimen of *A. ulmata* taken near Brighton some fifty years ago. For years afterwards the latter species was sought for in the same place, but none were taken until about sixteen years

ago, when it was found in some numbers but very local. Mr. Adkin said it was found at Chalfont Road, but was local and confined to one portion of one wood. The President and Mr. McArthur had both found *A. grossulariata* to be exceedingly local in Stornoway.

Mr. Kirkaldy exhibited specimens of the lantern-flies *Pyrops candelarius* from China, and *P. maculatus* from Ceylon, and contributed the following note:—Mr. Fletcher has been good enough to send me a copy of his observations on this insect, recorded at the time in his journal:—Sometimes they were on the trunk (of the tree), with which they harmonise very well, and sometimes high up in the branches; in the latter case they are easily beaten out, and then fly quite a distance, their vivid yellow hind wings rendering them very conspicuous on the wing. . . . A tree at the top of the (Botanical) Gardens (at Hong Kong), with a Chinese coolie gesticulating under it, attracted Mr. Fletcher's attention, and he found a pair of *candelarius* settled on a branch, with whose environment they harmonised well. Mr. Fletcher insists on the harmony of *candelarius* with its environment, but Mr. E. E. Green's account of the Singhalese *maculatus* is very different. "Our *Pyrops maculatus* is a very conspicuous insect when at rest, and takes no measures to conceal itself, trusting to its marvellous agility" (E. E. Green *in litt.*, August 22nd, 1900).

Mr. Burr called attention to the evasive habits of many grasshoppers. The active species, especially males, would leap and then fly, the heavy females would burrow under grass and *débris*, while the smaller species would walk round to the further side of the stems they were upon.

Mr. Manger exhibited a number of species of Odonata, Ascalaphus, and Myrmeleons.

MARCH 28th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Alf. Sich exhibited specimens of *Goniiodoma limoniella* (*auroguttella*), a species closely allied to the genus *Coleophora*, of which the larva quits the case when about to pupate; some species of the genus *Coleophora*, including *C. deauratella*, *C. frischella*, *C. alcyonipennella*, *C. ochrea*, *C. vibicella*, and *C. salicorniæ*, of which the last also quits its case to pupate, together with *Gelechia tenebrella*, a moth bearing a

superficial resemblance to *Coleophora alcyonipennella*, but at once distinguishable by the quite different shape of the hind wings.

Messrs. Harrison and Main exhibited long series of early spring Geometers, taken this season in Delamere Forest and in Epping Forest, viz. *Hybernia marginaria* (*progenitaria*), *H. ruficapraria*, *H. leucophæaria*, *Anisopteryx æscularia*, and *Phigalia pedaria* (*pilosaria*), together with *Nyssia hispidaria*, captured in Delamere Forest, where, it was believed, it had not hitherto been taken. Mr. Sich remarked that as a rule the hind wings of *H. marginaria* had one well-defined line, but frequently there were two, and in some instances three lines, while he had seen an example in which the lines were four in number.

Mr. West (of Streatham) exhibited pieces of amber having examples of Diptera and Homoptera enclosed in them.

Mr. Robert Adkin exhibited specimens of *Acherontia atropos*, bred from pupæ taken in Huntingdonshire in the autumn of last year, and communicated the following note :

"On December 12th last I received fourteen apparently healthy pupæ from a correspondent at Ramsey, who at that time had upwards of two hundred of them that had been collected from the potato-fields in the district some two or three months earlier. I was confidently assured by those who had experience with the species that I should do no good with them, as it was too late to commence forcing them, and that if not forced they would all die during the winter. This, I am bound to admit, was quite in accordance with my own views. It is possible, under specially favourable climatic conditions, that some of the autumn pupæ may withstand the effects of a British winter and produce imagines in the spring if left undisturbed ; but after being dug up, and thus deprived of their natural protection, the chances of success are undoubtedly very greatly diminished. Presumably *atropos* is, with us, on the verge of the district in which it can exist under natural conditions, and is therefore more likely to complete its metamorphoses successfully when placed under artificial conditions more nearly resembling the warmer climates where it breeds freely, such as 'forcing.' I accordingly determined to try to assist my pupæ by putting them, on arrival, in an earthen pan on about a couple of inches of damp moss, and covering them with a like thickness of the same material, covering the whole with a bell-glass, the joint between the glass and the pan being made with a strip of cotton wool, and keeping them in a warm

room. I was not, however, satisfied that the warmth was sufficient, and so on December 20th (just over a week after I received them) I removed the pan into the kitchen, and stood it on the top of a cupboard beside the hot-water pipes that supply a bath. Here the temperature appeared to be all that could be desired, but I found that the moss became too dry. To overcome this difficulty the pan was stood upon a soup plate filled with water, and I then found that the conditions that I had aimed at were working quite satisfactorily. On January 18th a fine perfect moth emerged, and on the 20th another, and I began to feel hopeful of success. On the 23rd a badly crippled moth appeared, and that was the end of my experiment. On opening several of the remaining pupæ a month or so later I found in every case that the moth appeared to be fully formed; but the abdomen was empty, a mere hollow shell, a point that has puzzled me considerably, but for which I have, at present, been unable to find any satisfactory solution."

Mr. Carpenter suggested that perhaps the pupæ had been kept too hot. He also had failed, but thought it was because in his case the larvæ were very late in feeding up.

Mr. Pearce had been very successful with his pupæ. He had a perforated tin with loose soil at the bottom, some two gallons in amount. Then he placed a layer of two inches of moss, with moss all round. The larvæ were laid on the moss, which was kept moist. The tin was kept inside the fender of a fire which was burning ordinarily during the day. Most of the pupæ yielded moths in November, but one went over December, and was put away in an outhouse. From the latter a perfect imago emerged in the following June.

Mr. Adkin said that it seemed if one wished to force the pupæ it should be commenced early. It would seem that in nature the early stage of the pupæ would be at a fairly warm temperature.

Mr. Montgomery said that it was the custom of the late Mr. Young, of Rotherham, to leave the pupæ of this species in the earth in which they had pupated; and they, as a rule, emerged in due course the following June.

The President remarked that he once had a pupa, which was placed in a vase on a mantelpiece, and from which there emerged a perfect imago at the normal time in the following year.

Mr. Montgomery exhibited a larva of *Charaxes jasius*, sent to him by Dr. Chapman from Cannes, and from which a *Gordius* had extruded.

Mr. Bishop read a paper entitled "The Natural History of the Guildford District."

APRIL 11th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Carpenter exhibited a large number of specimens of *Picris napi*, reared from ova deposited in May, 1896. The larvæ fed up and pupated in June, 1896. About half of these emerged during the latter part of June and the early part of July of the same year. The remainder of the brood went over the winter of 1896-7, and emerged in April and May of the latter year. The early emergences were all very typical, with scarcely any variation, while the latter were especially noticeable for the great amount of variation in the black markings of the female. He also exhibited a large number of bred specimens of *Melitæa aurinia* from Penarth and Carlisle. Mr. Montgomery noted a female of the former species without the discoidal mark on the upper surface of the wing.

Mr. McArthur exhibited specimens of *Plutella annulatella* from the Orkneys. They were very bright and conspicuously marked.

The President exhibited a number of species of Lepidoptera and other insects taken during a short trip to Canada last year, and read notes on their occurrence.

Mr. W. J. Lucas exhibited ten species of dragonflies collected by Mr. H. S. Fremlin in Canada in 1900. All the specimens but one were taken at Loon Creek, Fort qu'Appelle, Assiniboia. The most noticeable point is the general resemblance to British species. There are three *Sympetra*, one closely resembling our *S. sanguineum* and another our *S. flaveolum*. The specimens of *L. quadrimaculata* are unsuffused and with small nodal spots, like the northern British forms. The *Gomphus* came on board ship near Montreal, and insisted on being captured. The only *Æschna* is a British species, *Æ. juncea*. The *Lestes* is very near *L. sponsa*, if not identical with that common British species. Then we have at least three Agrionines, of whose identity I have no idea at present.

Mr. Enock reported that Mr. J. Enock and himself had met with an example of the spider *Epeira umbratica*, which had hibernated in an old trunk at Golder's Hill. He also

said that a partridge had visited his garden at Holloway quite recently, and that the pied blackbird had for the fourth season returned to his garden to breed. Last year the brood contained two young which were splashed with white. He exhibited specimens of parasitic Hymenoptera.

Mr. F. Noad Clark exhibited slides of Desmids which had been prepared by Professor Bryan's method, as described in "Science Gossip" last year (1900). They included several species of *Micrasterias*, *Closterium*, *Cosmarium*, *Penium*, etc. The colour and outline of these were seen to be perfectly preserved, a result which is generally difficult to attain with this class of object. Mr. Clark expressed the opinion that these mounts were as nearly as possible permanent.

Mr. R. Adkin, referring to the *Acherontia atropos* exhibited by him at the last meeting, said that he had opened several of the pupæ from which the imago had not emerged, and found them hollow sacs, but in some there were remains of a membrane.

Dr. Chapman remarked that the great cavity shown in the abdomen of the imago of *atropos* might, perhaps, be stretched in drying, but represented substantially the air cavities formed by dilated tracheæ, which occupy much space in the abdomina of so many insects. Inflation of these cavities, and apparently also of portions of the alimentary canal, was a constant resource at emergence from the pupa to secure the tension and increased bulk necessary for rupturing the pupa case and cocoon, as also to obtain tension of the cutaneous envelope, and so fulcra for muscular action,—as, for example, in male Psychids at pairing time, and in female Psychids in completing oviposition. In the case of *atropos* these large cavities, compressed by muscular action, afforded the means of making the squeak of that species. At the base of the proboscis was a sac or space, apparently a dilated portion of the upper extremity of the œsophagus; between this and the proboscis was an opening, capable of being contracted to a narrow slit, a truly laryngeal structure. Air forced out of the sac through this slit produced the squeak. Some similar structure probably exists in all Lepidoptera that have suctorial habits, and forms a pump for sucking up through the proboscis and passing the results onwards. It has no sufficient muscular apparatus, but is largely surrounded by dilated tracheal vessels. There seems, therefore, to be present no means of forcing air (or other fluid) into or out of this vocal and

suctorial sac, but variations of pressure of air in the surrounding tracheal plexus, enlarging or contracting them, and being in the confined space of the insect's head, compelling the sac to contract or enlarge compensatorily. The force for doing this is probably chiefly derived from the action of the abdominal muscles on the abdominal air sacs seen in the specimens shown, assisted by reaction that is probably chiefly the result of the elasticity of the tracheal vessels and other parts. That the alimentary canal is also inflated appeared to be the case in transparent-bodied *Tipulæ* observed at emergence, there being a large cavity containing both air and fluid, of which the latter was voided on completion of the expansion of wings and contraction of the abdominal proportions. The tension so obtained was no doubt also useful in wing expansion, etc.

Several members remarked that they had heard the larvæ "squeak."

Mr. Step said that the gurnard fish possessed an internal air-bladder which was constricted in the middle, and by means of pressing the air through this constriction it produced a grunting sound. The fishermen had named it the "Piper."

APRIL 25th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

The evening was devoted to a special lecture by Mr. R. Kearton on "Wild Life in Nature." This was illustrated by many pictures on the screen from his own photographs.

MAY 9th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Step exhibited a number of living specimens of a Coleopteron, *Mycetophagus quadripustulatus*, taken on the banks of the Brent in decaying fungi.

Mr. S. W. Kemp exhibited a box containing seventy-eight cases made by larvæ of caddis-flies (Trichoptera) of the genera *Phryganea*, *Limnophilus*, *Scricostoma*, *Anabolia*, and *Molanna*. They were all found either near London or at Oxford.

The larva of *Limnophilus pellucidus* cuts circular pieces

from dead leaves at the bottom of the pond to make its own case. Two beech leaves which had circular pieces cut from them (after the manner of the leaf-cutting bee) were exhibited. A large number of cases probably made by *Limnophilus flavicornis* were composed of fresh-water shells; *Sphærium*, *Planorbis*, *Limnæa*, and *Bythinia* being most frequently used. One larva had used an operculum of *Paludina*, and another had attached a dead land-shell which had dropped into the water. It should be mentioned that the *Sphærium* and *Planorbis* shells were all living when the cases were found.

Mr. Cant exhibited a specimen of cork composition, suitable for lining insect drawers. It was not cork carpet, which had been found to become too hard in time. The cost of the composition was about the same as that of cork, but it was much more uniform in texture.

Mr. Enock exhibited living nymphs of several species of dragon-flies, including *Anax imperator*, *Æschna cyanea*, *Brachytron pratense*, *Calopteryx splendens*, and *Erythromma najas*. They were obtained from the Black Pond, Esher, and from Byfleet.

Mr. Lucas exhibited specimens of *Ancylus lacustris*, a so-called fresh-water limpet, from the canal near Byfleet station. These were taken from a branch lying in the water. *Ancylus* is closely related to *Limnæa*, but the spire, which is very small in some *Limnæas*, is absent from *Ancylus*.

Mr. T. N. Clark exhibited photographs of the ova of *Tæniocampa stabilis* and of *Ennomos tiliaria*.

Mr. Turner exhibited dragon-fly nymphs, one being that of *Anax imperator*, from the ponds at Keston.

Dr. Chapman exhibited living specimens of *Thais polyxena* bred from larvæ taken in the south of France.

The President exhibited several cultures which he had made from the dead pupæ of *Acherontia atropos*, exhibited recently by Mr. Adkin. Separate species of bacteria were obtained from each pupa examined, and this suggested to him that the presence of these organisms was no cause of the death of the pupa. Dr. Chapman said that of his twelve pupæ of this species none had produced imagines, and all but one had died. Mr. Hall said that he only obtained one pupa last year, and this was still lively.

Mr. Bateson gave an address on "The Recent Advances in the Study of Heredity," and exhibited numerous specimens, chiefly botanical, in illustration of his remarks.

MAY 23rd, 1901.

Mr. W. J. LUCAS, B.A., *Vice-President*, in the Chair.

Mr. Step exhibited the eggs of the redstart (*Ruticilla phœnicurus*), found during the field meeting of the Society at Oxshott on May 18th.

Mr. Robert Adkin exhibited a living example of the coleopteron *Pyrophorus noctilucus*, commonly known as the "fire-fly," received from Jamaica. During the voyage and since its arrival in this country, some ten days before the date of the meeting, the insect had been supplied with sugar and water on a sponge and small pieces of sugar-cane, on which it appeared to have fed freely. He mentioned that the insect had, soon after its arrival, given several brilliant displays of its luminous powers, but during the few days preceding the meeting it appeared to have become feeble and to have lost the power of emitting the light. He pointed out the yellow patches, one on either side of the thorax, from which the light was given off, and referred members desiring further information regarding the species to the "Cambridge Natural History," vol. vi., p. 258. He also exhibited the cartilaginous vertebræ of a shark, a specimen of sugar-cane measuring $5\frac{1}{4}$ inches in circumference, and a green cocoa pod with seeds *in situ*,—all from the same locality.

Mr. F. M. B. Carr exhibited series of some thirty species of Lepidoptera that he had reared or captured during 1901.

Mr. E. Step, under the title "Spring Notes—chiefly Botanical," gave a lantern demonstration of photographs taken during the last and present springs, depicting many Surrey wild flowers and bird's-nests, and made comments upon these as they appeared.

JUNE 13th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Messrs. R. Armstrong Adkin, Lingard's Road, Lewisham; R. Armstrong, of Granville Road, Lewisham; W. Dodds, of Stoke Newington; and W. Thornethwaite, of Hersham, were elected members.

Mr. Lucas exhibited a living lizard (*Platydictylus muralis*) which came in a crate of bananas from the Canaries, and

specimens of the plants *Cotyledon umbilicus* and *Sedum anglicum* sent to him by Mr. Rowden, from Exeter. A discussion arose as to the distribution of the former plant, and it was generally considered to be confined to the south-west and western districts at no great distance from the sea, and not to be found at all further east than Hampshire. Mr. Step remarked that several plants had practically the same area of distribution, such as *Sibthorpia*, two of the heaths, and one or two species of clover. Dr. Chapman called attention to the fact that the *Cotyledon* was by no means restricted to the coast on the Continent, being found commonly in many parts of the Alps.

Mr. R. Adkin exhibited the living larvæ of *Acidalia marginepunctata* feeding on yarrow, and stated that previously he had always been unsuccessful with the breeding of the species. He remarked that the larvæ seemed to be much removed in form from the usual Acidalid larva, and that this fact seemed to portend the breaking up of the genus at no distant date.

Mr. Kemp exhibited series of the following Coleoptera taken on the banks of the canal at Byfleet on June 1st, during the Society's field meeting:—*Rhagium bifasciatum* (confluent spotted var.), and fine series of *Donacia bicolora*, *D. sericea* (black var.), *D. semicuprea*, *D. simplex*, *D. cinerea*, and *D. discolor*.

Dr. Chapman exhibited the curious fungus *Geaster limbatu*s, the starry puff-ball. He also exhibited the pupating burrow of *Scardia boleti*. Their peculiarity consisted in a specially constructed trap-door. The burrow is of some length, and the cocoon proper occupies the lower half or third of the burrow. The surface opening of the burrow is a loosely constructed dome of silk and *débris*, but the top of the cocoon proper is a trap-door, made of scraps of fungus, rotten wood, or whatever the burrow is made in, embedded in a dense mass of silk, the whole forming a circular disc of some thickness, firmly attached to one side of the burrow so as to form a hinge; loosely elsewhere, so that the pupa easily thrusts it open, though it is less easily forced inwards. There is often a bend in the burrow at this point, purposely arranged to allow the trap-door to fall well back out of the way of the pupa. As a cocoon with a trap-door, that of *Lagoa crispata* was instanced, and specimens exhibited; in this cocoon, which roughly resembles one of *E. lanestris* or *H. prasinana*, there is a trap-door, woven of silk, hinged at one side, loosely attached at the other. The cocoon is

somewhat curved, being convex on the hinged side, so that the line of egress of the pupa is facilitated. In *L. crispata* there is above the trap-door an arch or dome of looser silk, and the space between the two is stuffed with the grandly plumose hairs of the larva, which do not appear to enter into the construction of the cocoon elsewhere. The trap-doors of the Australian *Xyloryctes* to larval burrows and of the trap-door spiders are perhaps better known, but such structures are not frequent.

The pupal burrow of *Acronycta strigosa*, and of some others, much resembles at first sight that of *S. boleti*, having an outer and inner diaphragm. In these, however, the lower diaphragm is not a trap-door, but is ruptured by the moth in its escape.

Mr. Main exhibited a batch of ova of *Bombyx rubi* deposited naturally on a spray of *Myrica gale*, together with a photograph of the same.

Mr. Lucas read the Report of the Field Meeting of the Society held at Oxshott on May 18th (page 11).

Mr. Adkin gave an account of the annual meeting of the South-eastern Union of Scientific Societies held at Haslemere in the first week in June.

JUNE 27th, 1901.

Mr. F. NOAD CLARK, *Vice-President*, in the Chair.

Mr. A. W. Pepper, of Horniman's Museum, was elected a member.

Mr. Ashdown exhibited, and afterwards placed in the Society's collection, the dragon-flies *Anax imperator* and *Ischnura pumilio*, male and female, all taken in the New Forest.

Mr. Hewitt exhibited specimens of *Geranium striatum* and *Corydalis claviculata* from Kent. The former was a native of N. America, and no doubt a garden escape.

Mr. Turner exhibited an almost black specimen of *Amphidasys betularia* taken in Camberwell. Mr. Main said that he had taken a var. *doubledayaria* at Forest Gate, and had seen another taken. Mr. F. M. B. Carr had also taken a black female of the species, which had deposited a considerable number of ova.

Mr. West exhibited the following Hemiptera, all from the Ravensbourne below Lewisham:—*Microvelia pygmaea*, a developed form which was very rare in this country; *Gerris*

odontogaster; *G. najas*; and undeveloped and developed forms of *Hydrometra stagnorum*.

Mr. Fred Enock exhibited bred specimens of *Libellula depressa*, of which the nymphs came from Epping; bred specimens of *Libellula quadrimaculata*, the nymphs from the Black Pond, Esher, with typical and some very fine varieties of var. *prænubila* and others in which the nodal spots were much diffused laterally, and the costal margin beautifully clouded right to the base as well as being suffused with saffron. From a large number bred he had noted that the nymphs come up to the surface about 9 p.m. and remain all night, then from 7 to 8 a.m. search out suitable stems up which they climb. In this matter they are most fastidious, much preferring to crawl (if possible) over the edge and then risk cracking their skulls by a fall of four feet, so that they could crawl up and affix themselves to some rough board, or better still the edge of a drawing board. The time from leaving the water to full development was four hours, the "rest" period being generally twenty minutes.

He also exhibited larva of *Thecla betulæ* from Epping, and a female *Anax imperator* (alive) with right posterior wing abnormally small.

Dr. Chapman exhibited a specimen of *Cordulia aenea* from Reigate, and also an example of *Trichiura cratægi*, var. *ariæ*, from the Alps. Mr. Tutt remarked that it was a form parallel in its life history to *Lasiocampa quercûs*, var. *callunæ*, in that it passes the first winter as a young larva, and the second as a pupa, from which the imago emerges the following June. Its habitat is high moorland districts.

Mr. Harrison exhibited a series of *Amphidasys betularia*, consisting of twenty males, forty females, and six gynandrous specimens, bred from a pair taken in the New Forest in 1900. The parents were also exhibited, and were quite normal. Altogether seven gynandrous specimens were bred; the wings and antennæ of four were male on the right side, the remaining being male on the left side. The larvæ were started indoors, and then sleeved on birch till full-grown.

JULY 11th, 1901.

Mr. W. J. LUCAS, B.A., F.E.S., Vice-President, in the Chair.

Mr. Kemp exhibited a short series of the Coleopteron *Dytiscus punctulatus*, caught by Mr. F. Enock at Wisley. He also exhibited the Odonata, *Brachytron pratense*, *Calopteryx*

splendens, *Erythromma najas*, *Agrion pulchellum*, and *Ischnura elegans* (with var. *rubra*); the Trichoptera *Phryganea grandis*, *Limnophilus marmoratus*, and *Limnophilus rhombicus*; and *Raphidia maculicollis*. All were obtained at the Byfleet Field Meeting.

Mr. F. M. B. Carr exhibited a series of *Thecla rubi* taken at Wrotham, Kent, this year. One specimen had a cream lozenge-shaped spot on each of the fore-wings [aberration of male mark].

Mr. South exhibited a series of *Zonosoma porata* bred in June last from ova deposited by a female specimen taken at Oxshott in August, 1900. Four of the twenty specimens bred were of brownish coloration, tinged with reddish on the discal area as is usual in this species. He stated that he did not notice any difference in the coloration of the insects when removed from the breeding cage in which they emerged; they were placed in the ammonia jar, and when turned out for setting the unusual colouring was at once detected. Although he thought that the change in colour might be due to the action of the ammonia, he was at a loss to understand why the other specimens had not been affected in a similar manner, seeing that they too had been killed by ammonia. He also showed a specimen of *Eurrhynx urticata*, Linn., in which the basal spots and the discal and upper spots of post-medial series were confluent, forming blotches on fore-wings; the submarginal spots were also confluent, and united with the marginal border. On the hind wings the post-medial spots were more elongated than usual, and connected by a black streak with the discal spot. The specimen was taken by a boy in Balham last June.

Mr. South exhibited, on behalf of Mr. R. S. Mitford, three varieties of *Melitæa cinxia*, taken by Mr. Mitford in the Isle of Wight in May and June last.

(a) Central transverse lines absent from upper surface of fore-wings; black lines on outer marginal area of hind wings more or less confluent. On the under surface of the hind wings the straw-coloured bands are almost devoid of black markings. This example is a modification of the aberration of the species figured in "Proc. S.L.E.N.H.S.," 1887, pt. 1 (right-hand fig. of *M. cinxia*).

(b) Central spots of fore-wings confluent.

(c) Central transverse lines partially effaced.

Mr. A. M. Montgomery exhibited pupæ of *Leucophasia sinapis*, on one of which the usual white line was replaced by pink.

Mr. Bishop exhibited living larvæ of *Eugonia* (*Vanessa*) *polychloros* from ova taken as they were deposited in nature by the female, together with pupæ of *Euchloë cardamines*.

Mr. Kirkaldy exhibited a series of genera of Fulgorinæ (Homoptera), showing the remarkable development of the head, particularly *Phrictus*, diademate; *Zanna* and *Pyrops*, long, sometimes tapering, sometimes clavate, sometimes thick, proboscis-like; *Euchophora*, recurved; the inflated *Fulgora* (= *Laternaria*), with a ludicrous resemblance to a hippopotamus in *parvo*. Also a series of some ornate Rhynchota, among which may be particularised the lovely pale blue-lilac Singhalese *Hansenia pulverulenta*; the Japanese *Geisha punctatissima*, delicate pale green, margined narrowly with pale rose; the Indian *Cerynia maria*, delicate rose-tinted—all three belonging to the Fulgoridæ—and a number of fine Cicadidæ and Scutelleridæ (*Chrysocoris*, *Calidea*, *Huechys*, etc.). Also a number of coffee and cruciferous pests from Ceylon, Africa, and America.

Mr. Colthrup exhibited two varieties of *Smerinthus tilia*. (1) Bred by Mr. A. J. Lawrance, Bromley, Kent, November, 1900 (forced out), from larvæ taken there October, 1900. *Fore-wings*: ground colour very pale fawn; usual markings very pale fawn-green and indistinct. *Hind wings*: pinkish tint, the whole insect having a pinkish tint. (2) Bred by himself, 1901, from larvæ taken in East Dulwich, October, 1900. *Fore-wings*: ground colour dark brown; markings very intense green. The band on fore-wing replaced by a small spot midway between costa and hind margin. *Hind wings*: ground colour dark brown, with green markings.

Mr. Lucas read the Report of the Field Meeting held at Byfleet on June 1st (page 15).

Mr. F. Noad Clark read the following "Notes on my Garden":—"Amidst the most unpromising surroundings how often have many of us succeeded in making a passable collection of specimens of natural history! It does not always follow that the most likely or the best recommended localities will yield a 'bag' which will fulfil our expectations.

"Having an hour to spare this afternoon after my midday meal, I took myself to my favourite spot at that part of the grounds of the Paddington Infirmary which abuts on the Grand Junction Canal, with the object of collecting, if possible, one or more specimens representative of the various orders of insects.

"I will relate to you as to how far I was successful in my

search. The part chosen for collecting lies on the north bank of the canal, and in consequence of the grounds being private, having the towing-path on the opposite side, the banks here are unfrequented and present a naturally wild aspect, with a fair amount of undergrowth, backed by a row of lime, poplar, and privet. The sweet-flag, *Acorus calamus*, grows in abundance on the margin of the water, and numbers of dragon-flies, *Ischnura elegans*, flitting here and there amongst the rushes, present at once a striking feature. Time will not allow of my giving an exhaustive account of the many interesting inhabitants of the canal proper, but in past years it has been a source of the greatest interest to me, chiefly on account of the great numbers of the three-spined stickleback (*Gasterosteus aculeatus*), attended by their guests, the little-known Entomostrakon, *Argulus foliaceus*, whose life history I have had exceptional opportunities of studying.

“From time to time I have taken here several species of the aquatic Hemiptera, *Corixa*, *Nepa*, *Notonecta*, etc., as well as the larval forms of several of the dragon-flies and may-flies.

“The waters abound with microscopic life, such as the Desmids, *Infusoria*, *Rotifera*, fresh-water Diatoms, etc. etc., and I have derived much instruction and interest from their study with the microscope.

“The Lepidoptera, as one might imagine, are of the ordinary type. In previous years *Catocala nupta* was frequently to be found on the adjoining grey brick walls, their similar appearance to the latter being, no doubt, a good example of ‘protective coloration.’ *Spilosoma menthastri* and *S. lubricipeda*, *Dicranura vinula*, *Smerinthus populi*, *Phlogophora meticulosa*, *Arctia caia*, etc., are among others I have noticed.

“During my search this afternoon I took the following examples of the various orders:—Lepidoptera—*Schaenobius forficellus*; Coleoptera—*Coccinella bipunctata*; Diptera—two species of Syrphidæ; Hymenoptera—the black ant (*Lasius niger*) and a species of ichneumon; Odonata—*Ischnura elegans*; Trichoptera—a species of caddis-fly; and Hemiptera—one of the genus *Spumaria*.”

JULY 25th, 1901.

Mr. A. HARRISON, F.L.S., F.E.S., in the Chair.

Mr. Kemp exhibited the following species of Coleoptera taken at the end of June in the New Forest:—*Donacia*

crassipes, on leaves of the water-lily in a stream at Rhinefields, with *D. versicolora*, *D. sericea*, both black and red forms. *Strangalia nigra*, taken at bramble flowers. *Asemum striatum*, flying over dead fir trees. *Anoplodera sexguttata*, taken in flight. *Liopus nebulosus*, beaten from oak. *Coccinella sedecimguttata*, beaten from sallow.

Mr. Step exhibited the larvæ of a *Cassida* from Wisley Common, Surrey, found feeding on hemp-nettle (*Galeopsis tetrahit*). Two pointed processes on the last segment held a mass of plant débris, frass, and cast skins, and this was usually upturned and held over the back. He noticed that not more than one larva was found on a stem.

Mr. Turner exhibited the larvæ of *Macroglossa stellatarum* from Bromley. He had picked a small bunch of *Galium verum*, and during a few days no less than eight larvæ appeared on it. He afterwards visited the patch from which he picked the flowers, and there found twenty-seven more larvæ. Other larvæ were found in adjoining fields. He exhibited three forms of the larvæ—(1) the full-grown form about to pupate, of a delicate pink colour; (2) the usual green form with the distinct white or slightly yellow line; (3) the very dark olive, almost black form, with the white stripe. The last form Mr. Montgomery said he had never found naturally, it only seemed to be assumed in confinement.

Mr. Stanley Edwards exhibited a number of species of *Papilio*, including *P. agesilaus*, *P. archesilaus* and var., *P. paris*, *P. cressphontes*, *P. pæon*, *P. marcellus* and var. *walshii*, and *P. asiaticus*.

Mr. Harrison and Mr. Main exhibited a very fine series of *Geometra papilionaria* bred this year from larvæ taken in Delamere Forest, and also a very varied series of the var. *delamerensis* of *Tephrosia biundularia* from the same locality.

Mr. Edwards exhibited a box of Odonata, Orthoptera, and Hemiptera which he had just received from Bucharest. Among them were noted the dragon-flies *Libellula quadrimaculata* and *Platetrum depressum*, and the Hemipteron *Centrotus cornutus*.

Mr. Enock exhibited short series of the following Odonata which he had bred this year:—*Anax imperator* and *Cordulia ænea*, both from larvæ obtained at the Black Pond, Esher, and *Brachytron pratense*, from Wisley. *C. ænea*, he stated, was most abundant at the Wake Valley pond, Epping Forest. *A. imperator* he had always found emerge late in the evening, which had made it much more difficult for him to take his

photographs and notes. He found that the London sparrow was exceedingly keen after all the specimens which he had allowed to go free.

Mr. Robt. Adkin exhibited a bred series of *Lobophora polycommata* from Brighton; also specimens of *Silene maritima* and *Mertensia maritima*, two plants which Mr. McArthur had gathered in the neighbourhood of Stornoway and sent up for identification. Mr. Step said that the *Silene* was a proliferous form, which he considered decidedly uncommon in this species; the *Mertensia* was also interesting, its distribution in this country apparently being confined to the west coast from Wales northward.

AUGUST 8th, 1901.

Mr. H. S. FREMLIN, F.E.S., *President*, in the Chair.

Mr. Robt. Adkin exhibited a bred series of *Geometra papilionaria*, the parent moth having been taken in Bexley woods, Kent. He considered this one of the most difficult of the British Lepidoptera to preserve in good order, on account of the extreme sensitiveness of its colour. It was well known that a sufficiently long time in a "cyanide" bottle to be fatal meant utter ruin to the delicate green pigment. Ammonia was equally destructive to it, and even a short exposure in a damp box caused considerable damage. Piercing the abdomen with a fine pen dipped in a saturated solution of oxalic acid appeared to be the safest method of killing the insect, but its struggles during the operation were often a source of injury. He had, therefore, adopted the medium course of putting the insect into a dry "cyanide" bottle for a few moments, just long enough to stupefy it, and then applying the acid. He thought the condition of the series exhibited showed this method to be fairly satisfactory.

The President suggested the substitution of chloroform for stupefying, but several members thought this would stiffen the insects too much.

Mr. Manger exhibited an unusually large and light-coloured specimen of *Sphinx ligustri*, bred from Brockley, together with a male example of the dragon-fly *Æschna cyanea*, taken in his own garden.

Mr. Hy. J. Turner exhibited a pupa of *Macroglossa stellatarum* from Bromley, with a short bred series of *Agrotis ripæ* from Dawlish, and called attention to the

delicate beauty of this species when bred, and to the marked difference in shape of wing between the males and females.

Mr. Step referred to his exhibit at the previous meeting of the larvæ of a *Cassida*. He now exhibited the perfect insects, which proved to be *Cassida equestris*. He stated that the larvæ were taken on July 13th; they pupated about the 25th, and the imagines emerged on the 31st. The imagines, as well as the larvæ, fed on the same plant.

Mr. Fremlin exhibited a number of gall excrescences on the twigs of hornbeam, which had been produced by a species of *Aphis*.

Mr. Edwards exhibited a number of rose leaves that had been carved out by one of the leaf-cutting bees, presumably *Megachile centuncularis*, and stated that numbers of rose trees were so disfigured. Mr. Adkin had observed the same thing in his garden, but, curiously, only one kind of rose tree had been attacked. The President had had a similar experience. Mr. Turner called attention to the shapes of the pieces cut from the leaves, the circular pieces forming the partitions between the cells of the "nests" while the longer oval pieces formed the lining. These bees had been attached to his garden for years, and were accustomed to make their tunnels under the cactus plants, or to avail themselves of the hollows in pieces of bamboo forming a plant basket in his greenhouse. When first noticed in the garden they attacked one rose tree only, but recently they had been more indiscriminate in their ravages, cutting fuchsias, etc., and even Virginia creeper. They had a very fine ichneumon preying upon them. Mr. Montgomery and others continued the discussion.

Rev. F. H. Wood exhibited two spiders, *Theridion lineatum* (females), one almost white; the other (a variety) with red lines, enclosing a white space on the abdomen. The red-lined spider was in spirits; the other alive, and guarding two egg-cocoons. Both spiders were found with a cocoon each in a nettle and convolvulus leaf at Bromley on August 7th. The white spider killed the other while carried in a larva-collecting tin. After the dead spider had been removed the remaining one carried *both* cocoons from the leaves and fixed them together on the tin lid, binding them to each other.

Mr. E. Step read the Report of the Field Meeting held at Mickleham on June 22nd (page 17).

AUGUST 22nd, 1901.

Mr. F. NOAD CLARK, *Vice-President*, in the Chair.

Dr. Chapman exhibited a larva of *Graellsia isabellæ* brought from Bronchales, near Albarracin, the last of several brought over, the rest having spun up. It is the only European species of the Attacine group of Saturnidæ, and occurs only in this district of Spain, over an area stretching from near Madrid to Albarracin, on Scotch fir at an altitude of about 5000 ft. The colouring harmonises well with that of the Scotch fir twigs, and especially the immature fir cones are closely imitated in certain views of the larva in a way that the larva seen isolated does not at all suggest.

Mr. F. H. Day exhibited the following Coleoptera, all from Cumberland :

Donacia discolor (*comari*), from Sty Head Farm, Cumberland, a variable series, ranging in colour from bronze, through green, blue, purple, and crimson to nearly black.

Hydrothassa hannoverana, from the Eden valley, Cumberland. This species formerly occurred in Hampshire and Yorkshire, but has not been noticed in either of these counties for many years. The series of eighteen specimens shown were taken by sweeping *Caltha palustris* in a marshy meadow in June last.

Bradycellus collaris, from High Pike, Cumberland. A typical mountain beetle, and locally common among the hills of Cumberland.

Sphærites glabratus : one specimen from Salkeld, Cumberland. Very rare in the British Isles, most captures having been made in Scotland. One specimen taken in Northumberland about sixty years ago is the only previously recorded English capture. This specimen was found in carrion, a friend who was with Mr. Day securing a second.

Ancistronycha (*Telephorus*) *abdominalis*, from the Gelt Valley, Cumberland. One of the finest of the Telephoridæ, and not uncommon locally in the county. It is usually found among bracken.

Telephorus darwinianus, from Skimburness Marsh, Cumberland. Not an uncommon species in Scotland, but in England is only known from Cumberland as yet.

Rhynchites cupreus, from Barron Wood, Cumberland. A very local weevil, taken by beating mountain ash.

Agabus arcticus, from Scawfell, Cumberland. One of the

rarest of the British Agabi, and quite attached to mountainous districts.

Mr. Fred Enock exhibited ♂ and ♀ specimens of the dragon-fly *Orthetrum cancellatum*, captured in cop. at Wisley Lake, July 20th, "after four or five hours of the wettest work I have ever known. For between four and five hours Mr. Kemp and I were dashing through the shallows, where *cancellatum* was flying up and down some twenty or thirty feet from the edge. Both of us had our long boots on, which enabled us to get out twenty feet, but with this advantage *cancellatum* was far beyond our reach, and during all the time not one of the half-dozen seen settled more than once, and then on a bush well out in the water. At last we each saw a pair in cop., after which we sneaked, ran, splashed, and dashed. Once I got within striking distance, and *did* strike the branch of a tree, but saw the pair go onward and upward *together*, and I saw them come down together, sail away almost beyond my sight, but I splashed along, and once more saw them pitch at the extreme edge of some rushes, just beyond the depth of my boot tops. I drew near, *nearer*, set my teeth, took a final measurement, and struck; then yelled to Mr. Kemp, 'Got them both.' When safely bottled I noticed that the abdomen of the female was equally of the same lovely blue colour as that of the male, and that both had been in the wars a long time."

SEPTEMBER 12th, 1901.

Mr. W. J. LUCAS, B.A., *Vice-President*, in the Chair.

Mr. South exhibited two buff specimens of *Amphidasys betularia*, which had been for years in his collection, and also a buff example of var. *doubledayaria*, which he had received from a correspondent. He remarked that the antennæ in the former were normal, and in the latter were buff.

Dr. Chapman exhibited a much suffused black variety of an *Argynnis*, sp., which in shape agreed with *A. aglaia*, but in markings on the underside agreed with *A. adippe* to a large extent. It was taken in N. Spain, and was somewhat the worse for wear.

Mr. Lucas exhibited for Mr. H. E. Annett a variety of *Aphantopus* (*Epinephele*) *hyperanthus*, which approached var. *arcte*, the usual eye-spots on the under surface very much

reduced in size. It was taken at Oxshott in June of the present year. He also exhibited a ♀ specimen of the large earwig *Labidura riparia*, captured by Major Robertson near a lamp in Pokesdown in August, 1900, together with coloured drawings of (1) a pale yellow variety of *Argynnis paphia*, ♂, taken by Mr. E. F. S. Tylecote at Holmesley, in the New Forest, on July 6th, 1901; (2) a xanthic variety of *Epinephele tithonus*, ♀, taken by Mr. W. S. Briameed near Brockenhurst on August 8th, 1901.

Mr. Kirkaldy exhibited numerous species of Hemiptera, including *Miridæ* (= *Capsidæ*) (1—2) gen. ? (near *Orectodorus*), ant mimics; (3—8) *Orectodorus obliquus*, Uhler. Winged forms not ant-like; wingless forms very good ant mimics; (9—11) *Coquilletia insignis*, Uhler, together with various species of *Resthenia*, all from America.

Mr. West, of Greenwich, exhibited long series of three very closely allied and obscure species of the genus *Acocephalus* (Homoptera), viz. *Acocephalus brunneo-bifasciatus*, found at roots of grass on waste land at Catford, Lewisham; *Acocephalus albifrons*, taken under furze bushes at Blackheath; *Acocephalus flavostriatus* taken at roots of grass on waste land at Catford. All were taken in August of the present year.

Mr. Kemp exhibited living nymphs of the following species of Odonata:—*Sympetrum striolatum*, *Gomphus vulgatissimus*, and *Calopteryx virgo*, all taken in the New Forest in August, 1901.

Mr. Edwards exhibited the seed-pods of *Cercus quisco*, a var. of *C. chilensis*, a native of the Peruvian mountains. They were felted on the outside with thick wool, and the upper end, from which the seeds would be shed, was fringed with a ring of long and strong spines or bristles. He also exhibited a specimen of "vegetable wax," the produce of a Peruvian palm, *Ceraxylon*, sp., together with some curious galls pendent from the underside of a leaf of *Machilus duthici* from North-west India.

Mr. Turner exhibited two species of cactus, *Mammillaria pyramidalis* and *M. micromeris-greggi*. These showed two extreme forms of spine development. The latter was especially remarkable for the extremely small rosettes of spines, and for the number of closely set tubercles. The former was in bloom, and had been for some months, having a crown of deep pink flowers of small size. He also showed larva, pupa, pupa cases, and imago of a common "daddy long-legs," *Tipula*, sp., and referred to the pupa moving upward out of the ground just before the emergence of the imago.

Mr. Manger exhibited a very beautiful and unusually marked specimen of the shell of *Cypria tigris* from the Pacific Islands. The darker markings were all much intensified, with numerous rings and spots of varied colour, as well as many very evident depressions over the surface. There was no form like it in the British Museum.

SEPTEMBER 26th, 1901.

Mr. W. J. LUCAS, B.A., F.E.S., *Vice-President*, in the Chair.

Mr. F. M. B. Carr exhibited a varied series of *Cidaria truncata* which he had observed to be fairly common at Porlock, North Somerset, in August, in a long patch of bilberry. Specimens of the *russata* form were not found.

Mr. Lucas exhibited two specimens of the rare dragon-fly *Libellula fulva*. 1. ♂ without blue colour to abdomen. 2. ♀ with dark tip to wings. They were taken near Christchurch by Major Robertson, of Pokesdown. He remarked that very few British specimens have been recorded.

Mr. Bishop exhibited a bred series of *Eugonia* (*Vanessa*) *polychloros* from eggs seen laid in the open by a ♀ in the New Forest. Two specimens had faint blue markings on the hind margins of the fore-wings.

Mr. Robert Adkin exhibited a specimen of *Cossus ligniperda* reared from the larva referred to in his notes on the species ("Proc.," 1900, p. 4, foot-note). The larva was found crawling on a gravel road on September 15th, 1900, and on being placed on a semi-rotten stump of a poplar tree in his garden it at once found and squeezed itself into a hole in the stump that had been tenanted by a larva of the same species some two or three years previously, and the moth exhibited was detected in the act of emerging from the same hole on July 18th following. This tends to show that the wandering full-fed larva readily accepts the first suitable place for hybernation that it meets with, and does not leave it before pupation. Mr. Adkin also exhibited a series of *Boarmia consortaria* reared from pupæ received from Abbott's Wood, Sussex, and said that, in his experience, the species had been quite common during the past two years, after a time of comparative scarcity extending over several years previously.

Mr. Kemp exhibited two specimens of *Sphinx convolvuli*,

caught while flying over tobacco flowers in August at Hythe, near Southampton.

Mr. Colthrup exhibited series of *Colias hyale* from Margate; *Triphæna orbona*, including red forms of various depth of colour, from Deal; and very varied *Triphæna fimbria* from the Isle of Wight.

Mr. Cane exhibited a very striking and distinct fungus, *Polyporus lucidus*, found on an acacia tree.

Mr. Harrison reported that Mr. Main and himself had taken ten specimens of *Sphinx convolvuli* at Forest Gate during the last few days. Mr. McArthur said that the species had been common at Brighton. Other members reported it from Folkestone, Camberwell, N. England, etc.

Mr. Manger exhibited fine specimens of several species of the Gasteropod family Xenophoridæ, and read the following notes upon the exhibit :

“I have brought for exhibition a few specimens of shells of the little-known family Xenophoridæ, class Gasteropoda. These things some years ago were called *Onustus*, afterwards *Phoreus*, and then for no valid reason, so far as I can understand the matter, they were called *Xenophora*. Verily nomenclature is a great stumbling-block in all branches of natural history; I have heard something of this even in entomology.

“These Molluscs (there are only a few known species—nine or ten, I believe) occur in the West Indies, India, Malacca, Japan, Philippines, China, West America, Red Sea. They are found at depths ranging from a few fathoms to the enormous depth of 350 fathoms = 2100 feet. There is a specimen in the Natural History Museum brought home by the *Challenger*, *Xenophora callidula*, dredged off the Andaman Islands at 100 fathoms, and another brought by the same vessel, *Xenophora caribbæa*, dredged off Pernambuco, which is on the north-east coast of South America, at 350 fathoms.

“Woodward gives a short description of the animal. He says they ‘have an elongated proboscis, tentacles long and slender, with sessile eyes at their outer bases, sides plain, foot narrow, elongated behind.’

“They scramble along like the Strombs. They extend and fix the front dilated part of the foot, and draw the posterior portion to it, jerking the shell forwards at every movement. This mode of progression seems to be adapted to the nature of the surface on which they move, which is usually composed of the *débris* of dead shells. ‘The peculiarity of this

tribe,' says Mr. Tryon, in his 'Manual of Conchology,' 'is the habit of agglutinating foreign bodies to the upper surface of the shell, which is carried to such an extent in some instances as to conceal the volutions, and give the structure the appearance of a small pile of fragments of stones and shells.' That this imitation of its surroundings is protective in its nature there can be no doubt, but in some of the species the protection is not apparent, the agglutinating process being restricted within the narrowest bounds, as you will see in the species *X. calculifera* and *X. indicus*.

"You will notice that the objects are arranged with a degree of regularity as to size and occurrence, indicating the existence of choice or artistic taste on the part of the Mollusc. The specimen already referred to from Pernambuco is covered *only* with *Cerithium* shells (a small pyramidal shell about an inch in length). Of the shells attached, single ones of bivalves seem to be preferred, probably because they give more surface for their weight than univalves, but you will notice in the specimens before you that the *Conchyliophora* are mineralogists as well as shell collectors, and some 'go' for both stones and shells.

"Now if this protection is found to be necessary by some species, why not by all? one would naturally ask; why should some go about without any or very little mask, seeing that as many specimens are found in the same localities unprotected as protected? It is a question which I cannot attempt to answer, and which, like thousands of other questions continually occurring in the study of natural history, we can only hope that patient study and observation will some day be able to elucidate."

In the discussion which followed, Mr. Step said that, from his knowledge of the Mollusca, it would be found that although it might seem that certain species were conspicuous, yet a more intimate knowledge of the habits of these creatures would show that they had sufficient protective resemblance to preserve the species from destruction.

OCTOBER 10th, 1901.

Mr. F. NOAD CLARK, *Vice-President*, in the Chair.

Mr. McArthur exhibited several larvæ of *Triphæna comes* in a novel cage, made by adapting to his purpose one of

those globular, fine-wire traps, which are commonly sold as fly-catchers.

Mr. Barnett exhibited a variety of *Epinephela tithonus* having pale xanthic patches, taken at Oxshott, and an unusually large and pale male specimen of *Fidonia atomaria* from the same place.

Mr. Garrett exhibited a very long series of *Vanessa io*, bred from larvæ obtained near Arundel.

Mr. Kirkaldy exhibited his collection of Nabinæ (one of the sub-families of Reduviidæ), comprising ten genera and about fifty-four or fifty-five species. The collection was rich in the rare winged forms of several species of *Nabis* (*Prostemma*) and *Reduviolus* (*Nabis*), while attention was called to brachypterous specimens of *R. ferus* (Linn.). Examples of the Kongolan *Platymenis horrida*, Stal, and other Reduviidæ were also shown.

Mr. Kemp exhibited a portion of a stem of broom bored by a beetle, *Hylastinus obscurus*, together with specimens of *Hylastinus obscurus*, *Lamophlæus ater*, *Phlæophthorus rhododactylus* found in the same stem. All were from Oxshott, and were taken on October 5th, 1901.

Mr. Robert Adkin exhibited a series of *Lophopteryx cuculla* (*cucullina*, Hb.) reared from Sussex parents. The original moth was taken in the spring of 1900, and from ova obtained moths resulted in May, 1901. Ova obtained from a pairing of these moths hatched at the end of that month, and the larvæ, some thirty in number, commenced to pupate on July 5th, the whole of them completing that operation within the following week. Nine moths emerged between July 24th and 31st; the remainder of the pupæ are still lying over.

Mr. Manger exhibited several shells which had been obtained in the island of Lewis this year by Mr. McArthur. They consisted of *Helix ericetorum*, var. *itala*, and *Helix acutus*. The former were somewhat darker and with a slightly higher spire than the form which is found in county Galway.

Mr. South exhibited *Thyatira batis* (Linn.), *T. cognata* (Moore), and *T. aurorina* (Butl), belonging to the Cymatophoridæ; also *Risoba trimaculata* (Brem.), and *Cymatophoropsis sinuata* (Moore), both members of the Noctuid sub-family Stictopterinae, and contributed the following notes:—
 “*Cymatophoropsis* and *Risoba* belong to the Noctuid sub-family Stictopterinae, which, in Hampson’s ‘Moths of India,’ is placed sixth of the ten sub-families into which he divides the Noctuidæ. It follows next but one to the Sarrothripinae, which

includes the European *Sarrothripa revayana* (a British species), and immediately precedes Gonopterinae, in which sub-family *Scoliopteryx* is comprised.

"*Thyatira* and *Habrosyne* are members of the Cymatophoridae, a family which has been associated by some authors with Arctiidae, by others with Notodontidae, and by others again it is regarded as a branch from the same stem which produced the Geometridae, and gave rise during the process of evolution to Drepanulidae, as well as to Pyralidae, and some other families belonging to the old-time 'Microlepidoptera.'

"The object of the present exhibit, however, is not to raise any question touching classification, but only to point out the very close superficial resemblance between species belonging to the widely separated groups of moths, and to incidentally remark on some points that appear to be of interest in the species themselves.

"With regard to *Thyatira batis*, the three specimens exhibited are respectively from England, N.W. Himalayas, and N. Japan (it occurs also in Amurland and W. China), and I think it will be conceded that they are all very much alike. Then we have one example of *T. cognata*, a darker insect, with rather longer fore-wings than *T. batis*, and apparently wanting the spot on the middle of the inner margin; on close examination of the fore-wing we shall, however, find that the spot is there in its proper place, but so obscured by the general dark suffusion that it escapes notice at first. This specimen is from Sultanpore, N.W. Himalayas, and the Indian *T. batis* is also from the same locality. If we examine the under surface of these two insects we shall find that there is no difference whatever between them. The next species, *T. aurorina*, is from Japan (it occurs also in Corea and Western China). Here we find that the basal patch is very similar to that of *T. batis*, also that the patches at the outer angle of each species are somewhat alike, but the spot on the inner margin is really absent, and the patches on the apical area are very different. Another species, *Habrosyne dieckmanni* (Graes.), of which I do not possess a specimen, is very like *T. aurorina*.

"*Risoba trimaculata*, it will be observed, is exceedingly like *Thyatira batis* in colour and pattern of the marking, but the former does not agree with the latter in neuration or in other structural details. The three specimens of *R. trimaculata* are from the valley of the Yang-tse, China, and the species also occurs in Amurland and Corea.

"The other species shown is *Cymatophoropsis sinuata*, from the North-west Himalayas. This bears a very strong likeness to *R. trimaculata*, although it is not congeneric with that species.

"The chief points of interest in this connection are—(1) a strong resemblance of species belonging to nearly related genera; (2) a remarkable likeness between species belonging to widely separated families. Before so much attention was given to the structural details of Lepidoptera, species agreeing more or less in the matter of form and ornamentation were generally associated. Now, however, we often find that species of the most diverse pattern and of varied forms are really congeneric; whilst others, seemingly allied, as in the instances shown this evening, do not possess even tribal affinities."

Mr. Step communicated the following report of the Field Meeting held at Oxshott on October 5th, and conducted by Messrs. Lucas and Step:

Heavy rain on the preceding day, and unsettled conditions in the morning, reduced the number of members in attendance from that expected, but, in all, twenty-two searched the woods for fungi in the afternoon, and took tea together in the evening. The list of species identified is not so long as that of last year, but it will be noted that several species named below did not appear in Mr. Edwards' report. *Amanita rubescens* and its congener *muscaria* were very abundant, as also were *Cantharellus friesii* and *C. aurantiacus*. *Marasmius orcadus* formed the most striking growth of a meadow at Queen's Drive, which may truthfully be said to have been full of it. A fine specimen of *Sparassis crispa* was discovered late in the day by Mr. John Drury, and was found to have a diameter of 14 inches in two directions.

Amanita phalloides (Fr.), *Amanita mappa* (Fr.), *Amanita muscaria* (Linn.), *Amanita pantherinus* (D.C.), *Amanita rubescens* (Pers.), *Armillaria melleus* (Fl. Dan.), *Clitocybe laccatus* (Scop.), *Collybia radicata* (Rehl.), *Pleurotus ostreatus* (Jacq.), *Clitopilus prunulus* (Scop.), *Clitopilus orcella* (Bull.), *Psaliota campestris* (L.), *Stropharia semiglobatus* (Batsch.), *Hypholoma fascicularis* (Huds.), *Hypholoma velutinum* (Pers.), *Coprinus micaceus* (Fr.), *Paxillus involutus* (Fr.), *Lactarius torminosus* (Fr.), *Lactarius turpis* (Fr.), *Lactarius piperatus* (Fr.), *Lactarius vellereus* (Fr.), *Lactarius quietus* (Fr.), *Russula vesca* (Fr.), *Russula heterophylla* (Fr.), *Russula emetica* (Fr.), *Russula alutacea* (Fr.), *Cantharellus cibarius* (Fr.), *Cantharellus*

friesii (Quel.), *Cantharellus aurantiaca* (Fr.), *Marasmius oreades* (Fr.), *Boletus luteus* (L.), *Boletus flavus* (With.), *Boletus badius* (Fr.), *Boletus piperatus* (Bull.), *Boletus chrysenteron* (Fr.), *Boletus edulis* (Bull.), *Boletus luridus* (Schæff.), *Boletus scaber* (Fr.), *Polyporus schweinizii* (Fr.), *Polyporus perennis* (Fr.), *Polyporus versicolor* (Fr.), *Tremellodon gelatinosum* (Pers.), *Sparassis crispa* (Fr.), *Calocera viscosa* (Fr.), *Scleroderma vulgare* (Fr.), *Lycoperdon gemmatum* (Fr.), *Hypomyces luteovirens* (Tul.).

OCTOBER 24th, 1901.

Mr. A. HARRISON, F.L.S., F.E.S., in the Chair.

Mr. W. West (Greenwich) exhibited specimens and series of nearly ninety species of British Homoptera, mainly taken by himself, and which he gave to the Society to form the nucleus for a typical collection of the sub-order. It should be remembered that Mr. West had on a former occasion given the Society a similar nucleus for a typical collection of the British Heteroptera, to which he had since added considerably.

Mr. Barnett exhibited a long series of *Bryophila muralis* (*glandifera*) taken at Shorncliffe in August, and also a series of *B. perla*, including an unusually dark specimen.

Mr. J. W. Kaye exhibited a previously unknown species of *Papilio* near *P. latinus*, together with a new species of *Sphingidæ* allied to *Ambulyx strigilis*. They were both taken by himself at Bartica in British Guiana, during a collecting tour on the Demerara and Essequibo Rivers in June, July, and August of the present year.

Mr. H. Moore exhibited two specimens of *Phlegethontius* (*Sphinx*) *convolvuli* taken in Rotherhithe this autumn, and also a specimen of *Sphinx ligustri* bred from a larva taken in the same place.

Messrs. Harrison and Main exhibited six specimens of *P. (S.) convolvuli* taken by them on the Romford Road, at the electric light.

Mr. Robert Adkin exhibited bred series of *Plusia moneta* and *P. gamma*, together with some of the cocoons from which the species were bred, and contributed the following notes:

"The *P. moneta* are part of the moths reared from fifty-six larvæ that were taken on one large plant (or perhaps, to speak more correctly, clump of plants) of a *Delphinium* growing in

a garden at Bexley, in Kent, early in May last; they commenced to spin their cocoons on the 17th of that month, and the moths emerged between June 16th and 27th. There were four other and smaller clumps of *Delphinium* in the same garden, but a careful search of them produced only two or three larvæ each.

"The series of *P. gamma* consist of the parent moth and part of her descendants, also an example reared from a wild larva. The parent moth, an undersized, travel-stained individual, was found hanging from a window curtain in my house on June 24th last. She appeared to be utterly exhausted, and as the house was shut up for the night at the time when I found her, I put her in a pill-box intending to throw her away in the morning, but overlooked the box for a couple of days, and was surprised when I did look at it to find that she had deposited a quantity of eggs. These hatched on July 2nd, fed up rapidly on *Dahlia*, two large plants of which they consumed, and commenced to pupate on July 21st, the moths emerging between August 5th and 12th. The whole brood, like their parent, are, as compared with the specimen bred from the wild larva, somewhat undersized and dull in colour. I have little doubt that the parent was an immigrant, and probably so worn out when captured that she would have deposited ova just where she alighted, the chances of their succeeding or not depending simply on the possibility of the young larvæ on hatching being able to reach suitable food.

"On comparing the cocoons of the two species it will be seen that those of *P. moneta* are well formed, tough, and bright yellow in colour, reminding one forcibly of the 'silk-worm' cocoons of his younger days, when the loose outer silk had been stripped off; while those of *P. gamma* are of the flimsiest description, too flimsy indeed to retain their shape when handled, and of a pale dirty grey colour."

Dr. Chapman, referring to the large number of *P. moneta* larvæ being found on the one clump of *Delphinium*, remarked that *Cnethocampa pityocampa* was well known to affect particular pine trees, and to inexplicably avoid indiscriminate feeding.

Mr. Adkin also exhibited a series of *Boarmia repandata* taken by Mr. McArthur in the Isle of Lewis during the past summer for comparison with series captured both in 1887 and 1901, which Mr. McArthur exhibited and called attention to, together with a case showing the manner in which this species rested on the rocks. Concerning these exhibits Mr. McArthur contributed the following notes :

"*Boarmia repandata*, var. *sodorensium* (Weir), was first captured by T. Harper during the summer of 1881, and some of the specimens that I saw were very fine, and similar to those taken by me this season. In 1887 W. Salvage and myself worked the island, and the first example of *B. repandata* that we observed was on a fir trunk in the Castle grounds. We worked hard for days, but did not see another at rest until we found specimens sitting on rocks by the sea-shore. Our captures, as will be seen on looking at the 1887 series, are not nearly such nice forms as those taken this year, and I believe that this is accounted for by the colour of the rocks in the different localities in which this year I took *B. repandata*, being blue-grey, whitish grey, and a dirty yellowish grey, the specimens matching the rocks very closely indeed.

"This season *Melanippe sociata*, var. *obscurata*, was fairly plentiful in one locality about midsummer, but examples of the autumn brood were very rare, and, as you see by those exhibited, smaller and darker in colour."

Dr. Chapman exhibited a beautiful N. American Noctua, *Acontia urania*, he had recently bred, and also three bred specimens of *Ocketicus omnivorus* from New Zealand.

Mr. R. Adkin read the Report of the Field Meeting held on July 6th at Brasted, in Kent, when some thirty-six members and friends were present (page 20).

NOVEMBER 14th, 1901.

Mr. W. J. LUCAS, B.A., F.E.S., *Vice-President*, in the Chair.

Mr. Lowe, Clarendon Road, Putney, was elected a member.

Messrs. Harrison and Main exhibited a long bred series of *Agriopsis aprilina*, from larvæ obtained in the New Forest at Whitsuntide, with an example captured in Delamere Forest. The latter, compared with the former, was of a much deeper green. They also showed a series of *Calocampa exoleta* taken at sugar in Delamere Forest this year.

Mr. H. Moore exhibited several trap-door spiders' nests (adult and young), *Cteniza ionica* (Saunders), from Corfu.

Mr. Step exhibited a series of photographs of the more prominent species of Fungi found at Oxshott during the recent Field Meeting of the Society. The most noticeable was that of the rare *Sparassus crispa*.

Dr. Chapman exhibited long series of *Parnassius apollo* and

P. delius, to show the range of variation of the local races of Central and Western Europe, and especially the large pale form taken this summer in Spain. He said that *P. apollo* and *P. delius* from Switzerland are very distinct, and it would be difficult not to recognise them at a glance. Those from Spain are no doubt *P. apollo*, as evidenced by their antennæ and size, but in colour and markings they are very close to Swiss *P. delius*, and very different from Swiss *P. apollo*. Specimens of *P. delius* from South-western France and adjacent districts present a close approach in colour and markings to Swiss *P. apollo*; and *P. apollo* has, in these districts, races that do not exceed *P. delius* in size.

Nevertheless at Digne, which is not very far from this region, *P. apollo* grows as large as in Spain, and with some tendency (as compared with Swiss specimens) to the paler coloration of the Peninsular specimens. These remarks refer to the males. The females do not present differences in precisely the same directions, though each race appears to differ in their sex, as in the other. The females of the Spanish form are very large, and present some varieties with the red eyes of the hind wings of immense size.

Mr. F. Percy Smith exhibited a large number of lantern slides in illustration of his lecture on "Spiders," and an interesting discussion took place on the relative values of drawing and photography in biological demonstration.

NOVEMBER 28th, 1901.

Mr. W. J. LUCAS, B.A., F.E.S., *Vice-President*, in the Chair.

The evening was devoted to the exhibition of varieties, notable captures, and interesting series, and a large number of members and their friends were present.

The Chairman made the following introductory remarks: "This is now the fifth year in which we have had an exhibition of varieties and notable captures. While each of these gatherings seems to have been a greater success than its predecessor, this one, apparently, will not spoil the record; and no doubt such an exhibition commends itself to you, as it certainly does to me, as a suitable way of spending an evening at the end of the season. Every naturalist who takes pride in his pursuit properly feels a delight in showing some of the results of his labours, and the rest of us, I am sure, are equally pleased to see what he has to show, and to

increase his pleasure by sharing it with him. With such anticipations on my own part, it is superfluous to say that I am delighted to see so large an assembly this evening. To simplify matters I must request each member, as he brings his exhibit to the table, to state *at least* of what it consists, and the points about it to which he particularly wishes to call attention. At the same time I should like to ask him to furnish full notes on the same for the use of the report secretary."

Mr. J. H. Carpenter exhibited a long and very fine series of *Colias hyale*, reared from ova obtained from a female specimen taken at Sheerness on August 18th, 1900. The larvæ hybernated through the winter of 1900-01; many died, but about one hundred or so duly pupated and produced imagines the following May and June (1901). The larvæ were kept from frost during the winter, perfectly dry, and fed upon *Trifolium repens* (life-history written and published by F. W. Frohawk, "Entom.," June, 1901).

Mr. W. J. Lucas exhibited specimens of the dragon-flies—(1) *Libellula fulva*, male, without blue pruinosity on abdomen, and a female, with dark tips to the wings, both taken near Bournemouth by Major Robertson; (2) a male *Oxygastra curtisii*, taken by him in the same district; (3) male, female, and female var. *aurantiaca* of *Ischnura elegans* from the New Forest. Also two large and perfect bubble shells, *Haminea hydatis* from S. Devon, and a specimen of *Anodonta anatina*, dark, rather thick, and eroded in the region of the umbo, reminding one of *Unio margantifera*. The latter was from a stream in the New Forest.

Mr. W. J. Ashdown exhibited specimens of the following species of Coleoptera, showing extreme variation in length:—*Clytus arietis*, 9 to 15 mm.; *C. mysticus*, 9 to 14 mm.; *Molorchus minor*, 6 to 12 mm.; *Pachyta cerambyciformis*, 8 to 12 mm.

Mr. W. West (Greenwich) exhibited an Homopteron, *Stictocoris flaveola* (Boh.). This species is an addition to the British fauna, and was taken near Blackheath during August and September, 1901. The identification was determined by Mr. J. Edwards and confirmed by Dr. Sahlberg. (For description see "E. M. M.," 1902, p. 5.)

Mr. Thornthwaite exhibited a dark-banded specimen of *Hybernia defoliaria* he had taken on his way to the meeting.

Dr. Chapman exhibited specimens of *Pieris brassicæ*, with black marginal line in hind wing; *Argynnis adippe*, var. *chlorodippe*; a black suffused example of the same species; and a

dark variety of *Melitæa athalia*. The last three were from Spain.

Mr. W. J. Kaye exhibited a beautiful series of *Ambulyx rostralis*, with the light form considered by some as a distinct species, and named *A. ganascus*. Both occur in the same localities. Whether the form *ganascus* always occurs there is no record to show. *A. rostralis* is found fairly commonly, but never abundantly, in Central America, in the West Indies, where it is rare, and in tropical South America. The series exhibited comprises specimens from Rio Janeiro, Merida, Venezuela, and Jalapa, Mexico, and shows a certain amount of variation. There are three (2 ♂ and 1 ♀) specimens of an allied species, *A. donysa* from Mexico. A peculiarity with these species of *Ambulyx* with red hind wings is that on the underside the colouring is reversed, the fore-wing having the red and the hind wing wholly wanting it; the black bands are even reproduced on the red of the fore-wing in *rostralis*.

Messrs. Harrison and Main exhibited, among other species, varied series of *Triphæna comes* from the New Forest, Delamere Forest, Epping Forest, Wallasey sand-hills, and the Isle of Lewis; also of *Agrotis tritici* and *A. cursoria* from the Isle of Lewis and Wallasey.

Supplementing Mr. Harrison's exhibit, Mr. R. Adkin exhibited the following from the Isle of Lewis, viz. *Triphæna comes*, including ordinary forms, the variety *curtisii*, and one example having a broad, dark central fascia on the upper wings; the red colour of the var. *curtisii* he thought hardly so bright as in examples from Forres and some other of the Scottish mainland localities; *Xylophasia monoglyphæ*, all of the blackish-brown form; *Noctua xanthographa*, chiefly dark forms having a purplish blush; a long series of *Boarmia repandata*, var. *sodorensium*; a very strongly marked example of *Larentia didymata*, and one of *Coremia ferrugata* that varied in an opposite direction, the general tone of colour being unusually dull.

Mr. Adkin also exhibited the specimen of *Pieris daphidice* that he took at Eastbourne on August 19th last; and examples of *Colias hyale* and *C. edusa* taken at the same time and place.

Mr. H. M. Montgomery exhibited—

1. *Pieris napi*, L., var. *bryoniæ*. (a) Twenty-eight males and twenty-six females, bred from a specimen taken at Myringen, Switzerland, by Mr. A. Harrison, July 9th, 1900. The egg stage lasted four days; the larval stage lasted four-

teen days; the pupal stage lasted 298 days. Specimens emerged continuously from May 9th to June 22nd. All the females were *bryoniæ*, and the males were typical. (b) A typical male from an ovum attached to the abdomen of a dead specimen of *bryoniæ* received from Mr. Harrison July 15th. (c) Nine males and ten females bred from a third specimen of *bryoniæ* received at the same time as b. Specimens emerged from May 8th to June 7th, 1901; males typical, females extreme form of *bryoniæ*.

2. *Leucophasia sinapis*, L. Four broods from females received alive from Mr. W. Edwards, of Malvern. Ova were deposited about May 22nd, and hatched about June 2nd. Larvæ were full-grown about July 2nd, and pupated about July 3rd. One brood, D., produced winter pupæ. The food-plant was *Lotus corniculatus*. The specimens emerged from July 16th to July 22nd.

3. *Argynnis paphia* and var. *valesina*. Ova were obtained from four females (one *valesina*) captured in the New Forest by Mr. H. J. Turner. About eighty larvæ survived hybernation. The first larva pupated June 9th, and specimens emerged from July 3rd to July 20th. There were seven males and fifteen females, including eight var. *valesina*.

Mr. G. T. Porritt exhibited varieties and melanic forms from Yorkshire, including black *Acronycta menyanthidis* from Selby; a remarkable *Mania typica*, having a large pale pinkish V-shaped mark across each wing; a *Cosmia trapezina*, with the central band dark olive-green; black *Larentia multistrigaria*; a yellow *Anchocelis rufina*; all from the Huddersfield district. Also a black specimen of *Odontopera bidentata* from Wakefield.

Mr. B. W. Adkin exhibited the following varieties:

Nemeobius lucina.—A specimen with the brown fascia replaced by pale yellow, especially on left fore-wing (New Forest, 1901).

Tephrosia biundularia.—Wings much suffused with fuscous shading (bred New Forest, 1901).

Cerastis spadicea.—Whitish line on outer margin of fore-wings (Essex, 1901).

Agriopsis aprilina.—The black markings in fore-wings almost absent (New Forest, 1901).

Miselia oxyacanthæ.—The usual white crescent near the dorsum replaced by a white smudge extending to the dorsum; the dark colour of centre of wing exaggerated and bordered by a dark line from reniform to crescent, leaving a wide pale border (New Forest, 1901).

Gnophria quadra.—Extreme dark and light forms of males, and large spotted and small spotted female forms.

Mr. H. E. Garrett exhibited *Sphinx convolvuli*, taken at flowers in a garden at Donhead St. Andrew, Wilts, September 11th, 1901; *Miselia oxyacanthæ* and one var. *capucina*, taken at sugar, Wimbledon Common, October, 1900; a series of six *Epunda lutulenta*, taken off ripe blackberries at Reading, Berks, September 13th, 1901; *Dasycampa rubiginea*, taken at ivy bloom at Padworth, Berks, October 16th, 1900; and a specimen of *Taniocampa populeti*, taken at willow bloom, Wimbledon Common, April, 1900.

Mr. D. Chittenden exhibited the following varieties and forms taken in 1901:

Lithosia sericea (*molybdeola*); *Anthrocera* (*Zygæna*) *trifolii*, var. *confluens*; *Nyssia hispidaria*, black; *Zonosoma pendularia*, (1) bluish (Lancashire), (2) light (Kent); *Cymatophora duplaris*, black (bred in Kent); *Hybernica leucophæaria*, black and light forms; *Pachetra leucophæa*, dark form; *Cerastis vaccinii*, dark form; *C. spadicea*, var. *subnigra*; *Miselia oxyacanthæ*, var. *capucina*; and *Hybernica marginaria*, dark (Kent).

Mr. G. B. Browne exhibited a specimen of *Vanessa antiopa*, taken in his garden at Lee on August 24th last on a sugar patch, where his little son succeeded in putting a tumbler over it. He also exhibited an example of *Phlegethontius* (*Sphinx*) *convolvuli* taken at Lydd on 14th September.

Mr. H. Dixon Hewitt exhibited, on behalf of Mr. R. L. Hewitt, the following plants, and said:

"The fourteen specimens of plants were selected almost at random, either as being rare or at least rather local, or as showing some variation from the type.

"They were all collected by Mr. R. L. Hewitt or myself, except where initials of collector are given. Localities are not very definitely stated for obvious reasons.

"*Helleborus fœtidus*.—Plant from which specimen was taken originally found near York, but grown on in garden. (H.)

"*Polygala calcarca*.—This is possibly only a good var. of *P. vulgaris*, but is given as a species in the Lond. Cat., and I think is now known as *P. amara*. It is rather local, I believe. The specimens came from near Downe, Kent, and near Stroat's Nest, Surrey.

"*Geranium striatum*.—A North American species, which now seems to have obtained a good foothold in this country. Unlike some other plants from America, it is a *real* acquisi-

tion to our Flora. The specimen is from near Halsted, Kent.

“*Pyrus torminalis*.—A few plants of this rather scarce tree or shrub occur in South-east London. The specimen is from a lane near Lewisham.

“*Parnassia palustris*.—From near Carrick-on-Shannon, Ireland. (L. L. D.)

“*Lactuca saligna*.—If the specimen is really this species it is rather a rarity. It came from the marshes between Dartford and Northfleet, Kent, where it is associated with *L. virosa*.

“*Aster tripolium*, var.—The form without ray florets seems to be commonest in the Thames marshes, while on the south coast the more perfect type is the usual form. This specimen came from between Dartford and Northfleet.

“*Centaurea calcitrapa*.—A very local species, very likely introduced. It is fairly abundant in the above-mentioned river marsh district.

“*Ajuga chamæpitys*.—This pretty and rather local Labiate seems fairly well distributed in the home counties. The specimens are from Shoreham, Kent, and near Croydon, Surrey. Two other stations in the same district have also been noted.

“*Teucrium botrys*.—This very rare plant occurs only in two of the London Catalogue’s districts, one of which, I believe, is Surrey. The station from which this specimen came is near Addington, Surrey, where in one field I have observed it in some abundance for several seasons.

“*Samolus valerandi*.—This plant ought to be commoner from its comital number in the London Catalogue. The only locality, however, from which I have obtained specimens is the Greenhithe marsh district.

“*Myosotis arvensis*, var. *umbrosa*.—The foliaceous variety, which is very common in chalky, wooded lanes. The specimen was from Stroat’s Nest, Surrey.

“*Polygonum bistorta*.—One of our most handsome plants, of a rather inconspicuous order. The peculiar winged petiole and large rootstock are very characteristic. From Darenth, Kent.

“*Habenaria conopsea*, var.—The very singular short-spurred variety. If this be correctly named it appears to differ very markedly from the type,—far more so, for instance, than the so-called species *Orchis maculata* and *O. latifolia*. This plant (*H. conopsea*, var.) lacks the spreading leaves, the long spur, and, I believe, the odour of the type *H. conopsea*. The flowers, moreover, have not the waxy, crystalline appearance

of the type. Yet this plant is not even given a varietal position in the London Catalogue, 1895. The specimens were found in a bog in the New Forest associated with *Orchis maculata*."

Major Ficklin exhibited three specimens of *Dianthæcia luteago*, var. *ficklini*, two being very small and pale, and one of the ordinary Cornish coloration, but with suffused markings, and a specimen of *Argynnis (Brenthis) selene* with very dark under wings.

Mr. A. Sich exhibited several species of Lepidoptera, among which were a small, dark variety of *Vanessa urticae* from Chiswick; two specimens of *Xylophasia polyodon* (Chiswick), one with dark median band, the other with stigmata confluent; *Plusia gamma* (bred Chiswick), Y-mark represented by pale spot, and the grey form of *Hyponomeuta padellus*. He also showed the following shells:—*Purpura lapillus*, banded form (Eastbourne); *Helix aspersa*, sub-scalariform monstrosity (Chiswick); and *Helix rotundata*, var. *sinistrorsum* (Chiswick).

Mr. H. Rowland Brown exhibited a series of *Lycæna dolus*, var. *vittata*, taken this summer (July) in the Cevennes, and *L. admetus*, var. *rippertii*, for comparison. The two species are remarkably alike, and Dr. Chapman says that structurally the genitalia are identical in both. He also exhibited a remarkable variety of *Melitæa cinxia*, in which the black spots on the under side are almost absent, and a curious specimen of *Argynnis lathonia*, with the left lower wing only abnormally small, a fact which did not appear to interfere with its ability to fly strongly.

Mr. Manger exhibited various species of the Molluscan genus *Opisthostoma*, from Borneo, and contributed the following notes:

"The few notes that I am about to read are mainly taken from what Mr. Edgar Smith (the Curator of the Mollusca at the British Museum, South Kensington) has written on the subject. He has described and named many of the species.

"I exhibit a few specimens of some most wonderfully sculptured shells.

"These remarkable structures belong to *Opisthostoma*, a group of very small operculate land shells, occurring in India, Borneo, and adjacent localities.

"At the present time there have been found and described about twenty species. They occur on limestone rocks in damp places, living apparently on the microscopic vegetation

investing the surface. Land shells, as a rule, are not remarkable for any very prominent ornamentation of the surface, such as obtain among the marine Gasteropods; their beauty lies rather in the marvellous variety of their form of coloration. We find the exterior in the majority of cases more or less even. True, among the Clausillæ, the Strophiaæ, and Helicidæ many species exhibit longitudinal riblets, but few species of land molluscs exhibit thorny processes of any importance. Fresh-water shells, like the terrestrial forms, are, as a rule, also devoid of spines, but here again there are some exceptions. In two or three species only of the Bornean *Opisthostoma* prickly adornment attains remarkable development.

“There is a perfect gradation from shells with rounded whorls ornamented with simple oblique striation, like *O. baritense*, to the form *O. grandispinosum*, in which the spines assume such a marvellous perfection. In *O. wallacei* the whorls are angulated at the middle, as if indicating the place from whence the spines would eventually develop. In *O. jucundum* they make their first appearance, in *O. pulchellum* they are still more pronounced. *O. everetti* exhibits yet further development, the maximum being reached in *O. mirabilis* and *O. grandispinosum*. The former of these is more beautifully graceful and more delicate in structure than the latter,—indeed, it is difficult to recall among all the thousands of marvellous forms of land shells any as strikingly wonderful as this tiny creation of beauty; its minuteness increases our admiration of its perfection. The fragile tapering spire of a pale brownish tint, the erect glassy hollow spines, bristling all round the middle of the volutions, the more curved ones curling beneath the base, the trumpet-like aperture defended behind as it were by a shield of glass,—these are some of the principal characteristics of this most delicate and wonderful structure.

“*Grandispinosum* has a very spider-like look, the spines curling over like so many claws ready to clutch an enemy. The curious manner in which the last whorl is contorted makes it difficult to follow the design of the shell itself. Up to a certain period it has the normal appearance of a dextral conical shell; the last volution then commences its erratic course, making a complete curve up the spire and then to the right, carrying the aperture even above the apex. This peculiar production of the whorl makes it difficult without consideration to say whether it is a dextral or sinistral shell we have before us.

"One would probably at first sight guess wrongly upon this point with regard to all the other Bornean forms, for the apertures are so decidedly on the left of the spire. This, however, does not in reality make them sinistral shells, but the left-handed appearance arises merely from a peculiar twist and retroversion of the body-whorl, which turns the aperture backwards.

"One question forces itself upon us: To what end is all this extraordinary development of sculpture? We can well suppose in the case of the succulent murex or cockle, to be covered all over with strong bristling spines would make the hungry fish shy of attack; but in the case of these tiny *Opisthostoma* one would almost imagine that their bodies, a mere microscopic film, would hardly be worth attacking, yet some carnivorous beetle may rove about in Borneo in the home of these little creatures, whose onslaught may be averted by the bristling array of spikes; and some bird, always pecking at something, may hesitate to prick its tongue. That this marvellous 'sculpture' has its meaning, and is of some advantage to its possessor, we may rest assured, but that we shall ever fathom its purpose is less than likely."

DECEMBER 12th, 1901.

Mr. W. J. LUCAS, *Vice-President*, in the Chair.

Mr. Newnham, of Hersham, Surrey, was elected a member.

Mr. McArthur exhibited a male specimen of *Lasiocampa quercus* taken at Brighton, having the female coloration.

Mr. Kirkaldy exhibited a specimen of what he supposed to be the Heteropteron *Reduviolus ferus*. This example had the wings on one side fully developed (macropterous), while those on the other side were only partially developed (brachypterous). He noted that this development was most rare.

Mr. F. M. B. Carr exhibited series of Lepidoptera that he had recently captured or reared, and contributed notes on some of them as follows:

"Series of *Selenia illunaria*.—The first specimen, a female, is one of three taken at Shoreham, Kent, in April this year, and is rather large and dark. The remainder were bred from ova laid by these females. The larvæ, although hatching all about the same time, fed up and pupated very irregularly, and the moths began to emerge in July. The

last female in the column, which emerged in October, resembles the captured specimen; and the two above, which also emerged in October, are not quite ordinary in their markings. The remainder are somewhat larger than captured July specimens that I have taken. The moths are *still* coming out at odd intervals, but unfortunately most of the later ones are cripples.

"*Dicycla oo* (three), taken at treacle at Chingford, July 13th and 14th, 1901.

"Series of *Bryophila glandifera* from Hythe, Kent, taken at the end of August, 1901.

"A very large number of cocoons of this species were also found, but of the pupæ taken 90 per cent. were ichneumonoid.

"Also a single *B. glandifera*, from Dawlish, the only one I succeeded in finding during a very boisterous day in August this year.

"Series of *Acidalia marginipunctata* from Hythe, Kent, and from Porlock, Somerset. All the specimens were taken in August, 1901. The Somerset examples are much darker than the Kentish ones."

Dr. Chapman exhibited a number of butterflies collected last summer in Spain, amounting to about eighty-one species, and read a paper on the excursion during which they were collected. He gave some details as to travelling and the accommodation met with, and some notes on the geography and topography, as well as on the mode of life of the inhabitants of the district visited.

This was the Albarracin Sierra, an upland hilly country lying between Cuença and Teruel, about halfway between Madrid and the eastern coast of Spain. He mentioned that quite recent railway extension makes it now easy to visit, even compared with the state of affairs last summer.

The butterflies included *Satyrus pricuri* and its variety *uhagonis*, with seven other species of *Satyrus*. *Erebia zapateri*, and two very distinct forms of *L. corydon*, viz. var. *corydonius* and *hispana*, which occurred on adjacent, and even on the same ground, but had no intermediate forms, and behaved, in fact, as distinct species, the precisely similarly related *L. hylas* and its variety *nivescens*, etc.

(The paper is printed in full in "Entom. Record" for 1902.)

JANUARY 9th, 1902.

Mr. W. J. LUCAS, B.A., F.E.S., *Vice-President*, in the Chair.

Mr. Tonge, of Red Hill, Surrey, was elected a member.

Mr. Hewitt exhibited a specimen of the scarce Homopteron *Cicadetta montana*, caught flying in the sunshine in Stubby Copse, New Forest, on July 7th, 1901.

Mr. Robt. Adkin exhibited five specimens of *Melanippe galiata* that emerged from pupæ on December 8th last. The ova were deposited between August 22nd and 27th, they hatched between 29th of that month and September 6th, and the larvæ went to earth between September 24th and October 13th. No emergences took place until December 8th, when the five perfect examples now exhibited and one cripple came forth; nor have any others appeared since. The cage in which the larvæ were fed up, and in which the pupæ have since been kept, has throughout been exposed to the weather, except so far as being protected from both rain and direct sunshine. The temperature at the time was very uniform and mild, the range between the day max. and night min. being only 3°, viz. 55° and 52° respectively.

Mr. McArthur exhibited several specimens of *Triphæna comes*, bred on December 26th and 27th, 1901, from ova laid by a female taken in July, 1901, in the Isle of Lewis. One specimen was of a very rich deep red ground colour, and another had a wide brilliant red submarginal line on the very dark ground of the fore-wings.

Mr. E. Step read some notes on the nightjar (*Caprimulgus europæus*), and exhibited lantern photographs of the eggs and young birds. He expressed the opinion that the colouring of both eggs and birds was protective. He had been so fortunate as to secure a photograph of the two chicks immediately after they had emerged from the eggs, whilst the shells were still wet and present; another photograph showed the same birds when two days old, and others depicted an older example couching among heath plants and on the limb of an oak. The newly hatched birds hissed when handled, and on a peculiar call from the mother-bird at a distance they darted among the heather stems, going in opposite directions. They were able to fly a hundred yards when fourteen days old.

Mr. Lucas exhibited a few slides illustrative of particular natural objects in the south-west district, including the

corner of the Black Pond frequented by the smaller dragonflies, and the large silver birch at the western end of the pond.

Mr. Main exhibited lantern slides of the larvæ of *Samia cecropia* and of *Amphidasys betularia*; the imago of *Pieris napi* drying its wings after emergence from the adjoining chrysalis case; and a batch of ova of *Macrothylacia (Bombyx) rubi* on a sprig of heather.

JANUARY 23rd, 1902.

ANNUAL MEETING.

Mr. F. NOAD CLARK, *Vice-President*, in the Chair.

The balance-sheet was received and adopted, and the Report of the Council and Officers was read.

The following list was read of Officers and Council elected for the ensuing session:

President.—F. Noad Clark.

Vice-Presidents.—H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S., E. Step, F.L.S.

Treasurer.—T. W. Hall, F.E.S.

Librarian.—H. A. Sauzé.

Curator.—W. West.

Hon. Secretaries.—Stanley Edwards, F.L.S., etc. (*Corresponding*); H. J. Turner, F.E.S. (*Report*).

Council.—W. J. Ashdown; J. H. Carpenter, F.E.S.; T. A. Chapman, M.D., F.E.S.; A. Harrison, F.C.S., F.L.S., F.E.S.; W. J. Lucas, B.A., F.E.S.; H. Main, B.Sc., F.E.S.; J. W. Tutt, F.E.S.

Owing to the serious accident which befell the President for the year, Mr. Fremlin, he had been incapacitated from all literary and scientific work, and thus there was no annual address.

A very sincere vote of condolence with the President was passed, coupled with hearty best wishes for his speedy recovery to health.

Votes of thanks were unanimously passed to the Officers and Council.

Mr. Robt. Adkin exhibited a long series of *Acidalia aversata* bred from one banded female, a portion of them emerged in the autumn of 1900 and the remainder in the summer of 1901, and made the following remarks:

“Continuing my note on this brood (Proc. 1900, p. 92),

the whole of the remaining larvæ, forty-five in number, passed safely through hybernation, and by May 4th were beginning to spin up; the first moth appeared on June 2nd, their order of emergence being—

June 2nd, 3 plain, 1 banded,

„ 4th,	3	„		
„ 5th,	2	„	7	„
„ 6th,	5	„	4	„
„ 7th,	1	„	1	„
„ 8th,	1	„		
„ 9th,	1	„	1	„
„ 10th,	1	„	3	„
„ 11th,	1	„	2	„
„ 12th,			1	„

—thirty-eight in all, eighteen being of the plain form and twenty of the banded. It will thus be seen that the proportion of plain and banded forms in both portions of the brood were very similar, nor was there any appreciable difference in the size of the individuals or in the intensity of their markings, each containing both strongly and faintly banded examples.

In point of sex, however, the proportion of females was much greater in the later portion of the brood than in the earlier, 70 per cent. of the moths emerging in the autumn being males, as against just over 70 per cent. females of those that emerged in the spring from the larvæ that had passed through hybernation; but it should be noted that in neither case did the whole of the larvæ produce imagines.

Mr. Garrett exhibited a living specimen of *Dasychira pudibunda* which had just emerged in the open.

Dr. Chapman exhibited—

1. Three forms of *Polyommatus* (*Lycæna*) *corydon* :

- (a) Switzerland, greenish blue
- (b) Spain, violet blue
- (c) Spain, white

2. Two forms of *Lycæna damon* :

- (a) Switzerland, blue
- (b) Spain, green

3. Three forms of *Lycæna hylas* :

- (a) Switzerland, blue
- (b) Spain, blue
- (c) Spain, white

Each form being representative not of individual variation, but of geographical race.

4. ^gExceedingly dwarf *Plebeius* (*Lycæna*) *ægon* from Switzerland, measuring only 18.5 mm. 0.73 inch in expanse.

Mr. Step exhibited a number of photographs comprising studies of wild flowers, many having been taken at the Society's Field Meetings.

Mr. A. Harrison exhibited in the lantern a large series of slides taken from the illustrations in Douglas English's work, "Photography for Naturalists," together with a number made by Mr. Main, Mr. Step, and himself.

ERRATA.

Page 13, line 16, delete "*Zonaria punctularia* (Main)."

Page 16, line 7 from bottom, for "*Chorentes*" read "*Choreutes*."

Page 16, line 6 from bottom, for "*Alucita* (*Polydactyla*) *hexadactyla*" read "*Alucita hexadactyla* (*polydactyla*)."

Page 23, line 14, for "*Dicteopteryx*" read "*Dictyopteryx*."

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- 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. Memb.*) *h, b.*
- 1887 BARCLAY, F. H., F.G.S., F.E.S., The Warren, Cromer, Norfolk.
l, orn, palæontology.
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1896 BARNETT, THOS. L., 81, Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., Tremont, Peckham Rye, S.E. *l, m*
- 1900 BARRETT, J. P., 3, St. John's Villas, Margate. *l.*
- 1889 BEAUMONT, A., F.E.S., Gosfield, Halstead, Essex. *h, c, he, orn.*
- 1888 BENNETT, W. H., F.E.S., 15, Wellington Place, Hastings. *h, c.*
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road,
Peckham, S.E. *h, o, c, d, he.*
- 1897 BISHOP, E. B., 79, Alexandra Road, Wimbledon, S.W.
- 1900 BLENKARN, S. A., Clifton House, E. Dulwich, S.E. *l.*
- 1898 BLISS, M. F. *l.*
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*

YEAR OF
ELECTION.

- 1898 BOUSKELL, F., F.E.S., Sandown Road, Knighton, Leicester. *l*.
- 1895 BOWMAN, K., 18, Victoria Road, Clapham Common, S.W. *l*.
- 1902 BOXER, C. R. L., 151, Burnt Ash Hill, Lee, S.E. *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. MEAD, 8, High Street, Canterbury. *l, orn.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, R.S.O.,
N. Devon. *l*.
- 1890 BRISTOWE, B. A., F.E.S., The Cottage, Stoke d'Abernon,
Surrey. *l*.
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l*.
- 1895 BROOKS, W., Grange Hall, Rotherham. *l*.
- 1898 BROOME, E. G., Hurst Vicarage, Twyford, Berks. *l*.
- 1890 BROWN, E. W., Capt., 61, Church Road, Gorleston, nr. Yar-
mouth (2nd Royal West Kent Regiment). *l*.
- 1900 BROWNE, G. B., 43, Southbrook Road, Lee, S.E. *l*.
- 1897 BURR, MALCOLM B., B.A., F.Z.S., F.L.S., F.E.S., Bellagio,
E. Grinstead. *o*.
- 1890 BUTLER, W. E., F.E.S., Hayling House, Oxford Road, Reading.
l, c.
- 1903 CANNON, F. G., 7, Fordwych Road, Hampstead, N.
- 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.
- 1886 CARPENTER, J. H., F.E.S., *Vice-President*, Riverdale, Leather-
head, Surrey. *l*.
- 1899 CARR, F. B., 46, Handen Road, Lee, S.E. *l*.
- 1899 CARR, F. M. B., The Choristers' School, The Close, Salisbury.
l, n.
- 1877 CARRINGTON, J. T., 110, Strand, W.C. *l, cr.*
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood,
S.E. (*Hon. member*). *h, l, c.*
- 1897 CHAPMAN, T. A., M.D., F.E.S., F.Z.S., Betula, Reigate, Surrey. *l*.
- 1898 CHATTERTON, F. J. S., F.E.S., 5, Camden Studios, Camden
Street, N.W. *l*.
- 1888 CHITTENDEN, D., 98, Court Hill Road, Lewisham, S.E. *l*.
- 1896 CLARK, F. NOAD, *Vice-President*, Paddington Infirmary,
Harrow Road, W. *mi.*
- 1887 CLARK, J. A., F.E.S., L.D.S., M.P.S., 57, Weston Park,
Crouch End, N. *l*.

YEAR OF
ELECTION.

- 1898 CLARKE, H. SHORTRIDGE, F.E.S., 2, Osborne Terrace, Douglas,
Isle of Man. *l.*
- 1879 CLODE, W. (*Life member*).
- 1899 COLTHRUP, C. W., 127, Barry Road, E. Dulwich, S.E. *l.*
- 1902 COWHAM, F. W., 19, Brook Road, Stoke Newington, N.
- 1899 CRABTREE, B. H., Oaklands, Levenshulme, Manchester. *l.*
- 1885 CROKER, A. J., 191, Bethnal Green Road, E. *l.*
- 1898 CROW, E. J., 26, Tindal Street, North Brixton. *l.*
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l.*
- 1900 DAY, F. H., 17, Thirlmere Street, Carlisle. *l, c.*
- 1889 DENNIS, A. W., 45, Park Street, Stoke Newington, N. *l, mi, b.*
- 1884 DOBSON, H. T., F.E.S., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn.*
- 1901 DODS, A. W., 61, Dynevor Road, Stoke Newington, N. *l.*
- 1898 DOWNING, JOHN W., F.E.S., 152, Trevelyan Road, Tooting Graveney, S.W. *l.*
- 1897 DRURY, W. D., F.R.H.S., F.E.S., Rocquaine, West Hill Park, Woking, Surrey. *l, b.*
- 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., 13, Tufnell Park Road, Holloway, N. *d, mi.*
- 1900 ENOCK, J. K., 406, Birkbeck Bank Chambers, Holborn, W.C. *l.*
- 1889 FARRANT, M., jun., 137, St. Thomas, Exeter. *l.*
- 1891 FILER, F. E., F.E.S., 58, Southwark Bridge Road, S.E. *l, mi.*
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex (*Life member*). *l.*
- 1889 FORD, A., Hillside, Sunninghill Road, Pokesdown, Bournemouth, Hants. *l, c.*
- 1891 FORRESTER, A. C., 42, West Kensington Mansions, W. Kensington. *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., 86, Minet Avenue, Harlesden, N.W. *l.*
- 1899 GADGE, S. W., 9, Longley Road, Tooting Graveney. *l.*
- 1901 GARRETT, H. E., 3, Brewers Green Mews. *l.*
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l.*

YEAR OF
ELECTION.

- 1902 GOULTON, E. C., 4, Cornford Grove, Balham, S.W. *l*.
- 1889 GREENE, Rev. J. G., M.A., F.Z.S., F.E.S., Rostrevor, Clifton, Bristol. *l*.
- 1895 GRIFFITHS, G. C., F.Z.S., F.E.S., 43, Caledonia Place, Clifton, Bristol. *l, e l*.
- 1893 HALL, A., 16, Park Hill Rise, Croydon, Surrey. *l, e l, ool*.
- 1888 HALL, A. E., F.E.S., Norbury, Pitsmoor, Sheffield. *l*.
- 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., 52, St. Mary's Road, Oxford. *l*.
- 1903 HARE, E. J., 163, East Dulwich Grove, S.E. *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*.
- 1902 HARRY, S. P., 41, Binfield Road, Clapham, S.W. *l*.
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill, S.E. *l*.
- 1900 HEWITT, R. L., Ivydene, Felday Road, Lewisham, S.E. *l*.
- 1903 HICKMAN, J., 16, Aldred Road, Kennington Park. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1888 HOPKINS, H. E., 5, Haseldean Road, Brockley, S.E. *l*.
- 1889 HORNE, A., F.E.S., Ugie Bank, Aberdeen. *l*.
- 1902 INGALL, N. J., 55, Crescent Grove, Clapham, 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*.
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow. *l*.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie House, Monaghan, Ireland. *l, mi, marine invertebrata*.
- 1898 KAYE, W. J., F.E.S., Caracas, Ditton Hill, Surbiton, Surrey. *l*.
- 1900 KEMP, S. W., F.E.S., 80, Oxford Gardens, Notting Hill, W. *l, c*.
- 1884 KENWARD, J., 195, Hither Green Lane, Lewisham, S.E. *l*.
- 1900 KIRKALDY, G. W., F.E.S., S. Abb's, Worple Road, Wimbledon. *ex. rhyn.; fresh. arth.; ethnology*.
- 1888 KNIGHT, E., 2, Lichfield Grove, Church End, Finchley, N.
- 1894 LAMB, H., Acacia Place, Upper Faut, Maidstone. *b, orn*.
- 1898 LEMANN, F. C., F.E.S., Blackfriars House, Plymouth. *l*.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l*.

YEAR OF
ELECTION.

- 1898 LITTLE, W. W., 17, Belgrave Street, King's Cross, N. *l*.
- 1901 LOWE, F., Polruan, Clarendon Road, Putney, S.W. *l*.
- 1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *l, o, n, m*.
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1900 MACGEE, W. H., 79, Lillie Road, S.W. *l*.
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview Clarendon Road, Lewisham, S.E. (*Hon. member*). *n*.
- 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., 133, Park Grove, Hull. *l*.
- 1885 MERA, A. W., 79, Capel Road, Forest Gate, E. *l*.
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b*.
- 1888 MITCHELL, A. T., 594, High Road, Chiswick, W. *l*.
- 1896 MONTGOMERY, ARTHUR M., F.E.S., 83, Osborne Road, Forest Gate, London, E. *l*.
- 1880 MONTIERO, Señor A. A. DE C., F.E.S., 70, Rua do Alecrinar, Lisbon.
- 1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l, e h, e d, mi*.
- 1887 NEVINSON, E. G. B., 5, Bentinck Terrace, Regent's Park, N.W., and 7, Staple Inn, W.C. *l, stalk-eyed crustacea*.
- 1901 NEWNHAM, C. E., The Eyot, Hersham, Surrey. *l*.
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l*.
- 1900 NOTTLE, EDWARD, Lanyar Vale, Portland Road, South Norwood. *l*.
- 1903 OLDAKER, F. A., The Parsonage House, Dorking, Surrey. *l*.
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South Woodford, Essex. *l*.
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton. *l*.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology*.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b*.
- 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., 41, St. Martin's Lane, Charing Cross, W.C. *zoology, mi, pond life*.
- 1889 PERRY, Rev. J. F., Catholic Church, Brixton Hill, S.W. *l, c*.
- 1899 PICKIN, J. R., 2, Industry Terrace, Brixton, S.W. *l*.

YEAR OF
ELECTION.

- 1887 PORRITT, G. T., F.L.S., F.E.S., Mayfield, Edgerton, Huddersfield. *l, n.*
- 1896 POTTER, A. T., Whangarei, Auckland, New Zealand. *l, zoo.*
- 1903 PRATT, W. B., 10, Lion Gate Gardens, Richmond, Surrey. *l.*
- 1897 PREST, E. E. B., Arva, Dakers Road, Forest Hill. *l.*
- 1903 PRISKE, R. A. R., Thirlmere, Spencer Road, Acton, W. *l.*
- 1902 RAYWARD, A. L., Lessington, Grosvenor Gardens, Wallington, Surrey. *l.*
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. *orn.*
- 1902 RILEY, E. F., 94, Drakefield Road, Upper Tooting, S.W. *l.*
- 1887 ROBINSON, A., B.A., 1, Mitre Court, Temple, E.C. *l.*
- 1894 ROBINSON, LEIGH, 13, Victoria Street, Westminster, London, S.W. *l.*
- 1888 ROBSON, H., 93, Watling Street, E.C. *l, b.*
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l, c.*
- 1900 ROWDEN, ALFD. OLIVER, 6, Eastgate, Exeter. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1898 RUSSELL, A., F.E.S., The Limes, Southend, Catford, S.E. *l.*
- 1886 SALWEY, R. E., F.E.S., Springbank, Wokingham, Berks. *l.*
- 1897 SANDISON, JOHN, 2, Francis Grove, Wimbledon, Surrey. *l.*
- 1888 SAUZÉ, H. A., *Hon. Librarian*, 11, Venner Road, Sydenham, S.E. *l.*
- 1902 SCOLLY, A. J., F.E.S., Penshurst, Sheridan Road, Merton Park, Wimbledon, S.W. *l.*
- 1898 SICH, ALF., F.E.S., Corney House, Chiswick, W. *l.*
- 1899 SMITH, E. W., 16, Tresco Road, Linden Grove, S.E. *l.*
- 1890 SMITH, WALTER, 1, Arundel Villas, Hampton Road, Twickenham. *l.*
- 1890 SMITH, WILLIAM, 13, St. Merren Street, Paisley. *l.*
- 1882 SOUTH, R., F.E.S. 96, Drakefield Road, Upper Tooting, S.W. *l.*
- 1903 SPITZBY, J. H., 1, Douglas Road, Canonbury Road, N.
- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex (*Life member*). *l.*
- 1872 STEP, E., F.L.S., *President*, Oakwood House, Barnett Wood Lane, Ashted, Surrey. *b, m, orn, cr.*
- 1902 STONELL, B., 25, Studley Road, Clapham, S.W. *l.*
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, oo.*

YEAR OF
ELECTION.

- 1901 THORNTHWAIT, W., Hersham, Surrey. *l*.
- 1895 TOLHURST, J., Glenbrook, Beckenham, Kent. *l*.
- 1899 TOMLINSON, F. *l*.
- 1902 TONGE, A. E., Aincroft, Grammar School Hill, Reigate. *l*.
- 1899 TOOMBS, G. W., 40, Shrubland Grove, Dalston Lane, N. *l*.
- 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l*.
- 1895 TUNALEY, HY., F.E.S., 30, Fairmount Road, Brixton Hill, S.W. *l*.
- 1887 TURNER, H. J., F.E.S., *Hon. Report Secretary*, 13, Drakefell Road, St. Catherine's Park, S.E. *l, c, n, he, b*.
- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Hill, Blackheath, S.E. *l*.
- 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., 2, Handsworth Wood Road, Handsworth, near Birmingham. *l*.
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., H.M.S. Katoomba, Sydney, N.S.W. *l, c*.
- 1888 WALLER, R., 2, Grand Parade, Upper Richmond Road, Putney, S.W. *l*.
- 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*.
- 1903 WARNE, ERNEST, 45, St. John's Hill, Clapham Junction, S.W. *l*.
- 1888 WARNE, N. D., 8, Bedford Square, W. *l*.
- 1888 WEBB, S., 22, 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., 75, Lewin Road, Streatham Common, S.W. *l, mi*.
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l*.
- 1893 WOLFE, J. J., Skibbereen, co. Cork, Ireland. *l*.
- 1899 WOOD, Rev. FRANCIS HENRY, M.A., Brabourne Cottage, Bromley Park, Kent. *l*.
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *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 1902.

GENERAL FUND.

<i>Receipts.</i>			<i>Expenditure.</i>		
	£	s. d.		£	s. d.
By Balance	...	12 12 6	To Rent (1 year)...	...	25 0 0
" Subscriptions received, 83 at 7/6	...	...	" Attendance (1 year) ...	...	...
" " " 2 " 6/-	£31 2 6	...	" Postage, Stationery, and Sundries ...	...	2 10 0
" " " 8 " 5/-	0 12 0	...	" Insurance of Library and Collections	...	5 6 6
" " " 7 " 2/6	2 0 0	...	" New Subscription Receipt Book ...	...	0 8 3
	0 17 6	...	" Entrance Fees carried to Suspense A/c	...	0 10 6
" Entrance Fees, 8 at 2/6	34 12 0	0	" Sub. to South-East Union ...	...	1 0 0
" Arrears of Subscriptions received	...	1 0 0	" Transfer to Library Fund ...	...	0 5 0
" Subscriptions paid in advance	...	6 0 6	" Balance in hand ...	...	2 0 0
	...	1 5 0		...	18 9 9
	£55 10 0	0		£55 10 0	0

SUSPENSE ACCOUNT.

<i>Receipts.</i>			<i>Expenditure.</i>		
	£	s. d.		£	s. d.
By Balance in Hand	...	13 17 6	To Balance	...	14 17 6
" Entrance Fees from General Fund...	...	1 0 0		...	...
	£14 17 6	0		£14 17 6	0

LIBRARY FUND.

<i>Receipts.</i>		<i>Expenditure.</i>	
By Balance ...	£ s. d.	To Ray Society Subscription ...	£ s. d.
" Vote from General Fund ...	... 0 5 10	" Andrews for Binding Books ...	... 1 1 0
" Fines ...	... 2 0 0	" Postage and Carriage of Books ...	... 1 1 9
" Balance owing to Treasurer ...	... 0 2 0		... 0 6 10
	... 0 1 9		
	<u>£2 9 7</u>		<u>£2 9 7</u>

PUBLICATION FUND.

<i>Receipts.</i>		<i>Expenditure.</i>	
By Donations ...	£ s. d.	To Debit Balance ...	£ s. d.
" Sale of "Proceedings" ...	... 20 5 3	" Knight, Printing ...	... 3 15 6
" Debit Balance ...	... 1 15 0		... 25 18 3
	... 7 13 6		
	<u>£29 13 9</u>		<u>£29 13 9</u>

ASSETS AND LIABILITIES.

<i>Assets.</i>		<i>Liabilities.</i>	
By Balance, General Fund ...	£ s. d.	To Debit Balance Publication Fund ...	£ s. d.
" Suspense Account ...	... 18 9 9	" " Library Fund ...	... 7 13 6
" Arrears of Subscription, £34 10s., valued at say ...	... 14 17 6	" Balance ...	... 0 1 9
	... 7 2 6		... 32 14 6
	<u>£40 9 9</u>		<u>£40 9 9</u>

Examined, compared with vouchers, and found correct this 19th January, 1903.

H. A. SAUZÉ,
ALFRED W. DENNIS, } *Auditors.*

REPORT OF THE COUNCIL, 1902.

THE Council of the South London Entomological and Natural History Society, in presenting the Thirty-first Annual Report, is much gratified in being able to state that the affairs of the Society continue to be most satisfactory.

The membership again shows a slight increase. Fourteen members were elected during the year, four have resigned, and the Council regrets to record the loss of two Members by death—Major Ficklin, a past President of the Society, and one of its earliest supporters, and Mr. Mark Winkley. Both these gentlemen were regular attendants at the meetings.

The actual number of Members at the present time is 181, of which 4 are Honorary, 5 are Life, 38 are Country, and 134 are Ordinary Members.

The Honorary Treasurer's Balance-sheet, which will be found at page x, shows that the usual satisfactory state of the Society's finances has been maintained, under the able administration of Mr. T. W. HALL. The Council desires to point out that at the end of the year no less than fifty-five Members were still in arrear with their subscriptions, and to urge upon all Members the desirability of paying as early as possible in the year, so that the affairs of the Society may be carried on without causing the Treasurer unnecessary trouble and anxiety.

The meetings of the Society have been very well attended, and the exhibits have also been of an interesting character. The Council decided that it was not expedient to hold the second meeting in June, which fell during the "Coronation week," and due notice was forwarded to each Member. At the second meeting in November the usual special exhibition

of notable captures was held, and was most successful, both as regards the number of Members and friends who attended, and the interesting nature of the exhibits. The attendance was between eighty and ninety, and was a pleasing indication that the work of the Officers and Council in managing the affairs of the Society is well appreciated. The Council notes that nearly all the exhibits on this occasion were of Lepidoptera, and trust that on future occasions of this kind our ardent workers in other orders may make a considerable increase in their contributions, and so enhance the instructive value of such exhibitions.

With regard to the general exhibits at meetings, your Council would like to urge upon all Members who bring exhibits to give as full data as possible. It is most important for all record purposes that the exact date and locality be stated, and if possible some, at least one, biological fact as to life-history, distribution, affinities, etc. Above all, the full generic and specific name should be attached.

The average attendance at the twenty-two meetings, taken from the signature book, has been thirty-two. This hardly represents the exact number, as at each meeting several Members who were present unfortunately omitted to sign.

The Papers read before the Society, together with Addresses and Lantern Demonstrations, were thirteen in number, while nine Reports of Field Meetings have been communicated. The Council desires to thank most heartily those Members who year after year come forward in such a generous way and help them to bring some definite subject forward for consideration and discussion. The lantern still continues of use in illustrating the work various Members are doing. The Council would like to call particular attention to the President's most valuable and original Paper on the "Life-history of the Parasite of the Stickleback," which will ever be a notable addition to the Abstract of "Proceedings" issued by the Society. The following is a list of those who have contributed Papers, etc.:—Mr. LUCAS, four; Mr. ADKIN, three; Mr. STEP, three; Mr. MANGER, two; Dr. CHAPMAN, one; Mr. CLARK, one; Mr. HARRISON, one; Mr. KIRKALDY, one; Mr. MAIN, one; Mr. MOORE, one;

Mr. SCOURFIELD, one; Mr. SICH, one; Mr. SOUTH, one; and Mr. TURNER, one.

Nine Field Meetings have been held, a much larger number than in any previous year. In 1898 only three were held, and in 1897 only two. These meetings now seem to be well attended and appreciated, and form a very useful means for acquiring a knowledge of Nature during pleasant social intercourse. A new feature this year has been the organisation of an advance party of those who are able to spend the whole day in the field. They have gone down early and investigated a more distant part of the district selected, meeting the main body later in the day.

The following is a complete list of the Field Meetings for 1902 :

BOOKHAM, on May 10th; Conductors, Messrs. CARPENTER and LUCAS.

REIGATE, on May 24th; Conductor, Mr. HY. J. TURNER.

RANMORE COMMON, on June 7th; Conductors, Messrs. CARPENTER and STEP.

OTFORD, on June 21st; Conductor, Mr. R. ADKIN.

WISLEY, on July 5th; Conductors, Messrs. ASHDOWN and LUCAS.

BYFLEET, on July 19th; Conductors, Messrs. LUCAS and STEP.

OXSHOTT, on September 6th; Conductors, Messrs. LUCAS and SOUTH.

EPPING, September 20th; Conductors, Messrs. HARRISON and MAIN.

LOUGHTON, October 4th (Fungus Foray); Conductor, Mr. H. MAIN.

The meeting on September 6th was originally arranged for St. Paul's Cray, conducted by Mr. ADKIN. It was impossible to carry this out, owing to the falling-in of the Chiselhurst Tunnel, and Mr. LUCAS very kindly filled the breach by conducting a meeting to Oxshott. The Council has to thank those gentlemen who have conducted these meetings, and made all arrangements as to tea and trains with such success. They feel that the good attendance of Members and friends have assured them that their self-

denying efforts are well appreciated. In spite of the unfavourable weather on one or two occasions, the average attendance at the nine meetings was eighteen.

The collections still continue under the constant care of our first Curator, Mr. W. WEST, of Greenwich, who for thirty years has watched over this section of the Society's work so thoroughly, and the Council has much pleasure in tendering him hearty thanks for his unremitting attention during so long a time. Mr. WEST reports that he has been very fortunate this year in having several large donations :— Dr. CHAPMAN gave forty-four species, including some of our rarer Lepidoptera, in very fine condition ; Mr. A. HARRISON twelve species of Lepidoptera ; Mr. CARR numerous species on two occasions ; and from Mr. WEST himself a further addition of numerous species of Hemiptera. The best thanks are due to these gentlemen for their most useful donations.

The Council suggests that Members exhibiting series of insects, and having duplicates to spare, might consult the collections and ascertain if representatives of the species are wanted therein. Especially is this desirable among the Micro-Lepidoptera, Coleoptera, and Hemiptera.

The Library still receives the chief current magazines of Natural History from their respective editors, and also additions by donation of the more useful general works on Natural History. Very few additions have this year been made to the Photograph Album, and the Council recommends that a list be kept of those Members who have contributed their pictures, and that those who have not may then be occasionally reminded of the fact. Mr. SAUZÉ, whose care keeps the Library so well in hand, reports as follows :—" The books have been freely consulted during the past year, and the opportunity to refer to the volumes without taking them away in the hour preceding the meetings is evidently appreciated. The demand for ' Proceedings,' though small, is encouraging, America being the principal quarter from which orders have come."

The following is a list of the additions to the Library during the year, and the best thanks of the Society are due to

those who have so generously kept the Society's bookshelves furnished :

"Hymenoptera," by F. SMITH (n. ed.), from the TRUSTEES OF THE BRITISH MUSEUM (Nat. Hist.).

"Insect Life," by J. H. FABRE ; "Mammalia" (Cambridge N. H.), "British Lepidoptera," Vol. III, by J. W. TUTT, from Mr. STANLEY EDWARDS, F.L.S., F.E.S.

"Tettigidae of North America," by HANSON, from the AUTHOR.

"The Entomologist," from Mr. R. SOUTH, F.E.S.

"The Zoologist," from Mr. NEWMAN.

"The Entomologist's Monthly Magazine," from Mr. M'LACHLAN, F.R.S.

"Science Gossip," from Mr. J. T. CARRINGTON.

"Knowledge," from the PUBLISHERS.

"The Irish Naturalist," "The Canadian Entomologist," "The Rochester Naturalist," "Entomologische Tidskrift" (Stockholm), by exchange.

Reports of the Smithsonian Society, the Entomological Society of Ontario, the East Kent Scientific and Natural History Society, Norfolk and Norwich Naturalists' Society, Croydon Natural History Society, Holmesdale Natural History Society (Reigate), S.-E. Union of Scientific Societies, from the Societies, etc.

Pamphlets and Separata from Mr. T. D. A. COCKERELL, of Colorado, the Lloyd Library, Ohio, New Mexico College of Agriculture, etc.

The Abstract of "Proceedings" of the Society for 1901 was issued in June with the very kind aid of a few staunch and generous Members, to whom the gratitude of all is due. It consisted of a book of ninety-two pages and two plates. The Council regrets the late date of issue of the volume, and trusts that it will be possible to have the Abstract for 1902 in the hands of the Members by the end of March.

In conclusion the Council wishes to congratulate the Society on having passed through another year's successful work. They are pleased to see Members being added at each meeting, and have no doubt that during the coming year the work and prosperity of the Society may go on apace.

A Few Notes on some Land Shells (*Achatinella*) from the Sandwich Islands.

By W. T. MANGER. *Read February 13th, 1902.*

THESE beautiful little shells are of very great interest, inasmuch as they are found *only* in the Sandwich Islands (with the exception of one or two very small species). They occur in most of the twelve islands of the group, which lie in the North Pacific in mid-ocean, between the coasts of Asia and America, but are nearest to the American coast, from which they are about 2100 miles distant; and consequently their natural history has many special features of its own. These shells have an especial claim to the honour of being ranked as a genus; they are mostly of uniform size and substance, and are characterised by the same plan of convolution of six to seven whorls; never umbilicated; by a similar design of colouring, and by a peculiar structure of the columella. The species are nearly all small, and many of them are both dextral and sinistral; some are found on trees and shrubs, whilst others are always met with on the ground.

It is very remarkable that the average range of these species is so restricted as it is; in some cases it is only two or three square miles, and only very few have the range of a whole island; it is even said that each valley possesses its own peculiar species. Kew, in his "Dispersal of Shells," says, "The *Achatinella* of the Sandwich Islands, so remarkable for limited specific areas, have in all probability been occasionally carried by accidental means into the midst of each other's districts, but, as their distribution clearly indicates, they must generally have failed to establish themselves in the new surroundings, being unable, no doubt, to compete successfully with those already in possession." Speaking of distribution, the inquiry naturally forces itself on us, how did these animals get to the Sandwich Islands, which are of volcanic origin and 2100 miles from the nearest continent, and that none succeeded in getting to other places, or, at least, have not been discovered in other places, whilst other families, *Helicidæ*, for instance, are found in every country and nearly every island in the world? Mr. Wallace has maintained that all the animals now inhabiting truly "oceanic islands" must have reached them by crossing the ocean, or be the descendants of ancestors which did so, for such islands have been produced in mid-ocean and have never formed part of a continent. Quoting again from that work, "The Dispersal of Shells," it is suggested that the

creatures in a state of hybernation are likely to be carried by ocean currents while hiding in chunks and underneath the bark of drift timber, or in the interstices of floating pumice, etc. Thus situated, they may sometimes be protected, or partially protected, from contact with sea water, and may be carried during calm weather to great distances, so that the arrival of shells or ova, still alive, on the shores of a foreign country, or distant island, may not be a very improbable event; but, of course, the most favourable conditions are required for not only the landing but the establishment of the creatures. Another means of dispersal is by birds, and although the transportal of shells by these agencies can only rarely happen, as Mr. Wallace has remarked, "Nature can afford to wait," and if but once in many years a single bird should convey two or three minute snails to a distant island, that is all that is required for us to find that island stocked with a large and varied population of land shells.

Just a word about musical sounds in connection with *Achatinella*. The Rev. Glanville Barnacle (who served as astronomer to the Government expedition to the Sandwich Islands in 1874) has recorded in the "Journal of Conchology" in 1883, that when up the mountains of Oahu hunting for *Achatinella*, he heard the most curious and wildest music, as if from hundreds of *Æolian* harps. On a tree close at hand were many of these creatures, the animals drawing after them their shells, which, grating against the wood, caused a sound, and the multitude of sounds produced the fanciful music. On this tree he took seventy shells of many varieties, and twenty-three more at the root in the grass. I believe this statement about musical sounds has been corroborated by other observers.

I have two specimens of *Ampullaria* sent me by a lady missionary from the West Coast of Africa, which, she says, emit a faint musical sound, but how it is produced I cannot find out. This is only another of those many puzzles which continually occur in the study of any department of natural history, and which await the attention of the naturalist observer.

A Life Cycle of *Acidalia marginipunctata*, Göze (promutata, Gn.), and other Notes on the Species.

By ROBT. ADKIN, F.E.S. *Read February 27th, 1902.*

JUST twenty years ago some of my Folkestone friends sent me larvæ of *Acidalia marginipunctata*, with instructions to "feed them on knotgrass until the autumn, and when they were ready for hybernation to put them in a large bottle with dry sticks until the spring, when they would feed up on plantain." The first part of these instructions I carried out faithfully, but had no chance of following them through, as the larvæ all perished during the winter.

A couple of years later I took a moth of this species at Box Hill on July 14th, and obtained ova which hatched on the 30th of that month; the resulting larvæ fed slowly on knotgrass until the end of August, when they were transferred to a pot of growing plants of tormentilla, bramble, etc., and kept out of doors, but under cover, and on the 9th of June following a solitary imago appeared.

My first attempts, therefore, at rearing the species were not particularly encouraging, and as my attention was occupied pretty fully with other species I did not repeat them for some years; but falling in with the imago very commonly at Eastbourne for several autumns in succession, I became interested again, and recommenced operations with several batches of ova, and so far succeeded that I got the majority of the larvæ through the winter, and several of them into pupæ in the following June, but failed to rear any moths. The larvæ this time had been kept through the winter on growing plants, as in the last-mentioned case, but several other low-growing species were added to those mentioned.

Having so nearly succeeded, it occurred to me that my failure was probably the result of some small matter in the management of the larvæ, either during hybernation or after they commenced feeding in the spring; and with a view to benefiting by the experience of others, who had, perchance, been more successful than myself, I looked up the literature bearing on the subject in such books as I had at hand. One would naturally expect that there would be no lack of detail regarding so common a species, but as a matter of fact the amount of useful information to be obtained was exceedingly scanty. For instance, Stainton's "Manual" (under the name of *A. incanata*) tells us that the moth appears from July to end of August, and that the larva feeds on pink, vetch, and yarrow, in June. Meyrick's "Handbook"—moth in June and July, larva August to

May on *Achillea* and *Polygonum*, etc. "Wood's Index," under names of *A. incanata* and *A. contiguaria*, gives date of appearance of the moth as end of June. Wilson's "Larvæ" also gives June as the time of appearance of the imago, and July to May as the duration of the larval stage, the food-plants mentioned being mallow and yarrow, and knotgrass in confinement; and sundry other authors gave much the same information. Buckler, in "The Larvæ of British Butterflies and Moths" (under the name of *A. incanata*), gives a couple of very good figures of the larva, except that it is perhaps impossible to portray in print the delightfully soft tone of colour of the living animal (Pl. cxviii, figs. 5, 5a), but appears to have left us no notes regarding them. The deficiency is, however, supplied by Porritt (Vol. vii, p. 108), who edited this portion of the work. He gives an accurate description of the larvæ (which, taken in conjunction with the figures already mentioned, will be all that it is necessary to say under this head), and remarks that the larvæ received in September hybernated for an unusually long period, did not commence feeding until long after other larvæ had done so, and were not full-fed until quite the end of June; and adds, "This, however, cannot be taken as a natural habit of the species, whatever may have been the cause in this case." My own experience, however, is quite in accord with his, the period of hibernation invariably being prolonged.*

Thus left to my own resources, I determined to follow carefully the habits of the imago when next I should fall in with it, in the hope that I might gather such hints from its habits and surroundings as might enable me to work out its life history under something approaching natural conditions.

The desired opportunity occurred on my going to Eastbourne towards the end of August, 1900. For some days after my arrival I saw nothing of the species; strong winds and gales swept the coast, rendering the exposed stones on which the insect usually rests untenable; and it was not until the early days of September that I began to find them in any numbers, and even then in nothing like the profusion that I had seen in some previous years, but quite commonly enough for my purposes.

In previous notes on this species I have mentioned its habit of sitting, fully exposed, on the rough blocks of stone which support the banks facing the sea ("Proc.," 1891, p. 171; 1896, p. 108, etc.). At dusk it flits about among the thick masses of tamarisk that grow on these banks, and after a mild night, even though a fair amount of westerly breeze may sweep the front of the banks, the moths will be found settled down on the stones in the morning. Not so if the wind is east and the weather dull, when the moths probably find

* The part of Barrett's "British Lepidoptera" dealing with this species, and where some amount of detail regarding its habits is given, has since been published.

shelter among the herbage, as no doubt they also do in very stormy weather. After a sunny day the stones often feel quite warm to one's hand when placed upon them, even late in the evening. I also noticed that in very hot, sunny weather the moths resting on the stones were very torpid, one frequently having to almost scrape them off the stones into the pill-box, but that the moment they were in the shade they would commence to flutter, and that, if purposely disturbed, they would fly a short distance and then settle down again on the sunny front of the stones; also that in the afternoon individuals with wings still limp were frequently to be found a few inches up the stones, evidently having just crawled up there from the pupa.

Although the moths sitting on the stones harmonise remarkably well with their surroundings, the facts just mentioned suggested to my mind that there might be other reasons for their selecting this position. At times they would be well sheltered from the wind, but this was not always the case; indeed, more often than not, far better cover would have been afforded by the herbage. The explanation therefore appeared to be that the sun heat was a matter of vital importance to them, and the position in which the freshly emerged examples had been found appeared to suggest that the pupa also was not averse to a sunny corner. I therefore determined to repeat my former trials, and to let the insect have plenty of sunshine throughout its stages. The question of food, I confess, I could throw but little light upon. *Tormentilla* is certainly very common on the banks, but so are numbers of other small plants, the only species that exceeds in abundance all the others being the tamarisk.

On September 5th, 6th, and 8th, 1900, I took moths which deposited ova, the last being laid on the 15th. At first the eggs were pale green, but soon changed to a dull pink, and commenced to hatch on the 17th. The young larvæ were put in wide-mouthed bottles of about two-ounce capacity, with a piece of thin calico secured with an india-rubber band for a cover, and given knotgrass (*Polygonum aviculare*) for food. They were kept where they got a good deal of sunshine, and as they grew, larger bottles were substituted.

By the beginning of November knotgrass failed, and the larvæ, showing signs of hybernating, were moved into glass jars of some thirty-ounce capacity, about an inch of dry silver sand being put into the bottom to absorb any undue moisture, and a liberal supply of very fine, dry grass stems added, on which the larvæ soon settled themselves. For food, small portions of a crepis (*Crepis virens*, I believe) and chickweed (*Stellaria media*) were given at frequent intervals, but I could discover no signs of it having been eaten. As it dried, however, it formed good cover for the larvæ in case of severe weather.

Throughout the winter the jars were kept in such a position that the larvæ would get the benefit of any little sunshine there might be,

but in this respect they were at a disadvantage as compared with their wild brethren on the banks by the sea, for frequently when Eastbourne recorded several hours' sunshine it was of too feeble a nature in London to affect the recorder; and this fact will have to be taken into account later on when we come to compare dates between the broods reared in captivity and those that had lived under natural conditions. But when the sun did shine upon them, even in the depth of winter, it was curious to see these little thread-like larvæ holding on to the grass stems and curling themselves about in the most fantastic manner, evidently enjoying the sun's warmth to the full.

About the middle of March, finding that the larvæ of some other species of *Acidalia* were feeding occasionally on the fresh food that had been given them, and as the *marginipunctata* appeared to be going through their antics somewhat more violently in the now strengthening sunshine, I supplied them also with such food as was obtainable that I thought might tempt their appetite, but was unable to discover that they touched it.

On March 31st twelve larvæ were removed into a separate bottle, supplied with tender food, kept in a warm room by night, and stood in the sunshine by day whenever opportunity offered. They fed very little, if at all, at first; but towards the end of April some of them began to grow rapidly, and on May 21st one of them spun its cocoon, another at that date being apparently on the point of doing so, and ultimately four in all pupated; but two moths, which emerged on June 21st and July 9th respectively, were, I believe, the only two reared from this lot.

The remaining larvæ were divided into two lots of about equal numbers on April 28th, one portion being put into a flowerpot half filled with silver sand, and a piece of muslin tied over the top, the food, viz. yarrow (*Achillea millefolium*) and tormentilla (*Potentilla reptans*), being kept fresh by its stalks being put in a bottle of water buried in the sand, and young seedling knotgrass was frequently sprinkled upon it also, and the pot was placed so that the sun's rays shone through the muslin directly into it. The other portion was kept in a large glass jar and supplied with similar food. This jar was also kept in the sunshine, but as I deemed it advisable not to let the rays shine directly on the glass it was shaded by a muslin screen. For some time after this I could find no signs to indicate that either lot of larvæ was feeding, neither did the food appear to be eaten, nor did the larvæ increase in size; but about the middle of May it was evident that hybernation had ceased, and some of each lot were increasing in size. Of the two lots those in the flowerpot were doing the better, and on June 2nd those in the jar were shifted into a flowerpot also. From this time they fed up rapidly; at first tormentilla appeared to be their favourite food, but later yarrow was taken much more freely, while the knotgrass, on which, be it noted, they had entirely lived before hybernation, was completely neglected.

The majority became pupæ during June and the first week of July, but a few larvæ appeared to remain stationary when about half grown, and these, I assumed, would go over till the time of the late emergence. I managed to so far confirm this that three or four of them fed on until early in August and then pupated, but unfortunately the pupæ died.

The moths forming the first emergence came out between July 1st and 24th, probably about a fortnight or three weeks behind the time when that brood would be on the wing on the sunny banks at Eastbourne; but as I have unfortunately had no opportunity of visiting that locality at that season of the year, I am unable to verify the time at which that brood appears.*

I succeeded in getting a pairing between moths which emerged on July 6th and 7th, and obtained from them a good batch of eggs, which hatched on the 16th of that month. The larvæ fed up almost entirely on knotgrass, yarrow, and tormentilla, with which also they were kept constantly supplied, being hardly touched by them. They were kept as much in the sunshine as I dared to keep them at this time of the year, without letting their food become dried up unduly. Under these conditions they fed up rapidly (except about a dozen which remained about half grown, and are now—February, 1902—safely hibernating),† and commenced to spin their cocoon on August 18th. The moths appeared between September 6th and 19th.

On August 17th I went to Eastbourne, and on that day found the moth fairly commonly in its usual haunts, just three weeks earlier than the first individual emerged in confinement.

Briefly, then, the complete life cycle of the species appears to be : Ova deposited in August and early in September hatch within a couple of weeks; the larvæ hibernate and produce moths in the following June, except a small proportion which feed slowly, and do not produce moths until some two months later. Ova from the moths of the June emergence hatch in some ten or twelve days; the majority of the larvæ feed up rapidly and produce moths in August and early September, at the same time as the slow-feeding individuals of the hibernated larvæ; but of this brood also a small proportion remain as larvæ, and so pass through the winter, arriving at the imaginal stage at the same time as the offspring of the later brood. These remarks must, however, be taken as applying only to the species as found on extreme south coast; further north it is probably but single-brooded, the imagines being on the wing late in June and in July.

The species being not quite completely double-brooded in the south, appears to suggest the probability of the double-broodedness being an acquired habit of recent institution, the few larvæ remaining over from each brood, thus taking the full time of a single-brooded

* On July 6th, 1902, I found this species sparingly on the Eastbourne parades in rather worn condition. The season, it will be remembered, was a late one

† These larvæ produced moths between July 5th and 12th, 1902.

species to complete their metamorphoses, possibly being a means of securing the species against extermination in case of circumstances prejudicial to rapid development occurring. In other words, although the species is practically double-brooded in the south, it still retains a disposition to single-broodedness, which may, under certain conditions, become generally effective.

I have already referred to the food of the larvæ, and on a former occasion I expressed the opinion that although tamarisk (*Tamarix anglica*) grew so profusely all along the slopes on which the insect occurs, I could not think that that plant had anything to do with the prevalence of the insect in that particular part, further than affording good cover. One of my chief reasons for this was the fact that, although I had looked over the tamarisk bushes again and again, I had failed to find any signs that appeared to show that they had been eaten by any lepidopterous larva. However, on the occasion of my last visit to the locality, I happened to be returning along the banks early one evening, and, noticing the tops of several shoots to be very much eaten, I stopped to examine the cause, and was surprised to find a number of larvæ of *Hadena oleracea* feeding greedily upon them, thus showing that all lepidoptera are not absolutely averse to the plant. Possibly, then, the luxuriant growth of tamarisk may, after all, have something to do with the abundance of *A. marginipunctata* at the particular place, and I hope, should I have any luck with the larvæ I now have hybernating, that I may yet have a chance of deciding the question.*

Yet one other point of interest came under my notice on the occasion of my last visit.

There can be no doubt that a mottled-grey insect resting on the rough surface of a more or less grey stone is fairly well protected from observation; but if that same grey insect rests upon a dark green ivy leaf one would naturally conclude that it would become a conspicuous object. It is quite true that a moth so placed would receive the full benefit of the direct sun heat, if that be of importance to it, equally with those moths resting on the stones; but so far as protection from observation it would clearly be at a disadvantage. The ivy plants have grown very considerably of late years, and in many parts cover up the stones, yet it is rarely I have found moths resting on the leaves; when, however, I have so found them, they have been just as frequent on the leaves as on the stones. It appeared to be a point that needed explanation, and the explanation that presented itself appeared to me to be a simple one. I can, perhaps, best convey it by describing the circumstance that brought it to my mind.

As already stated, I arrived at Eastbourne on the afternoon of

* Since this was written tamarisk was given to some nearly full-grown larvæ, but they not only refused to eat it, but appeared to avoid it even as a resting-place.

Saturday, August 17th, and having seen the family *impedimenta* safely housed, went for a walk along the western parades. It was a very fine day, after somewhat showery weather just previously to my arrival, and it was probably about five o'clock when I started. I had not gone far when I caught sight of *A. marginipunctata* resting on the stones in its accustomed manner, and having boxed two or three of them, I searched one of the patches of wall over which the ivy had completely grown; at once I noticed a moth sitting on one of the ivy leaves, thought it a most conspicuous object, boxed it, and believing that I saw another sitting on another leaf near by, attempted to box it also. To do so I put the lid of the pill-box gently beneath the leaf, and putting the body of the box above it, drew them gently forward so as to scrape the moth off the leaf into the box. On looking into the box through its glass bottom I was surprised to find no moth there, and still more so to see, as I thought, the moth still sitting on the leaf. On a close examination, however, I found the supposed moth to be really a patch of grey mud, and that there were a very great many similar patches on the ivy leaves, all much alike in shape, and invariably at the tips of the leaves. It was, indeed, a difficult matter to single out a moth among the numberless mud patches, but when one's eye did light upon a veritable moth, it also was sure to be near the tip of a leaf. In a former note of finding the species resting on the ivy leaves, made some years previously, I find it is there stated that the weather had been showery. The phenomenon so interested me that I determined to closely investigate it. As I have previously mentioned, I believe, the ivy plants grow on the rough stone walls that hold up the earth banks on which the tamarisk bushes flourish. The soil of which the banks are composed is largely chalk; after dry weather a sudden shower washes the loose, dusty surface of the soil down over the walls and the ivy. The shape of the ivy leaves is such that they collect a quantity of this muddy liquid near their tips, and the first gentle breeze or gleam of sunshine dries it, and there it remains until again converted into dust by excessive drying and blown away by the breeze or washed away by heavy rain. It appears to be only in showery weather that the patches are formed, heavy or continuous rain washing the leaves clean; hence the phenomenon is not of very frequent occurrence, but the explanation appeared to be complete.

Foreign Cypræa.

By W. T. MANGER. *Read May 22nd, 1902.*

It is not my intention to occupy many minutes of your time in the consideration of a subject which is of interest perhaps to but few of our members. Species of the genus of *Cypræa* are among the best known of the Molluscs, and form the common mantelpiece ornaments in nearly every household, and they are certainly one of the most beautiful, both in form and coloration.

The term Cypria, Mr. J. C. Melville (who is a well-known writer on Conchology) says, "is derived from one of the many attributes of Aphrodite, the goddess of love and beauty, owing, doubtless, to her worship not only having been inaugurated, but for long years principally centralised, in Cyprus, then a luxuriant island teeming with industrial wealth." The term cowrie, or gowrie, is derived from a Greek word signifying a little pig, and this term cowrie has come to be employed in a general way to designate all *Cypræa*. Not only is the shell beautiful, but the animal also. Woodward well describes it as having a broad foot, truncated in front, mantle expanded on each side forming lobes, which meet over the back of the shell. These lobes are usually ornamented with tentacular filaments; eyes on the middle of the tentacles, or near their base, branchial plume single, lingual ribbon long, partly contained in the visceral cavity. They can contract their bodies entirely within the shell, notwithstanding the narrowness of the aperture. They have no operculum. There are about 200 known species, and about 100 fossil, chiefly in the Tertiary. They are found in all warm seas except, perhaps, the East Coast of South America, but a few stragglers occur in temperate seas (the Mediterranean, etc).

They are found in shallow water near shore, feeding on Zoophytes, etc. They are used as ornaments by some of the tribes in the Pacific Islands; the Friendly Islander used to wear the orange cowrie (*C. aurantium*) as a mark of chieftainship. I don't know if Mr. Chieftain is aware of the value here of this shell. I see there was a specimen sold the other day at public sale for £2 5s.—it is a very rare and beautiful shell. *C. annulus* is also worn, whilst *C. mauritiana*, being a large and heavy shell, is very often made use of as sinkers to weight their fishing nets. *C. moneta* is still used in Africa and some parts of India for barter; their value seems to vary between 2400 to 3200 per rupee. Cowries are represented in this country by *C. europea*, a small but beautiful shell. Our friend Mr. Step, in his

"Shell Life," tell us that we have also *Erato levis* and *Ovula patula*, both sub-genera of *Cypræa*.

It is very interesting to note the difference in appearance between the young cowrie and the adult. The young cowrie has a thin, sharp lip, with a distinct spire, sometimes covered with a fine epidermis, markings very indistinct; another phase is then entered upon, the shell becoming more solid, the dentition commences, and the pattern asserts itself generally in triangular or zigzag flames and waves. In the concluding period the mantle lobes expand on each side, covering the whole shell with a shining enamel, by which the spire is entirely concealed. There is usually a line of paler colour, which indicates where the mantle lobes meet. Many years ago a theory was propounded that the animal had the power of leaving his shell like a crab, and forming a successive number of new shells, during the second and third stages of growth; indeed, one gentleman stated that he was an eye-witness on more than one occasion of this transformation. I can only say it is very strange, considering the number of naturalists in all parts of the world, that this has not been observed by anyone else; it is, as M. Deshayes says, "opposed to the common laws of organisation." Monstrosities and malformations are often met with in *Cypræa*, whilst in some genera they are very rare. Balani sometimes produce strange protuberances on the back of the cowrie, to which they have attached themselves when young.

I have brought a few specimens for exhibition, principally to illustrate the difference between the young and the adult, and the great variability in colour in some of the species.

Argulus foliaceus. A Contribution to the Life History.

By FREDERICK NOAD CLARK. Read October 9th, 1902.

Classification, Literature, and Introduction.

THE subject of my paper this evening is *Argulus foliaceus*, of the class Crustacea, sub-class Entomostraca, family Argulidæ, genus Argulus. Biologically, it is more nearly related to the Copepoda than to any other family of the Entomostraca. So far as my information goes, *foliaceus* is the only species known in Great Britain, although others such as *A. coregoni* occur on the Continent, and *A. catostomi* in America. Furthermore one genus only is known. Little has been written in England concerning this interesting creature since Baird's account in his "Natural History of the British Entomostraca," published by the Ray Society in 1850. Short notes are given by Murray in his "Economic Entomology," and in Cuvier's "Animal Kingdom," vol. iii. Amongst other authorities may be mentioned Dana and Herrick, 1837; Gerstäcker, Jurine, 1806; Leydig, and Thorell. By far the best description is that of Professor C. Claus (Vienna), published in the "Zeitschrift für wissenschaftliche Zoologie," vol. xxv, 1875, in which he gives an exhaustive account of the development and organisation of *A. foliaceus*.

Commonly called the "fish louse," *Argulus* is found parasitic on various fresh-water fish, e. g. carp, roach, tench, stickleback, etc. It is from the *Gasterosteus aculeatus*, or three-spined stickleback, I have obtained my specimens. It is recorded to have been found on frog and toad larvæ, and on the minnow, but seldom on pike, perch, or salmon-trout. My observations commenced in 1896, since when I have had good opportunities of studying its life history, having repeatedly bred them from the egg to the adult stage, and so on again. By reason of its exceptional structural character, the elaborate nature of its apparatus for attachment to its host, the interesting details of its metamorphosis, and the curious organs and mode of reproduction, I venture to say that a study of the Argulidæ will well repay the scientific observer.

I will refer later on to a more detailed description of the anatomy of this creature, and for the present will describe it briefly as a transparent, jelly-like animal of a greenish hue, the bulk of whose body appears as a slightly convex carapace, which entirely covers the various organs with the exception of the eyes, swimming-feet, and tail (so called). The adult female measures 8 mm. long by 6 mm. broad. The male is slightly smaller, and may be distinguished from

EXPLANATION OF PLATE I.

ARGULUS FOLIACEUS.

- FIG. 1.—Stickleback, with two Arguli (adult female) attached. Two thirds size.
- FIG. 2.—Ova of *Argulus foliaceus*, photographed under water. Magnified 15 diameters.
- FIG. 3.—Larva, just emerged. $\times 36$ diameters.
- FIG. 4.—Female larva, third stage. $\times 15$ diameters.
- FIG. 5.—Adult male. $\times 15$ diameters.
- FIG. 6.—Adult female. $\times 15$ diameters.

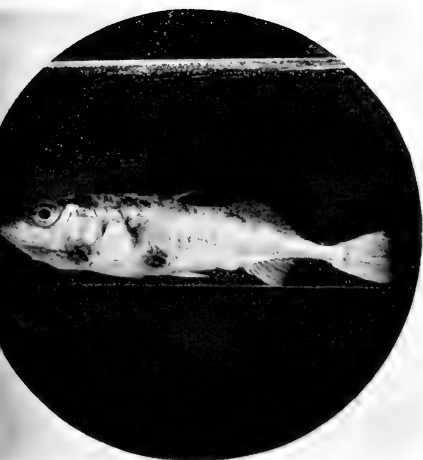


FIG. 1.

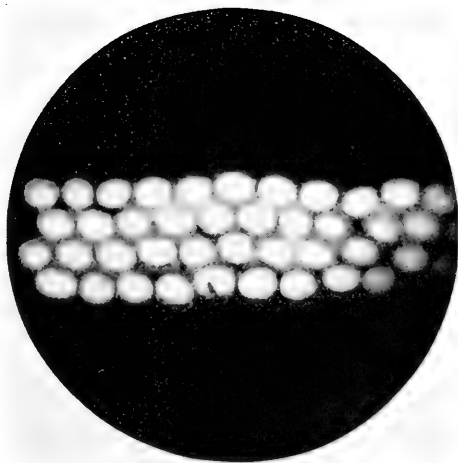


FIG. 2.



FIG. 3.



FIG. 4.

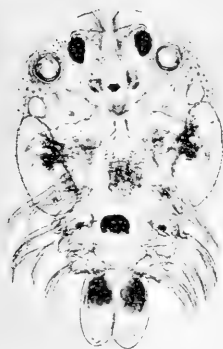


FIG. 5.

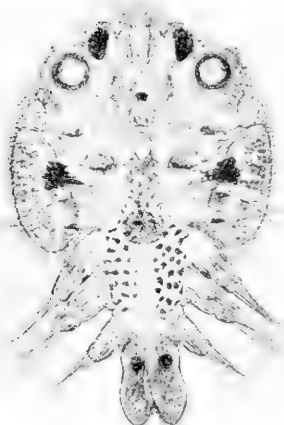


FIG. 6.

the female by the absence of the ovary and the two black spots on each lobe of the tail, which are so evident in the female even at an early stage.

Development and Metamorphosis.

The egg (Fig. 2) is of a spherical ovoid shape, measuring $\cdot 35$ mm., laid in rows three to six in breadth, of a pale yellow colour, and glued to its neighbour with an albuminous material. When freshly laid the egg is quite soft, and whitish opaque in appearance. The albuminous matter rapidly becomes coagulated, and is seen to spread over and extend outside the rows of eggs in short, ribbon-like processes, obviously for the purpose of adhesion to the object on which the eggs are laid. The egg is composed of three layers—the outer, tough, granular, and slightly brown in colour; the middle coat, which is much thicker, is more transparent, though somewhat granular in texture; the inner coat being transparent and membranous. The egg mass has the appearance of closely agglutinated starch granules almost crystalline and transparent. Previously to hatching, the eyes of the larva may be plainly seen, about the fifteenth day after oviposition. The contained larva makes its exit from the upper surface of the egg by cutting a longitudinal slit, the tail end first emerging.

The newly emerged larva (Fig. 3) measures $\cdot 8$ mm. in length, and immediately sets forth in quest of a host, to which it attaches itself and commences feeding. Even at this early stage it is well provided with organs for this purpose, although in a much modified degree. The eyes are relatively large. The swimming-feet are undeveloped, their functions being undertaken by two pairs of limbs bearing setæ, and situated at the base of the eyes. These give to the larva a darting motion similar to the *Daphnia*. A powerful pair of triple-barbed hooks or foot-jaws (which are replaced at a later stage by suckers) answer the purpose for attachment to the host. There are two pairs of antennæ—the anterior, or first pair, consists of a simple hook bearing on one side of its base an organ resembling a palpus, its function being probably the same; the second pair has three joints terminated by a claw, and united at its base to the first pair of swimming setæ. I have no doubt that these two pairs of clawed antennæ are the means by which the larva makes its exit from the egg. Of these setæ, the anterior pair at the base of the second antennæ are situated on a stalk, and are four in number of equal length, with one smaller. Each of these is finely covered with minute cilia, and, being articulated at the base, may be moved in any direction by the owner. The second pair of setæ are at the base of the first pair of foot-jaws, and adjoin the mouth organs; they bear three setæ each as above. In this larval state the modification of the antennæ into swimming organs is a character of the larvæ of the higher orders of Crustacea. The second pair of foot-jaws in the

adult is represented by a very similar structure with five joints, having two terminal hooks and a taste-pad.

On the third day an important change takes place, when the argulus makes its first moult. It then measures 1 mm. The first and second pairs of setæ are shed, the second pair of clawed antennæ still remaining. The four pairs of swimming-feet proper are now developed, the basal joints carrying two others, each of which has hairs, one singly, the other divided into two branches, which in their turn are covered with minute secondary hairs, which require the higher powers of the microscope to resolve. The first pair of swimming-feet at this stage are more developed than the others, and up to the eighth day are the only pair in active motion. At the apices of the lobes of the tail-plate are two tubercles, each terminated by three hairs; at later stages these gradually recede between the lobes. Their use I am unable to determine. The first pair of foot-jaws have now four barbs to each claw, as well as an adjacent plain one. Surrounding the mouth, and attached to the base of the foot-jaws, are several chitinous teeth. These are probably used for making the incision in the body of the host prior to feeding.

The second moult corresponds to the third stage in the life of the larva, and occurs from the eighth to the tenth day after hatching (Fig. 4). The increase in size is but slight, being only 1.5 mm. The sex may now be determined by the presence of the black spots on the tail-plate in the case of the female. The male organs are not yet developed. The most notable change is at the base of the first pair of foot-jaws, which are now becoming enlarged preparatory to a remarkable change which occurs after the next moult. On the under surface of the front of the carapace, a few spines appear, whilst the swimming-feet are gradually developing hairs and performing their proper functions. The second pair of antennal hooks are still retained, and the tubercles at the extremities of the tail-plate have approached nearer the fork of the two lobes.

The third moult, or fourth stage, commences about the sixteenth day, and a considerable increase in size is noticed (2.5 mm.). The male organs are also evident. The second pair of antennal hooks are cast, as are also the first pair of foot-jaws. These have become modified into sucking-discs, which have been gradually developing for the past three or four days at the base of the foot-jaws. Portions of the hooks still remain attached to the margin of the discs.

About the twenty-fourth day the fifth stage begins. The most important change is the shedding of the hooks above mentioned, the merest rudiments remaining. The first and second pairs of swimming-feet have each developed a small, recurved branch, which arises from the base of the fork of the two main branches on the dorsal side. The growth is now very rapid.

A few days later a fifth moult takes place. The suckers have now thrown off the rudiments of the hooks, and the *Argulus* has reached the perfect state. Its measurement at this stage is from 4 to 5 mm.

EXPLANATION OF PLATE II.

FIG. 7.—Eye (left). $\times 72$ diameters.

FIG. 8.—Antenna (left). $\times 36$ diameters.

FIG. 9.—Sucker (front view). $\times 36$ diameters.

FIG. 10.—Swimming-feet of adult female, showing the recurved branches. Left half section of thorax. $\times 12$ diameters.

FIG. 11.—Genital organs of male (left pair), situated on the third and fourth swimming-feet. $\times 45$ diameters.

FIG. 12.—Tail-plate of adult female. The two black spots are the receptaculi seminis. The papillæ referred to in the text lie between the receptaculi and appear as two spines with their apices pointing towards the middle line. $\times 24$ diameters.

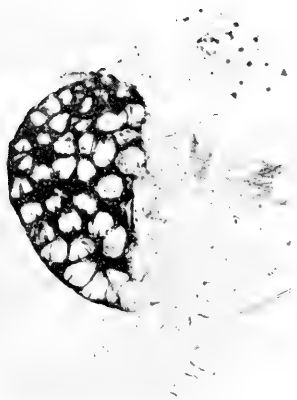


FIG. 7.



FIG. 8.



FIG. 9.



FIG. 10.



FIG. 11.

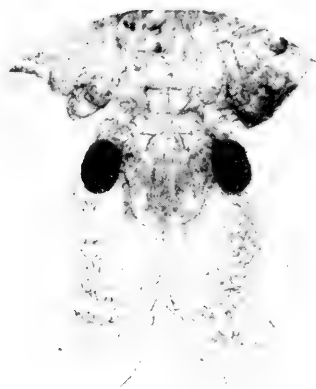


FIG. 12.

Exuviation now continues at intervals of a few days up to and during adult life. The cast skin has a most perfect resemblance to the animal it has left, the minutest structures being retained in the cast. The suckers alone appear to be shed separately from the body structures. I have observed ten moults in the same individual, but the length of time elapsing between these is longer as the season advances and the temperature is lower. The early development also of all organs in the young is largely influenced by the chances of feeding and temperature. Opinions vary as to the age at which the larva enters the second stage; Claus mentions five days, and Baird six days after hatching, but my observations go to show that the first moult takes place on or before the third day.

Structural Description and Organisation.

The carapace or shield is of a transparent greenish hue, cordate in shape, the anterior margin being rounded off, the posterior having a deep **A**-shaped indentation, the angle of which is occupied by the thorax.

The eyes are of a deep violet colour, enclosed in a membranous sac, and are areolar, like those of the Branchiopodæ (Fig. 7). They are situated on the dorsal surface of the carapace immediately below the antennæ. This pair of eyes (for there exists another eye) consists of about forty facets or kernel-shaped crystalline bodies in each eye; the dark pigment patches radiate from the base in five rows, the interstices being of a greenish-yellow colour. There is a channel surrounding each, through which may be seen blood bodies in motion. The eye itself is capable of a slight twitching, rotary movement. The single eye above referred to has three convex corneal lobes encircling a triangular mass of dark pigment, and is placed in the middle line of the carapace on the dorsal surface, just above the mouth, at the apex of a triangle having for its base the paired eyes. Baird apparently described this organ as the brain, but its lenticular structure shows it to be without doubt an auxiliary eye.

The antennæ are on the ventral surface of the carapace immediately above the paired eyes, but nearer to the middle line (Fig. 8). They consist of two pairs, the upper pair having three joints each, the lower four joints. Attached to the upper pair are a pair of acutely curved hooks having sharp points. Under the microscope they are seen to be traversed by a channel. At their bases are four hard, chitinous teeth. The structural difference between male and female antennæ is slight; the latter are the larger of the two.

The mouth or siphon is a curious structure, and occupies a central position below the single eye. It has the appearance of a prominent pouch, and bears two pairs of mandibles and maxillæ. These are minute, transparent, serrated plates, which are placed at

the entrance to the oesophagus. There are also an upper and an under lip. The whole structure is controlled by strong chitinous tendons connected with the muscles of the carapace. At the upper end of the siphon we find a sheath containing a long telescopic proboscis, called a poison-sting by Claus. It is a beautifully slender and exquisitely pointed weapon, capable of movement in any direction ; it may be extended or retracted very rapidly. Its function is difficult to determine. Claus thinks that by reason of its irritating effect on the skin of the fish that it induces inflammation and a flow of blood to the punctured part. As will presently be shown, the blood of the fish forms the food of the parasite.

The thorax has four slightly defined segments, some say five, best seen in the larval state. These correspond to the four pairs of swimming-feet which are attached. It commences at the base of the mouth, and contains the large and small stomachs, and at its lower extremity the dorsal heart, where it is terminated by the tail-plate. In the gravid female the ovarium occupies the whole of its ventral surface.

Describing the feet in their proper order, one must commence with the pair of foot-jaws (so called). These arise from a little below the mouth on both sides, and lie in the middle of the carapace. Each consists of five cylindrical joints terminated by two claws and a fleshy, claw-like pad. Numerous spines cover the surface of each joint. To each basal joint are attached three strong chitinous teeth, whilst four similar teeth unattached to the foot-jaws lie between their bases. The foot-jaws have an independent movement, and in this respect differ from the four pairs of swimming-feet. Their use is apparently to assist the *Argulus* in attaching itself to the fish, and in locomotion. They undergo little change in structure from the earliest stage to the adult.

The swimming-feet are most important organs (Fig. 10). There are four pairs placed on either side of the thorax. From the basal joint of each foot proceed two branches of about equal length, bearing pectinate hairs. These latter have a secondary structure of beautiful plumose cilia, which may be stained with nitrate of silver to render them more visible. The first and second pairs in both male and female bear short branches, which arise from the basal joint near the fork of the two main branches on the dorsal side, and curve backwards. Some authorities state that these recurved branches occur also on the third pair, but the most careful observation on my part has failed to reveal such. In the case of the male, as will be afterwards noticed, the organs of generation are situated on the third and fourth pairs of swimming-feet. The corresponding feet in the female have no special organs.

The suckers are prominent organs, lying a little below the paired eyes, but farther apart. They are the structures referred to in my notes on the fourth larval stage, where they replaced the first pair of foot-jaws. They are fleshy, cylindrical appendages, cartila-

ginous, with membranous margins which are fringed with many jointed rays (Fig. 9). The extreme margin is ciliated and perfectly circular, its diameter measuring 0.72 mm. Four muscles are attached to each for the purpose of producing a vacuum in the sucker and thus enabling the parasite to hold on securely to its host whilst feeding, whilst ovipositing, or as claspers during copulation.

The tail-plate at the extremity of the thorax is a flat, oval, bilobed organ. Its use is primarily as a rudder. Some consider it to be an organ of respiration. In the male it contains a portion of the reproductive organs, which are called the testicles by some authorities. In the female it has two well-defined oval black spots (one at the base of each lobe of the tail-plate) (Fig. 12). They are called the receptaculi by Claus, and their presence readily enables one to distinguish the female. Numerous spines and glands appear on its surface; some of the latter are very curiously provided with a tail-like duct. Inside the margin of the lobes is a blood-channel.

The *Argulus* has an armament of hooks and spines of varying size and structure, the under surface of the carapace being studded with them. All point in one direction—that is, to the tail portion. There are some very curious spines on the under surface of the joints of the foot-jaws, which are probably some special sense organs; some are bifid and trifid, and not unlike the scales of the lepidoptera. Numerous gland-cells exist on the surface of the integument in addition to those on the tail-plate.

The genital organs of *Argulus* are probably the most interesting of all, and their position, structure, and method of copulation are remarkable.

The male genital organs are situated on the third and fourth pairs of swimming-feet on both sides of the thorax, and are thus in duplicate (Fig. 11). On the anterior margin of the first joint of the fourth pair is a brown-coloured, conical tubercle of a horny nature. Corresponding to this we find on the posterior margin of the first joint of the third pair of feet a vesicle called the semen-capsule, filled with a transparent fluid, apparently for fecundation. Previous to copulation this fluid is opaque and darker than the surrounding tissues. Five minutes after copulation this opaque matter becomes absorbed, leaving a transparent sac. In the middle line of the thorax and near to the base of the tail-plate is a dark purple-coloured organ, the contents being granular. This is called the semen bladder, and from it proceed two branches. The tail-plate, as before mentioned, contains two brown-coloured patches or so-called testicles in either lobe, but in what manner these and the last-mentioned structures communicate with the male fecundating organs is not very clear.

The female organs comprise the ovary, the oviduct, the two receptaculi, and the papillæ. The ovary of the gravid female occupies the whole of the ventral surface of the thorax. At puberty the outer coat is covered with numerous pigment-cells of typical structure.

The oviduct has its orifice between the fourth pair of feet. The receptaculi seminis are two dark-coloured, oval-shaped bodies situated at the base of each lobe of the tail-plate, and, as their name implies, are the receptacles for the male fertilising element (Fig. 12). Claus says emphatically that there is no connection between them and the ovary; that the female fertilises the ova as they pass from the oviduct, by inserting in them the papilla conveying the male element. This is more effectually accomplished by the upward motion of the tail-plate during oviposition, and thus pressing the point of the papilla into the egg. The papillæ referred to are situated on the dorsal side of the tail-plate immediately above each receptaculum, but a little nearer to the orifice of the oviduct. They are minute pointed hooks, which lie concealed within a pouch-like sac. They communicate with the receptaculi by means of delicate tubes.

Physiological Functions.

The circulatory system is in a rudimentary stage, so to speak. The heart or dorsal vessel is situated in the last segment of the thorax, immediately above the base of the tail-plate. Its pulsations take place once every second, when the blood, containing small round diaphanous globules, may readily be seen in circulation. The best situations for observing this are in the outer margin of the tail-plate and in the channels surrounding the paired eyes; beyond these there do not appear to be any definite vessels wherein the blood circulates.

The brain and nervous system are connected with all the vital organs of the body, the former being situated immediately above the single eye. Thence proceed, by means of central ganglia, branches to the paired eyes, antennæ, suckers, foot-jaws, feet, and reproductive organs.

The muscular system is well developed, particularly in the region of the suckers and feet, where the striped muscle bundles may be seen. There are several chitinous bands connected with the muscles, which actuate the movement of the carapace and mouth organs. There are also four oval-shaped chitin rings, two on either side of the carapace.

Concerning the respiratory system little is known. According to Claus there is no satisfactory ground for supposing that there exists a definite respiratory area; that the constant motion of the swimming-feet is probably connected with respiration, their structure being similar to the branchiopoda and their use the same. Some observers consider the tail-plate to be an organ of respiration.

The alimentary system is somewhat complex. The main canal, or stomach intestine, as it is called, commences at the base of the mouth organs and occupies about one half of the thorax. It is then joined by a smaller channel or intestine, which terminates at the anal opening. The large intestine has two main branches on either

side, which ramify throughout the larger portion of the carapace. It has been suggested that these ventral branches serve as a store for food, so that the *Argulus* is enabled to live for several days, or even weeks, away from its host.

The reproductory system will now be considered. The generative organs having been described, I will give a short summary of my observations on the copulation of the *Argulus*. This frequently takes place when attached to the fish, and at this period the female is seen to be full of ova. The male takes up a position on the back of the female and places the tail-plate underneath that of the female. The third and fourth feet of the male are seen to be clasped together at their bases, the branches of which are bent under. This position is taken up alternately with either lobe of the female tail-plate, and contact appears to take place just over the receptaculum. The corresponding feet on the opposite side of the male are held motionless during this time, whilst the first two pairs of feet continue their usual movements. Under the microscope the semen-capsule on the third foot of the male is seen from the dorsal side to be placed under the tubercle on the fourth leg. It appears to me that the semen is transferred to the receptaculum from the male semen-capsule by means of this tubercle, possibly by pressure thereon, but exact observation is very difficult, if not impossible. The change in the appearance of the semen-capsule from opacity to transparency, before and after copulation, has already been noticed. Copulation may be performed with either side of the organs of both male and female. Claus says that the female requires copulation on both receptaculi. Leydig is of opinion that the capsule of the male is placed over the papilla of the female. Copulation may last during several hours.

Oviposition.

Under natural conditions ovipositing commences about the end of April. There are at least two broods during the year. In confinement I have records of ova laid on November 29th and hatching on May 6th the following year; also others laid as late as December 27th, when the weather was very cold and frosty. On the other hand, some batches laid on August 30th and September 2nd remained over the winter and hatched on April 10th. I have also observed two batches of eggs hatched on February 27th, when the weather was mild, and continue hatching throughout March. *These became adult on June 27th, and laid ova which hatched on July 20th (23 days).*

Statistics which I have taken from twenty cases of oviposition show that the average time for the laying of the egg until hatching occupies *twenty-five days*, and hatching continues over three or four days. The opinions of competent authorities differ widely on this point. Temperature no doubt influences the length of period between oviposition and hatching, for I find that the later broods before hatching

occupy a longer time. Oviposition is also arrested if the Arguli are deprived of food. The number of eggs laid vary from 300 to 500, and I have a record of one *Argulus* of 633 eggs laid at intervals. Eggs are laid in rows of from three to six broad.

Whilst ovipositing the three first pairs of feet are in motion, the fourth pair being held rigid, with their bases (which are somewhat prominent) pressed together over the entrance to the oviduct, as in the act of straining. After depositing an egg the *Argulus* raises itself higher up on the object on which the eggs are laid, and, moving a little from side to side, causes the eggs to be placed in proper order in the several rows. The average time occupied during the depositing of each egg is eight seconds. I have already described under the heading of female organs the mode of self-fecundation of the egg by means of the papillæ, and I have only to add that the protuberances at the base of the fourth pair of feet materially assist the *Argulus* during this operation. The *Argulus* generally dies soon after completing ovipositing. I have noticed that ova laid in confinement are invariably fertile. My experiments were carried on by means of test-tubes blocked with cotton wool and placed in the shade at a moderate temperature.

Concluding Remarks on the Habits and Life History.

To the casual observer the most noticeable feature of the *Argulus* is the incessant motion of the swimming-feet, in which the four pairs participate simultaneously. The pair of foot-jaws have an independent movement. The *Argulus* frequently makes a series of somersaults, and when about to attach itself to its host the current of water caused by the movement of the fish's fins gently carries it on to the fish. When once attached by means of the powerful suckers, all efforts of the fish to shake it off are in vain. The movement of the swimming-feet just described is never arrested during life, even when the *Argulus* is at rest on its host, or when ovipositing. Occasionally one sees the *Argulus* maintain for an hour or more a whirling motion.

The food of the *Argulus* is blood-plasma, procured by means of the proboscis and mouth organs. The incision made on the fish is very minute, but a good deal of inflammation is evident. The favourite position of the parasite appears to be the gills, but it is also found on the fins and tail, underneath the gills, and even on the eyes. They remain attached without once leaving their host for as much as three or four days at a stretch; in fact, the newly-hatched Arguli immediately attach themselves to the fish, and only leave it to undergo their metamorphosis. On the other hand, the newly-hatched larvæ have been known to live five days without the host, and I have a record of an adult *Argulus* living fourteen days without food. Soon after the death of the host the parasites forsake it. If

hungry, or pressed for food, the stickleback will sometimes swallow the Arguli, but generally speaking they are avoided, and if swallowed are ejected from the mouth. Their abundance is probably due to their being distasteful to their enemies. Some I had in confinement were readily attacked by a *Notonecta*, and as speedily killed.

As to their capture, I have taken as many as a dozen on one fish, and about the middle of June, when fish were plentiful, nearly every-one captured had parasites attached. In captivity the Arguli, if numerous, will attach themselves to the number of thirty or forty on one fish, and needless to say the host lives but a short time after. I once took a young roach with two parasites attached, which remained so in captivity twenty-five days. The *Argulus* is frequently captured unattached, Mr. S. W. Kemp having supplied me with several specimens so taken. My observations as to their existence in the adult state during the winter have been corroborated by a capture made by Mr. Kemp in a pond at Alperton, under natural conditions, as early as March 15th. Winter eggs also exist, as I have previously mentioned. I am of opinion that delay in hatching and development is mainly a question of temperature, as, for instance—a batch of ova hatched on October 30th did not reach the third stage until November 28th, and the fourth stage on December 12th.

The average length of life of an *Argulus* is probably over six months, and I have kept several such. They are frequently victims of a filamentous fungoid disease precisely similar in its nature to that of its host. Vorticellæ also infest the *Argulus* from its earliest stages, some small captured specimens having been found almost entirely covered with colonies of Vorticellæ.

A remarkable capture of three *A. foliaceus* is recorded by Isaac C. Thompson, F.L.S., collected by Dr. G. H. Fowler from the Faeroe Channel, 1896-1897, in the "Zoological Society's Proceedings," 1898, showing that the *Argulus* will live in salt water. These presumably had been conveyed to sea by the medium of some fresh-water fish.

I have tried various methods of staining these transparent animals, with a view to a better differentiation of their structure, such as the aniline dyes, picro-carmin, osmic acid, hæmatoxylin, etc. Nitrate of silver, $\frac{1}{10}$ per cent., is the only reagent which has given me any satisfaction, and this only in staining the various ciliated organs. For their preservation as permanent specimens formalin is useless, as it renders the tissues opaque. Glycerine and water, equal parts, is the best means of killing them by immersion alive. For mounting as microscopic objects I can recommend Farrant's medium.

My specimens were taken from the Grand Junction Canal, Paddington.

On Inflation in Insects.

By T. A. CHAPMAN, M.D., F.E.S., &c. *Read November 13th, 1902.*

IN promising the Secretary that this should be a very short paper it was evident that it would not do to give it a long title. It becomes, however, very probable that the result is considerable ambiguity as to what the paper is about. I hasten therefore in the first place, in order not to disappoint too seriously the expectations of those members of the Society who may interpret it by the light of the financial jargon they learn in their business experience in the City, that I do not propose to say anything about the prices given occasionally for Goliath beetles, *Papilio antimachus*, great coppers, or other rare bugs, or as to the circumstances that govern such eccentricities. Nor do I intend to refer to the conscious pride with which many butterflies and other beautifully coloured insects disport themselves.

The title is to be taken more literally; the inflation I propose to call your attention to is that of the insect's body with air. Even so I have still further to define my position. Nearly all insects that fly—that is, nearly all insect imagines—possess large air-spaces in their bodies. In some the greater part of their bulk is fictitious, being due to large air-spaces within. Many Hymenoptera—the common wasp and the hive bee, for example—possess an abdomen that may be telescoped almost into the basal segment and extended to great length in a few seconds. This is managed by filling or emptying great air-sacs within the abdomen. As this form of inflation is not my subject this evening I do not feel called on to discuss how far this may be to secure a proper specific gravity and balance during flight, how far to correspond with varying contents of honey or other food, and what may be its use in assisting the active respiration necessary to insects making such strenuous muscular efforts as their flight requires.

The inflation I hope to interest you in for a moment occurs only once or twice during the life of each individual, to secure certain very definite objects. I know more of it in Lepidoptera than in other orders, but believe it occurs in nearly all the orders.

My first definite observation on this subject of which I have any record, though I certainly had previously some general ideas derived from the Lepidoptera, was made on a Dipteron, *Tipula flavolineata*, a species of daddy-longlegs whose larva lives in rotten wood. My notes on it are in the "Ent. Mo. Mag.," vol. vi, p. 31 (1869). In this case, when the imago emerges from the pupa it is

enlarged to much beyond the dimensions it has when ready for flight, and is, indeed, larger than that which it had just before in the pupa.

The insect is so transparent at this stage that the process by which the greater bulk is acquired may be observed. The abdomen of the imago is for the most part a cylindrical tube of very delicate thin walls, which, though they contain the whole anatomy of the insect, appear to be little more than transparent membrane. These walls are distended to their full capacity and the intersegmental membranes fully stretched. The main contents of this hollow tube are in its lower half watery fluid, in its upper half or so air, or at least some colourless gas.

It is by the addition of this gas to the ordinary contents of the skin of the insect, by what I have called "inflation," that the increased bulk is obtained.

I have no doubt whatever that a precisely similar condition exists, and might be easily observed in almost any other *Tipula*, and in all or nearly all those Diptera that have exposed pupæ, *i. e.* the Orthorrhaphous families.

In the Cyclorrhaphous Diptera it is usual for the larval skin to dry up and form a cocoon for the pupa, and a lid is forced off this cocoon when the fly emerges.

In how many of these flies I do not know, but certainly in most of the few that I do know, the pressure to produce this rupture is obtained by a great temporary sac in front of the imaginal head, which, after emergence, shrinks and practically disappears. This has various names; the *frontal vesicle* seems a satisfactory one. I ought to know, but I do not, how far this vesicle is filled with air and how much with fluid, but observation of the flies immediately after emergence will tell us that the abdomen is largely filled with air, and the increased bulk of the insect, that enables it to press from end to end of its pupal case and so force off the lid, is unquestionably due to an increased total content of air. The frontal vesicle probably contains fluid so forced into it, as well as tracheal vessels. It probably has two uses, first to increase the length of the insect, the body of the Muscidæ and allied families not being easily adapted for extension. The other use is to form an elastic pad by which to convey the pressure, a pad of uniform structure, and not like the front of the mature head consisting of antennæ and other delicate and sensitive parts unfitted for transmitting pressure. In this respect its function is the same as the head-plate of many Lepidopterous pupæ (*Cerura*, etc.), used to protect the head in transmitting force for the rupture of the cocoon. It may be noted that the frontal vesicle is a uniform structure, without any spines for causing rupture, the old larval skin having a sort of suture, which determines where rupture shall occur so soon as the tension is adequate.

In the Lepidoptera, inflation occurs at emergence from the pupa

in precisely the same way as in the Tipulidæ. It is not so easy to see in all its details as in these Diptera, on account of the scales and hairs with which the Lepidoptera are clothed. The following facts may, however, be easily observed, and have doubtless been noticed by most breeders of Lepidoptera.

When the moth is mature and preparing for emergence, the pupa is observed to elongate, the intersegmental membranes being stretched, usually to their full extent. The pupa may be observed in this condition for a longer or shorter period, varying with the species and with the temperature, but it always indicates that emergence is close at hand. If the pupa be opened early in this stage it is found that the added air is *within* the imago, since the surface and scales which cover it are bathed with fluid which fills all the space between the insect and the pupa skin. When the moth emerges, although it often ejects more or less urate-laden fluid into the abandoned pupa case, it is seen to be much more bulky than the mature moth. This increased bulk consists partially of fluid, partially of air—air that was secreted by the insect to produce the increase of bulk enabling it to extend the pupa case. When the wings are expanded and dried the abdominal bulk diminishes by the re-absorption of the air, and usually by the expulsion of a further amount of fluid loaded with urates.

It is in my experience not uncommon to meet with a male moth that one takes at first for a female, on account of the enlarged abdomen. I have several times seen this in *Zygænas*, and I show you a specimen of *Ennomos tetralunaria*, which I succeeded in preserving so expanded. These specimens, by some accident or disorder, instead of absorbing the air, reinforced it to their extreme capacity. In this *tetralunaria* the cavity practically occupies all the abdomen. This inflation of the Lepidopterous imago at its emergence from the pupa serves several objects, or, I may say, has several different aspects, as assisting the moth to escape from the pupa and complete its transformation to an imago.

The first and chief of these is certainly to obtain tension within the pupa case to cause its rupture, which occurs, of course, along the provided sutures. The actual escape of the moth takes place by a creeping or vermicular movement, very much the same as that by which the larva frees itself when casting its skin. But at the precise date of rupture no such creeping has in fact occurred, though it is very probable that the rupture actually occurs, and is in some degree assisted by them at the time when these vermicular movements begin to take place.

It may be observed in many obtect pupæ, and others, that if an attempt be made to open the pupa before the moth is ready for emergence, there is nearly as much difficulty in fracturing the pupa along the sutures provided for the emergence of the moth as in any other direction. I have noted this very often in obtaining immature wings in which to see the tracheal vessels and their relations

to the nervures. One begins by trying to crack the pupa along the sutural lines, as between the wings and antennæ, but the result is almost always partial or even complete failure; they can obviously only be fractured correctly by a uniform expansive pressure from within. This pressure may be aided by muscular movement, but its main source is from inflation; it certainly is not derived from the moth leaving the terminal segments of the pupa and pushing forward to the head end, as would be the case were the process parallel with that by which the larva casts its skin.

Another use of this expansion by inflation of the imago within the Lepidopterous pupa is to obtain an end-to-end pressure within the cocoon, in order to make an opening of exit.

In the great mass of Pupæ Incompletæ the pupa is provided with a beak with which to assist the opening of the puparium, whether by forcing off a lid, separating the sides of a valvular opening, piercing a slighter place in the cocoon, or otherwise. In nearly all these cases the force which the beak uses against the cocoon is not directly derived from inflation; the force used is muscular, and the fulcrum from which it acts is the armature of spines on the abdominal segment which catch on the walls of the cocoon.

There are, however, some exceptions. In *Eriocrania* (*purpurella*, etc.) the work of piercing the cocoon is not performed by a beak, but by great jaws. These are very powerful, but are not moved at all by muscles attached to them in the ordinary way, as they have none. They appear to be moved by variations of fluid-pressure against their bases, and, whilst this is guided and varied by muscular action, its actual source seems to be the result of inflation. Again, in the Limacodids the pupæ are very soft, and the spines arming the abdominal segments are often small and weak. Their use seems to be confined to extruding the pupa from the cocoon after it has been ruptured.

The cocoons are always very short, round, and squat, and have a peculiar brittle texture, so that end-to-end pressure from within, or, indeed, various other pressures tending to distort the cocoon, result in a lid being broken off one or other end. This lid is usually fairly circular and regular, but it is irregular in the sense that the rupture marking it out may occur anywhere within rather wide limits, and is due to general brittleness and not to the preparation of a special suture or valve. This is seen if a needle be used to a sound cocoon to break off a lid. The lid breaks off easily, starting from the point where the needle presses, which could not, of course, always happen to be exactly on a specially prepared line; nay, further, it breaks off as easily at the wrong as at the right end of the cocoon. It is not of course always, but very often is, as round and regular as that broken off by the emerging moth. The end-to-end pressure from within is obtained by the expansion of the moth within the pupa case by inflation. That the lid shall form at the right end and with a minimum of tension is determined by the pupa being furnished

with a "beak," which performs a very similar function to that already noted as done by the needle, in giving a point where pressure is brought to a focus, but not, as in the case of the needle, applying all the force.

In *E. lanestris* the lid is not always quite so regular as in *Limacodes*, and a beak can hardly be said to exist on the pupa, but the general process for rupture of the cocoon is almost identical with that in *Limacodes*. In *Lasiocampa quercus* exactly the same problem is solved in an almost identical way, but the lid removed is very irregular, and often fragmentary.

In *Cerura* the conditions and the results are very similar to those in *Lasiocampa*. In this case a plentiful supply of softening fluid is used to facilitate rupture; the opening is nevertheless a fracture produced by the moth exerting an end-to-end pressure within the cocoon.

In the allied *Hybocampa* the pressure is used to keep a sharp spine in contact with the cocoon whilst it is carried round in an elliptical line, applying softening fluid as it goes and at the same time scraping through the softened silk and enabling the softening fluid to reach a further layer, till at length an oval lid gives way to the pressure the moth is exerting.

There is no doubt that in the Lepidoptera at least the blood-tension necessary to distend and expand the wings and other parts after emergence is obtained by means of the inflation already fully in action for emergence from the pupa.

A similar inflation occurs in Lepidopterous imagines under at least two other circumstances, in both instances in the Psychidæ.

In the case of the Fumeas, Luffias, and various Solenobias that lay their eggs very rapidly within their larval sacs or pupa cases, and that have after laying their eggs to arrange a certain amount of wool as a protection over their eggs, I have observed in several species that when the female has finished laying her eggs she is still quite unreduced in bulk but is quite translucent, the place of the missing eggs being taken by air. Why it is that also in many cases the female simply shrivels up and completes her task without any inflation I do not know. This certainly happens in very many cases: when the inflated moth has finished her work the inflation rapidly disappears, and she falls to the ground a shrivelled scrap, just as if no expansion had ever occurred.

In the case of two species of higher Psychids, *Acanthopsyche atra*, L. (*opaella*), and *Oreopsyche tenella*, var. *zermattensis*, I have seen the female moth drop out of the larva sac after completing oviposition, inflated with air so as at first sight to look very much the same as those moths that drop out of their cases full of eggs, as many do that fail to be fertilised.

In the case of the Solenobias and Fumeas the eggs are laid very rapidly, often within half an hour. At first the moth is a distended bag of eggs; at the finish she is an amorphous mite, of perhaps a

fortieth of her previous bulk ; nevertheless the process of laying the eggs is an elaborate one, requiring many and varied muscular movements which could not be performed satisfactorily by the shrivelled and empty moth ; both ends of each of its muscles would, in fact, be close together, and no movement could take place. Most of these species also have a very long ovipositor in order to reach the bottom of the sac or pupa case and begin laying there. As the laying is completed it becomes necessary to retract this long ovipositor, since the laying is now close to the mouth of the sac. If the moth retains her bulk the ovipositor can be retracted, but not without, since the rods of the ovipositor in many species reach right up into the thorax. By means of inflation the original bulk is maintained, the oviposition can be properly completed, and the final disposition of the wool in the mouth of the sac can be satisfactorily managed.

In the higher Psychids the eggs are laid in the pupa case, which the moth herself occupies at the same time, and one would suppose that inflation would not be necessary. I have, however, never watched the process, and know of no one that has, so that any conclusions we may come to are pure hypothesis. What we do know and see is that the moth leaves the case when egg-laying is finished, and it is tolerably certain that the muscular action necessary for extricating herself would be impossible in the collapsed condition she presents when empty of eggs. The inflation is, then, a necessary condition to this final journey ; whether of any use during egg-laying we do not know, but we may imagine it does not occur till this is completed. *Heterogynis*, who lays her eggs in almost an identical manner, uses no inflation, nor does she leave the pupa case, but dies above her eggs and forms a protective closure to the pupa case containing them, affording also a first meal to the young larvæ when they hatch. I have recently come across an instance of inflation in Coleoptera, in the case of *Orina* (*Chrysochloa*) *tristis*, var. *smaragdina*. The young larva, when about to emerge from the egg, resorts to inflation ; and I find it does so also at its changes of moults.

The mechanics involved in the bursting of the egg-shell and the emergence of the young larva is of precisely the same nature as that by which such Lepidoptera as *E. lanestris* and *L. testudo* break open their cocoons. The young larva, when ready to hatch, completely fills the egg-shell, which is a somewhat strong, tough structure, of a short sausage shape, having its head at the top and its last segments at the lower end of the egg. It secretes air into its alimentary canal, and as the secretion goes on the tension of course gradually increases. Assuming this to go on indefinitely, a point would be reached at which the shell would burst irregularly, and probably explosively. The larva, however, is provided with three blunt points on either side, and their effect is to make the tension very acute along their line before it reaches any severe strain generally, and the egg-shell

accordingly splits on either side along this line. Once started, the slit extends from nearly the top of the shell to within a third of the bottom, probably by the protrusion of the soft body of the larva. An egg may occasionally be found with the larva forming a small protrusion on either side in this way. If the effect is aided by any cutting action of the points, due to movements of the larva, it must be within very narrow limits, as the extremities of the larva maintain their position unmoved till after the slitting takes place. The larva, on the relief of the tension, is free to move, and extricates itself from the shell by one of the two slits.

When hatched the inflation does not at once disappear, but remains and even extends to give increased bulk to the young larva ; this happens equally with the larvæ of other viviparous species of the same genus, where inflation is not wanted to rupture an egg-shell. Its probable use is to give a more solid base for muscular action than is to be had from the flaccid skin of the empty young larva.

At the further moults of *Orina* larva, inflation is again brought into use, its object being to rupture the effete larva skin. In each instance the larva is very fat and the skin fairly tense when the stage is complete and moulting imminent, and a slight further tension by inflation suffices to rupture the old skin. There are now no hatching spines, the site of the rupture (the thoracic dorsum) being determined by sutures provided in the old skin. The newly moulted larva may be seen to contain several large air-vessels, and that these are in the alimentary canal seems clear by their escaping by the mouth when considerable pressure is applied to the larva. The process of moulting is here very different from that obtaining in Lepidopterous larvæ ; in these the new larva creeps out of the old skin, the tension necessary for rupture being obtained by the new larva, so to speak, creeping forwards into the front segments of the old skin, and the empty skin is left more or less contracted and folded together, especially behind, where it was pushed backwards. Our beetle, on the other hand, leaves his skin fairly representing the larva, especially when it is not distorted by the opening allowing it to fall together again irregularly.

The process is, in fact, very much the same as that by which most Lepidoptera leave their pupæ ; it probably obtains, with variations and specialisations, in all those instances amongst insects in which the skin to be cast has more or less solidity.

The male of the higher Psychids also resorts to inflation when introducing the abdominal segments into the larval sac and pupa case of the female, in order to secure the necessary solidity by which muscular action can be effective.

We find, then, that insects secrete gas into their alimentary canals in order, at various critical points in their economy, to increase their bulk. The object of this increase of bulk is, in a large number of instances, to produce tension within, and so rupture, an egg-shell, a larval or pupal skin, or a cocoon. This is so common and universal

that it may almost be noted as the rule rather than the exception in many large sections, as in emergence of Lepidoptera from the pupa. Another object is to produce tension of a flaccid skin in order to give a satisfactory fulcrum for muscular action, as in some young larvæ, in Psychid moths that lay their eggs very rapidly, in male Psychids.

A third use of inflation is to produce tension in the blood-spaces to assist the expansion of wings and their appendages on emergence from the pupa. In Lepidoptera this is the rule, and is a continuance of the inflation that assisted emergence from the pupa. I have made no observations on Hymenoptera or Coleoptera, and do not know whether it occurs in these orders, in which it is unnecessary for pupal emergence.

I have nothing to tell you as to what the secreted gas is. It is most simple to call it air. Until some one collects and analyses a specimen we can only suppose that it is not air, but such a mixture of oxygen, nitrogen, and carbonic acid as would be afforded by extracting the gases dissolved in the blood of the insect, probably slightly but not greatly modified by having to be secreted. It would be very unlikely to be identical with air, and it would be equally impossible for it to be chiefly carbonic acid.

A Visit to the Forest of Arques.

By HARRY MOORE, F.E.S. *Read November 13th, 1902.*

FOR the past year or two business has prevented me having anything like an extended holiday. During my previous cycling tours I had seen many spots where I should have liked to linger a day or two, and had mentally resolved to revisit them when opportunity allowed. One of those spots was the Forêt d'Arques. A few days' leave in midsummer had never been my lot, so when the first Coronation holidays were arranged, and the weather being fine, the chance was too good and the temptation too great to let slip.

The Forest is easy of access, just outside our own doors, as it were. Leaving London by the 9 p.m. train on June 25th, by the same hour next morning I had had five hours in bed at Dieppe—all the more appreciated as the Channel passage had not been quite comfortable. The forest is situated about four miles inland from Dieppe; it occupies the crest of a range of chalk hills, a sort of plateau, for about another four miles. It covers an area of some 2500 acres, and at its highest point is about 400 feet above sea level.

The trees are chiefly beech, but along the outskirts, the roadsides, and forest paths is to be found the usual diversity of woodland and copse, with just a little touch of moorland here and there. There are two direct roads through the forest, but drives radiate from four or more centres. In these cross-roads and forest paths one may wander all day without seeing a soul. Directing posts are to be found wherever required, but *sign-posts* are wanting, so that one has to make his way down to some village in the valley for whatever refreshment he may require. There are a good many likely-looking clearings, margined with the usual tangle of undergrowth, veritable gardens of wild flowers, with usually a pyramid of tall foxgloves as a centrepiece. These clearings in ordinary seasons one would expect to teem with insect life; I found the majority blank, or at most tenanted by a few crane-flies and immature grasshoppers. But just below the forest on the steep hillsides, the northern slopes facing Ancourt and Sauchay, various species were swarming, and this is, undoubtedly, the most productive collecting-ground in the locality, especially with regard to Lepidoptera. These slopes remind one of many a Surrey hillside; there are plenty of juniper bushes, and at the time of my visit the purple orchis was in such profusion as to make the hill look like heather clad. I spent three days rambling about, and several times had to own that it is angle and not altitude that necessitates exercise. The fourth day was pouring wet, so I had to leave two portions of the district for some other time.

My chief object was butterfly-collecting, and, considering the inclement and backward season and that one of the three days the wind was rather high, the fact of seeing or taking over thirty species, I conclude, is sufficient evidence of its capabilities, which the odds and ends of the other orders, gathered without effort, tend to confirm.

There is a very convenient (but not frequent) train service to and from Dieppe, which enables one to approach and leave the forest at various points without the necessity of retracing one's steps. Apart from entomology the whole district is interesting; the scenery is charming, there are Celtic and Roman remains hard by, a ruined castle on a neighbouring hill, and, above all, the celebrated field of battle on the slopes of the forest itself.

The butterflies captured or noted were :

Pieris brassicæ, *P. rapæ*, and *P. napi* ; these three whites were in about equal numbers, but not numerous.

Euchloë cardamines ; one ♂ seen and taken near St. Nicholas.

Colias hyale ; one seen at Arques, another near Sauchay. I did not see *edusa*.

Gonepteryx rhamni ; fairly common in the forest, but, of course, in rags.

Aglais (*Vanessa*) *urticæ* ; one fresh specimen at Eugleville.

Eugonia (*Vanessa*) *polychloros* ; one seen near Sauchay.

Pyrameis cardui ; a number of worn specimens near St. Martin.

P. atalanta ; fairly common near the main road through the forest.

Dryas paphia ; one ♂ seen near Archelles.

Argynnis adippe or *A. aglaia* ; one seen near Ancourt.

Brenthis (*Argynnis*) *euphrosyne* ; a few remnants in the forest.

B. (A.) selene ; the commonest species in the forest.

Melitæa cinxia ; a few in the forest and on the hillside near Ancourt ; some seemed freshly emerged, but others were in rags. *M. aurinia* ; a few worn specimens on the hillside just below the forest, opposite Sauchay.

Pararge (*egeria* var.) *egerides* ; common in the forest along dark portions of the road, but not easy to catch. *P. (Satyrus) megæra* ; a few in the forest, some worn.

Cænonympha arcania ; I do not know whether this is a new locality for this species. Lang gives its habitat, woods in Central and Southern Europe. Kane says, abundant in most parts of France. I found it sparingly in the forest itself, but on the hillsides facing Sauchay it was in profusion ; three at a time in the net was not unusual. Apart from the mountain variety, *darwiniana*, I was not aware this species varied much ; my three dozen specimens were netted without discrimination. I regret now not taking more. However, my captures work out satisfactorily, exhibiting the whole range of variation as described by Kane and Lang, with the exception of *darwiniana* and an example showing "a second small apical eye-spot, which sometimes appears

in the marginal shading of the fore-wings." I have not seen *darwiniana*, neither do I know whether the absence of the apical eye-spot of fore-wing and the metallic marginal line are constant characters of this variety, but in my series of undersides several of that description will be noticed. On the upper side the brown outer marginal border of the fore-wings varies in width and density; two pale-bordered and one narrow-bordered examples were taken. The narrow-bordered specimen has also the disc of wing unicolorous, owing to the absence of the dark scales usually found along the nervures. *C. pamphilus*; not very numerous.

Aphantopus hyperanthus; apparently just coming out.

Epinephle jurtina (ianira); fairly common near St. Nicholas and St. Martin.

Callophrys (Thecla) rubi; common in the forest and just below amongst the junipers, but all much worn.

Zephyrus (Thecla) quercus; one seen and missed in the forest.

Cupido (Lycaena) minima; abundant on the hillsides opposite Sauchay.

Polyommatus (Lycaena) bellargus and *P. (L.) icarus*; a few opposite Sauchay.

Plebeius (Lycaena) ægon; a few on the hillside near Eugleville, evidently just emerged.

Hesperia (Syrichthus) malvæ; swarming on the hillsides in certain spots, and fairly numerous in parts of the forest.

Nisoniades tages; if anything, in greater numbers than *malvæ* on the hillsides.

Augiades (Hesperia) sylvanus; common, and the most generally distributed.

In addition to the above were two other butterflies that I saw, but was unable to identify. I half expected, at least I hoped, to make the acquaintance of *Apatura iris*. I believe it is found there, and one day for a minute or two my hopes ran high. I saw several large butterflies hovering about the top of an oak tree, near which there happened to be a quantity of willow. I think I perspired a bit, but as one turned in the sunlight I saw a glimpse of red. I had been watching *P. atalanta*.

I did not do much with the moths.

Hemaris tityus, L. (*bombyliformis*, Esp.), was fairly plentiful, both in sunny spots in the forest and on the open hillsides, but not easy to catch; the only chance I had of a downward stroke happened to be successful.

Adscita (Ino) geryon; evidently just coming out. I was under the impression the Foresters were sluggish insects. I lost those I attempted to box; in the bright sunshine they flit rapidly off the flowers, much the same as a "Skipper." The last two I saw I netted.

Anthrocera (Zygæna) trifolii and *A. (Z.) filipendulæ*: I made no serious effort to collect the burnets, but on the third afternoon, while resting on the hillside facing Sauchay, I noticed one pass that

seemed peculiar ; it was the specimen which I take to be the var. *minoides*, Selys, of *A. trifolii*. It then struck me that during my ramblings I had not seen a single cocoon, so I started netting as the moths came within reach. The first few were undoubtedly *trifolii* ; several others would have been interesting had they been in good condition. The rest, I am afraid, are not very extraordinary *filipendule* ; however, they seemed to me to be somewhat smaller than average English specimens, and two of them have decided blue-green instead of bronzy-green wings.

Cochlidion avellana, Kirby (*Heterogenea limacodes*), was fairly common in the forest ; the females were frequently seen in the road, at rest or fluttering in the dust. Its appearance to a bit of clay first drew my attention to it ; the resemblance is very striking—only in the absence of the small boy you wonder how the clay got there, and so detect the deception.

Arctia caia ; I found two full-fed larvæ in the forest, and brought them home on the off-chance of getting something good, but only very ordinary specimens emerged.

Euchelia jacobæ ; several near Eugleville.

Plusia gamma ; the only Noctua noticed, and this was bustling about everywhere.

COLEOPTERA.

The whole neighbourhood, especially the forest, struck me as good ground for the beetle hunter. I did no collecting ; the specimens exhibited are chiefly roadway samples, but searching and sweeping would probably be worth the labour. Several of those I boxed are not without interest. *Carabus auratus*, for instance, is common enough, but no one who has only seen a dry specimen can form any idea of its appearance when alive. Seen foraging in the midday sun, in the middle of a dusty road, its elytra glow like a live coal.

Geotrupes sylvaticus ; this species was in extraordinary numbers ; dead specimens were everywhere. At one spot, where the road was soft, they were clustered in groups for several yards ; it looked as though sheep had recently passed that way.

Cetonia aurata ; along a shady stretch of road in the forest, where the overhanging trees prevented much sunlight penetrating, were two luminous spots, not above a few feet in extent, and but a short distance apart. In each of these spaces, within its own nebulous limits, an insect was hovering. I netted them both, a ♂ and ♀ *Cetonia aurata*. I had never before taken this beetle on the wing, but my impression was I had disturbed a courtship.

Trichius fasciatus ; I understand British coleopterists consider this insect a good catch ; its popular name of bee-beetle is very apt. Its resemblance on the wing to *Bombus muscorum* is most deceiving. I must have seen a fair number during my stroll through this part of the forest. In an idle moment I netted, as I thought, a bee, which

struck me as having something peculiar in its manner. As soon as I saw what it was I looked out for others, but only met with two. The statement of certain authors that it shows a preference for thistle-heads is misleading; it would be more correct to say flowers—in fact, whatever happens to be in bloom at the time of its appearance, which is practically the summer through, as I have taken it at rest on some umbelliferous plant, in the Gorge of the Chartreuse, as late as the last week in August. It is safest to net it; it readily takes flight, and buzzes round the killing-bottle almost before one has time to get the cork in.

ORTHOPTERA.

It was rather too early in the year to expect to do much with the Orthoptera, but several species were in evidence to prove that it was at least not a bad locality.

Ectobia lapponica was seen on the juniper bushes on the hillside quite active in the sunlight.

Stenobothrus; several species as larvæ, and one mature in clearings in the forest.

Tettix bipunctatus; must have been abundant, for they frequently lodged on my net while walking along, and occasionally they were seen hopping about the road.

Platycleis grisea; larvæ were common in the long grass in many places.

Gryllus campestris; young specimens were not uncommon. I have never taken the perfect insect, but I have seen many scores of larvæ. It is said "to be of retiring habits," and Burr says "it frequents hot, dry, sandy places." That must refer to the imago; the young are very precocious, and are to be seen frequenting the roadway practically any and all times of the day, and without much choice as to locality. I brought home one alive with the idea of rearing it. Burr says it will readily eat lettuce; unfortunately I tried lettuce-stump. My specimen ate it right enough, and with apparent appetite, but in a few minutes it was on its back with legs and antennæ out straight and stark dead.

Gryllotalpa gryllotalpa; evidence of the mole cricket was forthcoming in a damaged specimen found dead on the hillside opposite Ancourt.

ODONATA.

Although I saw perhaps under half a dozen different species, it was evidently a good district for the dragon-fly hunter. The trout-streams Eaulne and Béthune meander through the valleys north and south of the forest.

Libellula depressa and *quadrimaculata* were about, but not numerous.

A large species of *Æschna*, probably *cyanea*, was fairly common, but all my strokes were misses.

Calopteryx virgo afforded a sight to be remembered; it was very abundant, and in all stages of imaginal development. I saw many hundreds in the forest, all immature, and, with the exception of one locality, always in company of pairs. The exception was the Sauchay path, where, for the better part of a mile, the sunny side was swarming with them, the sexes intermixed. The question was where they came from; the answer I found at the end of the path. Emerging from the forest you overlook the valley of the Eaulne, and up the steep hillside, with a sidelong fluttering flight, and against the wind, immature *C. virgo* were making their way. At this rendezvous they apparently choose their mates, then wander away in the forest, whilst their loveliness increases. I saw none making the return journey, but upon reaching the stream I found the sedges and watercress gay with these things of beauty in all their full dress glory. My captures were forest specimens, which, although immature, are perhaps of greater interest, showing, as they do, the various stages of the colour-development of the males. With one exception, the females seemed to me to be much alike,—that is, all russet, but of varying shades. The exception is a green variety, and without any trace of pterostigma.

HYMENOPTERA.

It seemed to me to be a good locality for Hymenoptera. I netted a specimen occasionally, but did no real collecting. Several species of saw-flies were fairly plentiful, but I did not see a single wasp. That hornets abound there at times I can vouch from a previous experience. There were plenty of sand wasps, *Ammophila*, in places, and solitary bees, *Andrena* and *Nomada*, were tolerably abundant. Along certain banks *Melecta*, with its black and white livery and formidable sting, was busy searching for *Anthophora* burrows. Humble-bees and their parasitic Apathi were occasionally seen, but were far from numerous.

DIPTERA.

In one portion of the forest I was forcibly impressed with the abundance of Diptera, for several species of gad-flies attacked me with suicidal persistency. The black and yellow crane-fly, *Ctenophora*, I netted for an Ichneumon, which it greatly resembled as it flew across one of the forest paths. There is also a rather curious yellow fly, which I took at rest on the road. To me my most interesting capture was *Stenopteryx hirundinis*, the parasite of the swallow, which I found in my room one morning. It is on record that it can make itself unpleasant if it gets between the sheets. I was glad I

did not see it overnight, as I have found chamber entomology not always conducive to slumber. It is also said that when its host, the swallow, dies, it immediately takes flight. Can it fly? My specimen progressed by a heavy sort of hop.

In conclusion I should like to draw attention to the very excellent map I used ; the whole of France, I believe, has now been issued on the same scale. It is published at eighty centimes a sheet. The scale is too large for cycle touring, but to the pedestrian, and more especially to the entomologist, it is invaluable. A visitor can see at a glance the spots to make for, as waste places and forest lands are alone productive in a country where hedges are either absent or rare, and the roads straight and interminable.

A Few Weeks in Italy.

BY G. W. KIRKALDY, F.E.S. *Read December 11th, 1902.*

BEING in very poor health, mentally and physically, last May, I was so fortunate as to obtain five or six weeks' holiday and a passage in a cargo-boat, the run taking ten days. A cargo-boat has the advantage of having no other passengers and of not being so speedy as a liner, thus ensuring a few more days of sea breezes. The coast of Northern Africa, comparatively so close, inspired a lively desire to entomologise there, but it was not to be, my cruise ending at Genoa.

As will be apparent, I did little entomological investigation during my holiday, though when at Naples I spent two days in the vicinity of Vesuvius, riding and climbing to the summit by the wrong and much more toilsome path, owing to the rascality of my guide. The geological and classical interest of the environs is very great, and I wandered as far on the one hand as Pozzuoli, with the *Lithodomus*—perforated columns of the Temple of Jupiter Serapis (now generally declared to be merely a bathing establishment), and on the other Castellamare and Pompeii. I have, however, prepared the following notes in the hope that they may be of some little interest to any British entomologist who proposes visiting Italy, showing him in what towns and cities he may find entomological centres and a warm welcome from genial *confrères*.

Although there are a number of zealous and competent entomological workers in Italy, they are greatly scattered, and, so far as I was able to judge, entomology is not a popular pastime as in more northern latitudes; in many places a sweep-net and water-net had never been seen before, and their use was considered problematical.

At Genoa, naturally, my first visit was to the Civic Museum of Natural History, charmingly situated at the summit of the pretty Villetta di Negro, a part of the Acquasola Park. The museum is small, but the entomological collections, at least in Coleoptera and Rhynchota, are well represented in forms from Burma, New Guinea, etc., while Ferrari's collection of palæarctic Rhynchota is preserved here. The "Annals," of which over forty volumes are now completed, hold a high position for their scientific value. I had the pleasure of making the personal acquaintance of the Vice-director, Dr. Rafaele Gestro, so well known for his coleopterological labours. I had known Dr. Gestro previously by correspondence, for the Genoan, like most Continental and unlike most British scientific museums, communicates its treasures freely for work among students,

and it was very pleasant to converse with the genial doctor on "men and things." His able assistant, Mr. Mantero, labours among the Hymenoptera. The Coleoptera and Rhynchota, at least, are well known for the beautiful condition in which they are preserved, and it may be of interest to note that their preparation for the cabinet is the care of a charming young Italian lady.

The Roman Campagna is, of course, celebrated for the labours of Grassi on malaria; otherwise there is, I believe, little entomological work effected at Rome. Florence, which I did not visit, is the headquarters of the Società Entomologica Italiana, founded in 1869. Adolfo Targioni-Tozzetti, who died at an advanced age last September, and A. H. Haliday were two of the original members.

At Naples I regret that my visits to Vesuvius and Pompeii left me no time to make myself known to any of the naturalists of the flourishing Zoological Station, and I regret, too, that owing to my hurried visit I did not realise that Portici was quite close, for here reside two well-known entomologists—Antonio Berlese, one of our foremost Coccid workers, and Ribaga, the discoverer of "Ribaga's Organ," a remarkable and at present little understood stridulating (?) organ in the female bed-bug (*Klinophilos lectularius*). The labours of these two men are very interesting to me, and I was chagrined that I could not improve upon my correspondential acquaintance.

At Turin there is quite a galaxy of men interested in insects, though the principal labours of some are in other directions. Dr. Festa, a well-known South American traveller; Noelli, a student of the University who has written on Rhynchota; and Francesco Ferraro, a botanist who made some interesting notes on the habits of *Mesovelia fuscata*, were not in town; but I was fortunate in catching, in the very act of leaving his door, Prof. Ermanno Giglio-Tos (now Professor of Zoology at Cagliari), who labours at Orthoptera, Diptera, etc., and who was so kind as to devote a great deal of his time to me during the two or three days I stayed at the fine northern city. I also met Dr. Camerano, herpetologist and Director of the Museum of Zoology and Comparative Anatomy, who is known to entomologists for his researches on the habits of *Forficula*, etc.; Dr. Borelli, the celebrated traveller in South America, whose collections enrich the museum, and who, since his return, works at Forficulidæ and Scorpions. The museum is housed in the magnificent Carignano Palace; the entomological collections seem extensive, but only partially worked out yet. The "Bollettino," now in its eighteenth volume, contains much valuable matter. Achille Griffini, who formerly worked here in all branches of entomology, is now Professor of Natural Science at Udine.

At Pavia I was welcomed by my correspondent, Dr. Angelo de Carlini, a well-known Rhynchotist, and I was so fortunate as to receive an invitation to stay with him, which I accepted during the two or three days of my sojourn. The genial doctor is Professor of Zoology in the University, one of the most ancient and celebrated

in Europe (it was here that Columbus was a student), while his charming wife is Professor of Civil History. Dr. Pavesi is the Director and a well-known arachnologist.

Among the entomologists at towns and cities that I could not visit, I may mention Dr. Emery, the specialist in ants, and Dr. A. Fiori, coleopterist and rhynchotist, at Bologna; Dr. A. Tosi, worker at bees, in Florence; Dr. G. Scarabelli, coleopterist, at Imola; Professor A. Piva, rhynchotist, at Rovigo; and Professor Bezzi, dipterist, at Sondrio. I regret that I have no information as to any lepidopterists.

I was, of course, travelling during one of the worst seasons for Rhynchota and Orthoptera that could have been chosen, but even then I was much disappointed with my captures. Around Naples I swept the vegetation in the amphitheatre at Pompeii, and on the slope leading down to the sea, and also along the sides of the vineyards leading to Vesuvius, but with little avail. *Anomala junii*, a longicorn Coleopteron, was common there, and indeed throughout Italy. *Epinephile jurtina*, *Cænonympha pamphilus*, *Pieris rapæ*, and a "blue" which has become lost, were absolutely the only Rhopalocera to be seen. Orthoptera were all immature; Rhynchota were few and common—*Aphrodes bifasciata*, Linn.; *Megophthalmus scanica*, Fall.; *Cercopis spumaria*, Linn.; *Cixius nervosa*, Linn.; etc. In the artificial ditches around new Pompeii I searched for aquatic forms, and found *Hydrometra stagnorum*, *Gerris lacustris*, and a species of *Gyrinus*!! The whole country around Vesuvius is, however, of course, very unsuitable for aquatic forms.

The environs of Pavia are, I should say, very good indeed for a neuropterist. At the middle of June the lovely *Calopteryx splendens* was either but recently emerged or was in the act of doing so; along the banks of the canal which stretches from Pavia to Milan it was literally in hundreds. I also captured *Orthetrum cancellatum* (as determined by Mr. W. J. Lucas). This canal is fringed on either side with weedy waste land, varying in breadth from a few feet to several yards; to the left again (from Pavia) is the high road, then more waste land, and an abrupt descent through bush and shrub to the osier-banked stream or river. The canal stretches more or less in this manner right along to Milan. My collecting was hasty and perfunctory, while on a visit to the Certosa. In Rhynchota I secured *Cixius nervosa*, Linn.; and *Cixius*, sp. (?); *Lepyronia coleoptrata*, Linn.; *Aphrophora alni*, Fall.; *Cercopis campestris*, Fall.; and *C. spumaria*, Linn.; *Megophthalmus scanica*, Fall.; *Tetigonia viridis*, Linn.; *Notonecta glauca* (nymph), *Reduvius subapterus* (nymph), and several Tetigoniidæ and Miridæ not yet named. Dr. de Carlini has worked this district pretty thoroughly as regards terrene forms, but I believe close working for aquatic forms in all orders here would discover many interesting species. As Milan is on the direct route from Paris or Ostend to Rome, and as Pavia is only an hour's journey from Milan, perhaps the hint may be accepted this year by some British workers. Of

Coleoptera I captured a number of forms, mostly, however, small and not yet named. Mr. S. W. Kemp has kindly identified for me, *Anomala junii*, Duftsch.; *Telephorus bicolor*, F.; *Coccinella 10-punctata*, L.; *Pæderus littoralis*, Grav.; *Ædemera nobilis*, Scop.; *Laccoptus obscurus*, Panz.; etc.

From Milan I journeyed to Airolo, where I left the train and walked as far as the south end of the Pass, which was blocked with snow, returning (glissading for a good part of the way) for the night to a little cottage (inhabited by cows and their keepers) about 5000 feet up, just over the snow-line. It was very cold here, but in magnificent scenery, and very bracing. During my walk I captured the Coleoptera *Lacon murinus*, Linn., and *Pterostichus multipunctatus*, Dej.; and an earwig, *Forficula*, sp.; and some immature Orthoptera. Rhopalocera were abundant, a non-British *Colias*, and apparently Argynnis, etc., as well as at least two non-British Lycænids. Starting before six next morning, I walked alone over the Pass, the only tracks throughout a large part of the way being the footmarks of previous travellers; a most exhilarating tramp ending, via the picturesque villages of Hospenthal and Andermatt, at Göschenen, where I rejoined the train for Fluelen, thence by boat to Luzern, where I stopped a week.

I greatly regret the meagre entomological results of my holiday, but the season of year was so unfavourable that I turned my attention almost entirely to other matters; and, indeed, in a short visit, art in the northern and central parts and physical phenomena in the southern parts of Italy are apt to engross the greater part of one's time.

Report of the Bookham Common Field Meeting, May 10th, 1902.

By W. J. LUCAS, B.A., F.E.S. *Read May 22nd, 1902.*

ON May 10th took place the first of the field meetings for the season of 1902. Though but a few spots of rain fell during the afternoon and evening, still the weather, cold and generally dull, was altogether unfavourable. This being the case, it argues well for the success of the large number of field meetings arranged that a party of eighteen should have braved the elements on so unpromising a day. The commons between Effingham Station and Great Bookham formed the hunting-ground for the occasion, and the track to them lay along a broad green lane, which in better weather might perhaps prove productive. Though situated on the London clay, the ground was firm under foot, and in most cases sufficiently dry; the ponds, indeed, around which, after wandering in various directions, the party finally assembled, were by no means too well filled with water.

Though the weather was so bad, a few things were taken and some observations were made. Mr. Step took note of a number of birds—the coot, the peewit, Ray's wagtail, the nightingale, swallow, swift, cuckoo, blackcap, hedge-sparrow, and blackbird,—while the same observer and the writer paid some attention to the flowers that were in blossom, and a fairly good list was the result. It included the white water-buttercup (*Ranunculus aquatilis*, form *heterophyllus*); *R. ficaria*, the lesser celandine or pilewort; *Cardamine pratensis*, the cuckoo-flower, or milkmaid, as it is called around Kingston-on-Thames; *Viola canina*, the dog-violet; *Cerastium glomeratum*, the mouse-ear chickweed; *Stellaria holostea*, the stitchwort; *S. palustris*; *S. uliginosa*, a very small plant not quite in flower, and not identified at the time; *Ilex aquifolium*, the holly; *Ulex europæus*, the furze; *Genista anglica*, petty-whin, the badge of the Plantagenets; *Lathyrus macrorrhizus* (= *Orobis tuberosus*); *Prunus communis*, the sloe; *Potentilla tormentilla*; *P. fragariastrum*; *Cratægus oxyacantha*, the may, which I had not previously found in blossom; *Bellis perennis*, the daisy; *Taraxacum officinale*, the dandelion; *Byronia dioica*, the white bryony; *Primula vulgaris*, the primrose; *P. veris*, the cowslip; *Veronica chamaedrys*, the germander speedwell; *Ruscus aculeatus*, the butcher's-broom (rather plentifully), with its tiny lily-flowers on the flattened phylloclades, which look like leaves; *Arum maculatum*, lords and ladies, or cuckoo-pint; and *Luzula campestris*, the wood-rush. So much for

the flowering plants. *Equisetum limosum*, one of the vascular cryptogams, was growing in a great mass in one of the ponds, and many of the shoots bore fertile cones, a few of which were, after some difficulty, obtained for examination.

The aquatic Mollusca received attention at the hands of Mr. R. A. Adkin, who found *Planorbis complanatus*, *P. vortex*, *Limnæa palustris*, and *L. truncatula*. He hoped that amongst the *P. vortex* might be some *L. spirorbis*, but was disappointed. *L. truncatula* I generally look upon as fairly good, perhaps only because I have seldom found it.

A Trichopteron (caddis-fly) taken and given to me was *Limnophilus auricula*. Two or three Diptera were taken and sent to Mr. Colbran J. Wainwright for identification. They were *Bibio marci*, ♂, *B. venosus*, ♂, ♂, and *Syrphus bifasciatus*. To *B. venosus*, however, a query is attached. Of two Hymenoptera taken, one was a ♀ of the genus *Perithous*, and the other was an *Ichneumon*.

Mr. West, of Streatham, collected material for the microscope, and reports:—(1) Cellular Cryptogams: *Spirogyra*, *Closterium*, and *Volvox globator*; (2) Rotifera (besides several free-swimming species): *Melicerta ringens*, *Floscularia cornuta*, *Scaridium longicaudum*, and *Rotifer vulgaris*; (3) Vorticellæ: *Epistylis vaginicola*, and *Vorticella nebulifera*; (4) Entomostraca: *Cypris*, *Cyclops quadricornis*, and *Chydorus sphericus*; (5) he also found *Hydra vulgaris*, statoblasts of *Polyzoa* (species not recognised), and great numbers of larvæ of *Ephemeris*.

As regards the Lepidoptera, Mr. Bishop and others searched the *Genista anglica* for larvæ of *Pseudoterpna pruinata* (= *cytisaria*) with some success. Mr. Bishop also reports an *Adeli* captured, and larvæ of *Cheimatobia brumata*; *Oporabia dilutata*; *Phigalia pedaria* (= *pilosaria*); *Orthosia lota* (probably); *Epunda viminalis* (probably), and a species of *Xanthia*. Other lepidopterists seem to have neglected their opportunities, or perhaps the postal authorities dealt unkindly with their contributions!

If the weather was bad, the catering at the Merrilands Hotel was not, and justice was done to the excellent tea provided. The wind having fallen in the evening, the walk back to the trains at Effingham Station was rather enjoyable than not, and on the whole the memory of the excursion—which, by the way, has become historic, owing to Mr. Step's article in the August number of "Pall Mall"—will not perhaps be an unpleasant one after all.

Report of the Reigate Field Meeting, May 24th, 1902.

By HY. J. TURNER, F.E.S. *Read June 12th, 1902.*

EACH year, when the list of field meetings is being arranged by your Council, some member is sure to propose a visit to Reigate. Why this locality is so constantly brought forward I do not know for certain. It may be that the chalk has a peculiar attractiveness for others, as it has for myself, as I was born and spent all my young days within sight and easy distance of it. Again, the walk usually taken is not a long one; the distance from the station is short; and, above all, given good weather, and at the right season, one can be sure of a good day's sport. Whether one wishes to study Lepidoptera, or Coleoptera, or Botany, there all will be found in variety, and among them many good local things can be secured. Even on a wet day one's energies can well be devoted to the molluscs, which are then so very abundant on the slopes and in the coppices.

Unfortunately on this occasion the weather, which during the last season was so extremely favourable, had at this date scarcely shown a trace of the "genial spring." The time of spring had nearly passed, and yet spring's beauteous face had been seen but seldom. Summer was being ushered in by most unsummerlike weather.

However, in spite of a most inclement week, Saturday, May 24th, was mild and warm, even hot, and the sun on that day gave us more than "a fitful gleam." But still the retarding influence of previous weeks remained, and life—at any rate active, apparent life—was dormant, producing very little to satisfy the wishes of even the most ardent and assiduous of our members.

As is usual now, a section of those attending went down by an early train, and these, getting out at Redhill Junction, worked the more eastern part of the accessible hills. The main body were later on to investigate the more western portion.

It seemed an unfortunate day for keeping in touch with one another, and complications early arose. Mr. Step, Mr. Montgomery, and myself met at East Croydon and went together as far as Redhill, where we decided to get out, walk up the beautiful Linkfield Lane to Wray Common, and go over that part of the hills near the Suspension Bridge. By so doing we missed Mr. Carr, who had seen us get in at Croydon, and fully expected to meet us at Reigate when he alighted. However, he made the best he could of the loneliness, and his list of species of Lepidoptera and larvæ is much fuller than ours. He reports the following :—

LEPIDOPTERA.—*Gonepteryx rhamni*, *Vanessa polychloros*, *V. io*, *Thanaos tages*, *Syrichthus malvæ*, *Cænonympha pamphilus*, *Lycaena*

argiolus, *Macrothylacia* (*Bombyx*) *rubi* (abundant), *Fidonia atomaria*, 1 *Melanthia ocellata*, 1 *Bapta taminata*, 1 *B. temerata*, 1 *Melanippe rivata*, 1 *Ennychia nigrata* (another seen), 1 *Panagra petraria*.

LARVÆ.—*Orthosia lota*, *Miselia oxyacanthæ*, *Nola cucullatella*, *Eupithecia sobrinata* (abundant on juniper), *Hybernia defoliaria*, *Oporabia dilutata*, *Cheimatobia brumata*, *Hypsipetes elutata*, *Cerastis vaccinii* (?).

Our morning captures were few and far between, and mostly single representatives of common species. Lepidoptera seemed very scarce; "micros" were almost totally absent. Mr. Step found a few Mollusca by close searching, and a specimen of *Hemerophila abruptaria* at rest on an oak paling fence was a capital object for his camera. Mr. Montgomery swept and beat, but only a few small and obscure Coleoptera resulted. Several plants peculiar to the chalk were seen, but all were in a very backward condition and few of them in flower. Even the beech woods at the top of the hill produced only one or two specimens of shells. On the slope near the reservoir *Catoptria ulicetana* was in abundance around the furze bushes. One example each of *Cyaniris* (*Lycæna*) *argiolus* and *Gonepteryx rhamni* were seen, with an occasional *Pieris rapæ* and *Euchloë cardamines*. The walk was delightful; the view was varied and extensive; and that, perhaps, is all that can be said. Such a corner in the hills facing S.W. ought at this time of the year to be teeming with active life.

By a misunderstanding here Mr. Step was deserted, while Mr. Montgomery and myself hurried to meet the main body at Reigate Station. He only regained us later in the day, but he, too, had evidently made good use of his isolation, as the following list of plants and molluscs observed by him will prove.

FLOWERS.—*Chelidonium majus*, L.; *Nasturtium sylvestre*, Br.; *Cardamine hirsuta*, L.; *Sisymbrium alliaria*, Scop.; *Helianthemum vulgare*, Gaertn.; *Viola odorata*, L.; *V. sylvestris*, Fries; *Polygala vulgaris*, L.; *Stellaria holostea*, L.; *Geranium robertianum*, L.; *Vicia sepium*, L.; *Fragaria vesca*, L.; *Poterium sanguisorba*, L.; *Cratægus oxyacantha*, L.; *Pyrus malus*, L.; *Sanicula europæa*, L.; *Anthriscus sylvestris*, Hoffm.; *Cornus sanguinea*, L.; *Viburnum lantana*, L.; *Sonchus oleraceus*, L.; *Veronica hederæfolia*, L.; *V. chamædrys*, L.; *Nepeta glechoma*, Benth.; *Lamium album*, L.; *L. galeobdolon*, Crantz; *Ajuga reptans*, L.; *Mercurialis perennis*; *Listera ovata*, Br.; *Scilla nutans*, Sm.; *Arum maculatum*, L.; also a fungus, the St. George's mushroom (*Agaricus gambosus*).

MOLLUSCS.—*Cyclostoma elegans*, Müll; *Hyalina pura*, Alden; *H. cellarin*, Müll; *Arion ater*, L.; *Helix rotundata*, Müll; *H. lapicida*, L.; *H. cantiana*, Mont.; *H. virgata*, Da C.; *H. caperata*, Mont.; *H. nemoralis*, Müll; *H. aspersa*, Müll; *H. pomatia*, L.; *Clausilin laminata*, Mont.; *C. bidentata*, Ström.; *Ferussacia lubrica*, Müll.

He had also employed his camera to some purpose, and we shall no doubt see the results in the shape of lantern slides in due course.

About fourteen members in all attended, and a very pleasant afternoon ramble was made along the foot of the chalk hills west of Reigate, known as Colley Hills.

From the reports sent me, pretty well the same species were noted by the later coming members as mentioned above. Mr. R. A. Adkin sent in a full list containing the same species of Mollusca as those observed by Mr. Step, but noting in addition white forms of *Clausilia laminata* and *Cochlicopa lubrica*, with *Bulimus obscurus*, *Helix ericetorum*, *H. hispida*, *Hyalina glabra*, *H. nitidula*, *H. crystallina*, and *Arion hortensis*. Mr. Brown and Mr. Rayward reported the same species of Lepidoptera as Mr. Carr and myself, except that the latter took a solitary specimen of *Phibalapteryx vitalbata*. Mr. Montgomery's and my own observations or captures, not included above, were:—*Thecla rubi* seen, a large "white," presumably *P. brassica*, one *P. napi*, a "plume" not identified, and odd specimens of "micro-lepidoptera"—*Sciaphila subjectana*, *Dichrorampha plumbea*, *Adela viridella*, *Incurvaria muscalella*, *Dasycera sulphurella*, and *Elachista argentella* (*cygnipennella*). The larvæ of *Diloba cæruleocephala* were also found, but they were very small. One member found the nest of the meadow-pipit (*Anthus pratensis*) containing four eggs, which showed very extreme variation in colouring, from one with most of the dark colour massed at the larger end and very intense, to another with the colour very uniformly spread. This "find" was of course duly photographed.

To sum up the observations at the meeting, one can safely say that everything was late and scarce; and, although the day was delightfully fine, the lesser forms of life evidently put little trust in the, for this year, unusual genial appearances, for not even the hardest workers could produce a list of observations of any respectable dimension.

The usual "substantial tea" was provided for the party at the Railway Inn, and an early train brought us back to London.

Report of the Ranmore Common Field Meeting, June 7th, 1902.

By E. STEP, F.L.S. *Read July 10th, 1902.*

No more unfortunate date could have been selected for a field meeting, for though the morning was only showery with alternations of sunshine, the afternoon was consistently wet throughout, varied only by an occasional deluge. Although the attendance was comparatively small (nineteen), it was large when meteorological conditions are taken into account. But it was altogether too wet for systematic work, even for snail-hunting, which would have been a great success in this neighbourhood on a merely showery day. Little wonder, then, that I have been favoured with only one list, that of Lepidoptera from Mr. Carr, which is as follows:—*Anthocharis cardamines*, *Vanessa polychloros*, *Thanaos tages*, *Lycæna icarus*, *Cyaniris (Lycæna) argiolus*, *Cænonympha pamphilus*, *Polyommatus phlæas*, *Lithosia aureola (sororcula)*, *Rumia crategata*, *Bapta taminata*, *B. temerata*, *Asthena candidata*, *Melanippe rivata*, *Pyrausta purpuralis*.

LARVÆ. — *Teniocampa cruda*, *Cosmia trapezina*, *Cheimatobia brumata*, *Hybernia defoliaria*, *Oporabia dilutata*, *Eupithecia sobrinata*.

The only Mollusca actually observed were *Cyclostoma elegans*, *Helix pomatia*, *H. aspersa*, and *H. cantiana*.

Respecting *H. pomatia*, I would like to remind members that at Reigate on June 9th, 1894, as recorded in our "Proceedings," we made the discovery that an underground chamber as large as the shell is excavated to receive the eggs of this snail, and is hidden by a roof of earth agglutinated by slime. In all the intervening years, residence far from *pomatia*'s haunts always prevented my verification of the observations then made. On June 7th, 1902, within a couple of days of the Reigate date, I had the pleasure of showing several members in Westhumble Lane the various stages in this egg-laying process. There were specimens excavating the holes with the "foot," there were others actually ovipositing, and some who were roofing in the furnished egg-chamber. I think this is worth recording, as it seems to indicate that June 7th is about the regular date to observe this process.

The following plants were in flower:—*Aquilegia vulgaris*, *Chelidonium majus*, *Polygala vulgaris*, *Geranium robertianum*, *Geum urbanum*, *Poterium sanguisorba*, *Sanicula europæa*, *Anthriscus sylvestris*, *Galium cruciata*, *Asperula odorata*, *Centaurea cyanus*, *Myosotis sylvatica*, *Cynoglossum officinale*, *Veronica officinalis*, *V. chamædrys*, *Lathræa squamaria*, *Lamium album*, *L. galeobdolon*, *Ajuga reptans*, *Habenaria conopsea*, *H. bifolia* (sub-sp. *chloranthu*), *Scilla nutans*, *Ornithogalum umbellatum*, *Arum maculatum*.

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Report of the Field Meeting held at Otford, Kent, June 21st, 1902.

By ROBERT ADKIN, F.E.S. *Read January 8th, 1903.*

IN the report of the field meeting held at Brasted in July, 1901, I dwelt somewhat fully on my reasons for selecting that locality, and it will be remembered that our operations were then carried out on the ragstone and sandy hills to the south of the valley through which the upper waters of the river Darent flow. To the north of this valley the hills are more broken in contour, and consist largely of chalk soil. Some four or five miles below Brasted the river bends away in a northerly direction, and, flowing through a valley that bisects this range of hills, ultimately finds its way into the Thames at Dartford Creek. Otford, the base from which the field meeting now under review was undertaken, is situated to the east of the river, just after it has taken its northerly course. The hill rising from it is one of the most chalky of the range, and, having a south-westerly aspect, is particularly suitable for a naturalist's hunting-ground. Well within my own memory the greater portion of this hillside was an uncultivated down, capped by woods which, if private property, were sufficiently open for all practical purposes. I know of few places where insect life was more abundant; *Argynnis aglaia* would fly on the down sides in bewildering profusion, *Lycena corydon* had a very flourishing colony, few knapweed heads were in their season untenanted by *Eremobia ochroleuca*, to say nothing of the innumerable species of *Micros* that found employment for one at any time of the day and well into the night.

But it is hardly to be expected that such advantageous situations can, in these days, long remain unappropriated, especially when within some twenty miles of London, and it is therefore not surprising to find that a stately mansion has been reared in a hollow on the hillside, and a large portion of the down converted into the surrounding park, thus materially circumscribing the available open land; yet I venture to think that there is still ample opportunity for an afternoon's profitable collecting by those who are content to expend their energies on the fringes of the woods, the few acres of still open waste land, and last, but not least, the hedge banks of the surrounding lanes, which are unusually heavy hereabout, and not only afford cover for numerous moths, but their varied growth provides suitable pabulum for a very considerable assortment of herbaceous and tree-feeding larvæ. Therefore, in spite of its present disadvantages, the neighbourhood appeared to me to offer a suitable *locale* for a field meeting.

The village of Otford, too, is not without interest, for although in the present day it is a place of very small importance, the road along which it is built and the two or three others that join up with it being mere country lanes connecting similar unimportant villages, yet in times of old it appears to have been a place of note. Situated on the "Pilgrim's Way," in the direct line of route between Winchester, Rochester, and Canterbury, it would no doubt have been a convenient halting-place for much of the traffic that passed between those important ecclesiastical centres. It was attached to the See of Canterbury before the Norman conquest; and so early as A.D. 1070, and for some centuries later, it appears to have been a favourite dwelling-place of the Archbishops of Canterbury. So far as I am aware, no relics of these very early times now remain. The palace (or castle) was rebuilt about the end of the fifteenth century, and the tower, which is still standing, forms a conspicuous object, and is regarded as an interesting example of the decorated brickwork style of that period. The church is probably of more recent date, its register commencing with the year 1630; it is built of Kentish rag-stone, and forms a prominent, if not particularly picturesque object, near the entrance of the village. The houses are for the most part modern, but the "Bull Inn," with its low ceilings and large fire-places, although recently somewhat modernised in its internal arrangements, still carries an air of respectable antiquity; and although its present resources are perhaps not of the highest order, it affords a convenient house of call for the weary wayfarer, and the views obtainable from the garden at its rear, across the valley to the sandy hills and woods of Seal Chart, are very pleasant. In the matter of water the village is singularly well off. In addition to the river, which flows hard by, there is, near the centre of the village, a banked-up pond, which appears to maintain a fairly constant level, and numerous springs of delightfully fresh clear water flow out from the chalk hills. Some of these are in private grounds, but one of them may be seen gushing out from a wall, be the weather ever so dry, as one passes from the railway station to the village.

Of greater interest, however, than the historic matters connected with this ancient settlement are the features of the surrounding country. The timber of the woods already referred to consists largely of beech and oak, with a sprinkling of birch, maple, ash, fir, etc. Although in the main these woods are somewhat closely preserved, they are sufficiently cut up by lanes through or alongside them to admit of their being fairly well worked. The hedge-rows are a feature of the neighbourhood, not only on account of their bulk, but of the variety of the shrubs of which they are composed, among which may be mentioned oak, beech, maple, hawthorn, hazel, willow, ash, damson, cherry, elder, yew, privet, broom, honeysuckle, clematis, etc. What small portions of the down lands still remain bear a growth of a very mixed character. In addition to patches of many of the shrubs already mentioned, there are a number of young

whitebeam trees, while the lower growing species include, among many others, quantities of marjoram, salad-burnet, wood-sage, wood-sanicle, rock-rose, mignonette, *Galium*, *Hypericum*, woodruff, etc. Such an assortment should surely provide good collecting in any order, except perhaps aquatic species, for although there is no lack of water, it is hardly of the sort to harbour them; and so far as I have been able to ascertain, Mollusca are less abundant than the class of country might reasonably lead one to expect—that is, if we except a thriving colony of *Helix pomatia*, from which some very fine examples may be obtained.

Having thus described the place, it now remains for me to briefly report upon the meeting held there and the results obtained.

On the afternoon of Saturday, June 21st, some dozen members met one another at Holborn Viaduct Station of the London, Chatham, and Dover Railway, with questioning looks as to whether such a muster was worthy the name of a South London Field Meeting, and, with some misgivings, proceeded by the 2.37 train to Otford. Happily others joined them *en route*, and so made up a total attendance of seventeen—a poor muster when compared with many of the meetings of recent years, but probably as large as might be expected having regard to the unusual number of meetings fixed for the summer months and the prevailing unsettled condition of weather. In this matter, however, we were singularly fortunate, a couple of slight showers that fell during the afternoon tending to freshen the foliage and soften the air, and caused no inconvenience to any, other than perhaps those desirous of beating for larvæ, and then only for the short time necessary for the gentle breeze to dry the rain-drops from the trees.

The route taken, on leaving the station yard, was to the right over the railway bridge and along the road leading to Kemsing; and at a few yards beyond the point where the road from Shoreham joins is a footpath on the left hand, which leads beside the garden of the cottage attached to the kennels of the West Kent Hunt, thence up a steep hill, over a bit of down land between Hillydea land Flatdeal Woods, and eventually terminates at the top of the hill where three lanes meet. This is the highest point in the immediate neighbourhood, and some 670 feet above sea level. Some of the party proceeded by the footpath just mentioned; others continued along the road towards Kemsing until the lodge gates were reached, where, taking the lane on the left hand and skirting the opposite side of Flatdeal Wood, ultimately met the other members of the party at the hilltop. Now taking the lane on the right towards Woodlands for a short half-mile, and just after a sharp dip in the road and past a couple of cottages on the right hand known as "Monks in the Hole," another and narrower lane goes off at a right angle on the right hand. Proceeding by this way, again for barely half a mile, the lane passes through a corner of Rowdow Wood and reaches the brow of an old quarry and a patch of broken-down

land some few acres in extent, at the foot of which the Kemsing-Otford Road is again joined. The railway station is hardly a mile to the right, and the "Bull Inn" less than another half-mile further on. The whole round from the station and back again is thus compassed in, approximately, three miles, the hedgebanks, woods, downs, and fences by which it is bordered affording an opportunity for an infinite variety of collecting throughout its entire length. The accompanying map will no doubt make clear, even to those who had not the advantage of being present, the route taken and the positions of the woods and downs worked over.

I do not think I shall be guilty of maligning any of our friends if I say that little serious collecting was undertaken by the party, although the copious notes received from some two or three members go to prove the ever-present exception to any general assertion. I am especially indebted to our President and Messrs. F. M. B. Carr, A. Harrison, and A. E. Tonge for notes on plants observed and Lepidoptera taken, and to the Rev. F. H. Wood for his remarks on spiders, from which the following lists are compiled, and to whom I take this opportunity of expressing my thanks. But are not the primary objects of field meetings the opening up of new areas for work, and the friendly intercourse among members in the midst of the objects that they make their common study, rather than any hard individual collecting during the brief space of time available on such an occasion? If this be so, I think we may congratulate ourselves upon the attainment of yet another successful field meeting, which was brought to a close by the usual substantial tea, provided at the "Bull Inn," after which the party returned to town by the 9.37 train from Otford Station.

BIRDS' EGGS.—Blackbird's (*Turdus merula*) nest with two eggs; thrush's (*T. musicus*) nest with four eggs, one of them nearly round, and one with three only large black blotches.—F. M. B. Carr.

SPIDERS.—*Clubiona holosericea*, *Theridion lineatum*, *Epeira cucurbitina*, *E. atrica* (*callophylla*), *E. umbratica* (near cocoon), *E. inclinata*, *Xysticus* (*Thomisus*) *cristatus*, *Pisura* (*Dolomedes*) *mirabilis* (carrying cocoon).

LEPIDOPTERA.—*Pieris rapæ*, *Euchloë cardamines*, *Chrysophanus* (*Polyommatus*) *phleas*, *Lycæna icarus*, *Syrichthus malvæ*, *Thanaos tages*, *Hepialus lupulinus*, *Euchelia jacobææ*, *Spilosoma mendica*, *S. lubricipida*, *Agrotis cinerea*, *Dianthæcia capsophila*, *Hadena genistæ*, *Rumia luteolata* (*cratægata*), *Venilia maculata*, *Tephrosia crepuscularia* (F. M. B. Carr), *T. punctularia*, *Zonosoma linearia* (*trilinearis*), *Asthena luteata*, *A. candidata*, *Acidalia ornata*, *A. remutata*, *Cabera pusaria*, *Bapta bimaculata* (*taminata*), *B. temerata*, *Eupithecia venosata*, *E. scabiosata* (*subumbrata*), *E. oblongata* (*centaureata*), *E. vulgata*, *Melanthia ocellata*, *Melanippe sociata* (*subtristata*), *M. montanata*, *M. fluctuata*, *Anticlea rubidata*, *Coremia unidentaria*, *C. designata* (*propugnata*), *Camptogramma bilineata*, *Phibalapteryx vitalbata*, *Anaitis plagiata* (very abundant), *Scoparia dubitalis*

(abundant), *Pyrausta purpuralis*, *Ennychia cingulata*, *E. nigrata* (*anguinalis*), *Scopula olivialis*, *Crambus pratellus*, *C. hortuellus*, *Alispa angustella*, *Argyrotoxa conwayana*, *Penthina pruniana*, *Pardia tripunctana*, *Phoxopteryx lundana*, *Pedisca corticana*, *Ephippiphora trigeminana*, *Dichorampha petiverella*, *Xanthosetia hamana*, *Chrosis alcella*, *Adela degeerella*. Larvæ: *Nola cucullatella*, *Porthesia similis* (*auriflua*), *Cosmia trapezina*, *Epunda viminalis*, *Metrocampa margaritaria*, *Hybernica rupicaprararia*, *H. marginaria* (*progemmaria*), *H. defoliaria*, *Oporabia dilutata*, *Anisopteryx æscularia*, *Hypsipetes sordidata* (*elutata*).

PLANTS.—*Ajuga reptans*, *Asperula odorata*, *Atropa belladonna*, *Bellis perennis*, *Bryonia dioica*, *Clematis vitalba*, *Crategus oxyacantha*, (still in bloom), *Chrysanthemum leucanthemum*, *Cytisus scoparius*, *Cynoglossum* ? *officinale*, *Daphne laureola* (in fruit), *Euphorbia amygdaloides*, *Euonymus europæus*, *Fragaria vesca*, *Fumaria officinalis*, *Galeobdolon luteum*, *Galium cruciata*, *Geranium robertianum*, *Helianthemum vulgare*, *Hypericum perforatum*, *Lamium galeobdolon*, *Lotus corniculatus*, *Ligustrum vulgare*, *Mercurialis perennis*, *Myosotis arvensis*, *Nepeta glechoma*, *Ophrys muscifera*, *Orchis mascula*, *O. pyramidalis* (?), *Origanum vulgare*, *Poterium sanguisorba*, *Polygala vulgaris*, *Papaver rhœas*, *Ranunculus repens*, *Reseda lutea*, *Rosa canina*, *Sambucus niger*, *Scilla nutans*, *Scrophularia nodosa*, *Sinapis arvensis*, *Stellaria holostea*, *Sanicula europæa*, *Solanum dulcamara*, *Silene inflata*, *S. nutans* (two or three plants, Carr), *Teucrium scorodonia*, *Trifolium repens*, *T. pratense*, *Veronica chamædrys*, *Viola canina*.

Report of the Wisley Field Meeting, July 5th, 1902.

By W. J. LUCAS, B.A., F.E.S. *Read July 24th, 1902.*

A FINE, hot day, with fairly bright sunshine, favoured the members and their friends who visited the Wisley Ponds and neighbourhood on July 5th. Vegetation was luxuriant, and flowers were pretty numerous. The following members of the flora of the district were perhaps most worthy of note :—*Ranunculus flammula*, *Lychnis flos-cuculi*, *Stellaria uliginosa*, *Hypericum elodes*, *Rhamnus frangula*, *Agrimonia eupatoria*, *Bryonia dioica*, *Hydrocotyle vulgaris*, *Œnanthe peucedanifolia*, *Lonicera periclymenum*, *Cnicus pratensis*, *Erica tetralix*, *E. cinerea*, *Anagallis tenella* (very fine), *Myosotis cæspitosa*, *Littorella lacustris*, *Euphrasia officinalis*, *Alisma ranunculoides*, *Carex pseudocyperus*, *Equisetum limosum* ; the evil-smelling *Phallus impudicus*, and the edible *Amanita rubescens*. The hornbeam, not a common tree in Surrey, I believe, was found in fruit.

Amongst the Batrachians Mr. Step noticed that the common toad "*Bufo vulgaris*, just emerged from the larval condition," was swarming on land, and the same member calls attention to a single Mollusc, *Succinea putris*. But the smaller pond abounds in water-shells, especially Planorbes, including *P. corneas* ; while *Zonites nitidus*, a somewhat scarce land shell, "which lives in the water," may be found by diligent search in one place along the margin.

Of the Orthoptera, immature specimens of *Forficula auricularia* were noticed, and some numbers of grasshoppers belonging to the genus *Stenobothrus* were seen, but in no case, I think, quite mature, though some ♀ specimens of *S. parallelus* were of large size. A small immature green locustid (that is, grasshopper with long antennæ) was taken from nettles. The little *Tettix bipunctatus* was taken mature. By the large pond several specimens of *Ectobia lapponica* were taken—in one case a pair *in cop.*,—and it was easily observed that the female is much lighter and rounder in outline than the male, and has shorter wings. The male soon died, but the female was kept alive some time, being fed first on strawberries, then on banana. From the tip of her abdomen a pale yellowish-brown egg-capsule was protruding on July 19th. At any rate, on that day it was first noticed, and she had been looked at most days previously. The capsule, therefore, is not to be seen till some time after copulation. At its darkest it was only of a palish sienna-brown. It was dropped on July 24th, having been carried about five days, a habit which has been noticed also in the case of some of the larger cockroaches.

Most of the Neuroptera noted belonged to the Odonata, the only others being *Chrysopa* sp. The Odonata were *Libellula 4-maculata*, *Sympetrum striolatum* (teneral), *S. sanguineum* (seen only), *Orthetrum cancellatum* (one male taken by Mr. Kemp), *Lestes sponsa* (abundant), *Anax imperator* (seen only), *Brachytron pratense* (one), *Agrion puella*, *Agrion pulchellum* (a fairly good species), the local *Erythronma naidas*, *Ischnura elegans*, and its var. *rufescens* of Stephens, and *Enallagma cyathigerum* (at the smaller pond). Mr. South made the interesting capture of a female *Ischnura elegans* flying off with *Crambus pascuellus*.

Of Hymenoptera but two seem to have been taken away. These, which were identified by Mr. A. H. Hamm, one of our members, were a sawfly, *Allantus viridis* (Linn.), and one of the sand wasps *Ammophila sabulosa* (Linn.), which provisions its nidus with lepidopterous larvæ.

The only dipteran captured for identification was *Sarcophaga carnaria*, a large grey and black fly, one of the commonest of British insects. The specimen taken seemed of rather striking size as it lighted at the smaller pond.

Mr. Kemp contributed a somewhat full list of Coleoptera, the best species being distinguished by an asterisk:—*Acupalpus meridianus*, *Pederus riparius** (a few specimens), *Homaloba scapularis** (caught flying), *Antherophagus nigricornis*, *Aphodius granarius*, *Agrilus angustulus** (taken by Mr. Turner), *Melanotus rufipes*, *Agriotes obscurus*, *A. pallidulus*, *Malthinus punctatus*, *Grammoptera tabacicolor*, *G. ruficornis*, *Pachyta livida*, *Donacia clavipes* (taken by Mr. Turner), *D. thalassina** (abundant on Wisley lake), *Chrysomela polita*, *Luperus flavipes*, *Notoxus monoceros*, *Crepidodera transversa*, *C. helxines*, *C. aurata*, *Psylliodes affinis*, *Ceuthorrhynchus melanostictus*, *Phyllobius argentatus*, *Thryogenes nereis*, *Otiorrhynchus sulcatus*, *Xyleborus dryophagus** (caught flying).

Of Lepidoptera a fairly long list has come to hand from Messrs. Bishop, South, and Carpenter: *Vanessa atalanta*, *Epinephile ianira*, *Cænonympha pamphilus*, *Pararge egeria* (one), *Lycæna argiolus*, *L. ægon*, and *Hesperia sylvanus* amongst the butterflies. Of the moths we have *Hydrelia uncula* (not previously recorded from the locality), *Hepialus hectus*, *Leucania impudens* (*pudorina*), *Plusia gamma*, *Erastria fasciana*, *Ellopiia prosapiaria*, *Boarmia repandata*, *Timandra amatoria*, *Cabera pusaria*, *C. exanthemaria*, *Ematurga atomaria*, *Bupalus piniaria*, *Aspilates strigillaria* (and a banded var.), *Larentia viridaria*, *Eupithecia indigata*, *Acidalia bisetata*, *A. trigeminata* (one), *Cidaria picata* (two), *Hyspispetes trifasciata* (worn), *Hydrocampa nymphaeata*, *H. stagnata* (common), *Aciptilia pentadactyla* (one), *Aphomia sociella* (one ♂), *Tortrix sorbiana* (one ♀), *T. ribeana* var. *cerasana* (one), *Sericoris bifasciana* (one), *Retinia pinivorana* (one), *Catoptria cana* (one), *Metrocampa margaritaria*, *Iodis lactearia*, *Macaria liturata*, *Lomaspilis marginata*, *Thera variata*, *Camptogramma bilineata*, *Scoparia ambigua*, *Crambus pascuellus*, *C. hortuellus*, *Tortrix*

rosana, *T. heparana*, *T. viridana*, *T. forsterana*, *Dictyopteryx bergmaniana*, *Penthina variegana*, *P. pruniana*, *Sericoris urticana*, *S. lacunana*, *Sciaphila nubilana*, *S. subjectana*, and *Grapholitha trimaculana*. Larvæ noted were *Gonepteryx rhamni*, *Porthesia similis*, and *Malacosoma neuustria*.

Rev. F. H. Wood looked after the spiders, and has contributed some most interesting notes:—"The *Lycosidæ* were well represented—*Lycosa agretica* (Blackw.), *L. campestris*, and *L. saccata*. A female of *L. saccata* was captured, with cocoon attached under the abdomen by means of silken threads. It may be noted that *Dolomedes mirabilis* (which was found at Otford) carries the cocoon under the cephalothorax, where it is held by the falces and palpi and threads drawn from the spinnerets. The *L. saccata* and her cocoon became separated on being transferred to a sod in a glass jar, and the cocoon fell away some distance out of sight of the spider. An hour later I found that she had regained possession of her cocoon. After two days she ceased to carry her cocoon, which lay quite visible in a sheltered position among the roots. She visited it frequently, but hunted all over the sod for the flies which were given her. To-day (July 16th) I notice that several little spiders, still very light-coloured, have emerged and are running in the grass.

"One of the *Salticidæ* (jumping spiders) was beaten from buckthorn. I think it is *Salticus coronatus*, but am open to correction, as it is new to me. The habits of this spider have been closely observed in a glass jar with soil and dry twigs. Its favourite position is on the gauze above, whence it watches for prey, turning its elevated cephalothorax in all directions. The eyes of *Salticus* need notice. Forming three sides of a square, they are admirably placed for all-round vision. In front the largest two are placed between two smaller ones, and at the end of each lateral row are two large ones surmounting the smallest two. The spider leaps swiftly down on a fly crawling below, turning completely over in its descent, and holding by a silken thread to its former position. The falces and legs are very strong, and its hold on a struggling bluebottle twice its size showed its tenacity. It dropped suddenly from above and held on to the insect's thorax, while both rolled over and over till the poison had taken effect.

"*Thomisidæ*. A most interesting find was made in the discovery of *Thomisus luctuosus*, a beautiful spider, with clear white lines surrounding a light brown cephalothorax and brown abdomen, on which darker shades enclose a pinkish space. This spider was found guarding its cocoon in a dry leaf. It has now (July 16th) fastened this leaf by strong threads to a piece of bark in a glass jar. It never leaves its charge, except to take food placed on the threads near its home. Its movements, like most of the *Thomisidæ* (crab spiders), are slow and generally sideways. Another *Thomisus*, *T. pallidus*, was kindly handed me by Mr. F. Noad Clark. This spider is of a light creamy yellow. This colour is evidently a disguise. *T. luctuosus*, in the instance above, can scarcely be distinguished from the dry leaf

in which it lurks with its white cocoon. Nearly all the spiders of the large family of Thomisidæ, taking their prey by craft and patient waiting, obtain concealment from their surroundings, which they often resemble in colour. I placed this spider among the blooms of yellow jasmine, in which it lay so well concealed that an unsuspecting fly actually walked on to its palpi. Another of this family, *T. citreus*, is known to be green, yellow, and even pure white. *Thomisus* is easily recognised by the length of the first and second legs. In *T. pallidus* the order is 2, 1, 3, 4; . . . in *T. luctuosus*, 2, 1, 4, 3.

"*Ciniflonidæ*. Webs of *Ciniflo* were seen on palings, but the spiders were concealed. *Ergatis benigna* was observed.

"Among the numerous members of the *Theridiidæ* which were seen on ferns and bushes, a little whitish *T. pallens* was discovered guarding its cocoon on a leaf. A picture of this pyriform structure has often been given, as, *e. g.*, in Blackwall. It is larger than the spider, and has several little points projecting from its surface. In this family the first and fourth legs are the longest in the female; in the male, of course, the order is different, being 1, 2, 4, 3. The female remains near her cocoon. *T. lineatum* and *T. denticulatum* were also observed.

"*Epeiridæ*. The bright green *Epeira cucurbitina*, which must be reckoned among our 'common spiders,' was fairly abundant. I see that at South Kensington it is shown on a green leaf as an example of protective mimicry, the colour of the abdomen harmonising well with its surroundings. The female found at Wisley spun her cocoon on July 9th. *E. callophylla* was numerous. *Tetragnatha extensa* was met with, both ♂ and ♀. The ♀ was found by Mr. Noad Clark; the ♂ was discovered 'extending' on a stem of blackthorn. This position is markedly 'protective.' The spider, at rest, extends the first two pairs of legs forward and the last pair backward. The front two pairs are very long; the third pair extremely short. The spider in this position is not easily noticed. It is well known that *Epeira inclinata* (frequently found in gardens) and *E. antriada* have the same habit."

At the "Black Swan," the very old-fashioned country inn at Martyr's Green, full justice was done to an excellent tea. This was followed by a leisurely stroll along the lanes to Effingham station—a most enjoyable walk on a fine summer evening. Not much "dusking" was done, I believe, but a large number of stag-beetles were noticed on the wing just before reaching the wood. Here *Phallus impudicus* generally makes its presence known by its extremely unpleasant smell, and does its best to mar the feelings of pleasure that one takes away from a delightful neighbourhood, in this case on an almost perfect day.

Report of the Byfleet Field Meeting, July 19th, 1902.

By E. STEP, F.L.S. *Read September 11th, 1902.*

THE unpropitious weather that has characterised most of the field meetings during 1902 again prevailed during the latter part of the afternoon of July 19th, and somewhat marred the success of the meeting. A few of the members who went by a morning train were more fortunate, and had the pleasure of the long canal-side ramble from Woking station in bright sunshine. To these early birds also fell most of the worms, though some of the afternoon party made good use of their time. The date selected was probably the very best in the whole year from the point of view of the botanist, from the fact that the majority of waterside plants were then in flower.

Between Woking and Maybury Bridge several examples of the fine flowering rush (*Butomus umbellatus*) were observed; the great water-dock (*Rumex hydrolapathum*) was also in flower, and a few feet from the water was found the bog asphodel (*Narthecium ossifragum*), with a fine specimen of the twayblade (*Listera ovata*), and plenty of the meadow plume-thistle (*Cnicus pratensis*). The canal overflow, known as the Flash, was almost dry, and covered with an abundance of the marsh bedstraw (*Galium palustre*), upon which Mr. Enock took no fewer than thirteen larvæ of *Chærocampa elpenor*. Most of these turned out to be very fine— $3\frac{5}{8}$ of an inch long and $\frac{5}{8}$ in diameter when full grown,—and all were green in colour. The sulphurwort water-dropwort (*Ænanthe peucedanifolia*) was also conspicuous here, with the branched bur-reed (*Sparganium ramosum*) and the purple loose-strife (*Lythrum salicaria*).

From Maybury Bridge to Byfleet the meadow-sweet (*Spiræa ulmaria*) was the most conspicuous waterside flower, and with it we noticed the forget-me-not (*Myosotis palustris*), the sweet flag (*Acorus calamus*), arrow-head (*Sagittaria sagittifolia*), and the two water-plan-tains (*Alisma plantago* and *A. ranunculoides*). The yellow water-lily (*Nuphar luteum*) was in flower, and specially abundant where the canal broadens as it passes through the woods. The woods were ablaze with the bright rosy blossoms of the willow-herb (*Epilobium angustifolium*). In swampy places at Byfleet the great valerian (*Valeriana officinalis*) was very fine, several clumps being noted that were at least six feet in height. Other plants noticed in flower were—ragged robin (*Lychnis flos-cuculi*), white campion *Lychnis vespertina*, small stitchwort (*Stellaria graminea*), petty-whin (*Genista anglica*), meadow vetchling (*Lathyrus pratensis*), hemp agrimony (*Eupatorium cannabinum*), yarrow (*Achillea ptarmica*), tansy (*Tanacetum vulgare*), cat's-

ear (*Hypochaeris radicata*), harebell (*Campanula rotundifolia*), cross leaved heath (*Erica tetralix*), fine-leaved heath (*Erica cinerea*), creeping jenny (*Lysimachia nummularia*), great yellow loosestrife (*Lysimachia vulgaris*), foxglove (*Digitalis purpurea*), yellow rattle (*Rhinanthus crista-galli*), marsh lousewort (*Pedicularis palustris*), yellow cow-wheat (*Melampyrum pratense*), common skull-cap (*Scutellaria galericulata*), marsh orchis (*Orchis latifolia*), and spotted orchis (*O. maculata*).

The Lepidoptera, for a list of which I am indebted to Mr. R. South, included *Epinephele hyperanthus*, *E. ianira*, *E. tithonus*, *Lycæna icarus*, *Cænonympha pamphilus*, *Clostera reclusa* (1 larva), *Gonoptera libatrix* (1 larva), *Cabera pusaria*, *Ematurga atomaria*, *Eupisteria obliterata* (1 ♀), *Acidalia immutata*, *Melanippe unangulata*, *Tortrix costana*, *T. xylosteana*, *T. rosana*, *T. heparana*, *Hedya dealbana*, *Aspis udmanniana*, *Sphaleroptera ictericana*, *Zygæna trifolii*, *Rivula sericealis*, *Hydrocampa nymphæata*, *H. stagnata*, *Ebulea crocealis*, *Scopula prunalis*, *Scoparia ambigua*, *Mimæseoptilus bipunctidactylus*, *M. pterodactylus*, *Aciptilia pentadactyla*, *Crambus hortuellus*, *C. pascuellus*, *Pempelia palumbella*, *Sericoris lacunana*, *Xanthosetia hamana*, *Phibalocera quercana*. Mr. Enock also took a fine batch of *Gonopteryx rhamni* larvæ, and Mr. Lucas a larva of *Dicranura zinula* on *Salix repens*. The latter gentleman, when he went down to make commissariat arrangements a few days earlier, took *Trochilium crabroniformis* (*bembeciformis*) by the canal, in the direction of Weybridge.

The Rev. F. H. Wood devoted his attention to the spiders of the district, and he has kindly furnished me with the following list of the species observed:—*Dolomedes mirabilis* (carrying cocoon), *Clubiona holosericea*, *Ergatis benigna* (and nest), *E. pallens*, *Agelena labyrinthica* (fine male, females, and nests), *Linyphia montana*, *L. pratensis*, *Theridion lineatum*, *T. denticulatum*, *T. pallens*, *T. nervosum*, *T. varians*, *Epeira apoclista*, *E. cucurbitana*, *E. callophylla*, *Tetragnatha extensa*.

Mr. Lucas complains that most of the grasshoppers were immature, but he identified *Stenobothrus parallelus*, and he added to the few Surrey records of the dragon-fly, *Cordulegaster annulatus*, by taking a male by the canal near Byfleet station. For the following list of Coleoptera and Odonata I am indebted to Mr. Kemp:—

COLEOPTERA.—*Donacia dentata*, *Ochrosis salicæ*, *Phyllobrotica quadrimaculata*, and *Anomala frischii*.

ODONATA.—*Agrion pulchellum*, *Pyrrhosoma nymphula*, *Cordulia ænea*, *Libellula quadrimaculata*, and *Erythromma najas*.

A nest with eggs of the reed bunting was discovered near Byfleet station and duly photographed.

About twenty members sat down to tea at the "Victoria Inn," Woodham.

Report of the Oxshott Field Meeting, September 6th, 1902.

By W. J. LUCAS, B.A., F.E.S.

A FINE, warm, and bright day rewarded the twenty-two members and four visitors who attended the Oxshott Field Meeting on September 25th. Perhaps the most interesting capture was that of a male specimen of the dragonfly, *Sympetrum sanguineum*, by Mr. Turner at the Black Pond. If this species had been present in previous years it could scarcely have been overlooked, seeing that the pond has been under close observation with regard to the Odonata. We must conclude that it was a new arrival. Mr. South took a nice female *Aeschna mixta*, of which species, however, there seemed to be few on Esher Common and none apparently at the Black Pond. Was it that the males were not yet out, that the females were far away from the pond at present, and that it was the latter we had been seeing so far? *A. grandis* was observed; *Sympetrum scoticum* and *S. striolatum* were common; *Enallagma cyathigerum* was also common, but of females only two were observed. One or two females of *Pyrrosoma tenellum* were seen. On the tree-trunks on Esher Common were found one or two larvæ of *Raphidia* (probably *notata*), with abdomen very much distended, and pale in colour where the integuments were soft enough to distend. On the inside of the glass tube in which one was placed were afterwards found a number of spores, some of them evidently germinating. A specimen was sent to Kew Gardens, where it was found that the larva was attacked by a parasitic fungus, *Empusa lampyridarum*.

Of butterflies, one *Pyrameis cardui* in fine condition was taken at the sand-pits near Oxshott station; one *Gonepteryx rhamni* was noticed; *Chrysophanus phleas* was fairly plentiful on and near Esher Common; some other common species were also on the wing. *Plusia gamma* had been abundant on Esher Common and was still so.

Report of the Field Meeting held in Epping Forest on September 20th, 1902.

By A. HARRISON, F.L.S., F.E.S.

AFTER an interval of many years a Field Meeting of the South London Natural History Society was held in Epping Forest, about twenty-five members assembling at Theydon Bois Station. The route taken was through Epping Thicks to Epping village—a distance of about three or three and a half miles.

Entomologically speaking, the meeting cannot claim to have been very successful, but the ramble through the Forest was most enjoyable. Lepidopterists found larvæ by no means plentiful, and none but the commoner species fell into the beating trays.

Mr. Kemp, as usual at our meetings, worked hard among the Coleoptera, and has supplied the subjoined list of his captures obtained by beating and sweeping.

COLEOPTERA.—*Zeugophora flavicollis* (very rare, one specimen on aspen leaf), *Ilybius fenestratus*, *Hyphydrus ovatus*, *Laccophilus interruptus* (Golding's Hill Ponds), *Rhagium inquisitor* (two larvæ and one pupa, from which the imago emerged September 22nd), *Dorytomus pectoralis* (on sallow), *Apion hæmatodes*, *Notoxus monoceros*, *Phyllodecta vitellinæ*, *Carabus catenulatus*, *Orchestes quercus*, *O. fagi*, *Crepidodera helxines*, *C. aurata*, *Strophosomus capitatus*, *Melanophthalma gibbosa*, *Notiophilus biguttatus*, *Adalia bipunctata*, *Halysia conglobata*, and *Coccinella 10-punctata*. Among the Odonata there were two specimens of *Æschna cyanea*, several *Sympetrum striolatum*, and both sexes of *S. sanguineum*.

The meeting concluded with "high tea" at the Cock Hotel at Epping.

Report of the Fungus Foray at Loughton, October 4th, 1902.

By H. MAIN, B.Sc., F.E.S.

THE annual Fungus Foray was held this year in Epping Forest. The weather was cold and unpromising, so only a dozen members put in an appearance.

Entering the Forest at Staples Pond, the route led through very varied scenery to the higher ground of Monk Wood, where so many fine beeches and oaks make this one of the most delightful parts of the Forest. Very few entomological specimens were taken, but fifty species of fungi were identified by Dr. M. C. Cooke as the result of the afternoon's search.

Tea was served at the Wake Arms Hotel. On the walk back to Loughton station *Catocala nupta* was observed on one of the roadside lamps, probably a rather late record.

Mr. Kemp reports the following captures among the Coleoptera :—*Notiophilus biguttatus*, *Liodes humeralis*, *Cis boleti*, *Nebria brevicollis*, *Homalota* (? sp.), *Carabus violaceus*, *C. catenulatus*.

The list of Fungi is as follows :—*Collybia radicata*, *Pholiota radicata*, *Cortinarius armillatus*, *Clitocybe laccata*, *Psilocybe spadiceus*, *Hydnum repandum* (edible), *Amanita mappa*, *Russula vesca* (edible), *Paxillus involutus*, *Boletus chrysenteron*, *Polystictus versicolor*, *Hygrophorus turundus*, *Amanita rubescens* (edible), *Boletus scaber* (edible), *Armillaria mellea*, *Hypholoma velutina*, *Collybia velutipes*, *Polystictus adustus*, *Marasmius peronatus*, *Hypholoma fascicularis*, *Amanitopsis fulva*, *Pholiota spectabilis*, *Stereum hirsutum*, *Amanita phalloides* (poison), *Russula emetica* (poison), *Senzites betulina*, *Lactarius vellereus*, *Russula rosacea*, *R. fellea*, *R. granulosa*, *Inocybe pyriodora*, *Russula lutea*, *Boletus subtomentosus*, *Gomphidius gracilis*, *Collybia fusipes*, *Hygrophorus miniatus*, *Trametes gibbosa*, *Boletus versipellis*, *Hebeloma crustulioniformis*, *Lactarius quietus*, *Boletus edulis* (edible), *Fistulina hepatica* (edible), *Lycoperdon gemmatum*, *Scleroderma vulgare*, *Fomes* (immature), *Stereum spadiceum*, *Fomes annosus*, *Phallus impudicus*, *Gomphidius gracilis* (scarce).

Lakes and their Scientific Investigation.

By D. J. SCOURFIELD, F.R.M.S. *Read May 8th, 1902.*

It has been announced that we are this year (1902), for the first time in the history of science in this country, to see the commencement of a comprehensive survey of the lakes of the British Isles. Mr. Laurence Pullar, in memory of his son, the late Mr. Fred P. Pullar, has generously placed a sum of money at the disposal of trustees for the prosecution of the survey, and Sir John Murray, well known for his work in connection with the "Challenger" expedition, has undertaken to direct the investigation.

Hitherto comparatively little has been done, and that only spasmodically, towards elucidating the various scientific problems presented by our lakes. Even the preliminary work of sounding and preparing bathymetrical charts of our lakes is not undertaken by the Ordnance Survey; and if it had not been for surveys of two or three Scotch lochs made by the Admiralty, and the work of Mr. Grant Wilson in Perthshire, Dr. H. R. Mill in the Lake District, Sir John Murray and Mr. F. P. Pullar in the Forth and Tay basins, and a few other private investigators, we should not possess any clear idea of the depths and other physical peculiarities of any of our lakes. As regards the biological side of the subject, absolutely nothing of a systematic nature has been done. A large number of lakes have indeed been examined by various specialists for particular groups of organisms, but there has been no attempt at co-ordinated study of the biological problems of lakes.

This is the more strange when we consider how much attention has been given on the Continent and in the United States to the subject of limnology, or lake-study, in its various aspects. The greatest amount of work on lakes has probably been carried out in Switzerland, due in great measure to the initiative and influence of Professor F. A. Forel, of Lausanne University. But Germany is not far behind in this matter, as is shown by the publications of the Boden See (Lake Constance) Commission, of Apstein, Zacharias, and many others. Austria, Italy, Russia, France, and Norway have also produced able limnological investigators, and on the other side of the Atlantic the names of Forbes, Birge, Reighard, Marsh, Ward, Eigenmann, and others are well known in connection with the scientific examination of the great inland fresh-water seas and smaller pieces of water of North America.

But, it may be asked, why should we want to bother about lakes at all? What are the problems upon which it is expected to throw

light by a systematic survey of lakes? Well, apart from the desirability of having the contours of the lake-basins determined for the purpose of completing our maps and thus showing the exact configuration of the earth's surface at the present day, there is the geological interest attaching to the much-disputed origin of lake-basins; also the increasing interest in the question of water-supply from lakes for our great cities, and the important question of the development of our inland fisheries. These and many lesser problems can only be properly attacked when we have at our command a much more extensive knowledge of a large number of individual lakes than we at present possess. From the strictly biological point of view, moreover, there is one great fact which seems to justify any amount of work and trouble, and that is that a lake is probably the most complete and self-contained "unit of environment," as it has been aptly called by Eigenmann, that occurs anywhere in nature. It is, of course, true that some so-called lakes are not at all well-defined pieces of water, but in the vast majority of cases lakes are almost isolated "units," with well-marked boundaries, and offering comparatively simple conditions of existence. It follows from this that each lake is a microcosm in itself, and, as it is usually of limited extent, it may be studied as a whole with some hope of success. Owing, however, to the infinite variety in the position, age, geological structure, shape, etc., of the lake-basins, and also in the amount and quality of the water and other factors, it also follows that each lake has a distinct individuality of its own. Lakes, in fact, occupy the same position with regard to the waters of the globe that islands do with regard to the land, and their careful study promises even better results than have been obtained in the case of islands, which is saying a good deal. Altogether it seems probable that it will be in a lake, if anywhere, that it will be possible to successfully investigate, under natural conditions, many of the larger biological puzzles, such as the exact influence of the environment, the inheritance or otherwise of acquired characters, the laws of variation, etc.

Before going on to consider the methods of limnological research a few words may be devoted to a consideration of the question as to what constitutes a lake. In ordinary speech the term "lake" is used very loosely, but there is always an underlying idea that a lake should be a piece of water of considerable area, although it is obviously very difficult to draw a hard and fast line between lakes on the one hand and large ponds, meres, broads, and tarns on the other. Depth is not, as a rule, taken into account, but, from the scientific point of view, this is even more important than area, and students of the subject now usually consider that for a piece of water to be properly called a lake it should not only have an area of, at least, some considerable fraction of a square mile (say, a quarter or fifth), but that it should have a depth, over a good part of this area, *exceeding* the lowest limit of growth of the Characeæ and aquatic mosses. This depth necessarily varies somewhat in different

lakes and in different districts, but may be taken to be at least forty to fifty feet. It appears from this that we here in the south-eastern section of England have no lakes in the modern scientific sense ; it is indeed necessary to go to the Lake District, to North Wales, to Scotland and Ireland to get real lakes with a characteristic lake fauna and flora.

Coming now to the actual work of surveying lakes, we can consider the subject under two distinct heads, according to whether the investigations are of a physical or a biological character. From the physical side the first thing to be done is obviously to get a clear idea of the shape of the lake-basin. This must, of course, be obtained by sounding, and the method generally adopted for this purpose, where approximately accurate results only are required, is to make a series of traverses of the lake in a rowing boat, the depths being recorded after each twenty or other definite number of strokes. For comparatively shallow lakes a heavy plummet attached to a thin cord, marked in feet or yards, is often sufficient to secure fairly accurate readings of the depth, but it is better to use a special sounding machine by means of which the depth is registered automatically as the cord or wire runs out. For deep lakes some such apparatus is absolutely essential. From the results obtained by sounding the contour lines of the lake-basin may be put in on a map just as in the case of the ordinary land surface. In connection with the sounding it should be mentioned that every time a depth is taken a sample of the bottom mud may be brought up, and in this way a considerable amount of light may be thrown on the deposits being formed in the lake, and indirectly on many other matters.

Continuing the physical investigations, attention must now be given to the water contained in the lake-basin. This is by no means such a simple matter as might be imagined, for it is necessary to make a large number of observations, extending over at least a year, upon the chemical composition, temperature, movement, colour, transparency, etc., of the water before a definite conception of its peculiar character in any one lake can be ascertained. It is not proposed to consider any of these questions in detail, but a few remarks on temperature and movement may be interesting. In very deep lakes the water near the bottom remains all the year round at a temperature very close to that of the maximum density of water—namely, 4°C . In summer the temperature falls as we go down, but in winter, when the surface water is near the freezing point, the temperature naturally rises from 0° to 4°C . The stratification in summer, however, is not uniform. In most lakes that have been examined from this point of view it has been found that there is a rather thick upper layer of water exhibiting very little difference of temperature from top to bottom—possibly only 1° or 2° . Immediately under this there is a thinner layer in which a very considerable fall takes place— 10° or more, perhaps,—after which the temperature decreases slowly and pretty uniformly to the bottom.

The layer in which the sudden change occurs is known as the "Sprungschicht" or "thermocline." Its position varies, getting deeper and deeper as the summer advances, until it is obliterated by the complete turn-over of the water in late autumn. Professor Birge has shown that the presence of the "Sprungschicht" in a lake may be of extreme importance to the organisms living therein, and that it is therefore necessary for the biologist to pay special attention to this matter.

Concerning the movements of the water of a lake, there are, in addition to the slow circulation due to temperature just described, various currents and oscillations of level brought about by the action of the wind and other causes, including, perhaps, sudden variations in atmospheric pressure. To the latter cause must almost certainly be ascribed the very peculiar periodic alterations of level known as "seiches," which represent a rhythmic swinging of the whole mass of the water. They may vary from movements of a yard or more to scarcely perceptible differences of level, but in all cases they occur in series with a gradually diminishing amplitude. The time of swing may vary from a few minutes to an hour or more.*

The biological investigation of lakes now remains to be considered, but the subject is so large that it will be quite impossible to deal with it adequately in this paper. A typical lake may, from a biological standpoint, be divided into three regions, each characterised by peculiar conditions of existence and the occurrence of special animals and plants. These regions are—(1) the littoral, (2) the abyssal, and (3) the pelagic, and they necessarily require different methods for their examination.

In the littoral region of lakes the conditions of existence are rather severe, owing to the action of the waves, the great and sudden variations in temperature, light, etc. The fauna and flora are not usually very rich, unless there happen to be small sheltered bays and shallow creeks here and there round the lake. The littoral plants, when present, are arranged in more or less definite zones corresponding with the gradually increasing depth of water as we proceed from the strand out on to the top, and down the face of the "lake-terrace." Thus we get first the zone of *Phragmites*, *Scirpus*, etc. ; then the water-lily zone ; then the *Potamogeton* zone, with such species as *P. crispus* and *P. lucens* ; then the zone of *Chara*, *Nitella*, and *Fontinalis* ; and lastly a zone consisting only of ground algæ, such as *Cladophora* and *Rhizoclonium*. This marks the lowest point at which green plants can thrive, and probably coincides with the limit of the penetration of light in an appreciably active form. The fauna of the littoral, considered in its entirety, is very varied, but the species are mostly similar to those of ponds and other shallower waters. For collection purposes a net fastened to a stick and

* One of the results of the Lake Survey under Sir John Murray has been the demonstration of the occurrence of a seiche in one of the Scotch lochs (see "Nature" for 12th June, 1902, p. 162).

worked by hand from the shore, and a net attached to a line for throwing out to greater distances than can be reached by hand, are usually sufficient for this region.

The abyssal region of a great lake is a complete contrast to that of the littoral, for it offers the most wearisome uniformity of conditions that it is possible to imagine. The temperature is nearly uniform, or at any rate never subject to sudden fluctuations; there are no violent movements of the water; there is practically perpetual darkness, and there is a blanket of fine mud everywhere and over everything. There are no living plants except bacteria, but animal life is fairly well represented, and may sometimes be abundant. The most remarkable forms are perhaps blind species of *Asellus*, *Gammarus*, etc.; Limnæas, which fill their air-sacs with water; and larvæ of winged insects, which seem to only reach the pupa stage and then become sexually mature. To collect from this region it is necessary, of course, to use various kinds of dredges and sampling tubes worked by means of long lines from a boat.

It is in the pelagic region, however, that the most characteristic features of lake-life are to be found. Here the conditions, though not nearly so uniform as at the bottom, are much less liable to sudden variations than in the littoral region, while there is a complete absence of all solid objects to which organisms can attach themselves or in which they can find hiding-places from their enemies. It follows from this that all genuine pelagic organisms have to be provided with physical or mechanical means of maintaining themselves permanently suspended in the water, and that the only possible chance they have of rendering themselves inconspicuous, either for the purpose of avoiding their enemies or for approaching their prey unobserved, is to become as transparent as possible. As a matter of fact, we do find that the majority of pelagic organisms either possess powerful swimming organs, or surround themselves with jelly, or develop various outgrowths in order to increase their area as compared with their bulk, and also that they are usually extremely transparent. With the exception of the fishes, all the organisms found in the pelagic region—and they belong to many groups: Algæ, Rhizopods, Infusoria, Rotifers, Entomostraca, etc.—are small and practically at the mercy of any currents in the water. They have on this account been grouped under the collective name of “plankton,” and it is with the study of these creatures that the most recent advances in the domain of limnology have been made. By the use of specially constructed nets, and even pumps, it has been found possible to collect the life contained in a vertical column of water of known depth and area, and from the captures thus made to estimate, by means of counting small samples under the microscope, the probable number of each constituent of the plankton. Researches of this kind carried on for a year or more have already given us a very large amount of information on the remarkable changes in the abundance, vertical distribution, diurnal

movements, seasonal variation of form, inter-relationships, etc., of limnetic organisms, about which we previously knew practically nothing. There seems every reason to hope that similar work carried on with still greater care and for longer periods will help very materially in solving many important biological problems which are at present obscure. The work, however, is tedious, and requires for its proper execution a small staff of specialists working together for at least two or three years at a permanent station by the side of a lake. Such a station, devoted to fresh-water biological research, will no doubt be started some day in this country—probably when it is too late to do more than fill in the details of the broad principles of fresh-water biology now being elucidated by many eminent workers on the Continent and in America.

The following books and papers will be found useful to any who may be tempted to look into the subject of the scientific investigation of lakes :—

APSTEIN, C.—‘Das Süßwasserplankton,’ 1896.

BIRGE, E. A.—“Plankton Studies on Lake Mendota,” ‘Trans. Wisconsin Academy of Sciences,’ etc., vol. x, 1895, and vol. xi, 1897.

FOREL, F. A.—“Le Léman,” ‘Monographie Limnologique,’ vol. i, 1892 ; vol. ii, 1895 ; vol. iii, Part I, 1902.

FOREL, F. A.—“Handbuch der Seenkunde,”—“Allgemeine Limnologie,” 1901. (The most generally useful work in a small compass on the whole subject.)

MILL, H. R.—“The English Lakes,” 1895. (Reprint of a paper “On the Bathymetrical Survey of the English Lakes,” from the ‘Geographical Journal’ for July and August, 1895.)

MURRAY, SIR J., and PULLAR, F. P.—“A Bathymetrical Survey of the Fresh-water Lochs of Scotland,” ‘Geographical Journal,’ April, 1900, and March, 1901.

WARD, H. B.—“Fresh-water Investigations during the Last Five Years.” (‘Studies from the Zoological Laboratory of the University of Nebraska,’ No. 31, June, 1899.)

WEISMANN, A.—‘Das Thierleben im Bodensee,’ 1877.

ZACHARIAS, O.—‘Forschungsberichte aus der Biologischen Station zu Plön,’ 1893 onwards.

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

Read January 22nd, 1903,

By FREDERICK NOAD CLARK.

GENTLEMEN,—You have just heard from the Council's Report that the affairs of the Society are in a flourishing condition both numerically and financially. The Society has now entered upon its thirty-second year of existence, and probably at no other period in its history has the average attendance of members at its meetings been so well maintained. The number of newly elected members also is a matter for satisfaction. It is particularly gratifying to us to find among the ranks of our younger members several who are doing good work in one or other of the Orders to which they have directed their special attention, and it is in this connection that we have evidence of the vitality and usefulness of a Society such as ours. It was a matter for general regret that owing to a serious accident my predecessor in the Chair, Mr. Fremlin, was absent from our meetings during a considerable portion of his year of office, and, as a consequence, was unable to deliver the usual annual address. I am happy to find that he has now quite recovered, and is with us once more.

It is my sad duty to record the loss by death of two old and valued members—Major A. Ficklin and Mr. Mark Winkley.

Major Ficklin's death took place on February 4th, some-

what suddenly, after but a few days' illness. The late Major was one of our oldest members, having joined the Society in 1872, and was President in 1880. He was essentially a practical entomologist, and, in the earlier days of his membership, had taken a prominent share in the work of the Society. It will be remembered that a form of *Dianthea luteago* (var. *Ficklini*) bears his name, he having taken it during his painting rambles in Cornwall—for the Major was an artist of no mean attainments. In addition to his many occupations he was an expert angler, and as a *raconteur* had few equals. His genial presence and good fellowship at our field meetings will be sadly missed.

Mr. Mark Winkley died suddenly on June 25th at his residence, after only a few hours' illness. He joined the Society in 1888, and was an all-round naturalist. He was largely instrumental in forming the Streatham Entomological Club, and it was to him that I owed my introduction to our own Society. He was a staunch advocate for the more general exhibition at our meetings of natural history specimens other than the Lepidoptera, although the latter claimed most of his attention. Like the late Major Ficklin, Mr. Winkley was a gentleman of great affability and genial good-humour. He leaves a widow and son to mourn his loss.

Before I proceed to review the work of the Society for the past year, I think it necessary to refer to the annually recurring and difficult question of the cost of publication of the Society's "Proceedings." Perhaps I cannot do better than follow the example of my predecessors in office, and bequeath the solution of this problem to my successors, in the hope that the remarks and suggestions which follow may bear fruit. As a suggestion submitted with all deference to the views of our clear-sighted and worthy Treasurer, I may be allowed to express the opinion that at least a partial solution of the difficulty might be found in an increased annual subscription to, say, 10s. 6d. This course, I have good reason to think, would meet with the approval of many of the older members. The abolition of the country member's minimum subscription is another phase of the question which might be considered, although such a drastic change as the latter would require very careful deliberation. The advantages of membership of a Society such as ours are obvious, and are certainly cheaply purchased at the present rate of subscription, to say nothing of the increasing value and interest of the "Proceedings" themselves. Non-publication of these would, I feel sure, be a source of weakness and a

drawback to the usefulness of our Society. The cost of publication has been met hitherto by issuing a subscription sheet appealing to the generosity of members, but in the opinion of many it is to be regretted that such a course is found necessary. As a source of income it has been suggested by some that the holding of an annual exhibition might benefit us. This, in my opinion, and judging from past experience, might prove a costly experiment. I trust, therefore, that these few remarks may be the means of directing the attention of members to this matter, which has been for some time past a source of anxiety to the Council in general and to the Treasurer in particular.

The work of the Society during the past year has been quite up to the standard of previous years, both in the number and excellence of the papers read and the exhibits generally. A contribution of much interest, by Dr. Chapman, on "Inflation in Insects," must be singled out as being, without doubt, of very great value, representing, as it does, an enormous amount of time and research in its preparation. The Society is also much indebted to Messrs. Lucas and Step for their admirable lantern demonstrations: to the former for so graphically illustrating our various reports of field meetings, and many interesting details of the captures effected; to the latter for giving us such botanical treats, the material for which was, in many cases, collected during our Saturday rambles. What the brothers Kearton have done in ornithology Mr. Step has and is still doing in the wider domain of botany. The lantern has thus been brought into requisition to the greatest interest and instruction of members generally. Nor must I omit to mention the acquisition to the Society, and to the lanternist in particular, of the generous gift of a new portable screen presented by Mr. Harrison. Mr. Stanley Edwards, with his proverbial kindness, continues to provide the necessary oxygen gas.

The exhibits at the Society's meetings have been of an unusually interesting nature. Those of Messrs. Kemp and Kirkaldy on the Coleoptera and Hemiptera have been particularly welcome, as have also the interesting exhibits and papers on the Mollusca by Mr. Manger. Mr. South's exhibit of *Liphyra brassolis*, an Australian lycænid whose larva is supposed to feed on ants, struck me as being a subject worthy of note. The attendance on the occasion of the "Varieties" exhibition was a record one, over eighty members and friends being present.

Field meetings have become an important factor in the

success of the Society, and were especially a feature of the past year. On these occasions the restraint of a formal meeting is put aside, and nervousness or hesitation to ask a question or offer an opinion disappears at an informal gathering such as a field meeting. They were nine in number, the average attendance of members and their friends having been eighteen per meeting. The organisers and leaders worked well, both in the selection of routes and—what is perhaps of not less importance—the arrangements for catering. The precedent established by Mr. R. Adkin in providing a route map for the day's excursion is one well deserving of imitation.

A field meeting is always looked forward to by the naturalist as a day of enjoyment such as few but lovers of nature ever experience. The comparing of notes with others of kindred tastes, and the profit derived from the ideas and observations of his elders, cannot fail to be of great value to the younger naturalist. In this connection one realises what an inestimable boon it is to the naturalist, who in later life takes up any particular branch in the study of natural history, to have had the advantage of an early life spent in the country.

The study of botany is an excellent training for entomologists.

Field botany and botanical exhibits at the meetings have been prominent features in the work of the Society during the past year, thanks to the fostering help of that veteran botanist, Mr. E. Step, and these have in a great measure made up for the paucity of insect captures at our various excursions. In the experience of an old collector, 1902 was the worst collecting year for over twenty years,—due, no doubt, to the coldness and lateness of the seasons, in consequence of which many species have deferred emergence until the present year, when it is anticipated that, given a good spring, many species will be abundant that were scarce last year.

In conformity with the custom which has obtained with my predecessors I will enumerate the additions to the British fauna during the past year.

LEPIDOPTERA.—One species new to the British list:

Coleophora milvipennis (Zeller), reared by Mr. W. C. Boyd from cases on leaves of blackthorn taken near Danbury, Essex, and recorded by Mr. C. G. Barrett, F.E.S. ("E. M. M.," 1902, p. 79).

COLEOPTERA.—Five new species and one genus are recorded:

Læmostenus complanatus (Dej.), taken by Mr. Stanley Kemp, F.E.S., near Dublin ("E. M. M.," 1902, p. 216).

Diastictus vulneratus (Sturm.), taken by Mr. Claude Morley in Suffolk, recorded by Mr. E. A. Newbery ("E. M. M.," 1902, p. 253).

Bembidium argenteolum (Ahr.); *Xantholinus cribripennis* (Fauvel); *Stenus argentellus* (Thoms.); by the Rev. W. F. Johnson and Mr. J. N. Halbert ("Entom. Record," vol. xiv, p. 223).

Gynandrophthalma affinis (Hellw.), a genus and species new to Britain, taken by Mr. W. Holland at Wychwood, near Witney, Oxon., on June 18th, 1899, recorded by the Rev. Canon Fowler ("E. M. M.," 1902, p. 281).

DIPTERA.—Ten species:

Ceratophyllus garei, a new pulex taken near Tring, in July, from the nest of the water-hen. So named in honour of Mr. G. Gare, of Bridgwater, who is an authority on fleas parasitic on birds. Described by the Hon. N. Rothschild ("E. M. M.," 1902, p. 225).

Ceratophyllus walkeri, a new pulex captured by Mr. J. J. Walker in a deserted mouse nest in March, 1898, at Chattenden, Kent. Described by the Hon. N. Rothschild ("E. M. M.," 1902, p. 225).

Meriania argentifera (Meigen), a new Tachinid taken by Mr. W. J. Lucas in the New Forest, beautifully figured by him, and recorded by Mr. C. J. Wainwright, F.E.S. ("Entomologist," 1902, p. 249).

Ceromasia wulpïi (B. & B.), recorded by Mr. C. J. Wainwright, F.E.S. ("E. M. M.," 1902, p. 227).

Theriopteles luridus (Fallén.), taken by Col. Yerbury at Nethy Bridge. *Hyalurgus lucidus* (Mg.), taken by Dr. J. H. Wood. Both recorded by Mr. G. H. Verrall, F.E.S. ("E. M. M.," 1902, p. 110).

Borborus notabilis, *Sphærocera eximia*, *Limosina halidayi*, *Limosina mirabilis*. Four new species of the family Borboridæ, described by Mr. J. E. Collin, F.E.S. ("E. M. M.," 1902, p. 55).

HYMENOPTERA.—Four species:

Probolus concinnus (Wesm.), an ichneumon taken by Col. Yerbury from the south-west of Ireland, recorded by Mr. Claude Morley ("E. M. M.," 1902, p. 54).

Microgaster suffolciensis, a species new to science, the type of which emerged from among larvæ of *Nothris verbascella* at

Bury St. Edmunds, described by Mr. Claude Morley, F.E.S. ("E. M. M.," 1902, p. 4).

Odynerus bifasciatus (Linn.), a wasp new to the British list, recorded by Mr. Ed. Saunders, F.L.S. ("E. M. M.," 1902, p. 106).

Nyxeophilus corsicus (Marsh), an ichneumon taken in the New Forest by Miss Chawner and Mr. F. C. Adams, and recorded by Mr. Claude Morley, F.E.S. ("E. M. M.," 1902, p. 173).

HEMIPTERA.—Three species :

Stictocoris flaveola (Bohm), an additional species of British Cicadina taken by Mr. W. West, in September, amongst long grass at Blackheath; described by Mr. Jas. Edwards, F.E.S. ("E. M. M.," 1902, p. 5).

Pseudophlaeus waltlii (H. S.), a coreid bug captured by Mr. H. J. Thouless at West Walton, Norfolk ("E. M. M.," 1902, p. 80).

Limotettix stactogala (Amyot), a new cicadine captured by Mr. Guernonprez at Pagham Harbour, Sussex, feeding on *Tamarix*; sent by Mr. E. A. Butler to Mr. Jas. Edwards, F.E.S., who recorded it in "E. M. M.," 1902, p. 17.

ORTHOPTERA.—Two new species of Blattidæ are additions to the British list, but may be regarded as accidental :

Stylopyga decorata (Brunner), recorded by Mr. E. Shaw ("Entom. Record," vol. xiv, p. 295).

Panchlora exoleta (Klug), recorded by Mr. W. L. Distant ("E. M. M.," 1902, p. 247).

NEUROPTERA.—A provisional list of five species is given by Mr. Kenneth Morton, F.E.S. :

Leuctra albida (Kempny), *L. handlirschi* (Kempny), *L. hippopus* (Kempny), *L. klapálecki* (Kempny), *L. nigra* (oliv. ?) (Kempny) ("E. M. M.," 1902, p. 255).

A tick new to Britain, captured by Mr. W. Hewett, of York, was brought under my notice and identified by Prof. Neumann, of Toulouse, as the male of *Ixodes putus* (Cambridge), who placed it under a new genus, viz. *Ceratixodes*, and described it in the "Archives de Parasitologie," 1902, p. 115. It is especially interesting as being a rare instance of sexual dimorphism. Found parasitic on the guillemot.

Selecting a few of the more important works on natural history published during the past year, I will mention the following as being of especial interest.

"Natural History of the British Lepidoptera," Vol. III, by J. W. Tutt, F.E.S., partakes of the exhaustive character of the preceding volumes, and, like them, gives the same

amount of detail concerning each species. A thick octavo volume of upwards of 550 pages deals only with thirteen species, the remainder of the Lachneides and Sphingides. This statement conveys but a faint indication of the immense amount of information brought together within the covers of this volume.

"Practical Hints for the Field Naturalist," Part II, by the same author, is a valuable work for collectors.

"The Lepidoptera of the British Islands," Part XCIV, completing Vol. VIII, by C. G. Barrett, F.E.S., is now nearing the end of the Geometers. Steady progress is being made with this work.

Monograph of "The Land and Fresh-water Mollusca of the British Isles," Part VIII, commencing Vol. II, by J. W. Taylor. Students of the Mollusca will welcome this issue after a long interval of two years since the previous part.

"Cambridge Natural History," Vol. X, dealing with the Mammalia, by F. E. Beddard, etc.

Monograph of "The Coccidæ of the British Isles," by Robert Newstead, F.E.S., Vol. I, 1901. Published by the Ray Society.

"British Tyroglyphidæ," by A. D. Michael. A companion volume to his "Oribatidæ," and deals with the Acari, of which the "cheese-mites" are the type. It contains nineteen coloured plates of excellent quality. Published by the Ray Society.

"Butterflies and Moths of Europe," by W. F. Kirby, F.L.S., with fifty-four coloured plates. A revised and extended edition of his popular work.

History of Surrey "Insecta." The first volume of the "Victoria History of the Counties of England." Edited by Herbert Goss, F.L.S. A comprehensive and up-to-date list of over 100 pages devoted to the Insecta.

"List of British Diptera," second edition, by G. H. Verrall, F.E.S.

"List of the Beetles of Ireland," by W. F. Johnson and J. N. Halbert; "Proceedings of the Royal Irish Academy," 1902.

"Index Zoologicus." An alphabetical list of Genera and Sub-genera proposed for use in Zoology, as recorded in the "Zoological Record," 1880—1900, together with other names not included in Scudder's "Nomenclator Zoologicus." Compiled for the Zoological Society by C. O. Waterhouse, and edited by David Sharp, F.R.S.

"Insect Life: Souvenirs of a Naturalist," by J. H. Fabre.

Translated from the French. Preface by Dr. Sharp ; edited by Mr. Merrifield. A charming book, dealing chiefly with the Coleoptera and Hymenoptera, and is an ideal work for field naturalists. M. Fabre was elected an Honorary Fellow of the Entomological Society last year.

"Photography for Naturalists," by Douglas English. Deals chiefly with zoology. Entomology is all too briefly noticed. Beautifully illustrated with photographs from nature.

"Natural History of Selborne," an illustrated edition by the Brothers Kearton. Contains 123 original photographic reproductions in the well-known inimitable style of the authors. With notes by R. Kearton, F.Z.S.

"The Naturalist on the Thames," by C. J. Cornish.

"Birds in the Garden," by Granville Sharp.

"Wild Fruits of the Country-side," by F. E. Hulme.

One has to regret the suspension for a time of our old friend "Science Gossip." I am, however, pleased to hear that it will shortly reappear.

A new magazine, "The Field Naturalist's Quarterly," commenced its career in May, 1902.

The various monthly magazines have done much to popularise natural history in its several branches by means of papers written by well-known authors and illustrated with photographic reproductions. The technical excellence of some of the latter may not perhaps meet with the approval of the expert, but they at any rate tend to foster an interest in natural history.

Mention must be made of the important contribution by Professor Poulton and Mr. G. A. K. Marshall on "warning coloration and mimicry" recorded in the "Transactions of the Entomological Society," entitled "The Bionomics of South African Insects." A vast number of observations, entailing much labour and extending over a long period, on the palatability or distastefulness of various insects with warning colours are recorded, and the results appear to show that "warning colour" is frequently of protective value, although not necessarily so. Mr. Marshall's observations and experiments on South African Lepidoptera prove without doubt that butterflies are often injured by birds, and thus disprove the theory that they are not liable to such attacks. The portion devoted to "seasonal dimorphism" is also of especial interest and value. Beautiful photographic reproductions illustrate the work.

As evidence of the increasing interest shown by the public,

and especially by the educational authorities, on matters relating to the study of natural history, I will instance the "Nature Study" Exhibition, held under the auspices of the Nature Study Exhibition Association, at the Royal Botanic Gardens, Regent's Park, in July and August last year. An excellent review of the work and objects of the Association is given by Mr. W. Mark Webb, F.L.S., in the "Record of Technical and Secondary Education." A series of conferences was held, and addresses given by the Duke of Devonshire, Lord Avebury, Lord Strathcona, Professors Geddes, Lloyd Morgan, and Miall, Sir G. Kekewich, Mr. H. Hobhouse, M.P., and others. The movement may be regarded as the outcome of the work of the Agricultural Education Committee, which resulted in the Government's recommendation that "nature knowledge" should be introduced into the schools under its control. The adoption by the Science and Art Department of Professor Miall's syllabus for teaching elementary biology in part contributed to this result.

Opinions were expressed at the conferences that the great value of "nature study" would lie in the direction of developing the faculty of observation in the young; that it should be regarded more as a means of education than as a subject for study, specialisation in the collection of natural history objects not being advocated. The following remark of Sir G. Kekewich at the conference was much to the point:—"The study of nature is the essence of all true education, and it is somewhat remarkable, and not perhaps creditable to our common sense, that we should have failed to fully realise it until the twentieth century."

Again, Professor Lloyd Morgan says that "nature study must be represented as not only the stepping-stone to science, but as a means of literary and artistic culture."

In treating of the scope of the work of the Association Mr. Webb referred to the possible difficulties of the scheme as to the question of obtaining teachers, the cost of field excursions to the scholars, the time occupied in the subject, and lastly, the danger of extermination of our fauna and flora by indiscriminate collecting. He does not, however, regard the objections as serious. As aids to "nature study" the following are advocated:—the making of nature diaries and notes, collecting, school excursions, and the formation of natural history societies and museums. In this direction it will be noted that good work has been done by Mr. W. J.

Lucas in connection with an excellent school natural history society at Kingston-on-Thames.

The exhibition was a very great success, and bids fair to have far-reaching effects. The official report of the Nature Study Exhibition Association is looked forward to with interest.

And now, gentlemen, you will probably expect me to say a few words with reference to my favourite study—photography and the microscope; and, bearing in mind the number of members who are successfully taking up this work and applying it to the study of natural history, a few remarks thereon may not be out of place. In an annual address I shall not of course attempt to give instructions as to the working of this or that process, etc., but rather to indicate where the advantages of photography lie in its many applications to the study of entomology and natural history generally. Considering the large number of field naturalists, comparatively little has been done so far in permanently recording by means of the camera the many original and valuable observations which are continually being made. To the entomologist photography should be of very great use, whether for portraying the insect in its different stages of growth and metamorphosis, or in combination with the microscope in the study of the more minute details of structure. The larva in its natural position on the food-plant, and cases of protective resemblance, aberrations, localities, etc., should be photographically recorded. It is not of course always possible to photograph an insect, for example, in its natural habitat, but the practice of “posing” dead specimens, or placing live ones in unnatural positions, sometimes resorted to, is one that should be discountenanced.

The old reproach of want of portability of apparatus, the necessity for highly skilful manipulation and experience, and lastly, cost, can no longer hold good now that most efficient, portable, and inexpensive apparatus can be procured by every field naturalist who desires to take up the practice of photography. I am pleased, therefore, to find the number of photographers in our ranks is increasing, and much excellent work is being done. Messrs. Step, Lucas, and others have on several occasions at our field meetings brought their cameras into use, and shown us their results on the screen by means of the lantern. The interest and value of such demonstrations cannot be too highly estimated.

It is perhaps to the botanist that photography appeals, if possible, even more than to the entomologist. What more beautiful results from an artistic, and useful from a scientific point of view, can be imagined than a really good collection of well-executed photographs showing our wild flowers in their natural surroundings? I remember at the Royal Photographic Society's exhibition having seen groups and collections of flowers, such as I venture to say for truthful and artistic rendering could not be surpassed, and the effect produced when exhibited on the screen was most admirable. There is one department in the study of botany which is worthy of more attention than has hitherto been accorded it, and that is the photography of the commoner British trees. There is room for much useful work in this direction in representing these at their flowering and fruiting stages, especially these latter in detail.

It is unnecessary for me to further enlarge upon the advantages of photography in the other branches of natural science which more immediately concern us, such as in geology and zoology generally; its good services to these sciences are sufficiently obvious.

The introduction of ortho- or isochromatic plates some few years ago was a discovery of great value to the naturalist photographer amongst others. They have placed in his hands the power of rendering colours in their proper order of gradation in monochrome, or in other words, representing colour as truthfully as is possible in black and white. It is a matter of common knowledge that prior to their introduction the blues were represented as more or less white, whilst the yellows and reds were distinctly darker in shade than is seen in nature. In some special cases where the desired result is more difficult of attainment, or when some unusual difficulty crops up, the use of a colour screen between the sensitive plate and the object may be necessary, but, generally speaking, such cases are not of frequent occurrence. The employment of isochromatic plates has now become so general, and their advantages over the ordinary or uncorrected plate so universally recognised, that there is no doubt whatever in my mind that in every subject and in all kinds of photographic work their use is not only beneficial, but in many cases indispensable. It must be borne in mind, too, that the conditions attending their use are identical with those of ordinary plates, with the single exception of the necessity for greater care in the dark room as to the exclusion of yellow or bright red rays of light.

To the landscape photographer as well as to the botanist their employment is indicated as a means for a better interpretation of the green colours of the foliage, etc. To the entomologist I would say, take a specimen of *Pyrameis atalanta* and photograph it first with an ordinary and then with an isochromatic plate. The result should be convincing.

The subject of colour photography is one that is attracting so much attention just now that I may be pardoned for briefly referring to the question. From time to time one sees reports in the lay papers of the alleged discovery of colour photography ; needless to say, these are more or less premature, although one cannot deny that several important steps have been taken in this direction during the past few years, and a vast amount of research work is still being conducted by some of our best authorities on these matters. Some excellent results have been achieved by Mr. Ives and exhibited in his "Kromscope," and, as transparencies, probably leave little to be desired. But when photographic reproductions in colour on paper or other opaque material are anticipated it is quite another question. The results of Mr. Sanger Shepherd's experiments, recently demonstrated at the Camera Club, are interesting from a scientific point of view, but it is doubtful whether they can be regarded as being very much in advance of the achievements of his contemporaries. The naturalist, in common with workers in other branches of science, would, of course, welcome any discovery in this direction.

I do not propose, in the short time at my disposal, to give even a general outline as to the importance of the microscope itself in the study of biology ; I will rather confine my remarks to demonstrating its utility to the naturalist, and more particularly to the specialist, when combined with photography, as a means of obtaining an accurate record of their microscopical investigations,—not only so, but also as an important aid in illustrating works on natural history subjects. Discussion has arisen on various occasions as to the relative merits of photomicrography and diagrammatic or drawn representations of natural history subjects. Whilst I will not attempt to deny that the former has its limitations, any prejudice shown has been probably either the result of ignorance as to the possibilities obtainable by modern methods, or from attempting to photograph all but impossible subjects. Unskilfully prepared objects have much to answer for in this respect. It is a

well-known fact that many text-books on animal and vegetable histology are illustrated by diagrams depicting details of structure which it is safe to say could only be recognised in the original tissue by the expert. On the other hand, great though the advantages of photography over drawing may be, in that the "personal element" is practically eliminated, yet there is no doubt that in many cases a carefully prepared drawing is preferable for educational purposes. The science of bacteriology owes much to photomicrography, for here the latter more than holds its own.

To produce really good work the microscopist must be an expert photographer. There are many who, although quite familiar with the modern microscope and its manipulation, fail when attempting photomicrography, solely by reason of a want of practical experience in the purely photographic portion of the work.

Another important factor which will largely contribute to success in the practice of this work is the necessity for suitably preparing the specimen for photography. No lens or method yet discovered will enable the operator to photograph a dense chitinous insect section, and at the same time to reproduce the finer details of structure. The same remark will apply to the case of a badly stained preparation. Whilst on the subject of the preparation of microscopical specimens for photography, I might incidentally mention that some method for preserving insects' eggs as permanent specimens is badly needed, as is also some means of displaying the neurulation of wings,—such as, for example, by infiltration or injection of some staining agent.

The careful worker will proceed with and record his observations systematically. In this connection I would draw attention to the value attaching to a series of photographic representations of the life history of any particular insect. There are immense numbers of these whose life history and structure have never been accurately studied, and the entomologist will find abundant material for investigation provided in the important changes undergone by insects during the period of their development. The photographer should be careful to represent allied structures as nearly as possible at the same magnification, and I scarcely need to remind him that his measurements should be taken on the metric system, such terms as "lines" being quite out of date. He should also keep an indexed record of his work, giving every particular as to the conditions under which his results were obtained. I would recommend the naturalist photographer,

when he wishes to obtain the maximum degree of detail and contrast, to print his results on a smooth or glossy-surfaced paper, such being also more desirable from the process-worker's point of view should they be required for purposes of book illustration. As a final exhortation I would strongly urge the beginner to perfect himself in the use of any good and well-known brand of materials and stick to them, and to the formulæ recommended by the makers. Were this course more generally followed there would be fewer cases of failure on the part of those taking up this interesting work.

Gentlemen, in conclusion I have to thank you all for the honour you conferred on me when you elected me as President of this Society. At that time, whilst appreciating the compliment, I was deeply sensible not only of the honour but of the difficulty of following the many eminent entomologists who had lent the lustre of their names to the office. I tender to my colleagues on the Council my very hearty thanks for their kindly advice and co-operation, and to you, gentlemen, for your forbearance with my many shortcomings.

The Society is to be congratulated upon the fact that the Secretaries, Treasurer, Librarian, and Curator have again accepted office.

And now I have but one duty remaining, that is to introduce my successor. Mr. Step is a gentleman who is already well known to you as a naturalist of many parts, and as an author of much ability. He is one of our oldest members, and has always taken the greatest interest in the Society's welfare. In his hands the continued success of the Society is assured.

FREDERICK NOAD CLARK.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 13th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

IT was announced with much regret that Major Ficklin, one of the oldest members of the Society, and a past President, had died since the last meeting. A resolution of deep sympathy had been passed by the Council, and several members, including Messrs. Dobson, Lucas, and Step, spoke in support.

Mr. South exhibited a specimen of *Urania* (*Cydimon*) *leilus*, Linn., and mentioned that, although a common species in the northern portion of South America, the specimen exhibited was interesting because it had been taken in the island of St. Kitts, one of the Leeward Group of the West Indies. The correspondent from whom the specimen had been received stated that, although he had collected insects in the island for many years, this was the first example of the species that he had seen, and he was under the impression that it might turn out to be new to science.

The species of this genus are inhabitants of Tropical America. Some of them abound in parts of that region from Mexico to Brazil; others occur in some of the West Indian islands (notably Cuba and Jamaica); but he did not know of any previous record of a species of *Urania* from the island of St. Christopher.

He added that as *Urania* had been used in botany before Fabricius introduced the name in entomology, some authors, including Guenée and Kirby, refer all the species to *Cydimon*, Dalman.

Mr. McArthur exhibited some specimens of *Eupacilia gilvicomana* taken some forty years ago by Standish near Brighton. The species had not since been obtained in Britain.

Mr. H. Moore exhibited an exceedingly fine specimen of the orthopteron *Sanaa imperialis*, from Sylhet, in N. India.

Dr. Chapman exhibited specimens of *Hypotia corticalis* from the Riviera, a species partaking of the characters of the sub-families *Pyrulina* and *Phycitina*, and for which he had proposed a new sub-family, viz. *Hypotiana* (see "Trans. Ent. Soc. Lond.," p. 49, etc., 1902).

Mr. Adkin exhibited a curious growth of two anastomosed Brazil-nuts.

The Rev. J. F. Perry exhibited a large number of Coleoptera from South Africa (chiefly the Port Elizabeth and Grahams-town district), taken by himself during a short residence there. He states that the British Museum authorities have informed him that the seven species new to the National Collection belong to the genera *Psammodes*, *Pheropsophus*, *Macrophylla*, *Achloa*, *Dichelus*, and *Psilonychus*.

The *Psammodes* have a curious way of calling to each other by knocking repeatedly on the ground with the end of their body.

The larva of *Manticora* was about two inches long. It lived in a burrow, just like that of *Cicindela campestris*. The shape, too, of this larva was precisely similar to that of *C. campestris*.

The custom of the genus *Anthia* of ejecting an acrid fluid at their enemies is well known. One he took at Grahams-town sent this liquid over his forehead, though he held the insect two feet away. The sensation was like being burned with fine, hot ashes, but did not leave ill effects.

Mr. Manger exhibited a very fine collection of shells of the genus *Achatinella*, and read a short paper on them, entitled "A Few Notes on some Land Shells from the Sandwich Islands" (see p. 1).

FEBRUARY 27th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. South exhibited a specimen of *Macaria liturata*, var. *nigrofulvata*, Collins ("Entom.," xxxiv, p. 364). The specimen was sent to him by Mr. J. Arkle, of Chester, who took it in Delamere Forest, July 6th, 1901. Mr. South stated that the form was apparently not known on the Continent.

Mr. Harrison said that the Delamere Forest form was usually much darker than that of the southern woods, but he had not met with one quite so dark as the specimen exhibited.

Mr. McArthur exhibited a specimen of *Agrotis segetum*, having a narrow, very dark marginal band on each of the hind wings. The white ground colour and the light fringe made the band very conspicuous. It was captured on the South Downs, near Brighton, in June, 1901.

Mr. Edwards exhibited a very large and unusually perfect nest of *Vespa vulgaris*. It was obtained near Rochester in a hollow tree during the past season.

Dr. Chapman exhibited imagines of *Crinopteryx familiella*, de Peyer, bred last summer; and living larvæ bred out of doors at Reigate from eggs laid by some of the moths. The larvæ, he remarked, are at first miners, but after cutting out their cases they live precisely like *Coleophoræ*, instead of grubbing about on the ground, as nearly all the other lower Adelidæ (*Incurvaria*, etc.) do. He also stated that there was neither in the neurulation, nor in any other item of structure or habit, anything he could find to confirm Spuler's opinion that it was intermediate between the Palæo- and Neo-Lepidoptera. The position was rather above but not near to *Incurvaria*, one of the lowest genera of Adelidæ (*Tinca aculeata*, Spuler).

Mr. R. Adkin exhibited a long series of *Acidalia marginipunctata* (*promutata*), the result of several broods, and read a paper entitled "A Life-cycle of *Acidalia marginipunctata*" (see page 3).

In the discussion which followed Dr. Chapman remarked that it was a most unusual thing for some larvæ of a summer brood to go over to help form the autumn brood, and he also noted the extraordinary fact of the insect gaining protection at certain times only from its resemblance to patches of dust occasionally in abundance on ivy leaves near its habitat. Mr. Montgomery referred to the mixed character of the genus *Acidalia*, one section having keeled larvæ and the moths scattered their eggs, while the other section had cylindrical larvæ and the moths laid their eggs in batches.

MARCH 13th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. A. L. Rayward, of Wallington; Mr. B. Stonell, of Clapham; and Mr. S. P. Harry, of Clapham, were elected members.

Dr. Chapman gave several examples of numerous species of Lepidoptera to the Society's Collections, including *Eupithecia consignata*, *Hyboma (Acronycta) strigosa*, *Jocheæra (A.) alni*.

Mr. Kemp exhibited living larvæ and imagines of the following Coleoptera:—*Endomychus coccineus*, found on hornbeam in Epping Forest, March 1st, 1902; *Ptilinus pectinicornis*, found on hornbeam in Epping Forest, March 1st, 1902; *Pyrochroa serraticornis*, found under moss at New Eltham, January 20th, 1902.

Messrs. A. Harrison and H. Main exhibited dark varieties (*nigrofulvata*) of *Macaria liturata* from Delamere Forest, with the type form from the New Forest.

Mr. F. M. B. Carr exhibited a number of specimens of Lepidoptera and Odonata from the New Forest:

ODONATA.—*Ischnura pumilio* (four), June, 1900. *Pyrrhosoma nymphula*, (a) typical male, (b) female varieties, June, 1900 (see "Abs.," 1900, page 80). *Agrion mercuriale* (four), June, 1900. *Gomphus vulgatissimus* (two), June, 1900.

LEPIDOPTERA.—*Dryas paphia*, (a) two female varieties, July, 1898, and July, 1897; (b) var. *valezina*, July, 1898. *Hemaris (Macroglossa) fuciformis*, Rhinefield, June, 1900. *Aventia flexula*, July, 1897–98. *Lithosia mesomella*, July, 1898. *L. complana*, July, 1897. *L. deplana (helveola)*, July, 1898. *Gnophria quadra* (three), July, 1898; (one) from larva, June, 1900. *Halias quercana (bicolorana)*, from larvæ, June, 1900. *Nola strigula*, from larvæ, June, 1900. *Notodonta trepida* (one), from larva, July, 1898. *Asphalia ridens*, from larvæ, June, 1900. *Triphæna subsequa* (two), July, 1898, at treacle. *Heliothis dipsacea* (one), July, 1898, Brockenhurst Heath. *Cleora glabraria* (two), July, 1897–98. *C. lichenaria* (three), July, 1897–98; (three) from larvæ, Easter, 1900. *Catocala promissa* and *C. sponsa*, mostly bred from larvæ. June, 1900. *Brephos parthenias*, Easter, 1899, 1900, and 1901. *Lobophora lobulata* (three), Easter, 1899 and 1901. *Selidosema plumaria*, males, Lyndhurst Heath, July, 1897 and 1891, and one female from larva, June, 1900. *Hyria auroraria (muri-cata)*, Bank, July, 1898.

Also a hornet taken from a hollow tree one Easter, and an egg of the night-jar (*Caprimulgus europæus*). The egg was extremely hard to find, as it was laid among a number of white flints on the heath between Lyndhurst and Matley.

The var. of *Dryas paphia* has the basal part of the wing of the usual colour, and the outer portion consists of a broad black band, which occupies nearly half of the wing. It includes

two rows of tawny spots, one on the hind margin and the other parallel with it. This variety was taken in the New Forest, July 20th, 1897.

Mr. Nottle exhibited examples of *Agrotis tritici* and *A. agathina*, from Keston.

Mr. Barnett exhibited a living female example of *Nyssia hispidaria*, from Chingford.

Mr. F. Noad Clark exhibited several species of ticks, and contributed the following notes:—"Some weeks ago I received from Mr. Hewett, of York, the two specimens exhibited. He described them as parasites which he found on guillemots on the Yorkshire cliffs. On examination I found them to be ticks, but as they were unlike any I had previously seen I came to the conclusion that they were 'something new.' I sent them to Mr. Wheler, of Alnwick, who is an authority on the ticks, and he at once pronounced them to be at least a species, if not a genus, new to Britain. At his suggestion I sent them to Prof. Neumann, of Toulouse, who is the Continental authority on these ticks. He was exceedingly interested in the specimens, one of which, a male *Ixodes fimbriatus*,* he had never before seen. He tells me that it had been described by Kramer and Neumann in 1883, who captured it during the Vega Expedition. It has never been recorded in Britain. It appears to favour migratory birds, which will account for its being found on the guillemot; and there is no doubt that it had come from remote regions.

"The other specimen, a distended female, is *Ixodes borealis*, Kramer and Neumann, or *Ixodes putus*, Cambridge, and is also found on migratory birds, and has been taken as far apart as Alaska and Cape Horn.

"I also exhibit seven specimens, nymphs and adults, of the common British tick, *Ixodes reduvius*, for comparison. These are found on cattle, deer, and sheep; to the latter they are a terrible pest, and the cause of a destructive disease called 'loup-ill.' They have also been found on birds, hedgehogs, moles, and bats, and even on reptiles."

Mr. Clark further exhibited photographs of *Ixodes fimbriatus*, showing ventral and dorsal aspects.

Dr. Chapman exhibited a living bred specimen of *Dimorpha (Endromis) versicolora*, and some pupæ in the larva cases of *Thyridopteryx ephemeriformis*.

Mr. Edwards exhibited very fine examples of *Ornithoptera*

* This species is now known as *Ceratixode putus*.

lydius and *O. socrates* from the Malays, with *Parnassius imperator* and *P. horsleyanus* from Thibet.

Mr. Hy. J. Turner exhibited a long-bred series of *Sesia* (*Macroglossa*) *stellatarum*, and contributed the following notes:

"July 14th.—An unusually large patch of the yellow bed-straw (*Galium verum*) was noticed at Bromley, Kent, situated in the middle of a meadow of very long grass. The stems of the bed-straw were conspicuously tall and fully exposed to the glare of the sun. A moderate-sized bunch of the flowers was picked, brought home, and placed in water.

"July 15th.—One young larva was observed, apparently just hatched, but no others were to be found. A search was not made for ova, unfortunately.

"July 20th.—It was found that other larvæ had appeared on the bunch, and that in all eight were present. A second visit was made to the patch of bed-straw at Bromley, and as the result of a thorough search no less than forty-two larvæ were secured, of all sizes, from some just hatched to others about half-fed. Nearly all were taken from the patch mentioned; only two or three larvæ were discovered on the smaller patches. For the first few days the larvæ were fed in cages (larger) and bottles (smaller) and placed in an open verandah facing N.E., getting the early morning sun. After that they were all put into a greenhouse having the full heat of the sun, but with the cages slightly shaded by paper placed on the top and overlapping. They fed up very rapidly; in fact, to get them food was a difficulty, as they consumed very little but the flowers, and dropped or detached about as much as they ate.

"July 25th.—Several larvæ assumed a beautiful dark purple tint and ceased feeding. They wandered about for a short time, but soon burrowed just below the surface of the rubbish and spun a very flimsy cocoon, in which they changed to pupæ. The cocoon was only just sufficient to prevent the rubbish from collapsing on to the pupa.

"August 3rd.—All but two or three larvæ had finished pupating.

"August 8th.—The remaining two or three had gone down. The pupæ were all removed from their cocoons and placed on blotting-paper on dry sand in a fresh cage.

"August 24th.—One pupa began to darken, the wing-cases first, beginning with the outer margin. The wing-cases were as a rule of a deep black-brown before the rest of the pupa began to darken.

"August 27th.—Several pupæ were now quite blackened and the abdominal segments were much elongated, such as one is accustomed to notice when a pupa contains an ichneumon.

"August 28th.—The first imago appeared.

"September 30th.—Out of thirty-six larvæ which were fed up and pupated successfully, thirty-one perfect imagines and three cripples were reared, two pupæ only dying. When it was noticed that the pupæ were nearly ready to emerge they were several times each day moistened with the breath. The pupæ were kept indoors in a room facing nearly N.

"The imagines invariably remained quiet for twenty-four hours after emergence, but were very restless if kept alive longer. They had a very large quantity of a blue-black fluid in their abdomen at emergence, some of which was left in the pupa-case and some was scattered about the cage. There remained, however, in all of them a considerable amount of this emergal liquid, which they got rid of with considerable force, when they were dropped somewhat violently on to the table."

Mr. Lucas exhibited a very large number of lantern slides to illustrate his remarks on "Entomological Localities." They were chiefly of well-known spots in the New Forest. Mr. West, of Streatham, also showed a few slides taken from several localities nearer London.

MARCH 27th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Stanley Edwards exhibited (1) a flower spike of *Saxifraga crassifolia*, a Siberian plant, from a garden at Barnet (it was stated that the sparrow prevented the flowering of this plant in the London parks and gardens); (2) very fine male and female specimens of the genus *Ornithoptera*, *O. borimanni*, *O. naias*, and *O. criton*, from the Malay Archipelago, and a male of the rare *O. plateni* from New Guinea; (3) a collection of Hemiptera Heteroptera received from M. Martandon, of Bucharest, comprising seventeen genera and eighty-five species, representative of all parts of the world; (4) a well-preserved fossil of a fern frond from West Point, North America.

APRIL 10th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Main exhibited a twig of hawthorn gathered in the New Forest at Easter, having a large cluster of the eggs of *Eriogaster lanestris*, and remarked upon the curious spiral arrangement in which they were deposited and the amount of woolly covering over and around them.

Rev. J. F. Perry exhibited a considerable number of insects from South Africa, including a large and conspicuous ant-lion; several species of cockroach; a mantis with clusters of eggs found on the gum trees; a very large Hemipteron, and a species which had a considerable portion of its abdomen bitten away when captured, and which seemed in no way inconvenienced thereby; numerous species of Coleoptera, chiefly Longicorns, one species of which had stridulating organs at the back of the pronotum; together with several species of scorpions and spiders.

Mr. Moore exhibited the following species of exotic Blattidæ:—*Blabera gigantea* and *Monachoda laticollis* (Costa Rica); *Periplaneta contraria* (Philippines); *P. concolor* and *Salganea* (? sp.) (Sylhet); *Opisthoplatia orientalis* (China); *Epilampra* (? sp.) and *Nyctibora tenebrosa* (Costa Rica); *Paranacephæta indica* (Assam); *Panchlora exoleta* (Costa Rica).

Mr. Kemp exhibited a macropterous example of *Hydrometra stagnorum* from Mitcham Common.

Mr. R. L. Hewitt and Mr. E. Nottle exhibited series of *Nyssia hispidaria*, reared from Epping Forest parents. Larvæ hatched May 9th, 1901, fed on oak, pupated in eighteen inches to two feet of earth about June 9th. Emerged January 20th to March 7th, 1902.

Amphidasys strataria, female, parent obtained in Epping Forest, 1901. Larvæ hatched May 12th, fed on oak, pupated June 22nd to July 3rd, emerged March 5th to 25th, 1902.

Phigalia pedaria, caught on lamps, trees, fences, etc., in neighbourhood of West Wickham, March, 1902.

Mr. Edwards exhibited a large number of exotic Hemiptera sent to Mr. Kirkaldy and himself by M. Montandon, of Bucharest, together with numerous species of the genus *Charaxes*, including several fine examples of *C. jasius*.

Mr. Lucas exhibited specimens of *Eriocrania subpurpurella*, which was now very common on the fences at Oxshott.

Mr. E. Step exhibited some berries of *Jasminum officinale*, and remarked that these were so rarely produced in this

country that none of the horticultural authorities considered it worth while to figure them, or to take account of the seeds as a means of propagation. A native of Northern India and China, there was no definite information extant as to its introduction, though it was known to have been in cultivation here as far back as 1548, and Gerarde nearly fifty years later mentions it as in common use for covering arbours. The flower has a two-celled ovary, but as a rule one of these cells became aborted, so that a single fruit was produced. In some flowers, however, both cells developed, and the result was twin berries, one slightly larger than the other, as seen to the left of the group exhibited. These berries are black, and each contains a large seed enveloped in a juicy purple pulp, rather nauseous to the taste. They ripen about November or December, and are at least experimented upon by birds, for many of them show that they have been burst by their bills and the seeds extracted. Mr. Step said he had planted a single seed in the winter of 1900-1, which germinated and produced a healthy plant. The fruits shown had been sent to him from Bonchurch, Isle of Wight, but he had found them on the front of his house at Harlesden during each of the past three seasons, and believed they were produced far more frequently than was generally thought to be the case.

Other members had noted the occurrence. It was also remarked that *Macroglossa stellatarum* had been unusually common during the last season or two, and members were inclined to couple the two facts.

Mr. F. Noad Clark exhibited the following objects under the microscope:—Legs of *Corixa striata*; the anterior pair bear the stridulating organs, which consist of two rows of chitinous teeth of a somewhat complex structure; the middle pair are the “rowers,” or oar-shaped legs, the posterior pair being apparently more adapted for walking. Rudimentary wings of female *Orgyia antiqua*, dissected to show upper and lower wing; fringed scales of *Pieris brassicæ*; and cornea of drone-fly (*Eristalis tenax*).

Dr. Chapman exhibited specimens of *Ræslerstammia erxlebellæ*, female, and contributed the following note:—“Larvæ beaten from birch by Mr. Carr at Oxshott (last field meeting S. L. S., 1901), a curiously colourless transparent larva, which makes a tubular cocoon of very white silk, furnished with a hinged lid, with tucked-in flange, something like that of *Megalopyge crispata*.

“It is placed by Spuler amongst the *Tineæ aculeatæ*, and

the pupa, with only the first two abdominal segments fixed, supports this position; but unfortunately the ovipositor is *not* a piercing one, nor is there a spiculate wing membrane. There are even some grounds for believing that it may belong to the Cochlidid-Zygænid series rather than to the Tineid one. A detailed study of the larvæ might make this point clearer. So far as I have observed it, it does not support this view.

“Herrch Shæffer made the name *Erxlebeniella*; Fabricius called it *Erxlebella*, and *Erxlebella* it therefore is. You may say, if you like, it *ought to have been* *Erxlebeniella*, and you may call Fabricius a grammatical idiot, and express your irritation at him by any language you choose to think sufficiently proper (or improper) for the purpose; but you cannot alter the fact that he called it *Erxlebella*, and *Erxlebella* it is,—named after Erxleben, I suppose. Well, was Erxleben a German, who went to Rome and became latinised as Erxlebenius, or was he a Roman called Erxlebus, who settled amongst the Germanic barbarians and got called Erxleben? For grammatical purposes we may assume either; for systematic purposes we are entitled to know or imagine nothing, except that Fabricius called it *Erxlebella*, a word that may or may not have any other meaning than the moth before us.”

Mr. South exhibited a specimen of *Acidalia marginipunctata* from the hills around Clevedon. It was a form new to him, having the central line distinctly edged with dark suffusion, forming an irregular band. He also exhibited a number of species of British and Eastern Asian Lepidoptera, and read some notes thereon. He stated that, excluding Tineidæ and Tortricidæ, over 300 species of Lepidoptera occurring in Britain were found also in Eastern Asia. The moths comprised 56 Sphinges and Bombyces (old style), 106 Noctuidæ, 76 Geometridæ, and 32 Pyralidæ.

APRIL 24th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. C. R. L. Boxer, of Lee, was elected a member.

Mr. Harrison exhibited a long-bred series of *Tæniocampa opima* from ova collected at Wallasey, Cheshire. A very considerable range of variation was shown, more than half the specimens being of an extreme dark coloration. The type form, glossy slaty grey with broad central band, was

much in the minority. A number were greyish white with the central shade almost obsolete, and one or two specimens were of a red-brown tint.

Mr. Main exhibited series of numerous species he had collected in the New Forest at Easter.

Mr. Kaye exhibited a very fine series of *Heliconius lindigii* taken in British Guiana on the Rio Potaro, and also specimens of the Lepidoptera *Melittia ceto* and *M. caudatum*, both from South America.

Mr. Robert Adkin exhibited a series of dark forms of *Psilura monacha* bred from a New Forest parent taken at rest in 1901. The intensity of the black markings and the amount of suffusion of the wings with black scales varied considerably in different individuals, especially in the females, but even in the most densely suffused specimens the white ground colour was discernible.

Mr. H. Moore exhibited specimens of the following Orthoptera:—*Polyspilota striata*, Stål (Africa); *Tenodera aridifolia*, Stål (Africa); *Hierodula vitrea*, Stål (Sylhet, India); *Creoboter urbana*, F. (Sylhet, India).

Mr. Clark exhibited the following plants and flowers which he had just obtained from Gloucestershire:

1. *Helleborus fœtidus*, in flower. He pointed out that the typical leaves were pedate, and not digitate as in *H. niger*, and at the same time referred to the well-developed nectaries.

2. *Daphne laureola*, in flower. This plant grows well in all chalk soils.

3. *Anemone pulsatilla*, in flower.

4. *Pulmonaria officinalis*, which was stated not to be an indigenous plant, and somewhat rare.

5. *Petasites vulgaris*, the butterbur, showing both flower and leaf at the same time, a most unusual occurrence.

6. *Fritillaria meleagris*, in flower. It was remarked that under cultivation two flowers were frequently produced on one stem.

Mr. Colthrup exhibited a variety of *Abbraxas grossulariata*, in which the black markings were extended, some coalescing into bands; and a specimen of *Cicada montana* found in the New Forest, together with the pupa-case from which it had just emerged. The case was fastened to a stem of grass.

The Rev. J. F. Perry exhibited a specimen of the sea-mouse, *Aphrodite aculeata*, and called attention to the delicate hair structures, which were such beautiful objects under the microscope. He also showed a number of insects from South Africa, including Coleoptera, Homoptera, Hemiptera,

with remarkable cases of mimicry among the latter. He made some observations on a fight between a red and a brown species of ant, which he had watched in progress for more than a week, and he referred to a species of wasp which habitually hunted large spiders, and carried its prey with great difficulty up the walls of houses to its nest in the roofs.

Mr. Pearce exhibited a curious fasciated stem of the common *Auricula*, in which a flower-stem and a leaf-stalk had anastomosed and broadened out, forming a natural "button-hole."

Mr. Edwards exhibited several species of the Nymphaline genus *Prepona* and various species and races of the *agamemnon* group of the genus *Papilio*.

Mr. Turner exhibited a cactus, *Opuntia microdasys*, having its stems covered with very numerous bunches of short, close-set, golden yellow spines. He also showed a specimen of the harlequin beetle, *Acrosinus longimanus*, from Trinidad.

Mr. Sich read a paper on "The Lesser British Lepidoptera," and exhibited a large number of species typical of the various groups in the so-called Tineina section.

MAY 8th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Messrs. Harrison and Main exhibited a very varied series of *Taniocampa incerta*, from Delamere Forest, Epping Forest, and the neighbourhood of Liverpool.

Mr. H. Moore exhibited two species of the *ægeus* group of *Papilio*, viz. *P. ptolychus* (♂ and ♀) from the Solomon Islands, and *P. erecthus* from New Guinea.

Mr. Hewitt exhibited three species of land Mollusca, viz. *Azeka tridens* and white var., from near Keston; *Balea perversa*, from Downe; *Clausilia laminata* and white var., from near Keston.

Mr. D. J. Scourfield, F.R.M.S., gave an address on "Lakes and their Scientific Investigation," and illustrated his remarks by diagrams and references to various works. A discussion took place (see page 61).

MAY 22nd, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Lucas exhibited a specimen of the rare plant *Leucojum*

æstivum, the snowflake, from Oxford, and stated that it was indigenous in a few places in the basin of the Thames.

Mr. Edwards exhibited specimens of *Morpho cypris* from South America, and several species of the genus *Caligo*.

Mr. Lucas exhibited primroses, obtained by Mr. Carr from Cornwall, which had the five sepals of the flowers developed as foliage leaves except at their base.

Mr. F. M. B. Carr exhibited a series of *Boarmia cinctaria* from the New Forest, showing considerable variation from the usual mottled form, one being nearly uniformly dark, another having a wide, light, central fascia, while one had a dark band near the base of the wing.

Mr. Barnett exhibited specimens of *Hybernia marginaria* from West Wickham Wood, one example being uniformly dark, approaching the form known as var. *fuscata*, and another having a very well-defined dark band.

Mr. South exhibited male and female specimens of *Liphyra brassolis*, Westw., together with ova, a preserved larva, larval skins or shells, a pupa, and an empty pupa-case, illustrative of the curious life-history of the species. The whole of the material was received from Mr. F. P. Dodd, of Queensland, who states that the eggs of this butterfly, which is a member of the Lycanidæ, are deposited on the under side of the branches of trees on which nests of the ant *Ecophylla smaragdina* occur, and that the larvæ and pupæ are found in the ants' nests. Although it does not devour them, Mr. Dodd believes that the butterfly larva subsists upon ant grubs.

Mr. Lucas exhibited the following species of shells he had found in the New Forest at Easter:—*Planorbis albus*, *P. spirorbis*, *Limnæa glabra*, and *Valvata piscinalis*.

Mr. W. B. Adkin exhibited series of forms of *Tæniocampa miniosa*, including four examples with the usual rosy colour of upper wings replaced by pale olive-greenish grey, taken in New Forest beginning of April, 1902; and one with broad darker bar across upper wing entirely absent, other markings less distinct, and general colour paler than usual, bred from New Forest larvæ March, 1897.

Mr. Montgomery exhibited bred specimens of *Pieris napi* showing a tendency in the markings to gynandromorphism.

Mr. Main exhibited larvæ of *Lithosia mesomella*. It was noted that this larva had curious spatulate hairs.

Mr. Manger read a short paper on "Foreign Cowries (Cypræa)," and exhibited a collection of the various species in illustration of his remarks. A short discussion took place, and it was noted as especially interesting how dif-

ferent were the very young forms to the adult specimens (see page 10).

Mr. Lucas read the Report of the Field Meeting held at Bookham on May 10th (see page 41).

JUNE 12th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Ashdown exhibited living larvæ of *Attagenus pelli* feeding on wool.

Mr. Tonge exhibited for identification a *Noctua* he had recently captured. It was afterwards recognised by Mr. South as a worn, and doubtless hybernated, example of *Hadena protea*.

Mr. Moore exhibited a specimen of the rare *Pseudacraa trimeni* from South Africa. It varied from the type form in having a considerable area of the lower wings white. It was taken in the Transvaal in 1902, and is not represented in the British Museum.

Mr. Manger exhibited some volcanic dust taken from the deck of the ill-fated vessel the "Roddam" by his son.

Mr. Lucas exhibited a specimen of *Gryllotalpa vulgaris* (*gryllotalpa*), taken in Brockenhurst village in May, 1902; and also *Meriania argentifera*, Meig, a male specimen taken in the New Forest on April 30th, 1902. This species was not previously known as British. It is allied to *M. puparum* (also not common), but can be separated by the fact that its "whiskers"—the hairs on the "jowls" below the eyes—are black, whereas in *puparum* they are pale. They differ also in other good points, and *M. argentifera* is undoubtedly distinct and a good addition to the list. The specimens had been determined by Mr. C. J. Wainwright.

Mr. R. Adkin submitted a report of the Annual Congress of the South-eastern Union of Scientific Societies held at Canterbury on June 5th, 6th, and 7th.

Mr. Hy. J. Turner read the Report of the Field Meeting held at Reigate on May 24th (page 43).

JULY 10th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

The President referred in sympathetic terms to the sudden death of one of the Society's members, Mr. Mark Winkley,

until recently a regular attendant at both the ordinary and field meetings. He stated that the Council had unanimously passed a resolution that a letter of condolence be sent to Mrs. Winkley, and suggested that the meeting should endorse the action of the Council. This was unanimously passed.

Mr. South exhibited a short series of *Melitæa aurinia* from Carlisle and Central Ireland. They represented an unaccountable failure in rearing from a large number of larvæ. Mr. Carpenter had bred a considerable number on several occasions, and had never lost many at any time.

Mr. West (Greenwich) exhibited short series of the following species of Hemiptera:—*Podops inuncta*, *Sciocoris cursitans*, *Rhyparochromus chiragra*, *R. prætextatus*, *Trapezonotus agrestis*, *Macrodera micropterum*, *Plinthisus brevipennis*. Taken by Mr. Ashby at Deal during the last week in May and first in June.

Mr. Turner exhibited a flower of *Phyllocactus peacockii* measuring five and a half inches across. It was remarkable for the unusual brilliancy of the "shot" colour on the interior segments of the perianth. It was grown by Mr. Head in his greenhouse in Camberwell. Mr. Turner mentioned that a few days before he had a flower of *P. haagii*, which was of a delicate pale rose and measured seven inches across.

Mr. Ashby exhibited several species of Coleoptera he had taken on the Deal sand-hills in June, including *Zabrus gibbus*, *Saprinus virescens*, *Melanotus punctolineatus*, *Chrysomela distinguenda*, and *Apion sedi*.

Mr. West, of Streatham, exhibited a piece of amber found by some boys at Maldon, some forty feet below the surface. It was not the true amber, which was the produce of species of pine trees, but gum animi, the fossil gum of the locust tree. There were numerous insects embedded in it, including one lepidopteron. He stated that when true amber was rubbed hard the smell of the pine was noticed.

Mr. M'Lachlan communicated the following:—On looking over the new part of "The Proceedings of the South London Entom. and Nat. Hist. Society" I see (1901, p. 35) that *Cotyledon umbilicus* is said not to occur further east than Hampshire. A year or two ago I saw it commonly on the wall of Winchelsea churchyard, and with every appearance of not having been introduced. Several old localities in Kent are given in Hanbury's "Flora of Kent."

Mr. F. Noad Clark exhibited some Jequirity seeds, and

contributed the following notes:—" (Syn. Prayer beads, Jumble beads, Indian liquorice.) They are the seeds of *Abrus precatorius* (Leguminosæ), of a scarlet colour with a black patch round the hilum, and are probably harmless when eaten, but poisonous when placed in wounds or under the skin. The plant is a climber, and has pea-like flowers of a reddish purple. By some it is called wild liquorice, on account of the flavour of the leaves when chewed. An infusion of the seeds is used to produce purulent ophthalmia for the cure of granular lids. Convicts in Mauritius have been known to use it for applying to their eyes to induce illness. The irritation thus caused is supposed to be due to a bacillus or a pepsin-like ferment. These seeds have a uniform weight, and the natives use them as a standard. It has been stated that their weight is the origin of the carat of gold."

The Report of the Ranmore Common Field Meeting, conducted by Mr. J. H. Carpenter and Mr. E. Step, was read (page 46).

JULY 24th, 1902.

MR. F. NOAD CLARK, *President*, in the Chair.

Mr. F. M. B. Carr exhibited bred examples of *Amphidasys betularia*. The primaries were black, dusted with white scales; secondaries, pale; fore-part of head, whitish; abdomen, black. The twelve specimens, which represent the entire brood, were bred this year from ova deposited by a black female taken in cop. with a typical male at Lee last summer.

Mr. Kemp exhibited numerous species of Irish Coleoptera taken by him mainly in the neighbourhood of Dublin during April, May, June, and July, 1902, and contributed the following notes:

Lamostenus complanatus, Dej., a species new to the British list, and closely allied to *Pristonychus terricola*. About two dozen specimens were taken under a fallen wall on sandy soil near Dublin in June, 1902. The species seems to have a wide distribution, being found all round the Mediterranean, and also in Madeira, Bermuda, St. Helena, and Chili. The species is probably an importation, but is evidently well established.

Carabus clathratus, *Pelophila borealis*, *Blethisa multipunctata*, *Chlœnius nigricornis*, dark forms of *Pterostichus cupreus* and *Bembidium bipunctatum*, all taken under stones on the shores of Lough Neagh, near Belfast.

Six specimens of *Bembidium argenteolum* (a species recently added to the British list by Mr. J. N. Halbert, of Dublin), found among shingle at Lough Neagh, with *B. paludosum* for comparison.

Aëpus marinus, *Phytosus balticus*, *Diglossa mersa*, *Cercyon littorale* (yellow var.), *Saprinus maritimus*, and *Telephorus darwinianus*, from the "North Bull," a sandbank near Dublin.

A series of *Cilleus lateralis* found under stones on the sea-shore near Dublin, and *Polydrusus chrysomela* from the same locality.

The following water-beetles :—*Cælamбус quinquelineatus* and *C. novemlineatus*, from Lough Neagh.

Hydroporus gyllenhali, *H. tristis*, *H. obscurus*, *H. morio*, from Mt. Kippure, Dublin; and *Deronectes assimilis*, *Hydroporus pictus*, and *H. rivalis*, also from near Dublin.

Orectochilus villosus, found freshly emerged under stones at Lough Neagh.

Silpha atrata, var. *subrotundata*, from Dublin, and *Silpha dispar* from Lough Neagh.

One specimen of *Hæmonia appendiculata*, a species not taken in England for many years, and a series of *Donacia discolor*.

Chrysomela banksii, *Barynotus schönherri*, and *Barypeithes sulcifrons*, from near Dublin.

A series of *Otiorrhynchus auropunctatus*, a species that does not occur in England, from near Dublin; and two specimens of *Rhopalomesites tardyi* from Lough Neagh.

Specimens of *Staphylinus cæsareus* from Lough Neagh, and *Meloë violaceus* from near Dublin.

He also exhibited a series of the rare dragon-fly, *Lestes dryas*, from near Hanwell, Middlesex, with *L. sponsa* for comparison. This species has only once previously been taken abundantly in England—in Cambridgeshire, in 1897. Other records are—one specimen by Mr. J. J. F. X. King in Ireland, and one by Mr. Briggs at Leigh, Essex.

Mr. R. Adkin exhibited several species of plants sent by Mr. McArthur from Shetland, including *Draba incana* (woolly whitlow-grass), *Plantago maritima* (seaside plantain), *P. lanceolata*, var. *vulgaris* (ribwort), *Cerastium alpinum*, var. *edmonsoni* (hairy Alpine mouse-ear chickweed), *C. semidecandrum* (lesser mouse-ear chickweed), *Gnaphalium supinum* (dwarf Alpine cudweed), *Arenaria ciliata*, sup. sp. *norvegica* (Norwegian sandwort), *Rubus saxatilis* (stone bramble), *Silene maritima* (sea bladder campion).

AUGUST 14th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Edwards exhibited ova of *Anthrocera (Zygæna) trifolii*, from Byfleet.

Dr. Fremlin said that during a recent visit to the Isle of Man he had taken *Dianthæcia cæsia* and larvæ of *Polia xanthomista*, var. *nigrocincta*.

Mr. Clark stated that he had recently visited the unique collection of orchids possessed by Captain Holford, and he described the method of the pollination of some rare hybrids.

Dr. Chapman exhibited specimens of *Nemoptera bipennis (lusitanica)* from Bejar, in Spain.

AUGUST 28th, 1902.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Edmund J. Riley, of 94, Drakefield Road, Upper Tooting, was elected a member.

Mr. South exhibited *Apamea ophiogramma*, selected from twenty-nine specimens bred from larvæ feeding on ribbon-grass at Upper Tooting. Little variation in colour and marking was noted, and all the examples but one were about equal in size. The exception measured 23 mm., or about one third less in expanse than the others, which ranged from 30 mm. to 33 mm.

Mr. Edwards exhibited a box of ferns sent for distribution by Messrs. Step and Turner, from Inistioge, co. Kilkenny, Ireland, and read the following note:—"Mr. Turner and I send herewith for exhibition and distribution a sample of five ferns, which are the common weeds that ornament all the walls in this region. They are *Polypodium vulgare*, *Scolopendrium vulgare*, *Asplenium ceterach*, *A. ruta-muraria*, and *A. adiantum-nigrum*.

"There is also a patch of *Hymenophyllum tunbridgense*, of which we have found enormous quantities in one particular spot, covering rocks, trees, and banks near a beautiful cascade.

"We have the sole run of a wood of 700 acres, as well as a considerable section of the county, with no one to interfere with us, and foresters, keepers, gardeners, and others instructed to give us any assistance we may need in our arduous labours. We have contrived to get about a fortnight's enjoy-

ment out of the few days we have been here, and are at present regretting that our visit will not extend to a month or so. The camera is making some pictorial records of our surroundings, and I hope at some future meeting to exhibit lantern slides of these whilst Turner tells racy anecdotes of our experiences.

"A salmon river flows through our demesne, and I need not say that, having sampled the salmon and trout taken from it, we find both species admirable."

Mr. Turner exhibited a short series of *Agrotis ripæ* bred at the end of June, 1902, from larvæ taken at Dawlish in August, 1901. They showed very considerable variation, from a specimen having an extensive area of mealiness to an exceptionally dark form with scarcely a trace of white markings. He stated that the larvæ were very common again this year, feeding especially upon a Crucifer, *Cakile maritima*. Other years they were feeding upon a Chenopod, *Salsola kali*. The books, authors of which copy each other so admirably, give only hound's-tongue, *Cynoglossum officinale*, a plant he had not noticed upon the Dawlish sand-hills.

Mr. Kemp exhibited an example of the Colorado beetle, which had been taken at Tilbury in 1901.

Mr. Bowman exhibited a large number of species of the genus *Erebia*, chiefly from Spain and Switzerland. Among them was a series of the very local *E. christi*, a species not recorded until very recent years, together with several specimens of *E. zapateri*. He also showed a series of *Melanargia lachesis*.

Mr. South exhibited ova of *Tortrix piceana*, *Retinia pinicolana*, and a Queensland butterfly, *Liphyra brassolis*.

Mr. McArthur sent for exhibition a curious fasciated flower cluster of ragwort, *Senecio jacobæa*, from the Shetland Isles.

Mr. Adkin exhibited several masses of cocoons of a species of ichneumon, which had emerged from the larvæ of *Boarmia gemmaria*. In each case the larva or larval remains was arched over the mass, where he had noticed it to remain for some while before dropping away. Dr. Chapman said that the larva no doubt placed itself upon a twig preparatory to change, when the Apanteles (grubs) emerged and placed themselves underneath; the successive emergences and consequent additions to the mass caused the larva to take up the remarkable arched position.

Dr. Chapman exhibited a specimen of *Gorytes bicinctus* and one of *Scoliaula (Bohemannia) quadrimaculella*, taken the preceding week at Reigate.

SEPTEMBER 11th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. South exhibited a few specimens of *Pigæra curtula*, representative of sixty-four imagines bred from ova laid by a female captured on May 31st at Blatchworth Heath, Hertfordshire. The larvæ were fed on sallow instead of poplar, upon which they feed naturally. The whole of those bred were smaller and darker than the female parent; whether as a result of feeding the larvæ upon sallow or whether due to seasonal dimorphism, he could not say. At present he had a succeeding brood of larvæ feeding upon sallow, and he was anxious to see the form of the resultant imagines.

Mr. Turner exhibited two species of Longicorn Coleoptera taken by Mr. J. W. Tutt at Torre Pellice, in the Basse Alps, viz. *Cerambyx heros* (*cerdo*) and *Purpuricenrus koehleri*.

Mr. Kemp exhibited several species of Coleoptera taken in the New Forest during August, including *Prionus coriarius*, *Halyzia 16-guttata*, *Tomoxia biguttata*, *Abdera bifasciata*, *Deronectes latus*, *Cæliodes erythroleucus*, *Thymalus limbatus*, *Bembidium decorum*, *Orchestes iota* (on sweet gale), *O. ilicis*, *O. avellanæ*, and *O. rusci*.

Dr. Chapman exhibited male and female specimens of the beautiful and rare Hesperid butterfly, *Heteropterus morpheus*, from St. Jean de Luz, stating that it was the first time he had met with the species. He also showed cases and two male specimens of the very distinct Psychid moth, *Oreopsyche leschenaulti*, from San Sebastian, in Spain. The cases were covered with fine grains of sand very closely and evenly laid on, and the imagines were remarkable for their scaleless wings and long-tufted white hairs on the body. He stated that at emergence scales were present on the wings, but were so loosely attached that they almost immediately fell off.

Mr. Hy. J. Turner exhibited series of the Clavicorn beetles *Soronia punctatissima* and *S. grisea*, taken by him at Woodstock, co. Kilkenny, Ireland, in the burrows of *Cossus ligniperda*, which abounded in an old poplar tree on the banks of the river Nore.

Mr. Adkin exhibited specimens of a plant from the Shetland Islands, sent by Mr. McArthur, and which Mr. Step afterwards identified as the Highland cudweed (*Gnaphalium supinum*), a plant confined exclusively to the extreme north of Great Britain.

SEPTEMBER 25th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Dr. Chapman remarked that he had found considerable numbers of larvæ of *Euchelia jacobææ* during his stay at Bejar, which differed from the ordinary forms in having the usual broad black rings or bands broken into four black marks. He exhibited imagines bred from these larvæ, but these in no way differed from the ordinary typical form.

Mr. H. J. Turner exhibited a cactus, *Mammillaria centrichirra*, of a different type to those he had previously shown, and having rosettes of long, curved, stout spines, with a central spine somewhat more robust and curved downwards.

Mr. W. J. Kaye exhibited a short series of *Leucania albipuncta*, representative of those he had taken in the Isle of Wight this year.

Mr. Dennis exhibited a very curious variety of *Scolopendrium vulgare*.

Mr. Kirkaldy exhibited a cruizie (or crusie) from the Orkney Isles. These old "lamps," which were formerly in general use in Scotland, in cowbyres and similar places, and are still used in the Shetlands and Outer Hebrides, have elsewhere been almost entirely superseded by cheap paraffin lamps. He also exhibited a "stocking" cap made in Fair Island of the soft Fair Island wool. The pattern is remarkable, being of Spanish origin; similar designs are to be noted in Murillo's seventeenth-century paintings. The Fair Islanders were taught the pattern by Spanish castaways at the time of the Armada.

Mr. Kirkaldy also exhibited a sufficiently remarkable case of insect mimicry in the shape of some Brazilian Rhynchota from the same locality in the Province of Goyas. *Mabelia pulcherrima*, a new genus and species of phytophagous Miridæ allied to *Lopidea* and *Resthenia*, was shown with the (probably raptorial) Pyrrhocorine *Theraneis oleosus*, Distant, from Costa Rica, and *T. luridus*, Distant, from Brazil. *Euryophthalmus succinctus*, Linné, and *E. trochanterus*, Signoret, were also shown to exhibit the modification in form of *Theraneis* from the more typical Euryophthalmini (= Larginæ).

Mr. Boxer exhibited a flower of garden scabious, from the apex of which leaves were growing. It was explained that the flower really consisted of an arrested axis, in which the leaves were metamorphosed into the various parts of the

flower. In this case the arrest was only partial, and the apex of the axis had gone on developing as usual.

Mr. Kemp exhibited a considerable number of species of insects taken by him during the various field meetings of the present year, as follows:

COLEOPTERA.—Wisley Field Meeting, July 5th.—*Donacia thalassina*, *Pæderus riparius*, *Antherophagus nigricornis*, *Agrilus angustulus*, *Xyleborus dryophagus*.

Epping Forest Field Meeting, September 20th.—*Zeugophora flavicollis*, *Ilybius fenestratus*.

Oxshott Field Meeting, September 6th.—*Zeugophora subspinosus*, *Hydaticus seminigra*, *Pelobius tardus*, *Ilybius ater*, *I. ænescens*, *Rhantus bistriatus*, *Cælabus confluentis*, *C. impressopunctatus*, *Bidessus geminus*, *Hydroporus tristis*, and *H. umbrosus*.

ODONATA.—*Orthetrum cærulescens*, Wisley, July 5th.

Mr. Lucas exhibited a coloured drawing of a variety of *Asphalia ridens* bred from a New Forest larva by Mr. Hooker. The contrast of dark and light markings was unusually pronounced. The central band was almost uniformly black, and the basal and marginal areas almost devoid of darker markings. He also showed a specimen of a very rare Dipteron, *Physocephala nigra*, from the New Forest, together with a female specimen of *Ectobia lapponica* and its egg-capsule. The latter insect was captured on July 5th in copulâ with a male, and, being placed in a box and fed, was noted on July 19th to have an egg-capsule protruding. This it carried until July 24th, when it was dropped.

Mr. Colthrup exhibited the following insects that he had reared or captured during the year:—A male specimen of *Lasiocampa quercûs*, with splashes of yellow, or epaulettes, at base of fore-wing, bred from Deal larvæ; an example of the same species, with male antennæ and wings; body like female, showing egg matter through segments, but male colouring, bred from larvæ obtained at Christchurch, Hants; a male *L. quercûs*, with yellow band on hind wing extending nearly to fringes.

Agrotis exclamationis, with spots on fore-wing joined together. Taken at Brighton.

A. corticea (dark), with a white band along outside edge of fore-wings. Taken at Brighton.

Mr. Lucas read the Report of the Field Meeting held at Wisley on July 5th, 1902, and exhibited a number of lantern slides in illustration of his remarks (page 52).

OCTOBER 9th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. McArthur exhibited, from the Shetland Islands, specimens of a moss which was undergoing the process of petrification. (1) The growing moss; (2) the moss partially covered by an earthy deposit; (3) the moss entirely formed into a porous, rocky mass. He also showed an extraordinary example of emergence from the pupa-case, in which an imago of *Hadena adusta* was emerging backwards. Mr. McArthur saw the pupa-case break open, and after sundry struggles the abdomen of the imago was thrust partly out. He then killed and pinned the insect.

Mr. F. B. Jennings exhibited the following species of Coleoptera:—(1) *Cathormiocerus socius*, Boh., Sandown, I. W., October 1st, 1902; (2) *Gymnetron linariae*, Panz., Southport, Lancs, July 14th, 1902; (3) *Baris lepidii*, Germ., Edmonton Marsh, October 5th, 1902; (4) *Hister merdarius*, F., Broxbourne, Herts, August 16th, 1902.

C. socius lives at the roots of grass at the sides of high cliffs, and is extremely difficult to find on first searching; when, however, the nature of its haunts is appreciated, it can sometimes be taken in numbers in favourable weather.

G. linariae is a rare and extremely local insect; it lives on toadflax. The specimen shown was sent me by Dr. Chaster, of Southport, who is, I believe, the only living coleopterist who has taken the species in this country.

Baris lepidii is also a local weevil, but is rather common where it occurs; it lives in marshes at the roots of *Barbarca præcox*, on which the larvæ, which are tiny white grubs, feed.

Hister merdarius is a usually scarce species of a family of dung- and carrion-feeding beetles. I have recently been fortunate enough to find a large colony of it living in old gas-lime!

Mr. Kemp exhibited specimens of the Coleopteron *Carabus violaceus*, var. *exasperatus*—two from North Cornwall taken by Mr. Montgomery, and two from the New Forest taken by himself.

Mr. Robert Adkin exhibited a specimen of *Cossus ligniperda* which emerged on July 8th last from a pupa found on the previous evening protruding from a round hole in the skirting of a fence, on which a number of examples of this species

were taken in June and July, 1889, and which were referred to in his paper on "The Pupation of *Cossus ligniperda*" ("Proc. S. Lond. Ent. S.," 1900, pp. 1—5). When found, the pupa was protruding about half its length from the hole, which it exactly fitted, in the side of the board forming the skirting at the bottom of the fence. Evidently the larva had sought the rotten part of the back of the board for forming its cocoon, and the pupa had forced its way through the thin surface of the board in order to assume the position suitable for the emergence of the imago. Several recently vacated empty pupa-skins were also found at about the same date, in positions similar to those described in the paper above referred to.

Mr. Step exhibited a rare fungus (*Auricularia lobata*) which he had found at Ashtead, on an old stump. There is only one other British species of the genus, *A. mesenterica*, which is met with much more frequently.

Dr. Chapman exhibited specimens of *Hybocampa* (*Notodonta*) *dryinopa* received from Mr. Dodd, Queensland, with some *H. milhauseri* for comparison, with cocoons, etc. Mr. Dodd has some notes on the habits of the species in the "Entomologist," 1902, page 42.

The species, in appearance and also in habits, is obviously very close to our European *Hybocampa milhauseri*. The similarity of the imagines is very close; so also are the eggs. The larva has the same bizarre aspect as that of *milhauseri*; it has the same dorsal process on the first abdominal segments; the latter segments are more like those of *Stauropus fagi* than *H. milhauseri*, but agree with both, and with the *Ceruras* in wanting the claspers.

The cocoon is more like a *Cerura* than that of *H. milhauseri* is, containing many chips of various sorts like they do, instead of being pure, gummy silk, like *H. milhauseri* uses. The pupa resembles that of *milhauseri* in having a frontal spike—this double and more prominent than that of *milhauseri*, which springs from the bottom of a depression. Both use this spike for making an opening in the cocoon for the escape of the moth. *Milhauseri* (see "Entomologist," 1890, page 92) actually, with it, cuts out an oval lid by passing the spike round and round the line of section, applying a softening fluid along the line and cutting through the silk as it softens till the lid is cut out. *Dryinopa* acts differently (the chips of wood, bits of stone, etc., would prevent the process that *milhauseri* can use in the pure silk), but actually, apparently without the use of softening fluid (but of this I am not sure),

pierces the cocoon with the spike, and does so repeatedly till it has marked out a lid, much as our postage stamps are separated by perforated holes; then the moth is able to break its way out. The lid does not appear to be of the oval form of *milhauseri*'s, but is rather irregular in form.

Mr. South exhibited four aberrations of the female of *Lycana corydon*. The specimens were most kindly presented to him by the Rev. C. A. Sladen, who took them this year in Wiltshire. The first example had a white discoid spot on each wing, that on fore-wing with a central black dot; a white submarginal lunulate line; the hind wings were shot with blue. The second example was fairly typical, except that the under surface of the fore-wings was unusually white. The third and fourth specimens were of the form known as var. *syngrapha*, Kef. In a letter sent with the specimens Mr. Sladen stated that in the locality where the *L. corydon* were taken "the females vary from the typical form with a few dots or splashes of blue on hind wings, or all wings, to full-blown *syngrapha*."

Pyralis lienigialis, a dark specimen captured in a village about twelve miles north-east of Oxford on August 22nd, 1902. Mr. South stated that this species was first made known as British in 1881 by Mr. Thompson, who, together with Mr. Bryan, obtained specimens at Stony Stratford, in Buckinghamshire, in 1879 and the following year. No other captures of this species in Britain have been recorded. Distribution—Lapland, Finland, Livonia, Britain.

Lycana minima, an example almost devoid of marking on the under surface of the wings, taken at Swanage July 3rd, 1902. (Sent by Mr. Theodore H. Robinson.)

Ematurga atomaria, a melanic male specimen taken at Bournemouth on June 28th, 1902. Very similar to one taken by the late Mr. Wellman, some years ago, in Epping Forest. Modifications of this form have been obtained at Oxshott. (Sent by Mr. Robinson.)

Zonosoma pendularia, four specimens sent by Mr. F. C. Woodforde, of Market Drayton. These differed from the type in the dark grey coloration of the wings. The fore-wings were more or less tinged with reddish, and in one example, which represents the extreme form, the red tinge was very bright and confined to the central area, which was defined by conspicuous pale, transverse lines. Mr. Woodforde thought that this form exists in certain woods in his district only.

Mr. Clark read a paper entitled "Contributions to the

Life-history of *Argulus foliaceus*, the Parasite of the Stickleback," and illustrated his remarks with a large number of very fine slides showing the minute structure of this curious form of animal life (page 12).

OCTOBER 23rd, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Inglis, of Clapham, and Mr. Scollick, F.E.S., of Wimbledon, were elected members.

Mr. South, on behalf of Mr. Fowler, of Ringwood, Hants, exhibited a series of *Lithosia deplana*, Esp., representing variation of the female. One of the forms was dark grey in colour, with a yellow stripe on the costa, extending to the yellow fringes agreeing with var. *ochreola*, Hübn. (Fig. 96). Another form had the fore-wings almost as yellow as in *L. sororcula*, and the hind wings only slightly tinged with grey. All the specimens were obtained in the New Forest.

Mr. Tutt pointed out that when variation occurred in the Lithosiids it generally took one of two directions, either a general darkening, or an intensification of the yellow, even becoming golden in some species, such as *L. lutarella*, in the Alps. He also remarked upon the constancy of the golden yellow costa in spite of any otherwise general darkening.

Mr. Dennis reported that at Earl's Colne, in Essex, he had found a flower of the daisy (*Bellis perennis*) with leafy bracts forming the involucre of the capitulum. He also said that on October 9th there were to be found all stages of *Cyaniris argiolus* among the ivy at the same place.

Mr. Turner exhibited a number of specimens of *Hypsipetes furcata* = *sordidata* = *elutata*, illustrative of local forms, and remarked upon the inconvenience caused by the continual change of the specific names. He quite saw that with increased knowledge it would be frequently necessary to change the generic name, but he trusted that ere long the specific name would reach its final determination.

Mr. B. W. Adkin exhibited some very fine forms of *Pachygastria* (*Bombyx*) *trifolii* bred from larvæ taken in the Isles of Scilly. One female was conspicuously light, and the wedge-shaped markings on the fore-wings of several males were enlarged and very prominent.

Mr. Lucas exhibited a large number of lantern slides which he had recently made, comprising—

1. A series illustrating some of the most beautiful spots in the New Forest.
2. Several showing protective resemblances in insects; and
3. A series of botanical slides to illustrate various vegetative phenomena.

NOVEMBER 13th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Colthrup exhibited a bred series of *Lymantria monacha* originating from the New Forest. The forms were mainly characterised by being very suffused with black, and the white marking massed towards the base of the fore-wings.

Mr. R. Adkin stated that he had had a number of larvæ from the same source, but that the few imagines that he obtained were quite normal.

Messrs. Harrison and Main exhibited long series of imagines of *Aglais (Vanessa) urticae*, reared in 1902. In his remarks on the specimens, which were from Eastbourne, Delamere Forest in Cheshire, and Argyleshire, he stated that the Eastbourne and Argyleshire specimens were bred from single colonies; the two rows of Cheshire specimens from two separate colonies.

The Scottish insects are, on the whole, darker, both upper and under surfaces. The two Cheshire colonies are very distinct, one colony having orange or yellow in place of the usual red colour.

In the Scottish insects and in one colony of the Cheshire, some of the specimens approach the banded form, but there is no sign of this tendency in the other Cheshire or in the Eastbourne insects.

Mr. Robert Adkin exhibited a series of *Lycæna corydon* taken at Eastbourne between September 18th and 25th last. He called attention to the late date at which the specimens were taken and to the frequency of blue scaling in the females, also to one of them being *minus* the two basal spots on the underside of the fore-wings. He also exhibited very dark specimens of *Acronycta menyanthidis*, from Selby, Yorkshire.

Mr. Hy. J. Turner exhibited—(1) A long-bred series of *Hypsilophus marginellus*, from Banstead Downs. It was a local insect attached to the juniper, but abundant where it

occurred. The larvæ bunched up the twigs and leaves of the juniper. A handful or two of these bunches produced more than forty imagines. He stated that the insect could be found along the old Roman Road at Mickleham, which the Society visited in 1901. (2) A very variable series of *Pædisca corticana* taken on a wet day in July in Epping Forest. The species was exceedingly abundant, literally in clouds, and the variation was extreme. Some specimens were of a deep brown-black, while at the other extreme were examples showing a greenish tinge. The protective resemblance of the majority was exceedingly perfect, and the numbers present on any one tree could only be observed by disturbing them. (3) A male example of *Pechypogon barbalis* set to show the remarkable secondary sexual characters existing in the extreme and fantastic development of tufts and hairs on the fore-legs. No explanation of the way in which these remarkable structures were of use to the species was forthcoming. (4) Two varieties of the underside of *Polyommatus icarus*, taken at Banstead. The first, a male, had the ocelli on the fore-wings either absent or much reduced in size; the basal spots were obsolete; only four of the submarginal row were present, and the marginal markings were very faint; on the lower wing the submarginal row was completely obsolete; the discoidal and the marginal markings only were left. The second example, a female, had the submarginal row of spots much enlarged and intensified.

Mr. Kaye exhibited—(1) A very fine female variety of *Fidonia atomaria*. The ground colour was very white and much increased at the expense of the dark brown bands, some portions of which had disappeared or almost disappeared. (2) A bred series of *Tiliacea (Xanthia) aurago* from ova deposited by a female taken at Worcester Park, Surrey, at ivy. He stated that he had for years worked this same ivy, but previously had taken but two specimens of this species.

Mr. H. Moore read a paper entitled "A Visit to the Forest of Arques," and exhibited a number of species taken by him in the locality, especially referring to a series of *Cænonympha arcania* (page 30).

Dr. Chapman read a paper entitled "On Inflation in Insects" (page 22).

Mr. Tutt said that Mr. Moore's paper called to mind several strange, and as yet unsolved, problems of distribution. One would expect at so short a distance from Britain to find a fauna practically identical with that of the south of England. Such, however, was not the case, for the character-

istic species of the district were non-British. Reference had been made to *Cænonympha arcania*, a well-distributed and common species in many Continental localities. At Fontainebleau Forest this species absolutely swarmed, and was there peculiar in its smaller size and duller appearance, no doubt due to being on the northern limit of its distribution. These Arques examples were also noticeable as being small, poorly scaled, and not so bright in coloration as the typical southern forms, but still not so extreme in these peculiarities as the mountain form *C. var. darwiniana*. He could not understand why the species was absent from many apparently suitable localities in the south of England. Another species exhibited was a six-spotted Anthrocerid. Some time ago he had discussed the various forms of the six-spotted species, including the closely allied *A. filipendulæ*, *A. transalpina*, and *A. hippocrepidis*. The *A. transalpina* was a denizen of the high southern Alps, bright and brilliantly scaled. *A. hippocrepidis* was a lowland, dull, and poorly scaled insect. He could not see why the latter species should not occur in our own country, and perhaps a close examination of the races of the common *A. filipendulæ* in various localities would result in its discovery. He referred to several species, which occurred still nearer to England, as at Calais, and yet were absolutely missing from these shores, e. g. *Chrysophanus dorilis*. There were, of course, records of a kind of various species, but none of a character sufficiently pronounced to show native origin. As regards Dr. Chapman's paper, he thought that it showed its own value when it was regarded as the mature results of more than thirty-three years' experiment and consideration.

NOVEMBER 27th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. E. J. Hare, 163, Dulwich Grove, was elected a member.

Messrs. Harrison and Main exhibited series of *Eupithecia venosata* and *Dianthæcia nana (conspersa)*, smoky and dark forms from the Shetland Islands, with south country forms for comparison.

Mr. Cant exhibited a pair of *Hemerophila abruptaria*, of the very dark form hitherto chiefly found in Hackney. They were taken this year in Regent's Park.

Mr. Kaye exhibited a long series of forms of *Anchocelis lunosa*,

representing the following varieties referred to in Tutt's "Brit. Noct.," vol. ii, pp. 168—170:—var. *obsoleta*, var. *humilis*, var. *brunnea*, var. *neurodes*, and var. *agrotoides*. The red form, var. *rufa*, was not shown, and Mr. Kaye said it must be rare, although in the work cited it was stated to be as common as the type.

Mr. Robert Adkin exhibited the following hybrid Lepidoptera, and read notes:

1. Three very perfect full-sized examples obtained from a pairing between a wild male *Smerinthus ocellatus* and a female *S. populi*, reared in captivity from a wild larva. The ground colour of the head, thorax, and body of the specimens exhibited closely followed that of the female parent, but the brown thoracic patch of *ocellatus* was very distinctly represented, although in a somewhat modified shade of coloration. The margins and pale veining of the wings resembled *populi*, and the general tone of colour inclined to the grey of that species, but with the pinkish shade of *ocellatus* underlying it. The markings of the fore-wings appeared to embrace those of both species, while the ocelli of the hind wings, although prominent, were blurred. The larvæ from which the specimens exhibited were reared appeared to be robust, fed up well on willow, poplar, etc., and in appearance were intermediate between the two species.

2. A single example of a hybrid obtained by a pairing between a wild male *Selenia bilunaria* (*illunaria*) and a female *S. tetralunaria* (*illustraria*), reared in captivity. From this pairing about sixty ova were obtained, but the larvæ appeared to be sickly, and in the result only three moths (all males) were reared, their emergence taking place between July 30th and August 2nd, thus being the second or summer brood, with specimens of which comparison should therefore be made. In general tone of colour the hybrid more nearly approaches that of *tetralunaria*, and the inner line of the fore-wings and the band on the hind wings follow that species. The outer line of the fore-wings, however, is distinctly that of *bilunaria*, and the absence of any spot on the hind wings is also characteristic of that species.

3, 4. A series of hybrids obtained from a pairing between a male *Pygæra pigra* (*reclusa*) and a female *P. curtula*, and between a *P. curtula* and a female *P. pigra*. In both cases a plentiful supply of ova was obtained, and the larvæ fed up well; and in each the hybrid more nearly resembles the female than the male parents, but the markings, more particularly the

“chocolate tips” to the fore-wings, show clearly their cross parentage.

Mr. R. Adkin also exhibited a specimen of *Vanessa urticae* in which the central, costal, and inner marginal spots were connected by a dark shade, giving the insect a very fasciated appearance.

Mr. Joseph H. Carpenter exhibited four specimens of *Apatura iris* bred from larvæ taken in the New Forest and hibernated.

Also, on behalf of Mr. F. A. Oldaker, Parsonage House, Dorking:—(1) Gynandrous *Polyommatus (Lycæna) icarus*; male left side, female right; taken on June 14th, 1902. (2) Aberration of *P. (L.) icarus*, male underside; marginal spots very faint, and on each wing in place of the usual number of black spots there is a single spot, the rest of the wings being plain ashy grey. Taken on June 7th, 1902. Both were captured on Ranmore Common.

He further exhibited a male *P. (L.) icarus* which was unusually small, being about the normal size of *Cupido (Lycæna) minima*. Also an aberration of *Vanessa antiopa* reared from German larvæ. On upper wings there was an entire absence of the blue spots, and on the lower wings only one small blue spot was present.

Mr. Scollick exhibited a variety of *Aglais urticae*, having the ground colour of wings resembling that of *Eugonia (Vanessa) polychloros*. Bred at Merton.

Mr. Carpenter suggested that the ground colour was exactly the same as that of some specimens he had bred from pupæ which had fallen from their suspension and had rested on the earth. It was afterwards found that the imago exhibited had emerged from a fallen pupa. August, 1902.

Mr. Scollick also showed a curious aberration of *Plusia chrysitis* which he had reared in June, 1902, from a larva taken at Ely. The usual area of burnished markings on the left fore-wing was much restricted; and although the scales were dark there was an absence of lustre.

Mr. E. J. Hare exhibited a specimen, taken at Marlborough, of *Strenia (Opisthograptis) clathrata*, in which nearly the whole of the lighter markings of the type form were obliterated; also an aberration of *Ephippiphora obscurana (gallicolana)* having the dorsal blotch suffused with fuscous.

Mr. J. A. Clark exhibited an almost white aberration of *Agrotis suffusa* taken in South Devon September 13th, 1902; also two hybrids from a crossing between *Smerinthus ocellatus* (♂) and *Amorpha populi* (♀), bred August 29th, 1902.

Mr. W. J. Lucas exhibited a series of the dragon-fly *Oxygastra curtisii*, Dale, consisting of three males, two females, and three nymph-skins. The imagines were taken by Major R. Robertson in 1902, in Hampshire. The nymph-skins were obtained in France by M. René Martin. He also exhibited three males and two females of the earwig *Labidura riparia*, taken by Miss Nellie Robertson near Bournemouth during 1902. On behalf of Master E. C. Ansorge, Mr. Lucas showed a short series of *Agriopsis aprilina* having unusually dark hind wings; these were bred from pupæ dug in the New Forest during 1902.

Mr. G. T. Porritt exhibited a box of specimens of *Polia chi* representing the forms occurring in the Huddersfield district. The series showed a great range of variation from almost white to dark slate-colour, and including the varieties *olivacea* and *suffusa*.

Mr. E. Joy exhibited aberrations, from Folkestone, of *Aphantopus* (*Épinephele*) *hyperanthus*, in all of which the ocelli were partially or wholly obsolete. He stated that he had not seen it recorded, but had observed that the tendency of the coast form is towards a diminution of the ocelli on the underside, whereas in inland woods, and the New Forest in particular, varieties almost invariably take the form of enlarged or lanceolate ocelli.

Mr. Main, on behalf of Mr. Mera, exhibited a short series of very dark suffused *Odontopera bidentata*, bred from a dark female taken near Leeds; also a very brilliant green example of *Mimas* (*Smerinthus*) *tiliæ*, bred in 1902 in the London district.

Mr. Turner exhibited three forms of *Melanippe montanata* taken at Amersham, Bucks, during the Coronation week—(1) having all the markings, except a black costal blotch, either very faintly present or quite obsolete; (2) an asymmetrical form with central band on the left fore-wing very much contracted in the lower half, only a streak remaining, while the band on the right fore-wing was fully developed; (3) a somewhat light form showing a darker marginal band to all the wings, and especially distinct on the hind wings.

Mr. Russell exhibited a malformation of *Pyrameis cardui*, taken on the wing, in company with a dozen others of the usual type, at Margate on July 30th, 1900. In this example the apex of the fore-wings was much shortened, and the markings, although present, somewhat compressed, but with perfect symmetry and without crippling.

Mr. Hamm sent for exhibition a photograph of an aberration of *Papilio machaon*, which was bred on June 16th, 1902, from larvæ found at Wicken Fen in August, 1901. Neither wings nor markings were symmetrical. The hind wings were more elongated than in typical specimens, and the antennæ were shorter. There was a large amount of irregular black suffusion, and a suppression of some of the area usually yellow in colour.

Mr. A. L. Rayward exhibited six pupæ of *Papilio machaon* obtained from larvæ taken at Wicken Fen on August 3rd, 1902. The food was fen carrot and, subsequent to capture, leaves of garden carrot. Of ten pupæ, seven were grey-brown and three green, most of the grey-brown having selected brown stems on which to pupate, and two green ones stems that were green at time of pupation. Among the six exhibited, however, were noticed one green pupa attached to a brown stem and one grey-brown attached to a green stem.

Mr. E. Step exhibited an album of botanical photographs, mostly taken at the Society's field meetings during the past summer.

Dr. Chapman exhibited forms of *Cænonympha pamphilus* from Cannes, Locarno, Reigate, Söcsterstoen (Norway), Bejar and Tragacete (Spain), illustrating the variation in marginal colouring, the development of ocelli, and especially in the change of tints and markings in the var. *lyllus*.

Lycæna corydon in Swiss forms—in the form *corydonius* from Tragacete (Spain), and in two forms of var. *hispana*, one fairly constant form from Albarracin and Cuenca, the other varying much in the strength of the black border and from Avila.

Erebia stygne, var. *bejarensis*, a large form, nearly half as large again as the Swiss form, and more richly coloured and well marked, from Bejar, in Spain.

Lycæna argus, var. *bejarensis*, from Bejar, a form much larger than any other variety of the species, brilliantly marked and coloured, and suggesting that *argus* (*ægon* of British lists), *zephyrus*, and *lycidas* are local forms of one species.

Mr. Tonge exhibited—

1. *Strenia clathrata* (black var.); this was netted in a stubble field near Andover, Hants, in company with numerous typical examples, July 20th, 1899.

2. *Phyllocnistis suffusella*, bred series, Reigate, 1902.

3. *Lithocolletis quercifoliella*, a short series bred from oak, and a similar series from beech. Mr. Tonge stated that he could find no record of the latter food being noted previously. Reigate, 1902.

4. *Lyonetia clerkella*, long series bred from cocoons found at Reigate on cherry by Dr. T. A. Chapman, which had not produced a single typical example. The specimens are dark, and some nearly black, with the markings very indistinct and suffused.

Mr. C. P. Pickett exhibited a large number of aberrations of British Lycænidae, *Minas tiliæ* and *Angerona prunaria*, including—

Polyommatus (Lycæna) corydon—(1) “dwarfs,” size of *Cupido (Lycæna) minima*; (2) unusually large, measuring $2\frac{1}{3}$ inches in expanse; (3) nearly white cilia; (4) deep suffused black submarginal bands; (5) with *P. adonis* coloration of male; (6) females perfectly blue; (7) females, one or more wings shot with blue; (8) males and females, absence of ocelli; (9) males and females with large ocelli; (10) with ocelli united into streaks; (11) various shades of ground colour on undersides; (12) females assuming ground colour of typical males; (13) female very light brown; (14) females, very conspicuous spots on margin of hind wings.

P. bellargus, showing similar lines of variation to *P. corydon*, and also (1) having coloration of *P. corydon*; (2) having coloration of *P. icarus*; (3) having shape of wings of *Cyaniris argiolus*; (4) females, lead-coloured.

P. astrarche—(1) dwarfs; (2) underside ground almost white; (3) fore-wings with spots joined.

Cyaniris (Lycæna) argiolus, female with unusually deep bands.

Cupido (Lycæna) minima, right underside with spots obsolete, the left normal.

Minas (Smerinthus) tiliæ, all bred from dug pupæ—(1) males of female coloration; (2) dark and light forms; (3) well-developed bands; (4) with band partially or wholly suppressed; (5) with asymmetrical markings; (6) females with male coloration; (7) female measuring $3\frac{3}{8}$ inches in expanse; (8) almost black hind wings.

Angerona prunaria, the results of four years' interbreeding and selection between a dark male taken at Raindean Wood, Folkestone, and a light-banded female from Chingford. Those exhibited ranged from plain orange males and females to deep chocolate-banded forms of both sexes. The chief aberrations were—(1) exceptionally dark; (2) with asymmetrical markings; (3) very slightly banded; (4) portions of the band suppressed; (5) very deeply mottled.

DECEMBER 11th, 1902.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Cowham, of Stoke Newington, N., was elected a member.

Mr. South exhibited on behalf of Mr. J. Arkle, of Chester, some varieties and aberrations of Lepidoptera, amongst which were a series of *Cænonympha typhon*, var. *rothliebi*, a black suffused male specimen of *Agrotis exclamationis*, a very dark form of *Cymatophora duplavis*, and a pretty form of *Ematurga atomaria*, in which the outer line on all the wings was replaced by a broad black band.

The specimens of *rothliebi*, which were from Delamere Forest, showed considerable variation in size, number, and shape of the ocelli on both surfaces, and also in the amount of white markings on the underside of the hind wings. In two examples the ocelli were more or less oval in shape, with the outer edge produced. In another specimen the ocelli on the undersides of the hind wings were larger than usual, especially as regards the two nearest the anal angle, and the white markings on these wings were well defined. The white markings of a fourth specimen were unusually well developed, and consisted of a broad, irregular-edged, transverse band, reduced to a slender line between veins two and four, an elongate patch at the base below the costa, and a curved and tapered streak beneath the discoidal cell extending to the band.

Mr. Ashdown exhibited specimens of the Homopteron *Ledra aurita*, taken at Mickleham in October, 1902, together with larvæ of the same species from the New Forest. Mr. Turner said that the species was to be found at Chattenden Woods, Kent, and Mr. West had obtained it at West Wickham.

Mr. R. Adkin exhibited a specimen of *Euchloë cardamines*, in which the usually large discoidal spot on the fore-wings was reduced to a mere speck.

Mr. Goulton exhibited a specimen of *Catocala nupta* taken at Balham, showing a general darkening of the colour. Mr. Carpenter thought this was unusual, and referred to the species as being of an exceptionally stable character. Mr. Turner had noted other dark examples in the neighbourhood of London.

Dr. Chapman exhibited the cocoons of *Nudaria murina* and *Euchromia lethe* with larval hairs similarly dispersed. The different effect is due to the cocoon being slight in the one case, dense in the other, and the hairs few and long in *N. murina*, and abundant and comparatively short in *E. lethe*. In both, the hairs are laid on as a thatch and inverted when the cocoon is placed as shown. In the case of *Euchromia* the thatch probably is useful as a thatch shedding in rain, etc. In *Nudaria* the arrangement has degenerated so as only to represent perhaps a spider's nest, as such often appear in crannies in walls and places such as *N. murina* inhabits—or it may be the spider-nest process has, so to speak, accidentally taken an orderly arrangement of the hairs, giving a starting-point for the development of a useful thatch, as in *Euchromia*.

Mr. Step exhibited a specimen of the winter heliotrope (*Petasites fragrans*), received from Shanklin, where it has become established as a wild plant. Its period of flowering is from November to February.

Mr. Kirkaldy gave an account of a tour he took in 1902 through Italy and Switzerland (see page 37).

JANUARY 8th, 1903.

Mr. F. NOAD CLARK, *President*, in the Chair.

Mr. Oldaker, of Dorking; Mr. Spityby, of Canonbury; Mr. Priske, of Acton; Mr. Pratt, of Richmond; and Mr. Goulton, of Balham, were elected members.

Mr. Goulton exhibited a very light form of *Ematurga atomaria* from Folkestone, and an aberration of the same species from Box Hill. In the latter the marginal and sub-marginal areas were uniformly dark. It was remarked that the light specimen was a good example of a form of the species usually occurring at Dover and Folkestone.

Mr. Chittenden exhibited a short series of *Ephyra pendularia* from Staffordshire, Ashford district, and Chislehurst. Those from Staffordshire were bred, and were of the beautiful rosy form, var. *subroseata*, which is dark in ground colour and suffused with a rosy tint. The Chislehurst specimens were very pale in ground colour, with less pronounced markings. The Ashford examples were banded with a lighter shade.

Mr. Lucas exhibited, for Mr. Kemp, an aberration of the

dragon-fly *Enallagma cyathigerum*, Charp, with one stigma missing and aberrant neuration of tip of same wing.

Mr. Kemp exhibited a collection of the genus *Donacia*, consisting of about 280 specimens and comprising sixteen species. He called particular attention to the long series of *D. discolor*, showing great variation in colour, and also pointed out the empty cocoons of *D. vulgaris*, showing the small perforation which communicates with the intercellular air-spaces of the root to which it is attached, and through which the beetle breathes.

Mr. Berthoud, of Hamel, West Australia, sent a large number of wild flowers from "the Bush," which were exceedingly beautiful and interesting. He had read a short notice of the Society in the "Review of Reviews."

Mr. Kaye exhibited examples of *Amorpha austauti*, a giant form of *A. populi*, and of *Smerinthus atlanticus*, a giant form of *S. ocellatus*, both from North Africa; together with the hybrid *metis* obtained from a crossing of *Amorpha austauti* (male) and *Smerinthus atlanticus* (female); and also the hybrid *hybridus* obtained from a crossing of *Smerinthus ocellatus* (male) and *Amorpha populi* (female). Both hybrids showed the male to be prepotent. It was remarked that it was extraordinary that *metis*, the equivalent of the inverse of *hybridus*, should be more frequently obtained when the actual inverse of *hybridus*, i. e. a pairing of male *Amorpha populi* and female *Smerinthus ocellatus*, should be so exceptional and rare.

Mr. R. Adkin read the Report of the Field Meeting held at Otford, Kent, on June 21st (page 47).

Mr. Step read the Report of the Field Meeting held at Byfleet on July 19th (page 56).

Mr. Step exhibited, through the lantern, a number of slides he had made from photographs taken during the past year including field portraits of individual members, illustrations of protective resemblance in insects, and a series of very fine studies of wild flowers in the midst of their surroundings.

Mr. Lucas exhibited on the screen a few slides illustrative of Wisley and the Black Pond, together with a large number of illustrations of protective resemblance in insects very kindly sent for exhibition by Mr. Hamm, of the Oxford Museum.

Mr. Dennis exhibited a very fine series of slides, illustrative of the flowering and fruiting of our more common trees and shrubs, from photographs taken by himself during the past year.

Mr. Tonge exhibited a few slides made from photographs of the ova of several species of Lepidoptera.

Mr. Cant exhibited views of Wisley, Oxshott, and Brasted, from photographs taken at the field meetings.

Mr. Kaye exhibited a number of slides made from photographs taken by himself during his collecting trip to British Guiana in 1901.

Mr. Clark also exhibited a few slides, illustrative of special growths around ponds.

JANUARY 22nd, 1903.

ANNUAL GENERAL MEETING.

Mr. F. NOAD CLARK, *President*, in the Chair.

The early part of the meeting was devoted to receiving the Report of the Council for the past year, the election of Officers and Council for the coming year, and the reading of the President's Address (p. 67).

The following is a list of Officers and Council elected for the Session 1903-4:

President.—E. Step, F.L.S.

Vice-Presidents.—F. Noad Clark, J. H. Carpenter, F.E.S.

Hon. Treasurer.—T. W. Hall, F.E.S.

Hon. Curator.—W. West.

Hon. Librarian.—H. A. Sauzé.

Hon. Corresponding Secretary.—S. Edwards, F.L.S., F.Z.S., F.E.S.

Hon. Report Secretary.—Hy. J. Turner, F.E.S.

Council.—R. Adkin, F.E.S.; T. A. Chapman, M.D., F.E.S.; H. S. Fremlin, M.R.C.S., F.E.S.; A. Harrison, F.C.S., F.L.S., F.E.S.; G. W. Kirkaldy, F.E.S.; W. J. Lucas, B.A., F.E.S.; H. Main, B.Sc., F.E.S.

Mr. Colthrup exhibited an example of the union of two leaves of the *Aucuba*.

Mr. Hy. J. Turner exhibited specimens of *Sympetrum sanguineum* from the Black Pond, Esher, and from Staples Pond, Loughton, both being new localities for the species. Mr. Lucas remarked that it was interesting to note that although the Black Pond had been under close and continuous observation for years the species had never previously been taken there. Mr. Turner also exhibited *Papilio macrosilaus* and *P. philolaus* from South America.

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- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *l.*

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

THE HINDU HYPOTHESIS OF THE HISTORY OF THE HUMAN MIND AND NATURE

BALANCE-SHEET FOR THE YEAR 1903.

GENERAL FUND.

Receipts.		Expenditure.	
By Balance	To Rent (1 year) ...	£	s. d.
" Subscriptions received, 111 at 7/6	" Attendance (1 year) ...	25	0 0
" " 2 " 6/-	" Postage, Stationery, and Sundries ...	2	10 0
" " 8 " 5/-	" Insurance of Library and Collections ...	5	7 9
" " 13 " 2/6	" Entrance Fees carried to Suspense A/c ...	0	8 3
" Entrance Fees, 16 at 2/6	" Sub. to South-East Union ...	2	0 0
" Arrears of Subscriptions received	" Transfer to Library Fund ...	0	5 0
" Subscriptions paid in advance	" Watson Alum Trough ...	1	0 0
	" Balance in hand ...	0	10 6
		46	10 3
		£83	11 9

SUSPENSE ACCOUNT:

	<i>Receipts.</i>		<i>£ s. d.</i>		<i>Expenditure.</i>		<i>£ s. d.</i>
	By Balance in Hand from 1902...	... ..	... 14 17 6	To Balance	... ..	...	... 16 17 6
	" Entrance Fees from General Fund...	... ..	... 2 0 0				
			... <i>£</i> 16 17 6				<i>£</i> 16 17 6

LIBRARY FUND.

<i>Receipts.</i>		<i>Expenditure.</i>	
By Vote from General Fund ...	£ s. d.	To Debit Balance from 1902 ...	£ s. d.
" Fines ...	... 1 0 0	" Ray Society Subscription ...	... 0 1 9
" Debit Balance ...	... 0 3 8	" Andrews, Binding Account ...	... 2 2 0
	... 2 5 0	" Postage ...	... 1 4 6
			... 0 0 5
	£3 8 8		£3 8 8

PUBLICATION FUND.

<i>Receipts.</i>		<i>Expenditure.</i>	
By Donations ...	£ s. d.	To Debit Balance from 1902 ...	£ s. d.
" Sale of " Proceedings ...	... 24 4 0	" Knight, Printing ...	... 7 13 6
" Debit Balance ...	... 0 4 0		... 39 12 6
	... 22 18 0		
	£47 6 0		£47 6 0

ASSETS AND LIABILITIES.

<i>Assets.</i>		<i>Liabilities.</i>	
By Balance, General Fund ...	£ s. d.	To Debit Balance Library Fund ...	£ s. d.
" Suspense Account ...	... 46 10 3	" " Publication Fund ...	... 2 5 0
" Arrears of Subscription, £187s., valued at say ...	... 16 17 6	" Balance ...	... 22 18 0
	... 7 0 0		... 45 4 9
	£70 7 9		£70 7 9

Examined, compared with vouchers, and found correct this 16th January, 1904.

FRED. NOAD CLARK, }
ALFRED W. DENNIS, } *Auditors.*

REPORT OF THE COUNCIL, 1903.

THE Council of the South London Entomological and Natural History Society, in presenting the Thirty-Second Annual Report, are pleased to state that the Society is in a very prosperous condition. The membership again remains about the same as it has been for several years. The number of new Members nearly makes up for the losses. Since our last Annual Meeting thirteen Members have been elected, as against sixteen who have ceased to subscribe to the Society, of whom seven Members have resigned, and nine have been written off through non-payment of their subscription. At the last Annual Meeting the Roll stood at 181; therefore the addition of thirteen new Members and the loss of sixteen Members makes the number of Members at present to be 178.

The Auditors report that the Treasurer's Balance-sheet is an unusually satisfactory one, and both the Society and the Treasurer are to be congratulated.

The usual number of Meetings has been held, and the average attendance, over thirty-two, shows that Members have maintained their interest in the objects of the Society, in spite of the most abnormal weather throughout the whole year.

On March 10th Prof. E. B. POULTON, M.A., F.R.S., (President of the Entomological Society), gave a special address on "Recent Researches in Protective Resemblance, Warning Colours, and Mimicry in Insects," illustrated with a very large number of lantern slides. There was a capital

attendance of Members and their friends, and a very pleasant and instructive evening was spent.

On November 26th was held the Annual Exhibition of Varieties, at which a large number of Members and their friends attended. At one time during the evening quite eighty were in the room. The exhibits were of a varied and interesting nature, embracing chiefly entomological objects.

The following is a list of those who have contributed papers, etc.:—Mr. STEP, three; Mr. ADKIN, two; Mr. LUCAS, two; Mr. TURNER, two; Mr. BROWNE, one; Dr. CHAPMAN, one; Mr. ENOCK, one; Mr. MANGER, one; and Prof. POULTON, one.

At two of the Winter Meetings the lantern was specially devoted to the use of Members who are employing photography in their investigations. Series of slides were shown illustrative of ova of Lepidoptera, peculiarities in the resting habits of certain moths and the manner in which they harmonise with their surroundings, the development of larvæ, etc.; also flowering plants, and nests and eggs of birds *in situ*, and other similar subjects; the exhibitors explaining each subject as it was thrown upon the screen. The Council are pleased to note the undoubted success that attended this innovation, and are of opinion that the interests of the Society will be furthered by similar facilities being given in the future. They also desire to take this opportunity to express their thanks to Mr. F. NOAD CLARK for ably operating the lantern on these and other occasions when it has been in use.

The Council are extremely obliged to those gentlemen who so kindly contributed to the scientific utility of the Meetings, and at the same time helped to render them so interesting. Again the Council would like to emphasise the fact that an exhibit becomes of much more permanent use if full notes of some biological point in connection with it be given for publication, both to those present at the Meetings and in the Abstract of Proceedings.

Seven Field Meetings were held during the year. To MESSRS. STEP, LUCAS, R. ADKIN, and HY. J. TURNER, who

made all the arrangements for these Meetings, the best thanks of the Society are due. Most of these gatherings were successful from the point of numbers, and in most cases the weather was fine for the exceptionally wet year.

ASHTED TO MICKLEHAM, on May 16th; Conductor, Mr. E. STEP, F.L.S.

HORSLEY, on June 6th; Conductors, Messrs. W. J. LUCAS, B.A., and R. SOUTH, F.E.S.

LIMPSFIELD, on June 27th; Conductor, Mr. R. ADKIN, F.E.S.

WENDOVER, on July 11th; Conductor, Mr. H. J. TURNER, F.E.S.

BYFLEET, on July 25th; Conductor, Mr. W. J. LUCAS, B.A.

HEADLEY LANE, on September 12th; Conductor, Mr. E. STEP, F.L.S.

ST. PAUL'S CRAY, on October 3rd (Fungus Foray); Conductor, Mr. R. ADKIN, F.E.S.

The Abstract of Proceedings for 1902 was published a month or two earlier than it had been for the two previous years. It contained eight papers and nine Reports of Field Meetings, with a considerable number of shorter notes of interesting exhibits, comprised in xvi + 126 pages. The thanks of the Society are given to those gentlemen whose names are inscribed on the second page of the cover, for their very kind assistance in forwarding the publication of the Report, and also to those gentlemen with whose assistance the two plates and the chart were issued.

The Society's Album has been enriched by the addition of no less than one photograph—that of Mr. WEST, our Curator. The Council desire to point out that each Member's conscience should tell him whether he has yet carried out one moral condition of his membership and given his portrait, so that his fellow-members may in years to come recall some of the pleasures of the social intercourse induced by the Study of Natural History in our Society.

The Society has lost the admirable services of Mr. SAUZÉ, who, through pressure of business, was compelled to resign after six years' careful supervision of the Society's Library. The Council wish to tender Mr. SAUZÉ their heartiest

thanks for the assiduity with which he always carried out his honorary duties, and much regret that circumstances, over which he had no control, forced him to relinquish the office. In accordance with the Bye-laws your Council chose Mr. DODS as Librarian, and feel confident that he will ably carry on this section of the work of the Society. The following is a list of the Books, Pamphlets, Magazines, and Separata which have been acquired by the Society during the year through donation, exchange, and purchase.

A handsome donation was received from Prof. POULTON in connection with his Address, consisting of some forty-two separata, which the Society decided to bind in chronological order and index so as to be the more available for reference. The following is a list :

A. From the "Linnæan Society's Transactions."

1. External Morphology of the Lepidopterous Pupæ, I—III.
2. External Morphology of the Lepidopterous Pupæ, IV and V.
3. Natural Selection the Cause of Mimetic Resemblance, &c.

B. From the "Transactions of the Royal Society."

1. An Inquiry into the Cause and Extent of a Special Colour-relation between Exposed Larvæ and Pupæ and Surfaces surrounding Them.
2. Experimental Proof that Colours of Lepidopterous Larvæ are largely due to Modified Plant Pigments from their Food.
3. Note on 2.
4. Note on 1.
5. Further Inquiry into Special Colour-relations.
6. Essential Nature of the Colouring of Phytophagous Larvæ ; with Accounts of Experiments.

C. From the "Zoologist."

1. Conscious Protective Resemblance.

- D. From the "Transactions of the Zoological Society."
1. Examples of Protective Mimicry in British Guiana.
 2. Experimental Proof of the Value of Colour-markings in Reference to Vertebrate Enemies.
- E. From the "Bull. of the Boston Society of Natural History."
1. Theories of Evolution.
- F. From the "Entomologists' Record."
1. Influence of Darwin upon Entomology.
 2. *Hypolimnas misippus* captured at Sea.
- G. From the "Transactions of the Entomological Society of London."
1. Notes on Colours, Markings, and Protective Attitude of Larvæ and Pupæ.
 2. Further Notes on Colours, Markings, and Protective Attitude of Larvæ and Pupæ, 1884.
 3. Further Notes on Colours, Markings, and Protective Attitude of Larvæ and Pupæ, 1885.
 4. Further Notes on Colours, Markings, and Protective Attitude of Larvæ and Pupæ, 1886.
 5. Experiments with Pupæ of *Pieris rapæ*.
 6. Further Notes on Experiments with Pupæ of *Pieris rapæ*, 1887.
 7. Further Experiments with Pupæ of *Pieris rapæ*, 1887.
 8. Sexes of Larvæ and Emergence.
 9. Courtship of European Acrididæ.
 10. Colour-relations of Pupæ and Surroundings.
 11. Notes on *Precis octaria* and *P. sesamus*.
 12. Protective Resemblance to Flowers of African Homoptera. Five Years' Observation and Experiment on African Insects.
- H. From the "British Association Reports."
1. Mimicry.
 2. Age of the Earth from a Naturalist's View.
 3. Mimicry and African Butterflies.
 4. Mimicry and Natural Selection.

5. Experimental Inquiry into the Struggle for Existence.
6. Mimicry and South African Insects.
- I. From the "Midland Union of Natural History Societies' Reports."
 1. Theory of Heredity.
- J. From the "Journal of the Royal Institution."
 1. Gilded Chrysalides.
 2. Syllabus of Two Lectures.
- K. From the "Report of the International Congress of Science."
 1. Mimicry and Natural Selection.
- L. From "Science."
 1. Organic Selection.
- M. From "Science Progress."
 1. A Remarkable Anticipation of the Modern Views on Evolution.
- N. From the "Journal of the Victoria Institute."
 1. Mimicry.
- O. From the "Hope Reports."
 1. Setting and Labelling Lepidoptera.

BOOKS.

- "British Lepidoptera," Vol. VIII, by C. G. BARRETT, from the AUTHOR.
- "Life of the Bee," by MATERLINCK, from Mr. HARRISON.
- "Coccidæ," Vol. I (Ray Society), by NEWSTEAD, by Purchase.
- "Catalogue of British Hemiptera," from Mr. KIRKALDY.
- "Larvæ of British Lepidoptera," by WILSON, from Mr. L. GIBB.
- "Catalogue of North American Lepidoptera," by DYAR, from Dr. CHAPMAN.

"Aquatic Insects of New York State," 'Bulletin of the New York State Museum,' No. 68, from Mr. L. GIBB.

"Reports on Injurious Insects," by ELEANOR A. ORMEROD, from Dr. CHAPMAN.

"Address to Entomological Society of London, January, 1904," by Prof. POULTON, from Mr. HY. J. TURNER.

Pamphlets from MESSRS. KIRKALDY and COCKERELL, Smithsonian Institute, New Mexico College, Texas Academy, and the Lloyd Library.

REPORTS AND TRANSACTIONS.

The Smithsonian Institute, 1901.

The Lancashire and Cheshire Natural History Society, 1902.

The Lancashire and Cheshire Natural History Society, Catalogue of the Library.

The Entomological Society of Ontario, 1902.

The City of London Entomological Society, 1902.

The Hastings and St. Leonard's Natural History Society, 1902.

The Texas Academy of Science, 1899—1901.

The Perthshire Natural History Society, 1902.

The East Kent Scientific and Natural History Society, 1902.

The New Mexico College Bulletin.

The Norfolk and Norwich Naturalists' Society, 1902.

The Croydon Natural History and Scientific Society, 1902.

The Horniman Museum, 1902.

All by Exchange.

PERIODICALS.

"Entomologist's Monthly Magazine," from Mr. M'LACHLAN.

"Entomologist," from Mr. SOUTH.

"Knowledge," from the EDITOR.

"Irish Naturalist," by Exchange.

"Canadian Entomologist," by Exchange.

"Science," March, 1903, by the EDITOR.

"Rochester Naturalist," by Exchange.

"Zoologist," from Mr. NEWMAN.

"Nature Study," May, from the EDITOR.

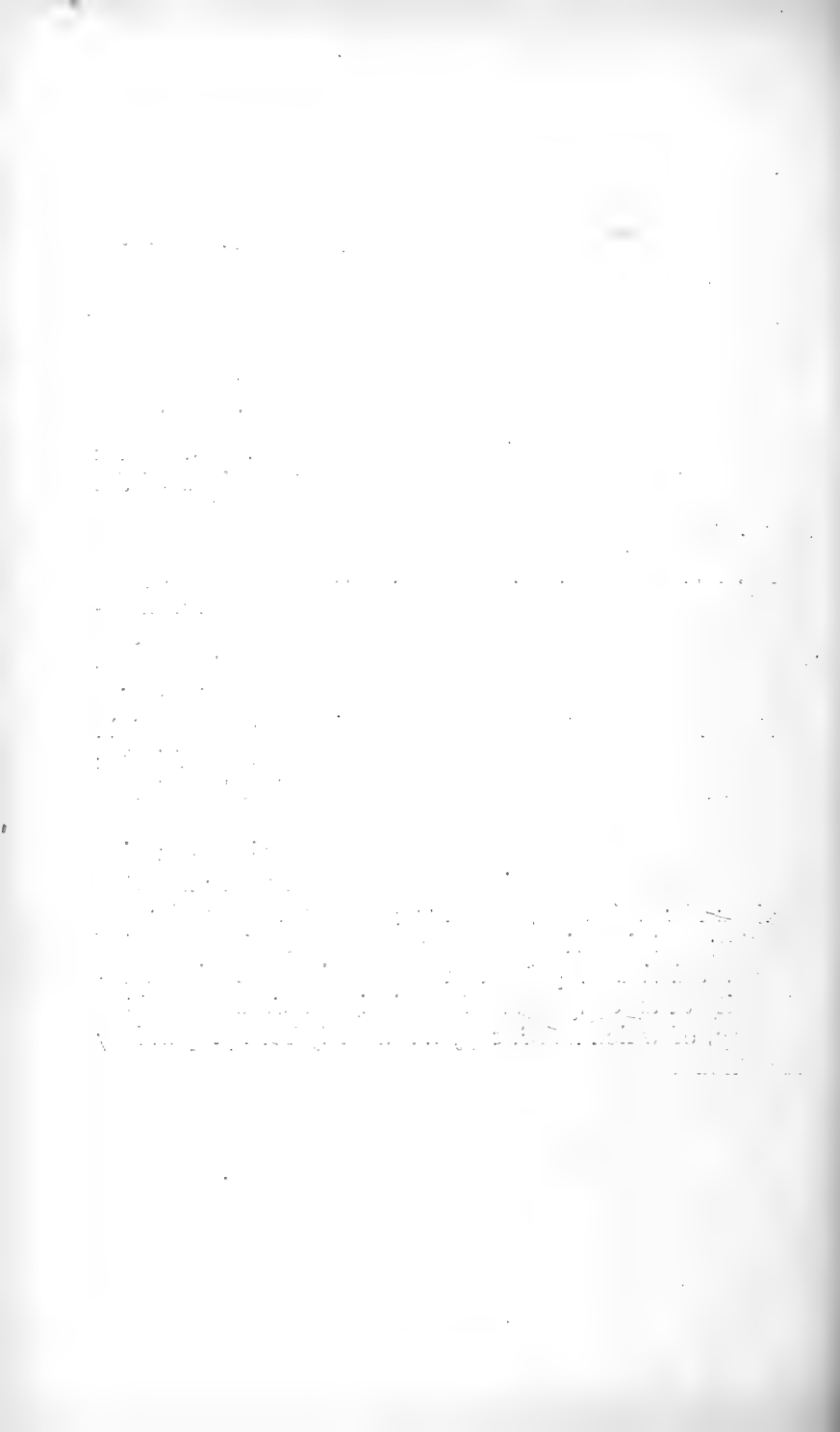
"The Field Naturalists' Quarterly," No. 3, from the EDITOR.

To those gentlemen named above, who have kindly added to the Library, the best thanks of the Society are given.

Mr. WEST, the one and only Curator the Society has had during its thirty-two years of existence, has again carried on his work to the full satisfaction of everybody. He reports the following list of donations to the Collections of the Society, and the Council wish to thank those gentlemen therein named :

Mr. R. ADKIN and Dr. CHAPMAN have given several good species to the collection, and Mr. HY. J. TURNER a store-box of Tortrices, Crambi, and Tinea. Mr. WEST also adds that he wishes to thank Mr. ASHBY for his valuable assistance in going through the Society's Collections with a view to eliminating the mould which has appeared in most drawers since the building operations. Most of it has been now removed, and only a few easily replaced specimens were beyond recovery.

The Council are pleased to note the increasing use which the Members of the Society make of the Library and Collections for reference, and the growing custom for the Meeting to finish with a conversazione. In this connection they would like to point to the incoming Council the desirability at an early date of publishing a Catalogue of the Library, of which a MS. copy has already been prepared by Mr. SAUZÉ.



The Pearly Nautilus.

By W. T. MANGER. *Read April 23rd, 1903.*

Class—**Cephalopoda.**

Family—ARGONAUTIDÆ.

Species—ARGONAUTA ARGO.

THIS is one of the most interesting of the Octopods, and occupies a perfectly unique position among the Mollusca. It is not homologous with the ordinary molluscan shell, not being attached to the animal by a special muscle, but is embraced or held to the body by two of the arms, which are dilated at the extremity and specially adapted for this purpose; the arms are furnished with minute secretive glands endowed with a power of calcification similar to that in the mantle of other Molluscs. The *Argonauta* has eight arms, each having two rows of suckers. When floating on the surface of the water, the two dilated arms mentioned are not expanded aloft to catch the breeze as has been so often represented: they are busy holding on to the shell from the outside, so that if the shell were taken out of the water and reversed, the animal would very soon fall completely out of the shell by its own weight. The *Argonauta* can float on the water, using its arms as oars; it can swim through the water by the successive injection and ejection of water in and out of the branchial cavity; and it also crawls on the bed of the ocean in an inversed position on its arms, feeding on Molluscs and Crustaceans. The mouth, with its parrot-like beak, is in the middle of the bases of the arms. One of the most curious attributes of this species is that the shell is constructed by the female only. The shell is simply involuted and not chambered, and forms a receptacle for the ova, a cradle for the young, and a protection for the parent.

The male is about an inch in length, and resembles an ordinary octopus, having neither shell nor palmate arms. The arms are tapering and alike, excepting the third on the left side, which is specialised. Perhaps the most remarkable in the sexual relations of all the Mollusca (says the "Cambridge Natural History") is the so-called Hectocotylus of the Cephalopoda. In the great majority of the male Cephalopods one of the arms, which is modified for the purpose in various ways, becomes charged with spermatophores, and sometimes becomes detached, and remains attached to the female; the lost portion is gradually reproduced, and in due time resumes its former appearance. It was a long time before naturalists could bring

their minds to believe that the animal found in this shell was any other than a parasite—a naked Octopod which took up its dwelling in this particular kind of shell, of which the maker and owner had escaped detection. This hypothesis was destroyed by Professor Owen many years ago, who brought before the Zoological Society of London the admirable observations of a lady, Madame Jeannette Power, who made a continuous study of these animals in her vivarium at Messina. The result of these observations showed that the eggs are deposited in the discoid portion of the shell. The ova form a large granulated mass attached to a many branched stem; they are contained in the spire of the shell in contact with the posterior part of the body of the mother, but sometimes project externally beyond the coil of the spire. In about twenty-five days after oviposition the young argonaut comes out of the egg a naked octopus, and in about twelve days more the two front arms of the female become dilated at the extremities into a pair of membranous webs and commence forming a thin, filmy shell. There are about eight species of *Argonauta* inhabiting the open sea throughout the warmer parts of the world, notably the Mediterranean, Red Sea, the Cape, the Morocco Coast, etc.

In concluding these very brief notes on this interesting and beautiful little animal, we cannot but be filled with wonder at the marvellously effective way in which the young are protected until they are able to take care of themselves, but why this is the only creature among the Cephalopods that makes this provision, who can say? The eggs of the common octopus (*Octopus vulgaris*) are fixed around a stalk, to which every egg is separately attached; the mother watches and guards the egg-clusters for some days. When the young emerge from the capsules, the spawn of the common squid (*Loligo vulgaris*) is left floating on the surface of the sea. The well-known eggs of the cuttle-fish (*Sepia officinalis*), resembling black, pointed grapes, are generally attached to the stems of sea-weed. In none of these species is there any protection to the eggs in the nature of a shell; this is reserved exclusively to those of the *Argonauta*.

Notes on a Holiday spent near Amersham, Bucks.

By HY. J. TURNER, F.E.S. *Read March 26th, 1903.*

THE powers that be having arranged that the week originally chosen for the Coronation of the King should be a vacation from duties, I thought it would be a fine opportunity to spend a holiday in the country, as usually at the end of June I am quite unable to get away for more than two days at a time. The ground lying between Amersham, Chesham, and Chenies has been visited by the Society on two or three occasions for a few hours, and a prolonged visit seemed to be desirable. I found a very comfortable and reasonable lodging at Amersham Common, and from there my daily excursions were centred.

As you no doubt already know, the district is a portion of the southern slopes, spurs, and valleys of the Chiltern Hills, and geologically, chalk capped by gravels, sands, and clays of various depths. Amersham Common, so-called "common," stands about 500 feet above the sea-level, and is situated on a ridge of varying width lying between the diverging valleys of the small streams, the Chess and the Missbourne, upon the banks of which are situated the picturesque towns of Chesham and Amersham respectively. The ridge is generally speaking flat, with somewhat sharp declivities to the two rivers. The northern slope to the Chess is covered by the extensive beech woods, which some of our members know so well, and which are easily approached by alighting at Chalfont Road Station of the Metropolitan Extension Railway. The area accessible from Amersham Common is well threaded by innumerable footpaths and roads, many of the former being most difficult to trace. It is interspersed by woods, lane enlargements, small coppices, and commons, and notice-boards are generally conspicuous, as yet, by their absence. Most of my collecting was done in a circumscribed area, but extended excursions could easily have been made, and no doubt would have been most interesting. The neighbourhood is attractive to the ordinary visitor—fishing can be indulged in in the Chess; Milton lived for a time at Chalfont St. Giles, and his cottage can be visited by a very pretty ramble across the fields; Great Missenden, near the next station beyond, is still further immersed in the Chiltern Hills, and has lovely walks and woods; while further on yet lies Wendover, in a deep gap through the main northern escarpment, and from which an ascent of the beacon, 850 feet above the sea, can be made. The weather was exceptionally fine after the wet spring, and the sun brilliant and hot, although on the upland there was invariably a pleasant breeze.

Insect life was not particularly abundant, no doubt owing to the unsettled weather which had prevailed up to the date of my visit, yet I was able to make a fairly representative list of captures, most of which were obtained in the daytime, as I did no sugaring.

Four species of butterflies only were taken. *Euchloë cardamines* was very common, and ova were to be obtained easily in the lane leading to the hanging woods above the Chess. *Pararge egeria* v. *egerides* was observed, as well as a few *Syrichthus malvæ*, while *Polyommatus icarus* was abundant. The larvæ of *Cosmotriche potatoria* were in numbers on the stems of grass late in the evening, apparently "drinking" in the dew-drops, and were the only representative of the Lachneides. Among the Noctuides *Euclidia mi* occurred in the rough fields, and at dusk *Caradrina morpheus*, *Apamea basilinea*, and *Miana strigilis* v. *æthiops*; the last one would hardly expect. All our species of Hepialids were met with, but none of more than ordinary forms. *Cilix glaucata* represented the Drepanulidæ and *Euchelia jacobæ* the Cheloniides. Two species of Geometers I had often wished to meet with in numbers so that I might see their habits and get a representative series, viz., *Abraxa sylvata* (*ulmata*) and *Asthena bloomeri*. The former was in absolute abundance in the deeper portions of several woods, and one could easily get a number in the net at once, or stand in one position and see six, eight, or ten at a glance resting in their characteristic attitude on the outspread leaves of the common dog's mercury, which grows so luxuriantly in the moister portions of the woods. Unfortunately the variation was very limited and confined to a slight difference in the area of the markings. The size too was remarkably uniform. *A. bloomeri* was not met with. *Cabera pusaria* was common near all the woods. *Bapta temerata* and *B. taminata* were just emerging. *Asthena luteata* occurred in one lane, and *A. candidata* was very common. *Iodis lactearia* was in very fine condition, and an unusually "green" series was obtained. The pugs were represented by nice series of *E. vulgata*, *E. rectangulata* (green), *E. satyrata*, and *E. castigata*, the last named being very generally distributed. *Larentia viridaria* was in good condition. The hanging wood is well known as a locality for very nice forms of *Melanippe montanata*, and on this occasion its reputation was well maintained by producing two very fine aberrations; one, a conspicuous asymmetrical form, having the median transverse band much contracted for the greater part of its length on one wing only, the other with only the costal portions of the transverse band present in a very contracted form, the remainder of the bands being quite absent, except a couple of dots on the inner margin. *M. sociata*, common, and *M. fluctuata* were the only other members of the genus taken. *Coremia ferrugata* and *C. unidentaria* were common, and *Camptogramma bilineata* a nuisance in the evening. *Cidaria picata* occurred sparingly, as did *C. corylata* and *C. truncata*. *Ematurga atomaria* could always be met with on sunny banks.

A visit to Wendover produced *Ligdia adustata*, two species of *Eupithecia*, *E. subumbrata* and *E. exigua*; specimens of *Phibalapteryx tersata* and *P. vitalbata*. I had almost forgotten to record *Melanippe unangulata*, two specimens of which were obtained close to Amersham Common. The Deltoides were represented by a solitary example of *Zanclognatha barbalis*, while only two species of *Crambus* were found, *C. hortuellus* and *C. pratellus*. *Scoparia dubitellus* and *Scopula olivalis* were abundant, and, with a specimen of *Pionea forficalis* met with at Wendover, represent the Pyralides. Of the Pterophori, the larvæ of *Aciptilia galactodactylus* were, as usual in the Chenies Wood, very common on the leaves of burdock. The following is a list of Tortrices:—*Ephippiphora brunniceana*, *Sericoris urticana*, *Sciaphila subjectana*, *S. hybridana*, *Spilonota suffusana*, *Penthina pruniana*, *P. cynosbana*, *Pardia tripunctana*, *Tortrix ministrana*, *Ptycholoma lechæana*, *Stigmonota composana*, *Simæthis fabriciella*, *Phoxopteryx lundana*, *Dichrorampha plumbana*, *D. plumbagana*, *D. petiverella*, *Argyrotoza conwayana*, and *Xanthosetia hamana*.

Among the Adelidæ a few *Adela viridella* and *A. degeerella* were captured, and at Wendover a colony of the beautiful *A. sulzella* was met with, the males assembling around a few females which were sitting on hawthorn leaves in the hot morning sunshine. A few *Eriocephala seppella* were swept off flowers as representatives of the Micropterygides. Among the Tineæ recognised were *Gelechia terrella*, *G. anthyllidella*, *G. scriptella*, *Glyphipteryx tripunctana*, *Dasycera sulphurella*, *Lampronia quadripuncta*, *Æcophora tripunctana*, *Scardia cloacella*, and *Enicostoma lobella*.

Next to the Lepidoptera the Coleoptera received most attention, my younger son devoting his time mainly to sweeping the abundant flowers and foliage of the lanes and path-sides. Most of the following identifications have been very kindly made by Mr. West:—Carabidæ: *Brachinus crepitans*, which when captured continued to give out the small clouds of smoke, *Harpalus ruficornis*, and *H. weneus*. Chrysomelidæ: *Gastroidea polygoni*, *Phyllotreta ochripes*, and *Chrysomela polita*. Longicornes: *Grammoptera tabacicolor* (in great abundance on Umbelliferæ), *G. ruficornis*, *Clytus arietis*, and a single specimen of *Toxotus meridianus* (on the stem of Scrophularia). Coccinellidæ: *Coccinella septempunctata*, *Halyzia 22-punctata*, and *H. 14-punctata*. Staphylinidæ: *Quedius fulgidus* and *Tachyporus solutus*. Pyrrhocroidæ: Four fine specimens of *Pyrochroa serraticornis*. Rhyncophora: *Polydrusus uniformis*, *Phyllobius pyri*, *P. argentulus*, *Sitones suturalis*, *S. ononidis*, *Cionus scrophulariæ*, *C. pulchellus*, *C. blattariæ*, *C. hortulanus*, *Cœliodes fuliginosus*, *C. quadrimaculatus*, *Apion minimum*, *A. fagi*, *A. miniatum*, *Hypera variabilis*, *Anthonomus rubi*, and *Rhynchites minutus*. Elateridæ: *Corymbites holosericeus*, *Athous hæmorrhoidalis*, *A. vittatus*, *Lacon murinus*, *Melanotus rufipes*, *Agriotes pallidulus*, *Limonius minutus*, and *Dolopius marginatus*. Telephoridæ: Generally common; *Tele-*

phorus rusticus, *T. nigricans*, *T. lividus*, *T. bicolor*, *T. lituratus*, *T. hæmorrhoidalis*, *Rhagonychia limbata*, *R. fuscicornis*, *Malachius viridis*, *M. bipustulatus*, and *Anthocomus fasciatus*. Anobiidæ: *Anobium domesticum*. Mordellidæ: *Anaspis frontalis*, *A. melanopa*, and *A. forcipater*. CEdemeridæ: Abundance of *CEdemera lurida*. Dermestiidæ: *Attagenus pello*. Nitidulidæ: *Meligethes rufipes*, *M. picipes*, *Byturus sambuci*, and *B. tormentosus*. Bruchidæ: *Bruchus ater*. Tenebrionidæ: *Cistela murina*.

I searched particularly for dragonflies along the two streams, but only met with *Libellula depressa* and *Agrion puella*, both examples being at some distance from any water. In June one looks for the female wasp to be scanning the banks, but only one was seen. Among the hosts of Coleoptera the following is a list of the Heteroptera which were met with:—*Sehirus bicolor* (a few), *Podops inuncta* (a few), *Monanthia cardui* (numerous), *Miris lævigatus* (abundant), *Notochilus contractus* (common), *Velia currens*, *Gerris najas*, and from juniper at Wendover five specimens of *Acanthosoma tristriatum*.

The shells and slugs which have been previously reported to the Society (1899, p. 92) as occurring were still abundant in the Chenies Woods.

The larks were exceedingly common, and the cries of the peewits were heard all around. A few nests only were noted, such as those of the thrush, blackbird, and yellowhammer.

Flowers were abundant, and a list of a few of the more striking plants may be of interest. The goat's-beard along the waysides, several species of veronica, the one in the beech woods being especially brilliant; in one wood the foxglove showed many very fine spikes; the Chenies beech woods produced abundant small specimens of the toothwort; in some parts a few specimens of *Verbascum thapsus* and *V. scrophulariæ* were seen; *Silene inflata* was not uncommon; the orpine (*Sedum telephium*) grew in abundance in the hedgerows of one meadow; along the valley of the Chess the yellow iris was common; one wood near the station produced fine specimens of the stinkhorn, in the same wood I was informed that the rare coral-root was to be found in early spring; many small, straggling spikes of the bird's-nest orchis (*Neottia*) were to be found in the Chenies Wood, along with plenty of the *Cephalanthera*, and in many meadows *Orchis maculata* appeared. I might mention that the wych elm is a common tree in all the woods of the neighbourhood as well as the beech.

From the above it may be judged, I think, that the lover of Nature may spend a really enjoyable holiday in this fine upland district, and no doubt sojourns at other times of the year, and in other years, would furnish lists of denizens which would greatly enlarge the foregoing.

Report of the Ashtead to Mickleham Field Meeting, May 16th, 1903.

Conducted by EDWARD STEP, F.L.S. *Read May 28th, 1903.*

THE field-meeting season has again begun under unfavourable meteorological conditions. Though the morning of May 16th opened with bright sunshine, it was cloudy and dull before noon, and the members alighted at Ashtead during a smart shower. So unpromising was the outlook that a number of those in attendance elected to go farther by train and join the main body at Mickleham.

The route from Ashtead Station ran across the village and *via* Rectory Lane to the Downs, until the old Ermyrn Way was reached, along which the party journeyed to Headley Lane. There were scarcely any insects observed on the wing, and the vegetation was too wet to sweep or beat. On the other hand, the moisture was too recent to have awakened the snails, with the exception of *Helix pomatia*, which swarmed in the narrow lane by the copse above Ashtead—much farther north than I had believed them to exist in this neighbourhood. The activity of this species was obviously connected with pairing.

The spring flowers were all but over, and the more characteristic chalk flora had not begun to blossom, so that there is very little to record in this department. Hedge garlic (*Sisymbrium alliaria*) and beaked parsley (*Anthriscus sylvestris*) lined all the hedges, and the greater stitchwort (*Stellaria holostea*), the germander speedwell (*Veronica chamaedrys*), and ivy-leaved speedwell (*V. hederæfolia*) were abundant. The greater celandine (*Chelidonium majus*) was in flower at Ashtead. Wild hyacinths (*Scilla nutans*) abundant in the copses, and ground ivy (*Nepeta glechoma*) and bugle (*Ajuga reptans*) made blue the hedge-bottoms, where the cuckoo-pint (*Arum maculatum*) was also conspicuous. A few blooms of cowslip (*Primula veris*), pilewort (*Ranunculus ficaria*), and moschatel (*Adoxa moschatellina*) lingered to show that spring was not quite ended. The wayfaring-tree (*Viburnum lantana*), was of course abundant on the chalk, as also was the wild strawberry (*Fragaria vesca*). Winter cress (*Barbarea vulgaris*) was noted in flower at Ashtead and on Mickleham Downs.

Birds and their nests in considerable variety were plentiful. Mr. Turner has supplied me with a list of those he noted; the nests including those of blackbird (common), song thrush (common), greenfinch (common), hedgesparrow, bullfinch, chaffinch, ringdove,

sparrow, and chiff-chaff; and the birds seen or heard were the nightingale, cuckoo, and lapwing.

The few insects noted or taken are as follows: (Mr. Carr's list)—
 Imagines: *Anticlea nigrofasciaria* (*derivata*), *Melanippe fluctuata* and *Eupithecia exigua*, all on fences. Larvæ: *Lithosia deplana*, *Miselia oxyacanthæ*, *Rumia luteolata* (*crategata*), *Crocallis elinguaris*, *Boarmia repandata*, *B. rhomboidaria*, *B. abietaria*, *Hemithea strigata* (*thymiaria*), *Cheimatobia brumata*, *Oporabia dilutata*, *Eupithecia sobrinata*, *Thera variata*, *Hypsipetes sordidata* (*elutata*), and *Himera pennaria*. In addition some of us beat the larvæ of *Eupithecia sobrinata* from the junipers on Leatherhead Downs, and Mr. Turner beat a larva of *Uropteryx sambucaria* from beech. Mr. Turner took the following Micros:—*Lithocolletis pomifoliella*, *L. viminetella*, *L. quercifoliella*, *L. coryli*, and *Nematois swammerdamella*. Mr. E. J. Hare took in addition to some of the above, *Adela viridella*, *Nepticula floslactella*, *Gracilaria hemidactylella* and *Micropteryx purpurella*, together with larvæ of *Boarmia abietaria*.

The entire party foregathered at Burford Bridge Hotel, where twenty-three sat down to an excellent tea.

Report of Field Meeting at Horsley, June 6th, 1903.

By W. J. LUCAS, B.A., F.E.S. *Read September 24th, 1903.*

JUNE 6th—the day set apart for the field meeting at Horsley—was fine and fairly bright. It was, moreover, warm without being unpleasantly hot.

Though insects may not perhaps have been quite so plentiful as to satisfy the more ardent lepidopterists, yet they seem, nevertheless, to have provided a very fair list; and then, of course, Horsley allows good scope for those whose inclinations are towards other branches of natural history. Taking all things together, therefore, the twenty-five members and friends who met at the “Duke of Wellington” can scarcely fail to have had a pleasant day, although their cabinets may not have profited to any marked extent.

On leaving Horsley Station the way to the “Duke of Wellington” at East Horsley lies along a pleasant road, with its hedgerows at this time of the year a garland of flowers. Here the geological formation is London Clay, but at the inn this gives place to a narrow band of the Lower London Tertiaries, which in turn are overlaid by the chalk, with characteristic flora and fauna, both of which it was the object of the party to investigate. Mr. G. Young (of the Battersea Field Club), who joined the field meeting, tells me that this narrow band of Lower London Tertiaries (rarely more than a quarter of a mile wide) forms a persistent border to the northern edge of the outcrop of the chalk, and that its position is indicated by the course of the main road from Croydon to Guildford, while the long string of towns and villages which it connects are all situated on this narrow strip. Their names are Croydon, Beddington, Carsharltan, Sutton, Ewell, Epsom, Ashted, Leatherhead, Fetcham, the two Bookhams, Effingham, East and West Horsley, East and West Clandon, Merrow, and Guildford. A track-way following the same line seems to be prehistoric, dwellers along its course in those early times probably finding it convenient to have the chalk downs for pasturage on the one hand and the woods on the London Clay for protection on the other, while the springs at the edge of the chalk gave them a reliable supply of good water.

The Upper Chalk was found exposed in a pit not a quarter of a mile from the village. The chalk is soft and white, and contains a fair number of flints. Some slight attempt was made with Mr. Young's assistance to test its fossiliferous qualities, with the result that some half dozen species were discovered. They were (1) a small portion of a sea-lily (*Bourgaticrinus*, sp.); (2) portions of a large

bivalve (*Inoceramus lamarckii*), one specimen apparently having been at least a foot in diameter; (3) two specimens of a small sponge (*Poro sphaera*); (4) two specimens of a small sea-urchin (*Echinoconus conicus*); (5) one very fine specimen of *Echinocorys vulgaris*, cut out with some difficulty almost without a flaw; (6) a specimen of *Echinoconus subrotundus*, found amongst rubbish in the pit. Whether any neolithic finds have been made in the immediate neighbourhood I do not know, but some have taken place at Netley Heath, and more at Headley and Walton Heaths, all of which are on outlying patches of these Lower London Tertiaries.

In addition to the pit, the many characteristic chalk lanes and other interesting spots in the neighbourhood were visited, and the various captures and finds made and observations noted are now to be discussed.

No Orthoptera, Hymenoptera, or Diptera have been reported. There are a few Neuroptera (Linn.)—Mr. South took *Agrion puella* near Effingham; the others belonged to the Planipennia. These were the large snake-fly (*Raphidia notata*), the delicate little lacewing (*Hemerobius micans*), the lacewing with blue-tinted wings (*Chrysopa perla*), and the two common species of *Panorpa*—*communis* and *germanica*.

Of beetles, the following were taken:—*Silpha atrata*, *Byrrhus pilula* (one dead), *Sinodendron cylindricum*, *Melanotus rufipes*, *Athous hæmorrhoidalis*, *Dascillus cervinus*, *Cryptocephalus aureolus*, *Cistela murina*, *Rhynchites æquatus*, *Phyllobius pyri*, *P. argentatus*, *Notiophilus biguttatus*, *Clivina fossa*, *Pterostichus madidus*, *Harpalus ruficornis*, *Creophilus maxillosus*, *Pederus riparius*, *Telephorus fuscus*, *T. lividus*, *Malachius bipustulatus*, *Melolontha vulgaris*, *Clytus arietis*, and *Miarus campanula*.

On this occasion by far the largest number of captures was amongst the Lepidoptera. Of the butterflies, besides whites a fair number of species was met with. Mr. Carpenter found the egg and larva of *Euchloë cardamines* as well as the female ovipositing. *Gonepteryx rhamni* and *Argynnis euphrosyne* were both observed. *Cænonympha pamphilus* seems to have been the only one of the browns. There were three blues—*Polyommatus icarus*, *Cupido minima* and *P. astrarche*. The rest were *Thecla rubi*, *Nemeobius lucina*, *Syrichthus malvæ*, *Nisoniades tages* and *Adopæa sylvanus*. In addition Mr. South met with two specimens of *Chrysophanus phlæas* between Effingham Junction and Ockham, where also he found (in addition to other butterflies) *S. malvæ* fairly common, a few specimens having the lower spots on the forewings confluent. Mr. Browne reported *C. minima* asleep on grass-stems. Messrs. Carr and Richards reported larvæ of *Zephyrus quercus*. Turning to the moths, the only Sphingid was *Smerinthus populi* (found at rest). The Bombyces were *Hepialus lupulinus*, *Euchelia jacobææ* (fairly common), *Dasychira pudibunda*, (a pair in cop.), and *Drepana falcatoria*. The Noctuæ were represented by a few species—*Xylophasia rurea*, *Hadena thalas-*

sina, *Anarta myrtilli*, *A. luctuosa*, *Plusia gamma* (one or two specimens noted by Mr. South between Effingham Junction and Ockham), *Plusia moneta* (two pupæ found by Mr. Richards in the garden of the "Duke of Wellington" on *Delphinium* plants), *Euclidami*, *E. glyphica*, and *Phlogophora meticulosa*. Larvæ of *Tæniocampa stabilis* and *T. pulverulenta (cruda)* were found by Mr. Carr. Owing to the fact that scarcely two (!) members seem to use the same name for the Geometers, it is almost a hopeless task for an outsider to collate the various notes, but the list seems to be as follows:—*Epione advenaria*, *Rumia luteolata*, *Iodis lactearia*, *Zonosoma linearia*, *Asthenia candidata*, *Acidalia remutaria*, *Cabera pusaria*, *C. exanthemata*, *Bapta bimaculata*, *Strenia clathrata*, *Panagra petraria*, *Macaria liturata*, *Ematurga atomaria*, *Fidonia piniaria*, *Lomaspilis marginata*, *Melanippe montanata*, *M. fluctuata*, *M. sociata*, *Camptogramma bilineata*, *Anaitis plagiata*, *Larentia viridaria (pectinitaria)*, *Eupithecia oblongata (centaureata)* (one), *E. tenuiata*, *E. exigua* (one); and larvæ of *Phigalia pilosaria*, *Hybernia aurantiaria*, *H. defoliaria*, *Cheimatobia brumata*, and *Oporabia dilutata*. Pyralides were *Pyrausta punicealis*, *Botys pandalis*, *B. hyalinalis*, *Loxostege verticalis*, *Scoparia ambigua* and *S. dubitalis*. Crambites: *Crambus pratellus* (very abundant), *C. chrysonuchellus* (abundant), and *C. hortuellus*. Tortrices: *Tortrix lecheana*, *T. ministrana*, *Pardia bipunctana*, *Anchylopera hundana*, *Catoptria hypericana* (three specimens). Tineæ: *Nemophora swammerdamella*, *Adela fibulella*, *Harpella geoffrella*, and *Gracilaria swederella*. In addition, between Effingham Junction and Ockham Mr. South took amongst the Micros, *Pyrausta aurata* (a few), *P. purpuralis* (one), *Ephippiphora pflugiana* (two males), *Argyrolepis hartmanniana* (two), *Xanthosetia hamana* (common), and *Glyphipteryx fuscoviridella* (abundant).

With regard to the Hemiptera, Mr. Kirkaldy reports that on arriving at Horsley a search was commenced for the bug *Eusarcocoris melanocephalus*, Fabr., which Mr. Turner had captured in the neighbourhood a few years previously, and whose food-plant he was desirous to determine. In the course of half-an-hour's examination and beating Mr. Turner found a pair, and afterwards nine more, while Mr. Kirkaldy secured two *in cop.* and two separate individuals. Between them they established the fact of its occurrence on *Stachys sylvatica*, each thinking that the observation was an original one. But on looking up the literature Mr. Kirkaldy found that Lethierry, in an apparently separately printed and little-known work ("Revue des Hemiptères de Belgique," Lille, 1892, pp. 1-2), records the species as "Partout sur *Stachys sylvatica*." The new observation is, however, useful as confirming this statement, since E. Bucaille, in his "Catalogue des Hemiptères au Département de la Seine-inférieure" ("Bull. Soc. amis des Sci. Nat. de Rouen, 1887," pp. 143-181), records it as "Sur les luzernes, des orties et un peu partout, mai à fin août." It may be, possibly, that he has mistaken the exact spot of his captures, inasmuch as here at least the *Stachys* is always found close

to and intermingled with nettles. Messrs. Kirkaldy and Turner came to the conclusion that *Eysarcoris* lies concealed in the flower-heads and under the leaves of the *Stachys*, coming out on the upper parts of the leaves during bright sunshine. Picton and Lethierry, in their catalogues, state "Europe" as the distribution of the species, but in the short time at disposal Mr. Kirkaldy could not trace records from Italy or Scandinavia. *Centrotus cornutus*, Linn., was found in great abundance, but only by beating oak trees. Bucaille says, "Sur les genêts, les *Pteris aquilina*, les jeunes chênes." A few specimens of *Tomaspis vulnerata*, Germar (= *Tricophora sanguinolenta* of many authors) were captured, beaten from oaks—in fact, oak trees afforded by far the best sport of the day.

Although the Mollusca abound at Horsley, but little search was made for them. Amongst the few secured were *Zonites nitidulus*, *Helix aspersa*, *H. cantiana*, *H. caperata*, *H. virgata*, and *Cyclostoma elegans*. On the trunks of the beech trees in one place there were a number of forms of *H. caperata*, and the shell was well protected on the bark.

As is usual on the chalk in June, flowers were plentiful, the following being some of the best amongst them:—Milk-wort (*Polygala vulgaris*), woodruff (*Asperula odorata*), cross-wort (*Galium cruciatum*), white campion (*Lychnis vespertina*), tufted vetch (*Vicia cracca*), slender tare (*V. tetrasperma*), bird's-foot trefoil (*Lotus corniculatus*), dogwood (*Cornus sanguinea*), spindle-tree (*Euonymus europæus*), rest harrow (*Ononis arvensis*), broom (*Cytisus scoparius*), purging flax (*Linum catharticum*), rock-rose (*Helianthemum vulgare*), sanicle (*Sanicula europæa*), wood forget-me-not (*Myosotis sylvatica*), germander speedwell (*Veronica chamaedrys*), thyme-leaved speedwell (*V. serpyllifolia*), louse-wort (*Pedicularis sylvatica*), bugle (*Ajuga reptans*), early purple orchis (*Orchis mascula*), fragrant orchis (*Habenaria conopsea*), lesser butterfly orchis (*H. bifolia*), great butterfly orchis (*H. chlorantha*), white helleborine (*Cephalanthera pallens*), guelder-rose (*Viburnum opulus*), and yellow dead-nettle (*Lamium galeobdolon*). The fly orchis and the bee orchis were sought for, but were not found.

During the day a few very good instances of "protective resemblance" were noticed. While walking up to the village from Horsley station with Messrs. Carr and Richards, the latter called our attention to the hedge-bank. I could at first see nothing of interest there, but it at length dawned upon me that a "dead leaf" on a grass-stem was not really such, but a poplar-hawk moth hanging at rest in its characteristic fashion.

Later in the day, when Mr. Step was on the point of taking a photograph of a butterfly orchis, he noticed a brown, crumpled leaf lying on a nettle close by. Recognising shortly that it was not a leaf, but an "angle-shades" moth, he secured a photograph of it. His eye being thus educated he soon afterwards found another angle-shades, but this time it was a leaf!

I accompanied Mr. Richards to some rough ground where the

chalk shewed amongst the herbage to find *Acontia luctuosa*. We noticed a fair number and caught a few. They flitted a short distance, and then settled down on the herbage or ground. When moving their black and white markings made them difficult to follow with the eye, and when they settled they were equally hard to see. They, indeed, seemed to be protected both by their manner of flight and their habitat. The little grizzled skipper was flying at the same place, and when they chased one another it was not easy to tell them apart, and when they separated you, of course, followed the wrong one! I succeeded in tracking a specimen down and boxing it, but the best method of capture seemed to be to watch the insect down, and, after the manner of a novice, to bring down the net perpendicularly over it as it rested.

In conclusion, I have to thank very heartily Messrs. Young, Richards, Kirkaldy, Step, Hare, South, F. M. Carr, Crow, Adkin, Browne, Scollick, and Priske for sending me notes—in some cases extremely interesting ones—and so for enabling me to compile this report.

Report of a Field Meeting held at Limpsfield Chart, June 27th, 1903.

By ROBERT ADKIN, F.E.S. *Read October 22nd, 1903.*

IT will be remembered that the field meetings placed under my charge during the past two years, viz. Brasted ("Proc.," 1901, pp. 20—23) and Otford ("Proc.," 1902, pp. 47—51), were held on the hills bordering the River Darent, and when it was suggested that I should undertake the arrangements for one during the present year it occurred to me that I could not do better than fix upon some adjacent part of this picturesque Kentish district, and accordingly Limpsfield Chart was chosen.

It should, however, be mentioned that, by the arbitrary division of counties, Limpsfield Chart belongs to Surrey, and it is very doubtful whether any of those attending the meeting set foot in Kent during any part of their ramble; but as it forms the western extremity of the Kentish ragstone hills, and many of the tiny rivulets which go to make the River Darent, already referred to, have their origin in its midst, I think we may, for our present purposes, accept the natural rather than the artificial boundary, and regard it as belonging to the West Kent district. Its name too has a distinctly Kentish ring, for I know no other county where the wooded common lands are designated by the name "chart."

Having selected the venue for the meeting, my first business was to work out a means for reaching it. Westerham is the nearest railway station, and anyone who may like to further investigate the locality, and can make his own arrangements as to trains, will find it an easy walk thence to the chart. The way, on leaving the station and gaining the High Street, is to the right through the village and to the left just after passing the pond; when little more than half a mile up the lane an ill-defined footpath on the right across a field brings one to the lower end of the chart, the distance from the railway station being perhaps a mile and a half. Or the path through the park may be followed to near the hill-top, and then, turning to the right through the woods or along the Edenbridge and Oxted Road, the upper part of the chart will be reached. But, although Westerham is the nearest railway station, the train service on that branch did not admit of convenient arrangements for a party being made by that route, and I had, therefore, to fall back upon Oxted as the only other available station whence we might gain our destination, and, indeed, by doing so secured some very distinct advantages; for, being on a line worked jointly by the S.E.&C.R. and the

L.B. & S.C.R., the train service is, for a place of its size, exceptionally frequent, and the former company having no stopping station between London and Croydon, the time occupied on the journey is considerably reduced. On the other hand, it is just two miles further away from the chart, and two very uninteresting miles they are—first along the high road, which is rapidly becoming bordered by more or less desirable villa residences, and then over Limpsfield Common, a none too attractive bit of furze-covered land now used as a golf-links, and uphill nearly the whole way, so that the prospect of any collecting on this part of the route is very poor; but once over the common the half mile of lanes leading to the woods are pleasant enough, and the hedges and broken ground at their sides no doubt worth the attention of the collector.

The accompanying map will no doubt enable any one desiring to reach the district *via* Oxted to find their way without difficulty, but I might mention that, should they not specially wish to visit the "Hoskins Arms," a short distance may be saved by leaving the railway station on the down-platform side and keeping to the main road, instead of following the route indicated, to the P.O. wall-box.

Any really fine days in the summer months of the year of grace 1903 are surely events to be recorded, and Saturday, June 27th, is therefore worthy of special mention. The weather for some time previous to the 20th had been very bad, barely fourteen hours sunshine was recorded for the week ending on that date, while for the same period a rainfall of 3.73 inches was registered, bringing the total for the first three weeks of the month to approximately 6½ inches, thus easily beating any previous record for the whole month of June. Temperature, too, had been low, the exposed thermometer falling to within three degrees of freezing-point on one night during the week above referred to, while one day maximum was only 49°. But on the 21st the weather began to mend, and although night temperatures were occasionally low, those of the day rose steadily from 61° on Sunday, 21st, to 84° on Saturday, 27th, the day of the meeting.

The sun was shining brightly when some fourteen members left London Bridge Station (S.E.R.) in the carriages specially reserved for them on the 2.13 train, and, being joined by others *en route*, the total attendance, on arrival at Oxted Station about three o'clock, was brought to twenty-two. Carriages were in readiness, and the party thus conveyed over the uninteresting two miles of road already referred to, to the cross-ways by "Briars Cross" at the top of the common, where the journey on foot was commenced.

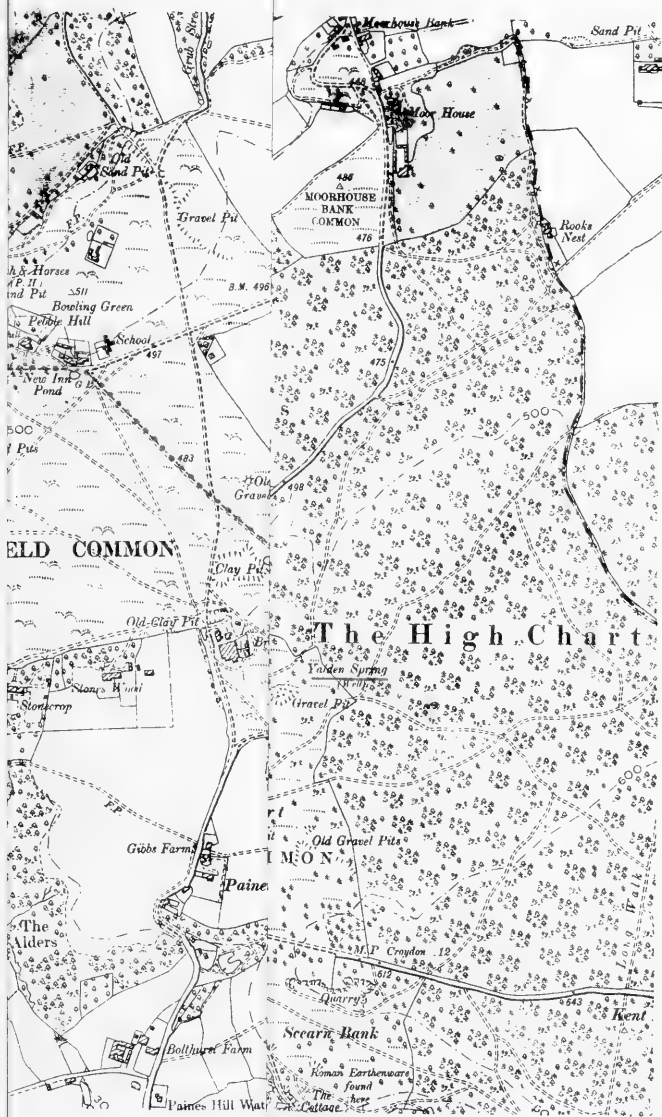
Taking the lane on the left hand—many of the party at once commenced collecting, while others took the opportunity of securing photographs of many of the picturesque bits of scenery that were met with by the way—and continuing past Ridland's Farm on the left and the hop-garden on the right to Whiteware Pond, the heather-covered borders of the chart were reached. Some hundred yards or

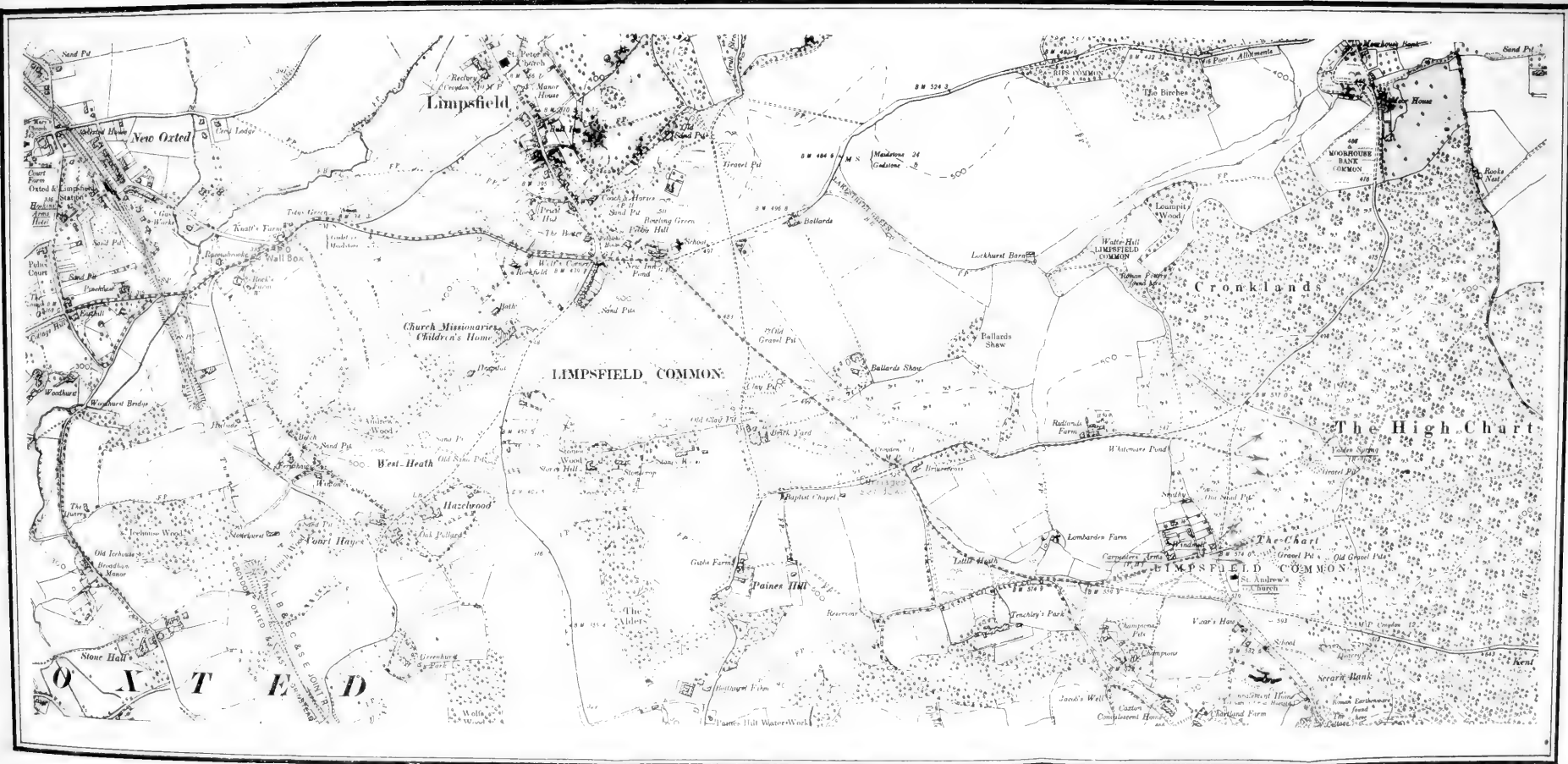
so further on the more heavily timbered woods were entered, and the greater part of the afternoon was spent in their investigation.

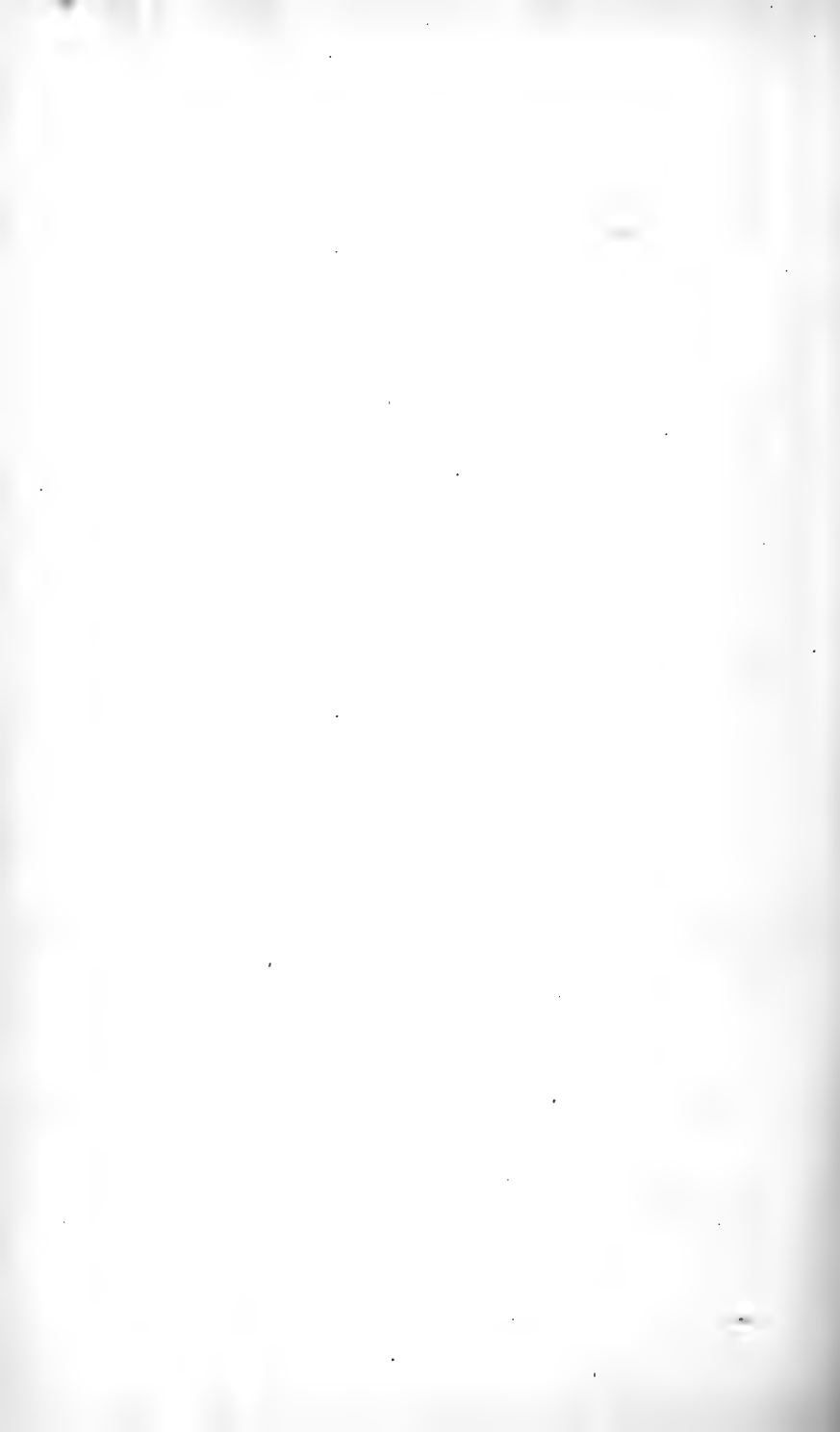
The High Chart, as this district is marked on the map, although perhaps better known locally as Limpsfield Chart, taking its name from the adjacent village, stands, as its map name implies, at a good elevation, the greater portion of it ranging between 500 and 600 feet above sea-level. The timber is similar to that of the other hills of the range, the larger trees being chiefly oak, beech, and fir, with an occasional white-beam, an abundance of birch in all sizes from little bushes to ancient forest kings, with here and there a bit of willow, nut, and such like; while the ground is covered with heather, bracken, bilberry, and sundry other of the usual low-growing plants, *Galium*, including a patch or two of *G. verum*, being not uncommon on some of the more open parts.

In so promising a district, and on such a warm sunny afternoon as we were favoured with, one would naturally expect insect life to be abundant; but it was by no means so, the bad weather of the week previous had left its mark, even sun-loving Lepidoptera appeared to be shy at getting on wing, and the beating-stick dislodged the more retiring species only at rare intervals, larvæ were conspicuous rather by their absence than otherwise, and searching the tree-trunks for moths was a wearisome occupation. Fortunately, however, sufficient were found to provide the photographers of the party with material for sundry illustrations of resting insects, Mr. Enoch securing some interesting examples in colour-photography. Working their way through the woods, the various groups of members eventually found themselves in the Long Walk, a wide and straight path running almost due north and south, and turning to the right until the main road was reached; some went on to Kent Hatch to avail themselves of the fine views obtainable over the lowlands towards East Grinstead and Ashdown Forest in the distance, while others busied themselves by collecting along the outskirts of the woods, all eventually meeting at the "Carpenters' Arms," whence the return journey was commenced, and after a pleasant though perhaps somewhat warm walk, the "Hoskins Arms Hotel," near Oxted Station, was reached, and the high tea there provided having been partaken of, a pleasant half-hour was spent in the spacious garden attached to the hotel, the return to London being made by the 9.40 train.

I have already referred to the comparative scarcity of Lepidoptera, the only order that appears to have received any serious attention on the occasion—a scarcity, be it noted, which appears to have been very general throughout the season of 1903. It will therefore not be expected that any long list of captures will be available, but such as I have been able to compile from the notes very kindly sent to me by some fourteen of the members present is appended. One of the species mentioned, *Cymatophora fluctuosa*, is perhaps worthy of attention. The larva feeds on birch in autumn, and the moth may be attracted to "sugar;" and I doubt not that if some of our more







energetic members were to set their minds to it, they would have little difficulty in completing their series of this delicate species.

One species of dragonfly only was met with, namely *Libellula depressa*.

Nests of the wood-ant (*Formica rufa*) were seen in profusion, some of them being of large dimensions and in a variety of positions, and were, not without some little difficulty, photographed by Mr. Step and others.

Many of the commoner flowering plants were in full blossom, and I am also indebted to the last-named gentleman for the following list of those that came under his notice; and at the Yalden Spring, a delightfully clear little pool just within the borders of the wood, a number of plants of the hard fern (*Lomaria spicant*) were found.

LEPIDOPTERA.—*Pieris brassicæ*, *P. rapæ*, *P. napi*, *Euchloë cardamines* (several quite fresh examples), *Epinephele tithonus*, *E. ianira*, *Cænonympha pamphilus*, *Polyommatus phlœas*, *Lycaena icarus*, *Hylophila prasinana*, *Lithosia mesomella*, *Nemeophila russula*, *Arctia villica*, *Phalera bucephala*, *Cymatophora fluctuosa*, *Agrotis strigula* (*porphyrea*) (flying over heather in sunshine), *Hecatera serena*, *Hypena proboscidalis*, *Rumia luteolata* (*cratægata*), *Iodis lactearia*, *Zonosoma punctularia*, *Z. liniaria* (*triliniaria*), *Hemithea strigula* (*thymiaria*), *Asthena candidata*, *Acidalia subsericeata*, *Cabera pusaria*, *Macaria notata*, *Ematurga atomaria*, *Bupalus piniaria*, *Lomaspidis marginata*, *Larentia viridaria* (*pectinitaria*), *Thera variata*, *Melanippe fluctuata*, *M. unangulata*, *Camptogramma bilineata*, *Cidaria fulvata*, *C. corylata*, *Scoparia dubitalis*, *S. ambigualis*, *S. cembræ*, *Scopula olivalis*, *Crambus hamellus*, *C. pascuellus*, *C. pratellus*, *Sciaphila hybridana*, *Prays curtisellus*.

PLANTS IN FLOWER.—*Tamus communis* (black bryony), *Veronica serpyllifolia* (thyme-leaved speedwell), *Lotus corniculatus* (bird's-foot trefoil), *Myosotis palustris* (forget-me-not) (some very fine examples growing near the Yalden Spring), *Orchis maculata* (spotted orchis), *Sarothamnus scoparius* (broom), *Bryonia dioica* (white bryony), *Lonicera periclymenum* (honeysuckle), *Galium mollugo* (great hedge bedstraw), *G. saxatile* (heath bedstraw), *Stachys sylvestris* (hedge wound-wort), *Vicia cracca* (tufted vetch), *V. sepium* (bush vetch).

Report of the Field Meeting held at Wendover on July 11th, 1903.

By HY. J. TURNER, F.E.S. *Read January 14th, 1904.*

A VISIT to the north-west escarpment of the Chiltern Hills at Wendover a year or two ago induced me to suggest that a field meeting of the Society should be held there. The Council, therefore, I suppose, requested me to arrange for one to take place, and although I should much have preferred some one with more knowledge of the locality to have led, yet I endeavoured to do my best. The original date chosen, July 25th, was somewhat late for an elevated and usually dry locality; so when the date was very kindly altered to July 11th to suit my personal convenience, there seemed a better prospect of a more successful meeting from a collecting point of view. Unfortunately members who had practically looked forward to joining were, owing to the tardy alteration of date and other causes, unable to attend, and less than a dozen met to enjoy the capital hospitality of the "Shoulder of Mutton" near the station.

As usual, the company, small as it was, split up into two sections. The advance party, consisting of Mr. South, Mr. Scollick, and myself, again divided, the two former staying at Chalfont Road, where, by the bye, they took only one example of *Abraxas sylvata* and one of *Asthena blomeri*, while I, alone, went on to investigate a remote part of the Wendover area, and more particularly to see what dragonflies were to be obtained around the large reservoir, which is so conspicuous a feature on the plain seen from the top of the beacon.

The second party arrived late, and appeared to be almost exhausted and at their last gasp from the terrible deprivation they had suffered on their journey. Their compartment, I understand, had been full, and the term "full" generally means something on Saturday afternoon about 2 o'clock on a London suburban railway, on the Metropolitan Railway in particular, and on the Baker Street Extension especially. However, all things have an end, and a few minutes of fresh air with a short, brisk walk soon produced a revivifying effect and sufficient impetus to give the necessary physical endurance for a climb of some hundreds of feet to the top of the Chilterns.

The weather was beyond, far beyond, one's expectation for such a year. It was simply delightful, and I think we all thoroughly appreciated it.

I have received three lists of captures, which I will take in order. Mr. South reports *Epinephele jurtina* (*ianira*), *Aphantopus hyperanthus*, *Pamphila sylvanus*, and *Polyommatus icarus* as the only Rhopa-

locera he noticed, but not commonly. Of the Heterocera he captured either single examples or a few of *Asthena luteata* (two), *Acidalia dimidiata* (*scutulata*) (two), *A. imitatoria* (three), *Cidaria dotata* (*pyraliata*) (a few), *Scotosia vetulata* (four), *Zanclognatha tarsipennalis* (one), *Z. grisealis* (one), *Scoparia cembræ* (one), *S. dubitalis* (a few), *Mimæseoptilus pteodactylus* (common), *Aciptilia tetradactyla* (one), *Graph. trimaculana* (a few), *Sciaphila subjectana*, and *S. virgaureana*. In addition to these Mr. Scollick reports taking *Cidaria fulvata*, *Hyphen proboscidalis*, *Scopula olivialis*, *Zonosoma linearia*, *Larentia didymata*, *Aciptilia pentadactyla*, *Metrocampa margaritaria*, *Scopula prunalis*, and *Ligdia adustata*. Mr. Carr has reported the following list:—*Cænonympha pamphilus*, *Cupido minima*, *Hadena dentina*, *Boarmia repandata*, *Iodis lactearia*, *Asthena candida*, *Cabera pusaria*, *Melanthia ocellata*, *Melanippe montanata*, *Camptogramma bilineata*, *Phibalapteryx tersata* (and ova), *P. vitalbata*, *Eubolia plumbaria*, *Hyphen proboscidalis*, *Eurrhypara urticata*, together with most of the species observed by other members. He also reports the following Larvæ:—*Ennomos erosaria*, *Ligdia adustata*, *Triphosa dubitata*, together with a whitethroat's nest containing four eggs.

My list contains the following additions to the above:—*Pyrameis cardui*, *Pieris brassicæ*, *Hadena porphyrea*, *Melanippe fluctuata*, *Rumia crategata*, *Crambus culmellus*, *Anthrocera filipendulæ*, and a few Micros. Around the reservoir I found *Enallagma cyathigerum* sparingly, and no other species of Odonata was observed. However, in the neighbourhood, I found a large number of larvæ of *Cucullia verbasci* feeding on *Scrophularia aquatica* growing in a ditch. In the reservoir I had the pleasure of seeing a swan sitting on her nest, which consisted of a huge mass of uprooted and torn-off flags, leaving a large area around quite denuded.

This seems very little result for so promising a district. But we all were of opinion, from the "lay of the land," and from the varied vegetation, that the potentialities for entomological work were great, and that persistent effort would no doubt result in a much better return. It seemed little use to remain for dusk, and the railway arrangements being by no means accommodating, most of us returned to London by an early train. I believe those two gentlemen who did remain got little for their pains.

Report of a Field Meeting held at Paul's Cray Common, October 3rd, 1903.

By ROBERT ADKIN, F.E.S. *Read October 22nd, 1903.*

THE closing field meeting of the season was held at Paul's Cray Common and Petts Wood on Saturday, October 3rd, and was devoted chiefly to the collection of fungi. The district has already been described in the report of a former meeting held there ("Proc.," 1900, pp. 17, 18), it is therefore unnecessary to dwell upon the beauties of its scene, or the many points of interest that it possesses for the collector.

In the matter of weather we were again singularly fortunate, for although the proverbial wetness of the season had not failed to assert itself during the days immediately preceding the meeting, no doubt preventing the attendance of many members who, had the prospect been more settled, would have been present; and even that morning had not been without its warning shower; but the afternoon was delightfully fine with genial sunshine and a soft westerly breeze, an ideal autumn afternoon for a country ramble.

The ten members comprising the party assembled at Chislehurst Station of the S.E.R. at about 3 o'clock, and proceeded by way of Chislehurst Common and the St. Mary Cray Road to Paul's Cray Common. Here fungi were found to be common enough, so far as concerned numbers, but the variety of species was not great, and the recent rains, although no doubt advantageous to the development of quantity, had not been altogether good for the quality, many of the individuals found being far too advanced to admit of their being gathered for identification; but no difficulty was experienced in selecting a considerable number of the fresher specimens. Having spent some little time in investigating the common, a move was made for Petts Wood, and just within the gate a goodly colony of that interesting but malodorous species *Phallus impudicus* was found in various stages of development, including the so-called "egg" stage, a fine example of which Mr. Step took in the hope of securing a series of photographs illustrating its development; but in this, I understand, he was only partially successful, owing to the remarkable rapidity with which it takes place. Further on in the wood a couple of dead birch trees produced some very fine specimens of *Polyporus betulinus* and *P. applanatus*, some of the best examples of which were secured by Messrs. Cowham and Dods respectively, who, at considerable risk of the dead stems collapsing under their weight, shinned up the trees and cut them out. By the time that the extremity of the wood was reached the light was rapidly failing, and it therefore re-

mained only for us to retrace our steps. In doing so we fell in with another member of the Society, who shall be nameless, who, having more regard for Lepidoptera than for fungi, had "sugared" a number of the trees to which such common species as *Anchocelis pistacina*, *Cerastis vaccinii*, *Xanthia fulvago* (*cerago*), *X. flavago*, etc., were already coming in some numbers, and this was as much as we saw of that order in the perfect state, for the afternoon had been absolutely barren in that respect. Some few larvæ, however, had been beaten, among them several *Amphidasys betularia* not yet half grown, a striking record of the unpropitious climatic conditions of the past summer. On the way back a halt was made at the "Bull's Head" Hotel at Chislehurst for tea, after which a pleasant stroll to the railway station brought the party there in good time for the 8.23 train home.

Mr. Stanley Edwards, who collected for the purpose of recording, submitted his basket to Dr. M. C. Cooke, who, from its contents, was able to identify upwards of thirty species, the remainder, for the reason already mentioned, being too far gone to be recognisable; and Mr. Step added another ten species from those that he had taken home for photographic purposes, of which we shall no doubt see more anon, bringing the total of those identified to forty-two species, a list of which is attached.

Dr. M. C. Cooke's list : *Amanita mappa*, *A. pantherinus*, *Amanitopsis vaginata*, *Clitocybe clavipes*, *C. opacus*, *C. ditopus*, *C. laccatus*, *Collybia maculata*, *C. butyracea*, *Mycena flavo-albus*, *M. capillaris*, *Hypholoma fasciculare*, *Psilocybe ericeus*, *Bolbitius tener*, *Cortinarius sanguineus*, *Lactarius turpis*, *L. pallidus*, *L. subdulcis*, *L. quietus*, *Russula lepida*, *R. furcata*, *R. vesca*, *R. rosacea*, *R. azurea*, *R. granulosa*, *R. fragilis*, *R. lactea*, *R. ochroleuca*, *Boletus scaber*, *Polyporus betulinus*, *Thelephora lacinata*, *Scleroderma vulgare*.

Mr. Step's list : *Amanita muscarius*, *A. rubescens*, *Russula nigricans*, *R. virescens*, *Clitopilus prunulus*, *Stropharia semiglobatus*, *Boletus edulis*, *B. badius*, *Polyporus applanatus*, *Phallus impudicus*.

A Fortnight's Collecting at Dawlish.

By G. B. BROWNE. *Read January 14th, 1904.*

It was after reading the notes of Mr. Turner upon Dawlish, in our "Proceedings" for 1900, that I formed the determination of paying a visit at the first opportunity to that exceedingly pretty and interesting part of Devonshire, the more especially as that brilliant insect *Callimorpha hera* was to be obtained there. I may say at once that, although the dates of my visit were arranged with a reasonable prospect of coming across this species, I did not see a single specimen of *C. hera* or hear of one being taken during the time I was there—from July 23rd to August 7th. The weather was very unsettled and wet the first six or seven days, and although the rest of the time was fine with the exception of a few showers, the wind was cold and kept persistently north-west, nearly always blowing so strong in the day as to render collecting and beating very uncomfortable.

The disappointment in not finding *C. hera* kept me continually on the move, and every day was spent in exploring the country round in the hope of seeing that insect. Although by so doing I missed visiting some spots of more general interest, I got pretty well acquainted with that most charming feature of Devonshire scenery, the beautiful paths and lanes that lie all around, whose banks and hedges teem with objects of interest in every branch of natural history. For variety one could turn to the sea-shore with its cliffs of red sandstone, and that beautiful walk along the top called the *Ladies' Mile* and, further on, the Warren, a capital collecting ground. For a more extended walk there is the two-mile climb to the top of Haldon, running through woods belonging to the Hoare family, of Fleet Street fame. When you arrive at the top there is a magnificent expanse of moor and heather with scattered birches and pines—a fine hunting ground, I should say, earlier in the season, but insects seemed very scarce on the two occasions I went up there. A few *Satryus semele* were taken in fair condition, but the weather was cloudy and the wind high, and captures were a work of some difficulty. There are few more charming and exhilarating spots than the top of Haldon with Dawlish lying at your feet.

"The Monk of Haldon" humorously alludes to Dawlish as follows :

"Then low at your feet,
From this airy retreat,
Reaching down where the fresh and salt water meet,
The roofs may be seen of an old fashioned street ;

Half village, half town, it is pleasant but smallish,
 A place I'd suggest
 As one of the best
 For a man breaking down who needs absolute rest,
 Especially, too, if he's weak in the chest;
 And known, where it happens to *be* known, as Dawlish.
 T— may be gay
 But as for the air,
 It really cannot for a moment compare
 With snug little Dawlish—at least, so they say here."

Having been, so to speak, introduced to Dawlish by Mr. Turner, it seemed quite in the proper order of things that, immediately on my arrival there, the first person I heard was coming down in a day or too was Mr. Turner himself. I was very glad indeed at this, for I knew that his general and special experience would be of great assistance to me during my stay. We had some pleasant outings together, and I owe it entirely to his kind help that I was enabled to come away with about thirty pupæ of *Bryophila muralis*. This insect was only just about emerging when I left. I took two imagines, but from my pupæ only about nine emerged, and some of these were partial cripples. It is necessary to keep these pupæ rather damp, which is all right when normal conditions prevail, but we had such a spell of cold and wet weather in August that it was all against their successful emergence, and most of the pupæ damped off, the last emergence taking place on September 1st.

I found the most profitable work by day was beating for Geometers, but this was sadly interfered with by the wind. Among the results were—

Cidaria picata: this species was not at all uncommon, and in fair condition, but its capture was a work of some difficulty owing to the high wind generally prevailing, most specimens flying high and being blown over the top of the hedge; *Emmelesia decolorata*, one taken; *Cidaria dotata*, mostly rather worn; *Melanippe unangulata*, in fair condition; *M. rivata*, not common; *M. sociata*, plentiful and in good condition, the dark-banded form usually; *M. fluctuata*, not many seen; *Melanthia ocellata*, three taken in good condition—one small clean form; *Acidalia imitatoria*, fairly plentiful (a good many no doubt missed owing to the colour-resemblance to *C. bilineata*); *A. interjectaria*, one; *A. bisetata*, plentiful; *A. scutulata*, I should say fairly plentiful, but mistaken at times for *A. bisetata*; *Cilix spinula*, one; *Hypsipetes elutata*, plentiful, but worn; *Eupithecia subnotata*, one; *Coremia unidentaria*, plentiful; *C. ferrugata*, fairly plentiful. I obtained a few ova from a worn female, the larvæ from which (eighteen in all) fed up and pupated in due course. Somewhat to my surprise one imago emerged on October 31st last, the weather at the time being warm and moist. Both this insect and the parent were of the same distinctive red coloration. *Triphæna ianthina*, two fine specimens, and others seen. *Camptogramma bilineata*, a most unmitigated nuisance, especially at dusking. I used to take a

small electric flash lamp in my pocket in the evening, putting on the light as soon as I got an insect in the box. A great majority of these were always *bilineata*, and were at once promptly rejected. *Nudaria mundana*, one specimen taken at rest on a tree-trunk on Dawlish lawn. I did not know the insect at the time, or I ought to have worked for more. *Bryophila perla*, a few found resting on walls. *Eubolia palumbaria*, one specimen on Haldon.

Dusking produced—*Arctia fuliginosa*, one fine red form; *Gnophos obscurata*, one dark form; *Calligenia miniata*, eight good specimens, all rather larger than usual; *Lithosia stramineola*, one; *L. griseola*, plentiful; *L. complanula*, plentiful; *Eubolia bipunctata*, not common; *Acidalia aversata*, three specimens; *A. emarginata*, one; *Pseudoterpna cytisaria*, worn; *Hemithea thymiaria*, worn; *Odonestis potatoria*, several seen; *Selenia illunaria*, and several of the carpets already noted; *Boarmia rhomboidaria*, an uncommon form; *Hepialus sylvinus* and *H. humuli*; *Dianthacia capsicola*, one; *Abraxas grossulariata*, plentiful as usual, I came across none but the typical form.

As to sugaring, the record is unfortunately a most meagre one. This kind of work, to be of much value as a test of a neighbourhood's capabilities, should be done systematically and regularly and, as far as possible, in all kinds of weather. I did my best to fulfil these conditions and, except on two impracticable nights, I treaced down in the Warren every evening during my stay with quite disappointing results. I had expected great things from such a promising neighbourhood, and the spot I selected seemed the very place where most of the coast insects would be found, as well as those of a more general character. Every insect I thought it worth while to take at sugar is included in my exhibit, and I think you will agree with me that such a result for a fortnight's hard work in such a district, at that time of the year, is most disproportionate. It is true that the conditions were unfavourable, but they were not more so than during my visit to Deal in August, 1902, when everything simply swarmed at sugar, and 1902 generally was by no means a good year in this respect. Besides being the least productive, my work here was carried on under most unpleasant conditions, the chief being the loneliness and dampness, indeed you really required to be equipped as for fen work, and I did not have this advantage. I noticed one peculiar circumstance in a dilapidated old *Noctua*, which came four nights in succession to almost the same post. This particular insect had one of its wings deformed, and there was no mistaking it when it put in its appearance time after time.

The insects noted at sugar were *Leucania putrescens*, one slightly damaged; *L. pallens*, *L. impura*, and *L. lithargyria*, all comparatively plentiful; *Thyatira batis*, one, worn; *T. derasa*, a few in fair condition; *Triphæna interjecta*, one with a fine reddish colour; *Hadena oleracea*, *Noctua plecta*, and *Agrotis puta*, a few only; *A. tritici*, one only seen; *Caradina blanda*, two; *Miana furuncula*,

fairly plentiful; *Amphipyra tragopogonis*, one; *Bryophila muralis*, one.

The common sorts, such as *Apamea oculate*, *Noctua xanthographa*, *Xylophasia polyodon*, *Triphæna pronuba*, etc., were all there as a matter of course, but only a few even of these were to be seen. *Anthrocera* (*Zygæna*) *filipendulæ* swarmed in the Warren, and the thistle-heads were covered with them by day and night. The pupæ could also have been taken by hundreds on the grasses and sedges. I did not notice any varieties.

The butterflies noted were *Dryas paphia*, a few worn specimens; *Argynnis aglaia*, a few seen on Haldon; *Pararge megæra*, plentiful on warm days; *Hipparchia* (*Satyrus*) *semele*, fairly plentiful on Haldon; *Aphantopus* (*Epinephele*) *hyperanthus*, one large form; *Epinephele tithonus*, plentiful; *E. ianira*, worn; *Chrysophanus phloxas*, few only seen; *Zephyrus quercus*, a few worn specimens seen; *Eugonia* (*Vanessa*) *polychloros*, one seen; *Aglais* (*Vanessa*) *urtice*, plentiful; *Vanessa io* and *Pyrameis atalanta*, only a few of each species seen; the common Pierids were fairly represented, and of the blues *Polyommatus* (*Lycæna*) *alexis* was not common, and only two *Cyaniris argiolus* seen high up, driven by the wind; *Thymelicus* (*Hesperia*) *thauumas*, a few worn specimens. I myself did not see either *Colias edusa* or *C. hyale*. The weather was very unfavourable for butterfly work all the time, the wind being the chief drawback.

From what I had heard before I went to Dawlish I had expected that "light" would have proved very profitable, and so I believe it would have been, if the weather conditions had been favourable and the "light" itself had been there. I had made the necessary arrangements with my landlady to stop out half the night, if needful, and it was therefore with intense disappointment that I learnt that there was something the matter with the town gas-works, and that only the lamps in the town itself were lit, and even these were put out at 11 p.m.! I had early experience of this on returning one night from sugaring. The air was a little warmer than usual, and, as there seemed some chance of insects appearing, I stopped at the first lamp, which, by the way, was nearly opposite the turning where Mr. Turner lodged, and captured a few common moths, which I had to reject as they were all worn. I was hoping for something better to come along when a man came up and paused, watching me. I thought he was merely interested in what I was doing, and so entered into conversation with him. He then said he was waiting to put out the lamp, but if I was catching anything valuable he would be pleased to wait a few minutes. He gave me some information as to the doings of others at the gas lamps, particularly referring to one well-known resident, which only made my regret the keener in thus missing an interesting hunting ground. The very night before I came away all this was altered, and the lamps everywhere in and around Dawlish were in full swing again, for the benefit, I hope, of those who came after me.

During my stay I kept a good look-out all the time for *Eremobia ochroleuca*, but I fancy I was too early for that beautiful species, as the specimens I captured last year (1902) at Deal were taken on the 21st August in fine condition.

It being rather an off-time for larvæ, I did not work for them, with the exception of one afternoon vainly spent in searching for *Agrotis ripæ*. Mr. Turner came across some *V. io* larvæ during our first ramble together, and some of the results are shown in my exhibit. I should judge that the neighbourhood possessed good possibilities in this respect.

I have endeavoured in these few notes to put before you my personal reminiscences of what was a very pleasant and very busy holiday, and I trust that they have not been altogether uninteresting to you. I have not gone into more general matters connected with that very beautiful part of Devonshire, as these have already been dealt with by Mr. Turner in his previous notes, and he will no doubt make up for my present deficiencies in those which he is about to give you. I have to thank him most heartily for his companionship and for his help, at all times most cheerfully rendered.

More Desultory Days at Dawlish (Supplementary to Mr. Browne's Notes).

By H. J. TURNER, F.E.S. *Read January 14th, 1904.*

AFTER the admirable paper you have heard from Mr. Browne my own notes must appear to be very deficient. In fact, my entomology was, I think, more desultory than ever.

I am omitting from the present list most of the species which I recorded previously. Among the butterflies no species new to me occurred, and those I had previously recorded ("Abstract Pro. S. Lond. Ent. Soc.," p. 22, etc., 1900) were very scarce or quite absent. No Sphingidæ were even seen, and of the Anthroceridæ only *A. filipendule* occurred sparingly. A solitary specimen of *Callimorpha hera* was the only example of the Euchelidæ taken or observed; this species has, I believe, been unusually rare this season, no doubt owing to the hard life the larvæ have in a mild wet winter. In the Eutrichidæ a *Cosmotriche potatoria* was the only example taken. *Bryophila perla* (two) and *B. muralis* (a few bred from pupæ) represent the Bryophilidæ. The latter species was certainly not so common as usual, although a diligent search always produced some pupæ. *Miana bicoloria* represented the Apameidæ, in numbers, as usual, on its favourite haunts, the low slopes near the sea, with a single *Apamea didyma*. Among the Noctuidæ were *Triphaena pronuba* and *T. comes*; but the larvæ of *Agrotis ripæ* were exceedingly small, and such difficult larvæ as they are to deal with, I thought it much better not to take any.

Turning now to the Geometers. The Ennomidæ were represented by *Eugonia quercinaria* and *Selenia bilunaria*, var. *juliaria*. The Boarmiidæ were illustrated by *Cleora lichenaria* and *Boarmia gemmaria*. The Acidaliidæ have *Asthena candidata* (a very late example), *Acidalia virgularia*, *A. bisetata* (exceedingly common), and *A. dimidiata*. The Zerenidæ afforded plenty of *Abraxas grossulariata*. The Larentiidæ were represented by *Eupithecia isogrammata*, *Cidaria picata* (in some numbers), *Melanippe unangulata*, and *Hypsipetes furcifera* (*sordidata*). Of the Pyralidæ the best capture was in *Botys asinalis* (obtained from among its food-plant, *Rubia peregrina*); *Pyrausta purpuralis*, *Pionea forficalis*, and *Ebulea sambucalis* were also taken. The Hypenidæ, represented by *Hypena proboscidalis*, were a nuisance everywhere. The Pterophoridæ taken were *Mimæse optilus pterodactylus* and *Aciptilia pentadactylus*. The Crambidæ observed were *Crambus culmellus* (in great numbers) and *C. pinellus*. Two forms of *Aphomia sociella* represent the Galleridæ.

In my previous notes the Tortrices and the Tineæ were represented by only two species. On this occasion I have a more extensive list of both groups.

Taking the Tortrices first, I have eight species of the family Tortricidæ: *Tortrix xylosteana*, *T. rosana*, *T. heparana*, *T. ribeana*, *Peronea variegana*, *P. ferrugana*, *Dictyoptyx holmiana*, and *D. forskaleana*. The Penthinidæ were represented by *Penthina variegana*. In the Spilonotidæ were *Hedya ocellana*, *H. aceriana*, *H. dealbana*, *H. neglectana*, and *Spilonota rosæcolana*. The only species of the Sericoridæ was a solitary *Aspis udmanniana*. The Sciaphilidæ was also represented by one species. In the Grapholithidæ were *Grapholitha penkleriana*, *Pædisca corticana*, *P. profundana*, *Dichrorampha petiverella*, and *D. simpliciana*.

The Tineina: the Tineidæ consisted of one species, *Tinea nigripunctella*. Three species of Plutellidæ were found, *Cerostoma lucella*, *C. radiatella*, and *Harpipteryx xylostella*. The Hyponomeutidæ were represented by *Hyponomeuta plumbellus* and *H. evonymellus*. Six species of the Gelechiidæ were found, *Phibalapteryx quercana*, *Depressaria costosa*, *Gelechia mulinella*, *G. maculea*, *G. tricolorella*, and *G. gerronella*. The Coleophoridæ were represented by an unidentified species, which at the time I took for *Coleophora solitariella*, on account of the very numerous mines of that species in *Stellaria holostea*. A specimen, *Lithocolletis quercifoliella*, alone represented the family Lithocolletidæ.

Among other orders I made a few stray captures, of which doubtless the most worthy of notice were *Cordulegaster annulatus*, the only dragonfly seen, and a fine specimen of the rare beetle *Prionus coriarius*, caught flying by my son.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History
Society.*Read January 28th, 1904.*

By EDWARD STEP, F.L.S.



GENTLEMEN,—Probably in order to secure uniformity in our published reports, the Bye-laws of the Society lay upon each retiring President the necessity of preparing and reading an address before he makes way for his successor. I believe I am correct in saying that among actual and possible Presidents this bye-law is by no means popular, and it has even come to my knowledge that men well qualified for the office have declined nomination solely on account of this condition. I must confess that I sympathise with this feeling, for though I have never held back when asked to read a paper or deliver a lecture to the Society, I do feel that I have nothing to say of sufficient importance to be made a special feature of an annual meeting, and possibly to be printed *in extenso* in our “Proceedings.” I think it would be better if this were an optional rather than a compulsory matter, so that he who had something to say could feel warranted in saying it, whilst he who felt no special call for speech might be silent and yet break no law.

The statistics relating to membership, meetings, and finance have already been placed before you in the Report of the Council and the Treasurer’s Balance-sheet, and there is little need for me to traverse the same ground. Though the past year has been marked by no new departure or by any circumstance of special note, I feel that we may congratulate

ourselves upon the fact that we have maintained our position, that our indoor meetings have not fallen off, and that our field meetings have been well attended in spite of continuous bad weather. In this last respect the past season has been phenomenal, and though I believe the temperature of the whole year has been above the average, the summer has been singularly deficient in warm, sunny days, and insects on the wing have been very scarce.

Messrs. Adkin and Turner succeeded last season in introducing us to new localities—a very desirable thing to do. There are many variations that might be made in the routes chosen, even for old and well-tried localities, but in practice the conductors are handicapped by three things—the railway service, the shortness of the afternoon, and the question of commissariat. There are places within twenty miles of London not yet visited by us as a Society where the distance from a railway station, combined with an inconvenient service, puts the place beyond the range of practical politics for an afternoon excursion. There are others that might be compassed, but the would-be conductor shrinks from the awful responsibility of taking a score or more of healthy naturalists to an enchanting spot where there is no means of rewarding their labours by some sort of a meal.

Many years ago, before our Saturday afternoon trips were inaugurated, the Society organised an annual whole-day meeting at Three Bridges, and I believe some attempt was made a few years back to revive this idea in a visit to the New Forest. These excursions were complicated by connection with Bank Holidays, when the difficulty of making suitable arrangements is greatly increased. Would it not be possible, once in a summer, to have a whole day together in some choice locality far afield, unhampered by bank-holiday crowds or beanfeasts? I think it is worth consideration.

There is one respect in which I am glad to say our report differs from most of its predecessors—that is in the fact that death has made no inroads upon our membership. We have missed several regular attendants from our meetings, but we are proud to know that their absence is due to their having been called to scientific work in distant fields. In this connection I would mention our friends, Mr. Kemp in Ireland, and Mr. Kirkaldy in far-off Honolulu. Gifted and enthusiastic scientific workers, we parted with them regretfully, but I think we are justified in believing that their future work will add to the prestige of the Society, with which they are still connected.

One paragraph in the Report may, to members not fully conversant with all the facts, convey the impression of a considerable defection of members during the year; but the numbers reported as struck off had practically ceased to be members for some years. The Bye-laws direct the Council to expunge the names of members whose subscriptions are three years in arrear; but the Council, in applying this instruction is careful to do so in the best interests of the Society—taking into consideration the circumstances of each case so far as they can be ascertained, and never losing a member if a little patience and friendly intervention will secure him. There comes a point, however, beyond which failure to strike off defaulters would be contempt of the Bye-laws and a betrayal of the trust reposed in the Council by the general body of members. From many years' experience on the Council I can say that I have never known the bye-law to have been applied with anything approaching harshness.

The season, as you all know too well, has been an exceptionally bad one for collectors; it is, therefore, a matter for congratulation that the British Fauna Lists have been enlarged by nearly a score of species. There are many naturalists who are of opinion that the fauna and flora of these islands have been worked out, and that one must go abroad for new fields of discovery. The steady addition yearly to the insect lists, however, shows that this is certainly not the case among invertebrates, and this year we have had a notable addition to our known species of British vertebrates in the identification by Mr. F. Pickard-Cambridge of the Giant Goby (*Gobius capito*) as an indigenous fish. This case is particularly interesting to me, because Mr. Pickard-Cambridge's discovery was made in the very rock-pools at Portscatho where I had collected and studied for several years. I, indeed, feel that his identification carries with it a considerable amount of reproach to myself, for I know the fish very well, and ought to have distinguished it years ago. The truth is, so far as fishes are concerned I was chiefly working with the aid of Couch's "British Fishes," where this species is actually figured, but under the name of *Gobio niger*. Couch describes *G. niger* as attaining a length of nine or ten inches, and so I never questioned his accuracy, but as a matter of fact the true *G. niger* does not exceed five inches. *G. capito* was never recorded except from the Mediterranean until Mr. G. A. Boulenger found it on the Breton coast in 1899. His suggestion then that it might turn up on the Cornish coast led Mr. Pickard-Cambridge to search for it in

August last, and to find it in the species figured by Couch as *G. niger*. The lesson of such a discovery seems to be that our flora and fauna is not so certainly worked out as we commonly take it to be, and that there are still rewards for those who will set themselves to the thorough exploration of a particular restricted area.

Coming to the additional species of insects, which will probably have greater interest for you, we have no less than three species of LEPIDOPTERA.

Ophiusa stolidus, Fab., is a beautiful Noctuid whose habitat is in Asia Minor, North Africa, and Southern Europe. It was taken at sugar by our member, Mr. Jäger, near Dartmouth, in September. Its very fresh appearance when exhibited at our meeting points to its having at least emerged from the pupa in this country, and as Mr. Jäger took it in the neighbourhood of its usual food-plant (bramble), it seems probable that it may have passed through all its stages in this country. The capture is recorded in 'E. M. M.' p. 269, 1903, and a photograph and description appeared in "The Queen" of December 19th, 1903.

Thalera fimbrialis, Scop., a Geometer of Central, Southern, and Eastern Europe, was taken by the small son of Mr. Charles Capper at Beachy Head, in August, 1902, and has since been identified by Mr. C. G. Barrett ("E. M. M.," p. 216, 1903).

Nephopteryx similella, Zinck., is a new British Phycid, taken by Mr. Bernard Piffard in the New Forest in June, 1901, and later by Mr. C. Gulliver in the same locality. It is recorded by Mr. C. G. Barrett in "E. M. M.," p. 1., 1903.

In addition to these new species it is worthy of note that this has been a *Cardui* year, the species being specially abundant during the fourth week in September, and Mr. W. Eagle Clarke's experiences on the Kentish Knock Lightship point to the probability that the insects came on a light S.E. wind from the Continent. During the period of this visitation, Mr. T. Ashton Lofthouse took at Middlesborough a specimen of the Noctuid, *Xylophasia zollukoferi*, only twice previously recorded in this country ("E. M. M.," p. 290, 1903).

Deilephila livornica, a species of rare occurrence, has been bred by Mr. Jäger from a larva obtained in Devonshire.

COLEOPTERA:—Five species new to Britain have been recorded.

Edemera virescens, L., though taken by Mr. Jas. Edwards, F.E.S., in central Norfolk, as far back as June, 1884, and

considered by him at the time to be *Æ. lurida*, has only now been identified as *Æ. virescens*, a species widely distributed on the Continent ("E. M. M." p. 64, 1903).

Hydroporus bilineatus, Sturm., was similarly taken as *H. granularis* in 1891, by Mr. A. J. Chitty, F.E.S., but is now identified by Mr. E. A. Waterhouse ("E. M. M.," p. 143, 1903).

Tetropium fuscum, Fabr., is described by Dr. Sharp ("E. M. M.," p. 198, 1903) from a specimen obtained by his daughter, Miss M. A. Sharp, by sweeping in the New Forest in June last. A specimen of the same insect had been taken at Betchworth in July, 1901, by Mr. Herman Saunders, and identified by Mr. Champion, but not recorded at the time because it was felt it might be but a casual introduction ("E. M. M.," p. 228, 1903).

Criocephalus polonicus, Motsch., a Longicorn new to Britain, was taken by Mr. H. Willoughby Ellis, and all the stages in its life-history were exhibited by him at the Entom. Soc. London. At the same meeting Mr. H. St. J. Donisthorpe exhibited—

Aphanisticus emarginatus, from Parkhurst Forest, as an addition to our fauna.

Then, I may add, as new to Ireland though not to Britain, *Soronia punctatissima*, Ill., which Mr. Turner has recorded, in our "Proceedings" (p. 41), as among the spoils of our joint visit to Co. Kilkenny in August, 1902.

HYMENOPTERA.—Two species have been added to our list.

Odynerus (Hoplopus) simillimus, Morawitz, a wasp, taken near Colchester by Mr. W. H. Harwood, is described by Mr. Edward Saunders, F.R.S., in "E. M. M.," 1903, p. 6.

Ammophila luffii, a species new to science, was taken by Mr. Edward Saunders, F.R.S., at St. Ouen's Bay, Jersey, in 1901, but not identified by him as a distinct species until he again took it in 1903 ("E. M. M.," p. 247, 1903).

DIPTERA.—Six additional species.

Chamæsyrrhus lusitanicus, Mik., is a new syrphid fly taken by Miss Allard at Boat o' Garten, Inverness-shire, in July, 1902, and since identified by Dr. Sharp ("E. M. M.," 1903, p. 197).

Pachygaster minutissimus, Zett., is a species and genus new to Britain. It was taken at Wells by Mr. C. G. Lamb in July, 1902, and has been identified by Dr. Sharp. In 1903, whilst in the New Forest, Mr. Lamb and Miss Sharp captured three examples of another species, which Dr. Sharp believes to be a *Neopachygaster*, but is not yet quite satisfied as to the exact species ("E. M. M.," 1903, p. 221).

Phortica variegata, Fall., a drosophyllid fly new to Britain, has fallen to the same enterprising collectors. Miss Sharp took it near Brockenhurst, and a few days later the same species rewarded Mr. C. G. Lamb. Recorded in "E. M. M.," 1903, p. 248, by Dr. Sharp.

Agathomyia viduella, Zett.—Two males and one female of this platypezid fly were taken in 1902 and 1903 by Mr. J. H. Wood, M.B., from a young sycamore in Stoke Edith Wood, and identified by Mr. Collin.

Ceratophyllus dalei is a flea new to science, although taken some years ago. Mr. C. W. Dale obtained it from a wood-pigeon's nest at Glanvilles Wootton, and regarded it as *C. columba*, Wulcken and Gerv., but the Hon. N. C. Rothschild considers it distinct from every known species, and has named it in honour of Mr. Dale ("Entom.," 1903, p. 297).

HEMIPTERA :

Myrmecoris gracilis, Sahlb., is an ant-like bug, of which a single male was taken at Fleet, Hants, by Mr. E. A. Butler, and identified by Mr. E. Saunders, who describes it as one of the most interesting additions that have been made to our insect fauna for many years. It was taken near a nest of *Lasius niger*, and its ant-like form is no doubt mimetic ("E. M. M.," 1903, p. 269).

Kermes quercus, L., a Coccid obtained by Mr. H. J. Burkill from Wimbledon Common in May, 1902, has been identified by Mr. R. Newstead, A.L.S. In July, 1902, the same species was found by Mr. Brockton Tomlin in Sherwood Forest ("E. M. M.," 1903, p. 57).

To British Neuroptera there have been no additions, but it is worthy of note that a female example of *Sympetrum fons-colombii*, Selys, was taken by Mr. W. C. Boyd in June, near Trewoofe, in W. Cornwall.

Agrion hastulatum, Charp., added to the British list on the strength of a single specimen taken at Aviemore by Col. Yerbury in 1900, has been taken in the same locality in 1903 by Mr. J. J. F. X. King, who has been more fortunate than Col. Yerbury, for he is able to speak in the plural of "typical specimens" ("E. M. M.," 1903, p. 202).

In the domain of natural-history literature the year has not been very eventful. One of the most important scientific volumes of the year is—

"A Monograph of the Tsetse Flies, (genus *Glossina*, Westw.) based on the Collection in the British Museum," by Ernest E. Austen (printed by order of the trustees). Although there are only seven species of *Glossina* known

to science, the fearful results to man and his cattle and horses ensuing from the attacks of these flies gives the subject an importance of the highest character. So that the author and the B. M. trustees are fully justified in devoting a volume of 330 pages to the elucidation of this small genus.

"A Treatise on Zoology," edited by Prof. E. R. Lankester. Another volume—being the second fasciculus of Part I—of this scholarly work has been issued, and deals with the Structure of Animal and Vegetable Cells, by Prof. J. B. Farmer, F.R.S.; the Foraminifera, by J. J. Lister, F.R.S.; the Sporozoa, by Prof. E. A. Minchin; and the Infusoria, by S. J. Hickson, F.R.S.

"Man's Place in the Universe," by Alfred Russel Wallace. A book, the scope of which is sufficiently indicated by its title and the name of its illustrious author.

"Mostly Mammals," by R. Lydekker. Although this is a gathered sheaf of magazine articles, the interest is continuous, and it contains much matter that will be found highly suggestive to the student of evolution.

"Coccidæ of the British Isles," by Robert Newstead, A.L.S. A second volume of this important monograph has been issued by the Ray Society.

"British Mammals," by Sir Harry Johnston, G.C.M.C. With coloured plates and illustrations by the author. A modern work dealing with the mammalian fauna of these islands has long been a desideratum, and this new volume of the Woburn Library will be welcomed by many.

Whilst speaking of scientific literature I may be permitted to mention with regret the passing away of the great philosophic writer, Herbert Spencer, whose monumental works clearly demonstrated the universal application of the doctrine of Evolution, and who was almost the last of that band of intellectual giants by which the Victorian era was distinguished.

By far the most important research of the past year, so far as insect life is concerned, was the elucidation of the means by which that hitherto mysterious African scourge known as "Sleeping Sickness" is disseminated. And this discovery makes the publication of Mr. Austen's book on the Tsetse-flies specially apposite, although as one reads one cannot help regretting that its issue had not been hindered for a few months that it might have included the report of the Royal Society's Commission upon this subject. For it has now been ascertained, I think beyond doubt, that one of the Tsetse-flies (*Glossina palpalis*) is the carrying agent by which

Trypanosomiasis is spread. It is within the knowledge of all here that the great scourge of certain parts of Africa is the Tsetse-fly (*Glossina morsitans*) which kills off buffaloes, oxen, and horses by tapping the blood-vessels of these beasts for purposes of refreshment, and leaving behind certain Protozoa known as *Trypanosoma*, which prey upon the corpuscles of the blood, and sooner or later reduce the victim to an emaciated condition which ends in death.

Much controversy has raged over this subject; that is to say, as to the real nature of the disease called Nagana, or fly-disease—whether it was contagious in the ordinary way, or due to some irritant or morbid matter ejected by the fly. The natives believed that the diseased condition only followed actual fly-bites, and told how the fly avoids the neighbourhood of human excrement, and was therefore absent from the immediate vicinity of the settlements. Explorers from the sixteenth century onward noted the effects of these fly-bites, and many imagined the proboscis had a poison-gland at its base, like the sting of the wasp. There were not wanting those, however, who held that the fly was a mere accidental concomitant of the disease, and neither a cause nor an agent in its dissemination. One is surprised to find Edward Newman in this company, and declaring with great conviction in the "Entomologist" for December, 1870, that the Tsetse was "a myth." He says, "I have always protested against the importation of a myth like the Tsetse into the domains of science; the mixture of truth and fable in matters of science is always to be deprecated." The last statement embodied a very proper sentiment for any naturalist to hold or express, but so far as the Tsetse was concerned, I think the mass of the evidence then available strongly supported the views of the explorers and natives that the fly was at least an agent. However, in the year 1895, Surgeon-Major Bruce, of the Army Medical Service, was sent by the Governor of Natal to Zululand to investigate the Tsetse-fly Disease, or Nagana; and his report gives a description of the fly, and describes his experiments upon it in relation to the native big game and such domestic animals as the horse, donkey, dog, and cattle. He traced out the distribution of the disease. The Tsetse-fly is not greatly unlike our Clegg (*Hæmatopota pluvialis*); but, unlike the majority of Diptera, it does not lay eggs. These are retained not only until they hatch, but until the larva is nearly as large as the abdomen of the parent and full-fed. They are extruded as active yellow larvæ ready to pupate as soon as they have found a suitable hiding-

place. They emerge as flies five or six weeks later. Before feeding, the abdomen of the fly is so empty that the upper and lower walls appear to be in contact, but after a few minutes the fly has imbibed so much blood that the abdomen has swollen to such an extent that its lower walls are transparent and the colour of the blood shows through. Unlike the Clegg, both sexes of the Tsetse-fly indulge in the blood-sucking habit. Bruce kept some of these flies in captivity for some days, until their previous meal had become entirely assimilated and the abdomen resumed its empty condition, and then fed them daily upon dogs for periods varying from ten days to two months. The dogs remained healthy, and thus showed that the mere bite of the Tsetse-fly was not capable of giving rise to the disease.

Then the flies were fed in turn upon dogs known to be suffering from Nagana and healthy dogs, with the result that these latter became affected by the disease. Many experiments were made, but briefly it may be said, that in all cases where the flies were fed first on diseased and then upon healthy animals, the blood of the latter yielded after a short interval countless examples of a Hæmatozoon, now known as *Trypanosoma brucei*. This Hæmatozoon appears to feed upon the red corpuscles of the blood, producing a condition of anæmia, emaciation, prostration, and finally death.

So much for Nagana. In more recent years a disease called Sleeping Sickness began to spread with alarming rapidity among human beings in Uganda, and several vessels homeward bound from East Africa were found to have among their crews men suffering from this terrible complaint. Last year the Royal Society appointed a commission to inquire into this disease, which was promising to prove a serious bar to the colonisation of Uganda. The commission consisted of Surgeon-Major (now Colonel) Bruce, Dr. Nabarro, and Captain Greig, of the Indian Medical Service. The report of that commission has now been published, and forms most interesting reading. From certain facts communicated to him by the doctor in charge of the hospital, who had detected Trypanosomes in the blood of the patients, Colonel Bruce got the idea that they might owe their presence to the attacks of Tsetse-flies, and he directed his inquiries to test this. As the results of his experiments and researches, described in detail in the report, we may regard it as being now established that the Sleeping Sickness is a human Tsetse-fly disease, and is caused by the activity of a Hæmatozoon (*Trypanosoma gambiense*, Dalton) in the blood

and cerebro-spinal fluid of man and monkeys : that the Trypanosoma is carried from the sick to the healthy by the biting of a distinct species of Tsetse-fly (*Glossina palpalis*), and that the occurrence of the disease coincides with the distribution of this particular species of fly. Dogs and rats are only partially susceptible to inoculation, but efforts to inoculate guinea-pigs, donkeys, oxen, goats, and sheep have so far yielded negative results only.

And now, in conclusion, a few more words concerning our own Society. One very noticeable feature of the last few years is the large extent to which photography has been brought to our aid. I do not intend to speak upon this subject in general, because that was done last year by my predecessor, who I may almost describe as a life-long photographer, whilst some of us can only claim a few years' acquaintanceship with the camera. What I regard as most important in the photographic exhibits here during the past year are the contributions to the life-histories of insects illustrated by the camera, especially those of larvæ and pupæ shown by Messrs. Main and Goulton, and the very beautiful ova photographs of those gentlemen and Mr. Tonge. It has been decided by the Council to solicit prints of many of these photographs, and I have no doubt that before long a definite scheme for their preservation in albums accessible to members will be prepared. I feel quite certain that photography is destined every year to play a more important part in the work of the naturalist, and I quite look forward to see nearly all works on natural history illustrated by its aid. Everybody knows how often in the past the work of artists, who have illustrated our scientific works, has been spoiled by engravers and colour-printers who have not understood what they were reproducing, and who have failed to realise the importance of truthfully preserving every detail of the original design. We also want a wider use of the camera in the field, though, of course, there are many branches of natural science in which this is almost impossible. The specimen posed in the studio makes a more attractive picture, but when we can succeed in getting photographs of the creatures at liberty and in their natural habitat, I think they will have a greater scientific value than those of bred examples under more or less artificial conditions. There have been almost endless portraits published of the well-fed animals at the Zoo ; but I should like to know that the sportsman of the future, instead of journeying to far countries armed with a gun to help in the rapid exter-

mination of the big mammals and birds, would arm himself with the camera, and bring us back reliable pictures of these creatures as they roam their native forests and prairies. Such photographs would soon result in the improvement of the stuffed specimens in our museums, which are often set up in a manner that gives a quite wrong impression of the animal.

And now, having detained you long enough, I will make way for my successor. There is no occasion to introduce him to you, for you all know Mr. Sich as an experienced entomologist; one, moreover, who has paid great attention to the smaller Lepidoptera, which are not so generally collected and studied. Under his Presidency I look forward to a year of success for the Society, and I trust it will also be one of pleasure and satisfaction to him, who may rely with confidence upon the cordial co-operation of all his colleagues.

EDWARD STEP.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 12th, 1903.

Mr. E. STEP, F.L.S., *President*, in the Chair.

Mr. Barnett exhibited a very lightly marked specimen of *Ematurga atomaria* and a very pale *Tephrosia luridata* (*extersaria*), both from W. Wickham woods.

Mr. H. J. Turner exhibited specimens of (1) *Erasmia pulchella*, one of the most brilliantly coloured species of all the Lepidoptera, belonging to the family Chalcidæ; (2) *Campylotes histrionicus*, belonging to the same family, and very un-moth-like in appearance; (3) *Areas galactina*, belonging to the Arctiidae; these three species were from Darjeeling. He exhibited specimens of *Abraxas sylvata* from Amersham, Bucks, and from Assam, which were almost identical in tint and markings. On behalf of Mr. Day he exhibited a box of Coleoptera consisting of some three dozen species taken in Cumberland, mainly near Carlisle, including *Hydrothassa hannoverana*, *Omalium septentrionis*, *Agabus congener*, *Hydroporus incognitus*, *Quedius auricomus*, *Hydrobius picicrus*, *Stenus guynemeri*, *Rhynchites cupreus*, etc. He also showed a box of moths, chiefly of Pyralidæ, from Assam, including representatives of some twenty-five genera.

Mr. Enock exhibited a considerable number of lantern-slides to illustrate his lecture, entitled "Notes and Photos." His remarks and pictures dealt mainly with the transformation details of the dragonfly *Brachytron pratense* and of *Gonepteryx rhamni*.

FEBRUARY 26th, 1903.

The PRESIDENT in the Chair.

Mr. F. G. Cannon, of Hampstead, was elected a member. A Special Donation was announced of a large number of

separata, consisting of articles on "The Theory of Protective Resemblance in Insects," by Professor Poulton, from the Author.

Mr. Turner exhibited a number of species of Lepidoptera, Coleoptera, Hemiptera, and Diptera taken during a trip to Co. Kilkenny, Ireland, in August, 1902. He stated that the weather was very unfavourable to insect life, and most of the insects captured were common species. Perhaps the most notable species was the Coleopteron, *Soronia punctatissima*, of which there had hitherto been only a doubtful record for Ireland. The species had been found in some numbers in *Cossus* burrows in a poplar tree, in company with the closely allied species *S. grisea*. The list of species taken is valuable as a record of distribution, especially that of the Hemiptera, which have been very little worked in the country. The full list has appeared in the "Irish Naturalist" (vol. xii, 1903, pp. 181, etc.)

Mr. G. B. Browne exhibited a considerable number of species of Lepidoptera, and contributed the following notes :

"Aided by a successful fortnight at Deal and its vicinity in August, I have been enabled to add something material to my collection in a year that has certainly not been a favourable one. In the ten days I actually spent at Deal I set over four hundred insects, and you will observe that I have shown the captures in that locality in some detail. Among them are extended series of *Agrotis tritici* and *A. valligera*, which were by far the most plentiful there. Representatives of most of the other species are also shown. It is possible that an inspection of the varieties of *A. tritici* will excuse the error I was unfortunately led into of recording this species in the "Entomologist" as *A. obelisca*, an error afterwards corrected.

"Among other captures are shown an example of *Syrichthus malvæ* var. *taras*, taken at Hailsham in the middle of June; some *Porthesia chrysorrhæa*, bred from larvæ taken at Hailsham at the same time; *Papilio machaon* and *Arsiloonche albovenosa*, from larvæ taken at Wicken the previous year; *Dicycla oo*, taken on a gas-lamp between Lee and Chislehurst last June; *Apamea ophiogramma*, taken in my garden at Lee; and also what I am told is *Acidalia osseata*, also taken at Lee; and *Geometra vernaria*, taken off a gas-lamp opposite my house. A railway embankment runs at the back of my garden, which no doubt accounts for the opportunities that come in my way there.

"I also show a locust taken at Deal. These were rather plentiful in the privet hedge there, and one came to sugar.

"On my way home from the New Forest in the middle of July I took, in a field near Guildford, a worn specimen of *Pyrameis cardui*."

Mr. Step gave a full account of a visit to Ireland in company with Mr. Turner in August, 1902, and illustrated his remarks with lantern-slides of the choicest views and various studies of wild flowers.

Mr. Lucas exhibited a series of slides to illustrate the habit of various lichens.

Mr. Dennis exhibited a series of slides illustrating the characters of various forest trees.

Mr. Goulton exhibited some very fine micro-photographic slides of eggs of Lepidoptera.

MARCH 12th, 1903.

The PRESIDENT in the Chair.

Mr. Hickman, of Kennington Park, and Mr. Furnival, of Harlesden, were elected members.

Dr. Chapman exhibited living examples of the three European species of the genus *Thais*, viz. *T. rumina*, *T. polyxena*, and *T. cerisyi*. He also showed specimens of a *Docophorus*, probably *communis*, from a blackbird. This genus of bird parasites (Mallophaga) has a jointed appendage in front of the antennæ. Giebel says that such a structure occurs in no other insect. He also says he does not know what use it is for. The use is tolerably obvious, viz., as Piaget points out, to act as a special guard for the base of the antenna when the insect pushes its way amongst the fine and often spiculated filaments of feathers, etc. The more difficult question is, what is it? How does a jointed appendage arise here? Is it an ordinary bristle remarkably developed? Is it part of the antenna, or what?

Mr. Robert Adkin exhibited series of *Acidalia aversata* and read the following notes:

"From a non-banded, reddish-coloured female, taken in my garden on July 16th, 1901, ova were obtained, from which fifty-six moths were reared during June and July of the following year, of which four were reddish in colour and non-banded, thus closely following the female parent; twenty-three were non-banded, but not reddish in colour, therefore

only partially following the female parent; twenty-nine were banded, thus in neither respect resembling the female parent.

“From a banded female, taken on July 20th, 1901, within a couple of yards from the same spot, ova were also obtained, and moths were also reared in the following June and July to the number of fifty-two, of which sixteen only were banded, and thus resembled the female parent; thirty-six were non-banded, and therefore did not follow the female parent.

“In neither case was the male parent known, and it is quite possible that some ova may have been deposited by the parent females before they were captured; but assuming that to have been the case, it is worthy of note that in both instances the moths that did follow the female parents were neither the first nor the last of the brood to appear, but were bred during the central part of the period over which the emergences extended, and at the time when the largest numbers were coming forth. I have on several former occasions reared broods from both banded and plain female parents, and whereas from 50 per cent. to 60 per cent. of the offspring of the former have invariably followed the known parent, I have never previously reared banded moths from a non-banded parent. It is quite possible that in the present case both females may have paired with males of the opposite form; but even assuming that to be so, the proportion of the progeny following the female parent appears to be less than usual.”

Mr. W. J. Kaye exhibited two specimens of *Larentia didymata*, bred from larvæ fed on broom from Glenbeigh, Co. Kerry. They were remarkable in having a very reduced central black band, and in having all the markings very clearly defined with the ground colour very pale. Broom is a most unusual food-plant, *Teucrium*, *Anemone*, and such like plants forming the ordinary pabulum.

Mr. Edwards exhibited the skull of a rabbit having most remarkable dentition, the result, no doubt, of an injury. Several of the teeth had grown to an extraordinary length and were most curiously curved.

Prof. E. B. Poulton, F.R.S., the President of the Entomological Society of London, gave a long address on “Recent Researches in Protective Resemblance, Warning Colours, and Mimicry in Insects,” and illustrated his remarks with a very large number of lantern-slides. There was a large attendance of members and their friends.

MARCH 26th, 1903.

The PRESIDENT in the Chair.

Mr. E. Warne, of St. John's Hill, Clapham, was elected a member.

Mr. Jennings exhibited a series of the very local *Cryptocephalus bipunctatus*, L. (v. *lineola*, F.), taken at Charing, Kent, in June, 1902, on hazel bushes.

Mr. Colthrup exhibited hibernating colonies of the larvæ of *Porthesia chrysorrhæa*, from Newhaven, where similar colonies could be found in almost every hedge. The larvæ were already beginning to wander, no doubt from the warmth of the weather just experienced.

Mr. W. J. Kaye exhibited the two remarkable Ithomiines, *Methona confusa* and *Thyridia psidii*, from the Essequibo river, British Guiana, two butterflies which so closely resemble one another that they can scarcely be distinguished except by the neurulation. A specimen of the *Methona* was also shown from Paraguay, where the black markings are less intense, and where also the *Thyridia* has undergone a similar change. Professor Poulton had referred to this remarkable instance in his recent address to the Society.

Mr. R. Adkin exhibited a very dark specimen of *Smerinthus populi*, bred from a larva found at Bexley, Kent. Compared with a normal Kentish example and one from Sutherland, which were exhibited with it for the purpose, it was considerably darker than either, not only in the olive-grey markings of the fore-wings, but also in the red patch of the hind-wings. In this latter respect it much more closely resembled the Scotch than the Kentish form.

Dr. Chapman exhibited specimens of the Dipteron *Lasioptera rubi*, a Cecidomyid, that makes swellings in the stems of brambles. They were bred from a gall taken recently at Reigate.

Mr. Hy. J. Turner exhibited a large number of species of various orders of insects, collected at Amersham at the end of June, 1902, and read notes on the district and its fauna and flora (see p. 3).

APRIL 9th, 1903.

The PRESIDENT in the Chair.

Mr. Dennis sent for exhibition flower-spikes of the toothwort, *Lathræa squamaria*, from near Halstead, Essex. Mr. Step noted that it was a true parasite, generally found on hazel-roots, and that the date of its flowering this year was somewhat earlier than usual. Mr. Turner had found it in flower at Amersham in 1902 at the end of June.

Mr. Boxer exhibited flower-spikes of the same plant from Shropshire.

Mr. Main exhibited some large leaves sent to him from Ceylon, attached to the main ribs of which were pupa-cases of some species of butterfly. Unfortunately the imagines had emerged in transit, and could not be determined.

Mr. R. Adkin exhibited a short series of male and female *Phigalia pedaria*, bred from York larvæ, particularly to show the intense black coloration which had been developed in both sexes.

Mr. Fremlin exhibited under the microscope some gall-mites, which had attacked the black-currant bushes in his garden at Hackbridge. The buds of the bush were much enlarged, but had not opened out, and no leaves were developed from them. He called attention to the early appearance of the glow-worm this year, and Mr. Step said that his daughter had noted the same early appearance.

Mr. Turner exhibited a type form of *Crocallis elinguaris* from Durham, and also a specimen of v. *trapezaria*, a form having a very dark central band across the fore-wings, taken in 1889 at Brockley. He also showed a short series of *Cleora glabraria* from the New Forest, and remarked on the species having recently been found in North Devon. Mr. Adkin said that the principal locality for the species was in the New Forest, but that occasional specimens were taken in various districts.

APRIL 23rd, 1903.

The PRESIDENT in the Chair.

Mr. Harrison and Mr. Main exhibited a long series of *Taniocampa munda*, bred from ova laid by two females taken in Epping Forest. These two broods exhibited practically

the whole range of ground colour existing in the species, from clear whitish grey (*pallida*), through dark grey (*grisea*), to reddish ochreous (the type), and red brown (*rufa*). The extreme dark specimen was very rich and deep in tint. Many of the grey forms were speckled with dark scales, *pulverulenta*-like. The fuscous shade of the reniform stigma was very apparent in all. The orbicular varied much in size, and in a few specimens was very indistinct. In a number of the grey examples the central shade was very apparent, but in most of the darker ones it was scarcely perceptible. One or two grey specimens had the basal line very well developed, but the abbreviated basal line was quite absent in all. The elbowed line was but little traceable, except in a few specimens, in which the dots were in well-developed series. Most of the specimens had the full compliment of six well-developed black spots in the subterminal line (*geminatus*), the two central ones being large and jet black in all. The costal pair of spots were the least developed, and in a few examples quite absent. In a few specimens additional dots were present, either just below the central pair or just above the inner-angle pair. It was remarkable that there was no tendency to the form without the subterminal dots (*immaculata*). He also showed a long series of *Hybernina marginaria* (*progenimaria*), bred from ova deposited by "black" parents taken in Delamere Forest. The series comprised eleven "black" males, twelve typical males, and fourteen females, of which eleven were either black or very dark.

Mr. H. J. Turner exhibited (1) specimens of the local tineid *Blabophanes imella* from Bonhill, Dumbartonshire; (2) specimens of *Lita* (*Xenolechia*) *athiops*, a Gelechiid only occurring in the N. of England and in Scotland, from the same locality as the last species; (3) a series of *Sitones griseus*, taken on April 11th at Horsell Common, by beating broom; (4) living larvæ and cases of the following Coleophorids:—*C. genistæ*, on *Genista anglica*, from Loughton; *C. caspititiella*, on *Juncus*, from Loughton; *C. pyrrhulipennella*, on heath, from Horsell Common; and *C. albitarsella*, on ground ivy, from Ashted. (5) Larvæ of *Porthesia chrysorrhæa* from the Esterell, S.E. France, sent by Mr. Tutt; and (6) larvæ and cases of *Coleophora auricella*, (?) feeding on a labiate plant from Locarno in S. Switzerland, sent by Dr. Chapman.

Mr. Goulton exhibited a female glow-worm, and it was pointed out that the male, female, and larva all exhibited the power of "glowing." He also exhibited a striking

variety of *Noctua festiva* in which the area beyond the angled, transverse, dark shade which passed between the stigmata was of a very dark, rich, chestnut brown; and a variety of *Plusia gamma* having the red spot much intensified, and a general red suffusion of the fore-wings, in place of the silvery gloss in the type form; it was referable to *v. rufescens*.

Mr. Lucas exhibited the marsh violet (*Viola palustris*), from Oxshott.

Mr. West (of Greenwich) exhibited specimens of three species of Hemiptera, taken at Box Hill on April 10th, viz. *Corimelana scarabæoides*, *Tropistethus holoscriccus*, and *Zettigometra impressopunctata*.

Mr. Carr exhibited living larvæ and cases of a Psychid, *Bacotia sepium*, beaten from fir in the New Forest.

Mr. Clark exhibited a piece of lead pipe which had been considerably gnawed by rats. It was a portion of a waste-pipe from a sink, and no doubt had become corroded by grease. It was suggested that sweet salts of lead had been formed by the acids of the waste, and had been a strong attraction to the animals. Several instances were adduced by members of pipes being bored by rats for the sake of moisture, and one or two members had known mice to have been the culprits.

Mr. Step exhibited living specimens of *Anthrenus musæorum*, L.; also photographs of the following flowering plants:—Toothwort (*Lathraea squamaria*), daisy (*Bellis perennis*), wood anemone (*Anemone nemorosa*), marsh marigold (*Caltha palustris*), wood sorrel (*Oxalis acetosella*), furze (*Ulex europæus*), dandelion (*Taraxacum officinale*), and hawthorn (*Cratægus oxyacantha*). The last named was photographed on April 11th, a very early date for May blossom.

Mr. Turner reported that he had heard from several members who were abroad. Dr. Chapman, who was at Locarno, had stated that cold weather prevailed there, but that on April 20th some twenty species of butterflies were noted. Mr. Tutt, who was at Alassio in N. Italy, had stated that the weather at Hyères during the first fortnight in April was perfect. Mr. Sich, who was on the shores of Lake Como, had stated *Papilio podalirius* was quite common during Easter week.

Mr. MacArthur and Mr. Cant reported that they had recently seen a furze-chat hawking successfully for *Brephos parthenias*. Several members reported that they had repeatedly seen birds catch butterflies on the wing.

Mr. Manger exhibited the shells of the pearly nautilus

(*Argonauta argo*) in various stages of growth, and read a short paper on the structure and habits of the species. (See p. 1.)

MAY 14th, 1903.

The PRESIDENT in the Chair.

Mr. J. J. Shakespeare, of Kingston-on-Thames, was elected a member.

Dr. Chapman exhibited (1) a pair of the very rare and local *Graëllsia isabellæ*, bred from larvæ brought from Broncholes in 1901; (2) a piece of bark from Albenga (Italian Riviera) closely set with cases of *Apterona crenulella*, as were many trees there, over large portions of their trunks; also imagines bred from Locarno, 1902; (3) living specimens of *Carabus auratus* from Aix-les-Bains; and (4) newly hatched praying mantis (these had died on the way to the meeting).

Mr. W. J. Lucas exhibited (1) a collection of shells taken in the New Forest district. Except as regards the water-shells, which are plentiful in the streams and some of the pools, the Mollusca do not seem well represented in the forest. The case contained eleven land-shells, thirteen water-shells, and a few sea-shells from the coast in the neighbourhood. The shells were collected only spasmodically, and no doubt there are other species to be found. (2) A photograph of pennywort, or navelwort, *Cotyledon umbilicus*, taken on May 5th at Brockenhurst, which it was thought, when the plant was under discussion at some previous meeting, was near the eastern limit of its range in England. It was very common in the hedgerows around Brockenhurst at the beginning of May. Mr. M'Lachlan had pointed out that there were several localities given for the plant in the county of Kent in the recently published "Flora of Kent," by Hanbury. (3) A large spider, taken amongst hot-water pipes in an orchid-house at Virginia Water. Presumably it is not British, but whence it came is uncertain, seeing that packages came the same day from South America, Java, and Borneo.

Mr. F. B. Carr exhibited living larvæ of *Ellopiæ prosapiaria* (*fasciaria*) and *Bryophila perla*, both from Brockenhurst.

Mr. West (Greenwich) exhibited three species of *Staphylinidæ* of somewhat rare occurrence, viz. *Mycetoporus angularis*, taken among dried leaves at Shirley; *M. nanus*, taken at Box

Hill in moss, and *Pseudopsis sulcata*, obtained by shaking decayed vegetable matter at Oxshott.

Mr. Step exhibited photographs of *Panolis piniperda* and *Tephrosia punctularia* in their position of rest on the trunks of trees. They were observed at Oxshott.

Mr. Priske exhibited specimens of *Testacella haliotidea* from Acton.

Mr. Kirkaldy called the attention of the meeting to his article on "The Maternal Solicitude of Female Insects for their Young" ("Entom.," 1903, p. 113), and urged members to make observations on this subject during the present season, especially as the evidence obtained so far was of a conflicting nature.

Mr. Turner called attention to the fact of birds attacking butterflies, and asked members to observe during the year and make notes upon any instance they may meet with, so that a report may be prepared and published.

It was suggested that members who were making photographs of scientific objects should give the Society a print, so that an album or albums could be arranged, to illustrate some branch of Natural History. The ova of Lepidoptera was suggested as a subject to begin with.

MAY 28th, 1903.

The PRESIDENT in the Chair.

Mr. Lister, of Easry, Kent, was elected a member.

Dr. Chapman exhibited a very large female of *Euchloë euphenoides* from Cannes. Expanse 48 mm., about a quarter of an inch (6 mm.) beyond the size of an ordinarily large specimen, 30 to 42 mm. being the usual range. A few others of the species were shown for comparison, and some *Polyommatus baton* and *Fidonia plumistraria* from the same place.

Mr. Turner exhibited cases, with living larvæ, of the following species of the genus *Coleophora* :—*C. artemisiella* and *C. maritimella*, on *Artemisia maritima*, from Benfleet; *C. nigricella*, on hawthorn, from Benfleet, and reported that one specimen of this species was found feeding on *Smyrniolum olusatrum*, an introduced Umbellifer; *C. anatipennella*, on sloe, from Benfleet; *C. ibipennella*, from Oxshott, on birch; *C. bicolorella*, on hazel, taken by Dr. Chapman at Box Hill during the Society's field meeting; *C. hemerobiella*, an uncommon species, sent from Chiswick by Mr. Sich, who found it on hawthorn; and a number of young curved cases which

had not been identified, found at Ashtead, on elm. He also showed a nearly full-grown larva of *Phorodesma smaragdaria* from Benfleet, where the species would probably soon be exterminated by the destruction of its food-plant in the repairing of the sea-walls.

Mr. Kirkaldy exhibited a very curiously shaped egg of the common fowl, small, elongated, and similarly shaped at both ends.

Mr. Goulton exhibited a specimen of the Coleopteron *Phytodecta viminalis* from Ranmore. Mr. Ashby said that the species had been somewhat common recently at Oxshott, on willow.

Mr. West exhibited photographs taken during the Society's meeting at Box Hill.

Mr. Step exhibited photographs of *Eupithecia exiguata* and *Melanippe fluctuata* in their resting positions on palings. These were taken during the Society's meeting at Ashtead. Dr. Chapman remarked that he had usually observed the latter species with its head close to the next pale and the body nearly horizontal.

Mr. Lucas exhibited a number of specimens of the shell of *Limnæa auricularia* from the Thames at Kingston.

Mr. Step read the Report of the Field Meeting held at Mickleham on May 16th, 1903 (see page 7).

JUNE 11th, 1903.

The PRESIDENT in the Chair.

Mr. Hy. J. Turner exhibited (1) two specimens of *Anisopteryx æscularia*, one from Dorking and the other from Lewisham in the London suburbs, and called attention to the decidedly duller and darker colour of the latter example contrasted with the brighter country specimen; (2) a very dark suffused *Hybernia marginaria* (*progemmaria*) from Dorking, in which only the outer margin of the transverse band and the submarginal row of dots were lighter; and (3) a series of *Dasycera sulphurella*, bred from decaying wooden posts near Golding's Pond, Loughton, and called attention to the sexual dimorphism, the males being much less bright, while the females have in addition a bright yellow longitudinal streak from the base, a yellow wedge-shaped costal blotch directly above the inner marginal blotch which occurs in both sexes, sometimes an additional short streak from the

base, numerous scattered shining scales, and antennæ thickened by dense and large scales from the base to about half their length.

Dr. Chapman exhibited a larva of *Thestor ballus*, sent by Mr. H. Powell, of Hyères, bred from the egg; and also an imago of *Orina (Chrysochloa) tristis* var. *smaragdina*, bred from the egg at Reigate (parent from pine, Lago Maggiore), but at large from last September as a full-grown larva till it was found this morning as an imago. Others have appeared during the past few days.

Mr. H. E. Garrett exhibited a very fine series of *Triphæna fimbria*, bred from larvæ obtained at Wimbledon Common in 1903. The varieties shown comprised (1) pale yellowish grey, the type *fimbria*; (2) a darker ochreous form, var. *rufa*?; (3) a rich chocolate or mahogany-brown form, var. *brunnea*; (4) a dark olive-green form, var. *solani*. Dr. Chapman noted that the white wedge-shaped costal blotch was very conspicuous in all the dark olive examples, but only slightly apparent in the lighter ones.

Mr. McArthur exhibited bred series of *Eupithecia venosata* from the Shetland Islands. The examples from Cunningsburgh in the south were much darker in ground colour, and often larger than those from Unst in the extreme north of the Islands. He stated that the larvæ were always found on *Silene inflata*, and never on *S. maritima*.

Mr. Jäger exhibited *Habenaria conopsea*, *Orchis maculata* and *Ophrys muscifera* from the neighbourhood of Dover; and also *Aceras anthropophora* from Reigate.

Mr. West, of Greenwich, exhibited the rare *Necrophorus vestigator*, taken from a dead rook, and *Harpalus servus*, found under stones; also the very uncommon Hemipteron, *Gnathoconus picipes*, Fall. All were taken the last week in May, at North Denes, Great Yarmouth.

Mr. F. B. Carr exhibited ova of *Hylophila prasinana*, which may be described as nearly flat, ribbed, and when laid they are entirely yellow, but after three or four days the centre turns to a red-brown and gradually becomes darker, the rim remaining yellow. Dr. Chapman stated that he had noticed a great resemblance between the ova of this species and those of the *Acronyctas*.

Mr. Sich exhibited larvæ of *Tæniocampa miniosa* from Brentwood, where it was somewhat local.

Mr. Lucas exhibited beautiful coloured drawings of *Ephyra pendularia*, var. *subroseata*, the local Staffordshire form of the species described, "Ent.," xxxv, p. 275, (1902).

Mr. McArthur reported having just bred a puss moth (*Dicranura vinula*), which had been lying over from 1901. The larva was from the Isle of Lewis. Mr. Enock has bred the same species, which had gone four years. Mr. Sich said that he had found the larvæ of this species on sallow growing at San Moritz, 6000 to 7000 feet elevation, and he had also found the larva of *D. furcula* at about the same elevation.

JUNE 25th, 1903.

The PRESIDENT in the Chair.

Mr. Councillor Newbery, of East Greenwich, was elected a member.

Mr. A. L. Rayward exhibited shells of *Buliminus montanus*, collected at Great Missenden, Bucks, on May 3rd, 1903, among herbage in beech woods. Mr. Step remarked that it was a very local species.

Mr. Turner exhibited living imagines of *Colcophora nigricella* and *C. fuscedinella*, bred from Benfleet and Lewisham larvæ respectively.

Mr. Jäger exhibited (1) specimens of the Orchid, *Herminium monorchis*, from Reigate; (2) examples of *Papilio polydamas*, from South Texas; (3) a larva of *Chelonia plantaginis*, which had been attacked by a worm, probably *Gordius aquaticus*; and (4) a *Tarantula* sp? from India. Mr. West said that he had measured a *Gordius*, which exceeded thirteen inches in length. Mr. Turner, referring to the plant exhibited by Mr. Jäger, said that he had not found it at Reigate, although he knew the district well, but it occurred in quantity near the Sevenoaks Road at Polhill, and also could be found near the zigzag road at Box Hill.

Mr. Enock exhibited *protens*, a very large species of *Ichneumon*, which had emerged from a pupa of *Eumorphia elpenor*, the larva of which was taken near Woking last year during the Society's field meeting. He also showed several slides he had made by means of colour-photography, a subject in which he was much interested.

Mr. Dennis exhibited a specimen of the grass-pea (*Lathyrus nissolia*) from Horsley. Mr. Turner said that the plant occurred also near Leigh, in Essex.

Mr. Hall exhibited a specimen of fasciated flowers of the garden foxglove. The inflorescence had the general appearance of the flower of a large Campanula. He stated that

seeds were produced and similarly aberrant flowering occurred each year in his garden.

Mr. West, of Greenwich, exhibited a series of the very local species of Rhyncophora, *Polydrusus chrysomela*, which he had taken on *Chenopodium*, in its old locality at Milton, near Gravesend, Kent.

Mr. R. Adkin gave a short report of the Annual Congress of the S. E. Union of Scientific Societies which had just been concluded at Dover.

JULY 9th, 1903.

The PRESIDENT in the Chair.

Mr. West, of Greenwich, exhibited several species of Hemiptera, which were taken by Mr. Ashby at Deal and Weymouth, and which he forwarded during the month of June, 1903—*Podops inuncta*, *Liocoris cursitans*, *Pseudophlaeus falleni*, *Rhyparochromus prætextatus*, *R. chiragra*, *Trapezonotus agrestis*, and *Aphanus lynceus*, all from Deal; *Salda lateralis* from Weymouth. He also exhibited *Eusarcocoris melanocephalus* and *Gnathoconus albomarginatus* from Horsley; and from Milton, near Gravesend, the Coleoptera, *Apion malvæ*, *Hamonia curtisi*, *Cercyon littoralis*, and *C. depressus*; the last two species were found under sea-weed just above high-water mark.

Mr. Sich exhibited a living example of *Geometra vernaria*, which he had just captured at Chiswick.

Mr. Goulton exhibited a specimen of the local plant, *Ajuga chamæpitys*, from Box Hill.

Mr. Turner exhibited cases, with living larvæ, of what he supposed to be *Coleophora cælibipennella*, which Dr. Chapman had just sent to him from Spain. He also showed living examples of *C. badiella* from Lewisham, and of *C. cæspititiella* from Loughton, both species bred from the larvæ previously exhibited.

Mr. Lucas reported that Mr. Porritt had taken several species of *Æschna isosceles* in the eastern counties. He also remarked on the appearance of *Mimulus luteus* in the ditches near Kingston; numerous localities were mentioned for the plant by several other members.

JULY 23rd, 1903.

Mr. E. STEP, F.L.S., *President*, in the Chair.

Mr. McArthur exhibited three female specimens of *Argynnis aglaia* of a very unusual size, the largest measuring 2.92 inches (74 mm.), and a male which had the black markings much extended; also an example of *Epinephele jurtina* (*ianira*), in which the left marginal and submarginal areas were very pale. All were from Brighton.

Mr. Tonge exhibited a specimen of *Heliaca tenebrata* (*arbuti*), taken on Nutfield Marsh, Redhill, and the sawfly *Pamphilus flaviventris*, bred from a larva found in Tilgate Forest feeding on blackthorn last August.

Mr. Sich exhibited ova of *Geometra vernaria*, which had been laid by the female captured at Chiswick. They were just on the point of hatching.

Mr. Clark exhibited a specimen of the Heteropteron, *Capsus lanarius*, which he had just taken in his garden. It was remarked that the species frequently appeared among cultivated flowers.

Mr. Step exhibited photographic studies of the greater broomrape, the rockrose, the foxglove, the wild strawberry (flower and fruit), the wood spurge; the spider orchis, the butterfly orchis, the fragrant orchis, the white helleborine, the bramble, and the great willow herb.

Mr. S. R. Ashby exhibited a specimen of *Polystichus vittatus*, from Walmer, taken in June; and a series of *Limobius mixtus* and *Lixus bicolor* from Deal, taken in June.

AUGUST 13th, 1903.

The PRESIDENT in the Chair.

Mr. Goulton exhibited several specimens of *Hypsipetes sordidata* (*clutata*) from Ranmore Common, including a green form barred with very deep black, and a wholly dusky form. He also showed a short series, bred from ova laid by a dark female of the above series, and pointed out that they were all lighter than any of the captured specimens. He also called attention to a female of the same species, which had yellow eyes instead of black. This last was captured in the Isle of Wight.

Mr. F. M. B. Carr exhibited a large number of Coleoptera he had taken this year at Salisbury and in South Devon.

Mr. Ashby exhibited series of the local Coleoptera, *Harpalus caspius* and *H. sabulicola*, from Portland, taken in June.

Mr. McArthur exhibited a specimen of *Cossus cossus* (*ligniperda*), taken at the electric light in King's Street, Hammersmith, and referred to a curious habit of the species in flying rapidly round the light two or three times, and then dropping suddenly to the ground.

Mr. R. Adkin exhibited a series of *Eupithecia exiguata*, and contributed the following note:—"Two or three rather worn females of an *Eupithecia* were taken among others near Brighton. They were not identified at the time, but for some reason which I have not been able to ascertain, the captor thought that they might be *E. fraxinata*, but evidently had some doubt, as the ova that he obtained from them he sleeved in two lots, the one on ash and the other on willow. Those on the willow all died, while those on ash fed up well, and produced pupæ. This led to the conclusion that they must be *E. fraxinata*, and more of the original moths were sent to me as that species. Although in a condition that rendered identification by no means easy, I had little doubt that they were referable to *E. exiguata*. To make sure, however, I managed to secure some of the pupæ which the ash-fed larvæ had produced, and had the satisfaction of rearing from them the series exhibited."

Mr. West, of Greenwich, exhibited series of the genus *Acalles* among the Rhyncophora. He said that this genus is a very obscure one, numbering more than a hundred species. Thirty-four are found in Europe, and the remainder are distributed over other parts of the world. The three species exhibited were the British representatives of the genus, and were taken by beating dead twigs, principally oak, at Darenth Wood, in July, 1903.

Dr. Chapman exhibited the larvæ of *Nisoniades tages* nearly full grown, from ova laid on *Lotus corniculatus*. He also showed a larva of *Orgyia splendida*, which differed from *O. antiqua* in being without the head and tail plumes of the latter species, although it possessed the brushes on the middle of the back. He called attention to a living example of *Parnassius apollo* he had just bred from Spain, as being exactly like the common Swiss form. It was characteristic of those he had met with this year, and quite different from the forms he had previously exhibited, as the result of his visit in 1902.

Mr. Turner exhibited larvæ of *Phibalapteryx tersata*, from ova laid by a female captured at Wendover, on the occasion of the Society's field meeting on July 11th, and also larvæ of *Spilosoma fuliginosa*, from ova, some of them feeding up rapidly, while others apparently intended to hibernate.

Mr. Step, on behalf of Mr. Turner, exhibited the so-called "bone" of the cuttle (*Sepia officinalis*), from the mouth of the River Exe, in Devonshire, and stated that such objects were common on some parts of the S.W. coasts, the cuttles having probably been killed and consumed by conger eels.

AUGUST 27th, 1903.

The PRESIDENT in the Chair.

Mr. Hare exhibited a variety of *Acidalia aversata* in which the outer half of both fore- and hind wings was suffused with dark fuscous.

Mr. Dodds exhibited several curious aberrations of the male of *Ocneria dispar*, more or less extensively streaked with the ground colour of the female. He had inbred the species for the last three seasons, and this variation had not appeared previously to the present year, except in one specimen in the second season, which he had thrown away, presuming that it had been stained slightly in the cyanide bottle. The larvæ were sleeved on apple each year.

Mr. Garrett exhibited a very small male specimen of *Porthesia similis (auriflua)*, taken on Wimbledon Common on August 12th, 1903, and measuring only one inch in expanse of wings; also a female *Polyommatus corydon*, with blue marks along the costa of the right fore-wing, forming a broken streak from base to apex. The latter was taken at Purley on August 13th, 1903.

Mr. West and Mr. Ashby reported that they had been warned out of the open sand pit in the centre of Oxshott Heath while searching for Coleoptera, because "it interfered with the birds getting their evening meal."

Mr. F. M. B. Carr exhibited—

1. A collection of Lepidoptera made in Salisbury district during 1903, including *Eugonia (Vanessa) polychloros*, *Nemobius lucina*, *Polyommatus (Lycæna) corydon*, *Lithosia mesomella* (Romsey), *Lithosia (aureola) sororcula*, *Eutricha (Gastropacha) quercifolia*, *Notodonta dictæa*, *Acronycta tridens* (from larva), one *Leucania straminea*, one *Xylophasia sublustris*, *Triphæna*

interjecta, *Dianthæcia conspersa*, *Plusia moneta*, *Amphidasys strataria* (*prodromaria*), *Eurymene dolabraria*, *Cleora lichenaria*, *Minoa euphorbiata*, *Eupithecia pulchellata*, *Numeria pulveraria*, *Mesotype virgata* (Stonehenge), *Orobena extimalis* (*margaritalis*), and many others.

2. *Cabera pusaria*, var. *rotundaria*, bred.

3. *Plusia moneta*, bred from Northwood larvæ, and cocoons of the same species, some of which were white, some yellow, and some mixed. He stated that the white cocoon dipped in water becomes yellow, and that the entirely yellow cocoons were spun by larvæ in metal boxes, the others by those kept in ordinary glass-top boxes.

Mr. R. Adkin exhibited an example of *Limenitis sibylla*, in which the white markings were somewhat reduced in size, and partially obscured by a dusting of black scales. Also an example of *Cleora glabraria*, in which a dark patch extended over the basal third of the fore-wings. Both were reared from the New Forest larvæ during the past summer.

Mr. Step exhibited the very large Heteropteron, *Belostoma grande*, sent to him from Trinidad, and there known as the "Electric cockroach." Its body measures over four and a half inches in length.

Mr. West exhibited the three British representatives of the Heteropterous genus, *Pilophorus*, all taken at Oxshott in August, viz. *P. cinnamopterus*, on pines, *P. perplexus* and *P. clavatus*, on oak.

Mr. Adkin remarked on the unusually abundant evidences of larval depredations in the gardens this season.

Mr. Carr stated that he had in two days obtained no less than sixty male specimens of *Orgyia antiqua*, by assembling with a bred female.

SEPTEMBER 10th, 1903.

Mr. E. STEP, F.L.S., *President*, in the Chair.

Mr. H. E. Garrett exhibited a specimen of *Pyrameis atalanta*, with the red band on the left hind wing marked with yellow spots, and the right one also slightly marked. It was bred from Arundel larva in July, 1903.

Mr. Goulton exhibited a living larva and case of *Coleophora limosipennella*, feeding on birch, from Oxshott, together with photographs of the larvæ of *Cucullia verbasci*, *C. lychnitis*,

Acronycta alni, *Pterostoma palpina*, and of a species of *Eupithecia* feeding on *Campanula glomerata*.

Mr. R. Adkin exhibited a series of *Zonosoma linearia*, reared from West Sussex ova. The individuals showed a certain amount of variation in colour and the intensity of the central line, and in one a small wedge-shaped mark extended inwards from the central at about one-third of its length from the costa.

Mr. Main exhibited examples of three species of New Zealand butterflies, including *Pyrameis gonerilla*.

Mr. Carr exhibited living larvæ of *Melanthia albicillata* and *Cosmotriche (Odonestis) potatoria*, and asked if any member had known the larvæ of the latter species to feed for two winters. At the present time he had larvæ not yet full fed, which had lived through the last winter and were apparently going to hibernate a second time. Mr. Carpenter thought it a most unusual occurrence, and said that no doubt the unprecedented bad summer was one of the causes. He had found that the caterpillars of butterflies had this year very considerably extended the length of their larval life. Mr. Adkin doubted whether ordinary single brooded insects had the power of going over a second winter in the larval state, although they might produce two broods or partial broods in one season.

Mr. West, of Greenwich, exhibited a series of the Homopteron, *Gargara genistæ*, which he had taken on broom at Oxshott in September. The species was a very local one, and when he first met with it the males were in the proportion of twenty to one of the females; but when he looked for it at a later date, the proportion was reversed.

Mr. Step exhibited seeds of the Chili pine, *Araucaria imbricata*, which he had just received from Woodstock, Co. Kilkenny. They were produced on the large specimen tree, of which he had exhibited the photograph at a previous meeting. He also showed a photograph of the cluster of four cones at the end of a branch, and stated that the weight of the cluster exceeded 16½ lbs. He described the cones and their method of growth at some length, and stated that it was rarely that any number of seeds were fully developed on the trees in this country.

Mr. Adkin exhibited a specimen of the flower-head of the yarrow which was of a very deep pink. He had found it at Eastbourne, where it was most conspicuous among a host of the ordinary white heads.

Mr. Clark exhibited photographs of the ova of *Eutricha*

(*Gastropacha quercifolia*), showing very clearly the remarkable dark and light banding.

Mr. Carpenter wished to record the unusual occurrence of a species of butterfly copulating in captivity. He said that Mr. Joye had a brood of larvæ from a bred pair of *Pararge egeria*, which he had enclosed together in a bandbox covered with lino, and exposed to the full sun. It was noted that, with the exception of Mr. Bateson's experiment with *Pieris napi* and v. *bryonia*, most of the records of such pairings contained an element of doubt.

SEPTEMBER 24th, 1903.

The PRESIDENT in the Chair.

Mr. South exhibited (1) a short series of *Aplecta nebulosa*, reared from larvæ received from Mr. Thompson, of Chester, who collected them in Delamere Forest in the spring of 1903. All the moths bred were darker than the typical form of the species, but only two of var. *robsoni*, Collins, appeared.

(2) Series of *Cabera pusaria*, bred from larva obtained in September, 1902, from Oxshott and Wisley in Surrey, and from Epping Thicks, Essex. All the larvæ were beaten from birch, and as most of them appeared to be nearly full grown, they were allowed to pupate in the cages, to which they were transferred without any supply of food beyond that placed with them when collected.

From the result it would seem that some of the larvæ did not obtain sufficient nourishment, and as a consequence produced undersized imagines. In the aberrant character of the markings these small examples resemble *rotundaria*, but in the shape of the wings they do not differ much from the larger specimens with typical markings.

Mr. F. B. Carr exhibited (1) specimens of a brood of *Malacosoma neuustria*, bred from ova found on sawfly in the New Forest. All the specimens were of the same dull brown shade, and none of the red tint, which he believed to be the normal colour. About half of the males were pale, and half were of the same shade as the females.

(2) A larva of *Cleora glabraria*, which was taken in the New Forest at Easter and was still feeding.

Mr. Boxer exhibited a collection of butterflies and moths from Durban, collected by Mr. W. T. Temple.

Mr. West (Greenwich) exhibited short series of three

species of Hemiptera, taken from broom at Oxshott in September—(1) *Livilla ulicis*, (2) *Dictyonota strichnocera*, and (3) the rare *D. fuliginosa*.

Mr. Adkin sent for exhibition from Eastbourne a spray of the tamarisk (*Tamarix gallica*, L.), and one of the sages, and communicated the following note:

“I do not remember to have often seen tamarisk blooming, and as some few bushes about here are in full blossom, I thought a sample might interest some of our members, and I am therefore sending a couple of sprigs of it under separate cover by same post. With them I have put a bit of a *Salvia* that is used here very effectively as a garden border plant; you will notice that the flowers are insignificant and among the green leaves some distance down the stem, its effectiveness being due to the colour of what appear to be the terminal leaves of the shoot. I dare say you may be familiar with it, but it was new to me, and so I am sending it on the off-chance of its being interesting to others who may not have come across it before.

“Lepidoptera are scarce here; of course one finds a fair number of “blues” in their special haunts, chiefly *Polyommatus corydon*, with just an occasional *P. icarus*, but so far not one *P. bellargus* has shown up. A few *Aglais urtica* and an occasional *Pyrameis cardui* may be seen. The only really common species is *Plusia gamma*, which since Monday has been quite abundant, although up to that time it had been seen only very sparingly. Even the drizzling rain of yesterday and the sea-fog with which we are favoured to-day do not appear to have affected its liveliness, but I have so far been able to detect no movement in any particular direction; it appears to simply hover about from flower to flower, whether on the downs, or in the gardens, or even at the window flower-boxes.”

Mr. Lucas read the Report of the Horsley Field Meeting held on June 6th, and illustrated his remarks with lantern-slides (see page 9).

OCTOBER 8th, 1903.

The PRESIDENT in the Chair.

Mr. F. A. Oldaker exhibited series or examples of the following species of Lepidoptera:

Apatura iris, bred from larvæ (Brockenhurst), June 30th, July 1st, 4th, and 6th, 1903. The females were particularly fine.

Gastropacha (Lasiocampa) quercifolia, bred from larvæ (Leatherhead), June 30th, July 1st, 2nd, 3rd, and 5th, 1903.

Triphæna ianthina, bred from larvæ (Galashiels), June 23rd to 30th, 1903.

T. fimbria, bred from larvæ (Arlington, Sussex), July 6th to 10th, 1903.

Psilura monacha, bred from ova (New Forest), July 2nd, 5th, 10th, and 14th, 1903.

Plusia moneta, bred from pupæ (Tilgate), June 24th, 25th, and 26th, July 4th, 1903.

Sesia myopæformis, one specimen, bred from larva (Dorking), July 2nd, 1903.

Lophopteryx carmelita, one example, taken from lamp (Dorking), May 1st; and

Agrotis cineræa, taken from lamps (Dorking), May 28th, June 11th and 16th, 1903.

Mr. E. B. Bishop exhibited a bred series of *Plusia moneta*, and read the following notes:

“The specimens exhibited were reared from larvæ found on April 12th, 1903, on *Aconitum napellus* in a wood near Chinnor, Oxon. I mention this fact, as in most records of this now comparatively common insect the larva has been found on *Delphinium* in gardens. Even in this case there was a cottage within a few hundred yards, and it is quite likely that the *Aconitum* was not truly wild. The larvæ were then very small, feeding gregariously out of sight in the spun-up heads of the plants, and would have passed unnoticed but for the presence of an entomological expert in Mr. Bacot.

“Perhaps the following notes will be of some slight interest:—The larvæ were fed up on *Delphinium*, and until the last moult (or possibly the last but one) were gregarious and retiring in their habits, their black tubercles showing up conspicuously against their green ground colour. Moulting appeared to be a very tedious process, sometimes necessitating almost a week of laying up in (at any rate the last moult) what could almost be called a special cocoon spun for the purpose. It is somewhat difficult to be quite sure of the habits of larvæ in captivity, but I am inclined to think that after the last moult but one the gregarious habit is given up, though the larvæ do not yet feed exposed. One larva which I isolated spun a most elaborate retreat

for its last moult, drawing a small leaf closely together, closing up every aperture, and lining the interior with silk.

"After the last moult the larva becomes a clear pale green, practically without spots or markings, and feeds exposed. The change in appearance produced by the last moult is most noticeable. I can only describe it in language which may sound somewhat archaic to advanced members. It seems like a jump in a single moult from a Micro to a Macro larva.

"As has been noticed, the cocoon is white when spun. When it becomes yellow the change is presumably due to the action of moisture. The pupa is attached to the inside of the cocoon by cremastral hooks.

"The singular and conspicuous process in the pupa, extending far beyond the wing-cases, is no doubt a sheath for the very long proboscis, but even then it seems to me, in my superficial ignorance, much too wide for the purpose, though Dr. Chapman could no doubt explain all about it. In the exhibits herewith I have tried to illustrate some of the matter touched upon."

Mr. R. South exhibited (1) a series of twelve specimens of *Vanessa urtica*, reared from larvæ that were taken from nettle when quite small and afterwards fed up on hop. Except in the case of three of the examples, no aberrational result was exhibited, and the variation in the three exceptions was simply an encroachment of the ground colour on the usually yellowish space between the black costal spots 1 and 2 on the fore-wings, and a narrowing of the reddish fulvous band of the hind wings.

(2) *Cleora glabraria*; about twenty-five larvæ of this species were obtained from the New Forest, and appeared to feed well and eventually pupate satisfactorily. Only fourteen moths emerged, mostly of the ordinary pale speckled form. Two of the specimens, however, were rather greyer than usual, and one was considerably suffused and clouded with blackish.

(3) *Acidalia trigeminata*; a female of this species, taken at Wisley on July 5th, 1902, deposited about twenty eggs. The larvæ hatched in due course, and some of them, about half a dozen, fed up rapidly, pupated, and attained the moth state in September. The other larvæ hibernated, and could not be induced to continue feeding. Most of these died in the spring, and only two attained the perfect state, one moth emerging on June 2nd and the other on June 10th, 1903.

Mr. Tonge exhibited series of the following species of Lepidoptera:

(1) *Conchylis dipoltana*; a short series taken near Brighton, August, 1903, by A. C. Vine, Esq.

(2) *Crambus alpinellus*; a short series taken near Arundel, August, 1895, by A. C. Vine, Esq.

(3) *Senta ulvæ* (*maritima*); four males and one female, taken near Lowestoft, June 28th, 1903, by exhibitor.

(4) *Leucania straminea*; one specimen, bred from a larva, found on sedge near Lowestoft, June 28th, 1903, by exhibitor; and

(5) *Leucania obsoleta*; one specimen taken near Lowestoft, June 28th, 1903, by exhibitor.

Mr. Goulton exhibited photographs of the larvæ of *Odontopera bidentata*, *Jochæra* (*Acronycta*) *alni*, *Sphinx ligustri*, *Hemaris fuciformis*, *Biston hirtaria*, *Halias prasinana*, and *Phorodesma smaragdaria*.

Mr. West, of Greenwich, exhibited a series of the local and conspicuous species of Hemiptera, *Aradus depressus*, taken at Darenth, under bark.

Mr. F. B. Carr exhibited living specimens of the Hemipteron, *Acanthosoma tristriatum*, beaten from juniper at Salisbury.

Mr. F. Noad Clark exhibited a fungus taken from a recently erected oak gate at Paddington. Mr. Step said it was a species of *Pleurotus*.

Mr. Step exhibited specimens of the fungi *Polyporus betulinus* and *P. applanatus*, taken at St. Paul's Cray, on Saturday, October 3rd, together with photographs of *Phallus impudicus* at various stages of its development. He also made some remarks on the various more or less unsatisfactory methods which had at times been made to preserve fungi.

Mr. Step then gave an address entitled "Some Notes on Marine Fishes," and illustrated his remarks with lantern-slides of the early stages of the sole, the full-grown conger, the white hound (a British shark), the early stages of the lump-sucker, the angler and the grey gurnard, the mature angler, the father lasher, the red gurnard, the streaked gurnard, the john dory, the boar fish, and the red mullett. He referred to the protective coloration of fishes, and showed slides giving the character of the shores where he had carried on most of his observations for some five years.

Mr. Step also exhibited slides to show the settling habit of *Pyrameis cardui* and *Vanessa atalanta* in nature on flowers, and the resting habit of *Panolis piniperda* and *Melanippe fluctuata*.

OCTOBER 22nd, 1903.

The PRESIDENT in the Chair.

Mr. C. W. Simmonds, of Tufnell Park, N., and Mr. J. Ovenden, of Frindsbury, Rochester, were elected members.

Mr. South exhibited very interesting series of *Zygæna trifolii* and *A. filipendulæ* from various localities, together with varieties, and some supposed hybrids, and read the following notes on the exhibit.

"At the end of July and the beginning of August this year I made one or two entomological excursions to Weybridge and the district around. Although captures of insects on these occasions were not very numerous, the journeys were not wholly devoid of interesting result. A weakness for overhauling specimens of any species subject to aberration induced me to pay a visit to a spot near the canal where *Zygæna trifolii* is fairly abundant in some seasons. This year, however, it was not common in its old haunt, and I only saw about a dozen there altogether. Oddly enough, two of these were varieties worth taking, and a third had a small extra dot between spots 3 and 5. A few days later, in company with Mr. Scollick, I went down to the same ground, but there were then no *trifolii* to be seen there, so we determined to hunt up the new home of the species, and after considerable roaming about we succeeded in doing this.

"However, before we came upon *trifolii* we struck a colony of *Z. filipendulæ*, and on examining the specimens, which, as the day was rather gloomy, were resting on the grass and other herbage around, we found several examples agreeing exactly with the form of the species I had previously obtained at Northwood, Middlesex, in May and June, and which were referred to var. *hippocrepidis*, Steph. ("Entom." xxx, p. 181). We also found what was still more important, four mixed pairs of *trifolii* \times *filipendulæ*; in all cases the male belonged to *Z. trifolii*. I took two of these pairs, and afterwards gave one of them to Mr. F. B. Carr, who informs me that the female deposited ova, from which he now has larvæ feeding. The female of my pair also laid a good batch of eggs and the larvæ subsequently hatched. Unfortunately I lost the majority through being unable to give them the necessary attention. At the present moment I have only three alive, but these seem to be doing well on a plant of

Lotus that I potted up for them after the bulk of the mischief had occurred. I hope that Mr. Carr will be more successful with his larvæ and get a fair number through to the perfect state.

"In any case the fact is now well established that *trifolii* and *filipendulæ* do, only occasionally perhaps, cross in a state of nature. At Northwood the two species occurred together, but I never saw an instance of cross-pairing in that locality. As in the Surrey locality, the colony of each species was not far removed one from the other, but there was this difference in the two cases. In the Middlesex district it was *filipendulæ* that was observed on a portion of the *trifolii* ground, whereas in Surrey it was *trifolii* that had invaded the *filipendulæ* colony. Possibly, if search had been made among the Middlesex *filipendulæ*, mixed pairs might have been found; unfortunately this was not attempted.

"As has been already stated, some specimens taken on the *filipendulæ* ground in Surrey, and, I may add, also bred from cocoons obtained there, were of the *hippocrepidis* form, and I cannot see that they are separable in any way from examples of the same form taken with typical *filipendulæ* in May and June at Northwood. If other evidence were wanting, these July and August captures would prove that the form *hippocrepidis* is not confined to the May and June *filipendulæ*. In his masterly treatment of the Anthroceridæ (Zygænidæ) Mr. Tutt ("Brit. Lep.," i. pp. 414—546) devotes fully fifty-eight pages to an elaborate and exceedingly instructive dissertation on *trifolii* and *filipendulæ*. He would seem to consider that we have two well-defined forms of *trifolii*, and he deals with *hippocrepidis*, Steph. (*tutti*, Rebel) as though it were specifically distinct from *trifolii*; but so far as I am able to follow his remarks it would seem that he is not very strongly convinced that *hippocrepidis* can be separated, as a species, from *filipendulæ*. Any way, the evidence he is able to adduce does not lend very much support to the suggestion that it is distinct.

"Formerly I was inclined to doubt that the form referred to as *hippocrepidis* was the result of a cross-pairing, but in the light of recent observations I find that I must modify that view. A fact of some considerable significance is that wherever *filipendulæ* and *trifolii* occur at the same time, in a common area, and sufficiently near for the two species to intermingle, there we find the form *hippocrepidis* in some numbers. So far as my limited opportunities of investigating the matter permit of any conclusion being arrived at

on this phase of the subject, I believe that it is always the male *trifolii* that seeks the female *filipendulæ*, and my reasons for this are—(1) The four mixed pairs found in Surrey were in each case *trifolii* ♂ × *filipendulæ* ♀, and occurred in the colony of the latter species; two of the females had only just left the pupa, and their wings were not fully developed. (2) The form *hippocrepididis* occurs among the colonies of *filipendulæ*, and not, so far as my observations extend, among those of *trifolii*.

“The time of year given for *hippocrepididis* (as a species) is May and June, but I have shown that the same form occurs also in July and August. If, as I am now much inclined to believe, *hippocrepididis* is a hybrid resulting from the union of *trifolii* and *filipendulæ*, it may naturally be expected that slight differences would be exhibited in one or more of the earlier stages, and these Mr. Tutt has commented on from the very limited material at his disposal. The form is recorded from a good many places, and I should suppose that there is no doubt but that the specimens have been correctly determined. It would be interesting, therefore, to know whether *trifolii* was really absent from any locality in which *hippocrepididis* has been reported to occur.”

Mr. McArthur exhibited a short series of *Hepialus humuli* v. *hethlandica*, taken in Unst in 1882.

Mr. Dodds exhibited specimens of the Coleopteron, *Corynetes rufipes*, found alive in a box of cigars.

Mr. Edwards exhibited a wedding cake, which had been under a glass shade in a confectioner's shop in the city for some twenty-two years. The whole of the interior part had been demolished by beetles, and even the sugar had been closely riddled by their burrowing. Countless numbers of dead specimens were lying around, and a few living ones were obtained by the members. The species was recognised as *Anobium paniceum*.

Mr. F. B. Carr exhibited a series of captured males of *Orgyia antiqua*, together with a series of examples bred from a captured female. The latter were much larger than the former.

Mr. Tonge exhibited some very fine photographs of the larvæ of *Diloba cæruleocephala*, *Asphalia flavicornis*, *Sesia* (*Macroglossa*) *stellatarum*, *Eumorpha* (*Chærocampa*) *elpenor*, and *Theretra porcellus*.

Mr. West exhibited short series of two species of the Hemiptera, *Microphysa elegantula*, from Darenth, taken on lichen-covered trees, and *Cardiastethus fasciventris*, from Box Hill. The latter is a rare species.

Dr. Chapman exhibited an album of photographs showing the embryonic development of *Botys hyalinialis*, and taken by Messrs. Hammond and Jeffreys. It consisted of five or six series of photographs taken at short intervals, showing the gradual changes in the development of the larva within the ovum. They were exceedingly well developed, and showed the smallest details very clearly, thus forming a unique record of embryonic growth from the moment of exclusion of the ovum until the hatching of the larva. This species is peculiarly adapted to such observation, as its egg is very flat and possesses an unusually transparent shell.

Mr. E. Step exhibited specimens of *Helvella crispa*, Fr., and *Clavaria coralloides*, L., from Ashted, and remarked that all the *Helvellæ* appear to be rare in the neighbourhood of London, though Cooke records several from Epping Forest. He said: "On October 17th *H. crispa* was really plentiful at the foot of the chalk downs, and I could have gathered several pounds of it. Cooke describes it as only occurring one or two at the time—at most half a dozen—and gives the impression that it makes a dish greatly to be desired. Worthington Smith, however, says they have little flavour and are very tough. I should say they have too much flavour—an earthy one, like spinach,—but I did not find them actually tough. I should imagine that the taste for them has to be cultivated, and I regard them as better to look at than to eat."

Mr. Step also exhibited photos of the above species, and of *Lycoperdon gemmatum*, *Merulius aurantiacus*, *Hygrophorus virgineus*, *Tricholoma nudus*, *Tricholoma terreus*, and *Pleurotus ostreatus*.

Mr. R. Adkin read the Reports of the Field Meetings at Limsfield (see page 14) and St. Paul's Cray (see page 20).

Mr. W. J. Kaye exhibited specimens of *Theope endocia*, *T. foliorum*, and *Nymphidium lysimon*, with figures of the larvæ and pupæ from Trinidad. All these were found to live on friendly terms with species of ants, and the ants milked the larvæ above the anal segment. The two first species feed on cocoa, and the last on *Cassia* sp.

NOVEMBER 12th, 1903.

The PRESIDENT in the Chair.

Mr. Jäger exhibited a specimen of *Ophiura stolidus*, a Nottid new to Britain, captured at sugar near Dartmouth on

September 23rd, 1903. It is a known inhabitant of Asia Minor, N. Africa, and Southern Italy. (See "Ent. Mo. Mag.," 1903, p. 269).

Mr. J. W. Kaye exhibited two remarkable aberrations of *Taniocampa stabilis*: (1) A female example with shining pale hind wings, with the transverse line and lunule distinct; the fore-wings were brick-red. The specimen suggested a hybrid between *miniosa* and *stabilis*. It was taken at Caterham in 1893. (2) A female specimen with grey fore-wings, the lines strongly black, and a broad black fascia passing through the reniform stigma.

Mr. McArthur exhibited a specimen of *Hippotion* (*Chærocampa*) *celerio*, captured at Brighton by Mr. Clayton, at the railways works, on October 24th, (see "Ent.," 1903, p. 292).

Mr. Colthrup exhibited a large number of the various species and forms of British Anthrocerids (*Zygænid*s), and contributed the following note:

"Series of *Z. meliloti* from the New Forest. One specimen, with spots confluent on the right wing only. A series of var. *hippocrepidis* (Steph.) from Folkestone, and a series of three *filipendulæ* from Shoreham, Kent, for comparison. Chief points of difference noted: The fore-wings in var. *hippocrepidis* are broader, and in colour the males are a dark blue-green (more like the colour of *Z. trifolii*). In the females they are light bronze-green, like the males and females of *Z. filipendulæ*. The hind wing of var. *hippocrepidis* has a very broad border of blue-green (like *Z. trifolii*), with a notch of the same colour, where the outline of the wing breaks in, just before it reaches the anal angle. In *Z. filipendulæ* the border is narrow, and the notch is not generally present. The var. *hippocrepidis* emerged from pupæ, June 15th to 30th, 1902, and the *Z. filipendulæ* emerged July 21st to 28th of the same year. One specimen of *Z. filipendulæ* had all spots confluent. A series of *Z. trifolii* from Folkestone and Torquay, including the var. *confluens*, and a series of *Z. loniceræ* from Ireland and Flamborough, for comparison. The latter from Flamborough were extremely large, being far and away the largest insects in the whole exhibit.

"A series of *Z. minos* from Wales (Abersoch) were also included."

Dr. Fremlin exhibited an example of *Hemaris* (*Macroglossa*) *bombyliformis*, taken this season in the New Forest.

Mr. Tonge exhibited very finely executed photographs of the ova of *Numeria pulveraria*, *Oporabia autumnaria*, and *Hemerophila abruptaria*.

Mr. F. Noad Clark exhibited flowers and a fruit of the strawberry tree (*Arbutus unedo*), picked a few days before in Gloucestershire. Mr. Step remarked that the fruit took twelve months to perfect after the flower, hence the appearance of flowers and fruit at the same time. Mr. Clark also exhibited a photograph of the teazel.

Mr. West exhibited a short series of *Sitones griseus* from Oxshott, where it was common on broom. At Yarmouth he had met with it at the roots of grass. Mr. Turner noted that he had taken the species at Woking on broom, and that it was more commonly taken near the coast; but very few inland localities being known.

Mr. Step exhibited two species of fungus from Ashted, *Hellvella lacunosa*, and *Xylaria hypoxylon*, the candle-snuff fungus. On behalf of Mr. Carr, he also showed specimens of *Hypholoma epixanthus*.

Mr. Dennis exhibited a number of lantern slides, consisting of studies of flowers and foliage, and of illustrations of the geological formations in N. Wales, near Snowdon.

Mr. Goulton exhibited lantern slides of lepidopterous larvæ and ova, and a few studies of orchids.

Mr. Main exhibited numerous lantern slides of lepidopterous larvæ, imagines, and pupæ.

Mr. Tonge exhibited lantern slides of lepidopterous ova, larvæ, imagines, and pupæ.

Mr. West (Streatham) exhibited lantern slides of a large number of diatoms, and a few studies of flowers.

It was suggested by the President that members exhibiting slides of ova and larvæ of Lepidoptera should make prints of their chief exhibits, and give them to the Society towards the formation of an album for future reference.

NOVEMBER 26th, 1903.

The PRESIDENT in the Chair.

The evening was devoted to an exhibition of varieties, special forms, and notable captures in all orders.

Mr. J. A. Clark exhibited a gynandromorphous specimen of *Cyaniris argiolus*, taken in Yorkshire in May, 1903. The left side wings were female and the right side were male in coloration. He also showed a uniformly smoky example of *Ligdia adustata*, taken at Bexley in March, 1903.

Mr. Chittenden exhibited the following forms and varieties :

—Four *Heodes* (*Chrysophanus*) *phlæas*, one dark and one light (from Ashford, Kent, 1895), one with blue spots on hind wings; four female *Nyssia lapponaria*, bred 1903, Perthshire; six *Hypsipetes* (*Hydriomena*) *clutata*, moorland forms, Yorks., 1903; one example of *H. clutata* with red bars on the fore-wings, Ashford, Kent, 1903; four *Spilosoma lubricepeda* v. *radiata*, black fringed, very dark, bred near Huddersfield, 1903; and eight other dark specimens of the same form from the same source.

Mr. MacArthur exhibited three aberrant specimens of *Amorpha* (*Smerinthus*) *populi*—(1) a very pale example; (2) a strongly reddish example; (3) an unusually well-marked male specimen; and (4) a photograph of a remarkable underside of *Pieris rapæ*, in which the lower wing had two large distinct black spots on the disc.

Mr. Robert Adkin exhibited specimens of *Argynnis aglaia*, taken near Brighton in July last, including a male example, in which the dark marginal markings were extended inwards, in the case of the fore-wings coalescing with the submarginal spots, and in that of the hind wings enclosing them; and on the underside the silvery basal spots were elongated, and joined up with the second row, thus forming three broad silvery stripes, extending from the base nearly to the centre of the wing. One in which the submarginal black spots were unusually large; and three unusually richly coloured females. Also a partially bleached female specimen of *Epinephle ianira* from the same locality; a male specimen of *Cleora glabraria* in which a black patch extended from the base to near the centre of the fore-wings, from the New Forest; strongly marked examples of *Zonosoma linearia* from Goodwood; and a specimen of *Smerinthus ocellatus-populi* hybrid, which emerged, July 10th, 1903, from a larva reared in 1901, it having remained for two years all but one month in pupa.

Mr. Adkin also exhibited a long series of *Boarmia repandata* from various English, Scotch, and Irish localities, to show the great local variation which occurs in that species.

Dr. Chapman exhibited a large number of specimens of *Heodes* (*Chrysophanus*) *phlæas*, taken in various parts of Western Europe, especially to illustrate the geographical and seasonal variation of the species, rather than to show the range of aberration to which it was subject. He made particular reference to the size, and the influences which control it; to the form, particularly with regard to the tail development; and to the colour, its richness, increase or

decrease of the ground colour, and all intensities of suffusion. He discussed the varieties *v. suffusa*, *v. eleus*, and *ab. schmidtii* with special reference to Mr. Pickett's exhibit, and also pointed out the peculiarities of the Lapland forms which are ranged under *v. hypophlæas*. In conclusion he stated that the predominant Central European form was typical *H. phlæas*, that of Southern Europe was *H. phlæas* var. *eleus*, and that of Lapland, etc., was the form *H. phlæas* var. *hypophlæas*, although each race had the capability of producing the other forms, and did do so in nature.

Mr. Moore exhibited a specimen of *H. phlæas* from the Himalayas, from which almost the whole of the copper had disappeared from the fore-wings while the hind wings were normal, and also specimens from America (Indiana to Cape Breton) somewhat small but closely resembling the Lapland form *H. hypophlæas*.

Mr. Carpenter exhibited several series of beautiful bred specimens of separate broods from Abbot's Wood, Folkestone, and Bude. Each brood had a facies peculiar to itself, although the divergence was but small.

Mr. Montgomery a long series with many pale and sparsely spotted specimens which had emerged late in November.

Mr. Harrison and Mr. Main exhibited (1) bred series of *Dianthæcia conspersa* (*nana*) and *Eupithecia venosata* from the Shetland Islands, with south-country typical specimens for comparison. The Shetland *D. conspersa* were all very much darker than our southern forms, and some were almost black. The *E. venosata* had a dull smoky colour for the ground colour of all the wings, very different from the yellowish colour of the type.

(2) Series of *Aplecta nebulosa*, bred from larvæ collected in Delamere Forest this year. Some of the specimens were of the usual dark form from Delamere, and several were the form known as var. *robsoni*. For comparison, specimens were shown from Cornwall, New Forest, and Argyllshire, all of which were much lighter than the Delamere series.

(3) A series of *Noctua brunnea*, bred from larvæ taken this year in Delamere Forest.

(4) A series of *Notodonta dromedarius*, bred from larvæ taken in Delamere Forest in September, 1902. These appeared to be a decidedly darker race than the southern form.

(5) A specimen of *Euchelia jacobææ*, bred from New Forest larvæ. This specimen had the hind wings and markings on the fore-wings of a very pale pink or salmon colour.

(6) A bred series of *Noctua baia*, from larvæ taken in Dela-

mere Forest this year. They showed a considerable amount of variation, and there was one particularly pale specimen.

(7) Series of *Hipparchia* (*Satyrus*) *semele* from Cornwall and from Eastbourne. The specimens from the chalk at Eastbourne had the undersides of all the wings much lighter than the Cornish specimens.

(8) A series of *Melanargia galatea* from Cornwall.

Dr. John H. Spitzby exhibited and discussed the variation of (1) series of Edmund Reitter's group of *Carabi* multi-setosi (setæ in groups on labial palpi); interesting because this group is placed about the middle of the groups into which Reitter divides the genus *Carabus*. *Platycarabus creutzeri*, from Austria; *Platycarabus depressus*, from Austrian Alps; *Chætocarabus intricatus*, Jura and Austria; *Chætocarabus adonis*, Greece; *Mesocarabus catenulatus*, Jura, France, England and Scotland; *Mesocarabus genci*, Corsica; *Megodontus violaceus*, Lake of Lucerne, England (Leicester and Kent); *Megodontus* v. *purpurascens*, France and Austria.

(2) Series of varieties of *Cetonia aurata* and *Potosia cuprea*. *Cetonia aurata* v. *piligera*, Switzerland; v. *lucidula*, Monte Bré, Lugano; v. *pisana*, Monte Bré, Lugano; v. *valesiaca*, France; v. *hispanica*, Malaga; *Potosia cuprea* v. *cuprea*, Lugano; v. *obscura*, Lugano; v. *metallica*, Lugano; v. *transfuga*, Italy.

(3) *Potosia affinis* v. *mirifica*, Syria; *Cetonischma æruginosa*, Lugano; and *C. speciosa* v. *jousselini*, Syria.

Dr. Sequiera exhibited a box of most interesting and remarkable varieties of Lepidoptera, including *Vanessa io*, uniformly suffused with slate-blue; *Catocala nupta*, with smoky-black margins; *Polygonia c-album*, an underside without any trace of the usually conspicuous white "comma" mark; *Hemerophila abruptaria*, strongly marked melanic forms from the New Forest; *Nemeophila russula*, female with wholly black hind wings; *Colias edusa*, with pale scales uniformly strewn over the black portions, making the marginal bands very light; and *Anthrocera* (*Zygæna*) *filipendulæ*, with very pale salmon markings.

Mr. W. J. Lucas exhibited specimens of (1) *Labidura riparia*, which had the last two seasons been found somewhat commonly near Bournemouth. They were extremely pale, resembling the sand, but get dark in drying. He said that the lightest specimen had not faded much.

(2) A pupa of *Lucanus cervus*, and stated that it was found in a kind of cocoon, but the appendages were free, as in the specimen at present.

Mr. Simmonds exhibited a long series of bred *Cucullia gnaphalii* from Sevenoaks, and a variety of *Epunda lichenea* without the usual reddish or greenish markings, very uniformly mottled and pale, and which may perhaps correspond to var. *calvescens* of *Polia flavicincta*, a pale form induced by its environment.

Mr. Colthrup exhibited a long series of *Bryophila muralis* (*glandifera*) and *B. perla*, and one specimen of *B. impar* (Warren) for comparison, micro-photos. of the eggs of the two former species (by A. E. Tonge, Esq.), preserved larvæ and empty pupa-cases of both species, and a specimen of the Ichneumon fly (*Cælichneumon consimilis*, Wesm), together with an empty *B. glandifera* pupa-case from which an ichneumon imago had emerged.

The series of *B. glandifera* included the various shades of green of the type, a pink form from the Isle of Wight, a black form from the same place, very dark forms from S. Devon, and including vars. *pallida*, *obscura*, *flavescens*, and *viridis* (Tutt) and var. *par* (Hub).

The series of *B. perla* ranged from very pale type specimens to very dark ones, and a row of the var. *suffusa* (Tutt).

Among them were two specimens, male and female, of a very striking variety—the fore-wing of both are pearly white, the usual markings just discernible, and the wings have the appearance of being dusted over with flour. The scales have not been rubbed off, and are plainly to be seen under a glass, and the fringes on the fore-wings are perfect, as are those on the hind wings, with the exception of a small notch jarred off when removing the insects from the setting board. One of the insects was drying its wings when taken, and both were taken within a foot of each other, on the same wall, where very pale specimens of *B. glandifera* have been taken in other years. Another specimen was not only suffused with red, but the markings were nearly all of the same colour.

Mr. G. B. Browne exhibited the following:—(1) A series of *Aplecta (herbida) prasina* and *A. nebulosa*, taken at Hailsham, June, 1903, together with a *light* form of *A. nebulosa*, taken in the New Forest, July, 1902, and *dark* forms taken at Sutton Coldfield, in 1902.

(2) *Polyommatus (Lycæna) icarus (alexis)*; a few specimens taken at Folkestone, in June, 1902, one female showing a bleached hind wing.

(3) *Heodes (Chrysophanus) phlæas*; a short series taken in various places to show local forms.

(4) *Camptogramma bilineata*; a few varieties taken at Folkestone, in June, 1903.

(5) *Luperina testacea*; a very light form taken at Lee.

(6) *Melanthia ocellata*, with very dark black band; taken at Dawlish, July, 1903.

(7) *Tæniocampa munda*; a brown form, taken at Chislehurst, 1902.

Mr. H. Main exhibited two living examples of *Blatta australasie* found among imported bananas.

Mr. Dods exhibited some very remarkable and aberrant bred male forms of *Ocneria dispar*, in which irregular and unsymmetrical patches of white appeared on all four wings; in some specimens the total area of these patches quite equalled half the area of the wings. The species had been inbred for three years, and the larvæ sleeved on apple in the garden.

Mr. E. C. Goulton exhibited, among others, an example of *Eubolia limitata* from Yarmouth, Isle of Wight, having a decided yellow ground.

Mr. West (of Greenwich) exhibited his collection of one hundred and sixty-six species of British Homoptera and twenty-one species of Psyllina, all collected within the last five years in Kent and Surrey, and with one exception (*Cicadetta montana*) taken by himself. No less than one hundred and twenty-four species were taken within three miles of his home near Blackheath.

Mr. Dobson exhibited twenty-six species of dragonflies collected by himself during 1903. Among the species were a remarkable extreme form of *Libellula quadrimaculata*, var. *prænubila*, *Anax imperator*, *Gomphus vulgatissimus*, *Æschna mixta*, *Ischnura pumilio*, and *Agrion mercuriale*. This was a notable result for a year in which the absence of sunshine was so marked a feature. He also exhibited an admirable wire frame, invented by himself, to form a stand for an exhibition box or cabinet drawer.

Mr. Jäger exhibited an example of *Phryxus* (*Deilephila*) *livornica*, which he had bred, September 27th, 1902, from a larva found at large in S. Devon, at Starcross.

Mr. C. P. Pickett exhibited varieties and aberrations of the following species:

Epinephele jurtina (*ianira*); several bleached specimens, one male with female coloration, the brown patches on forewings being exceptionally large; a long row of undersides, the marking being more striking than usual; from Dover, August, 1903.

Polyommatus (Lycæna) corydon ; very long series, both male and female, with some remarkable undersides. Males: dwarf specimens (no larger than *Cupido minima*) to extra large. Females: dwarf to extra large imagines, one of a brown coloration, several deep spotted and striated, one almost black in colour and without any markings; several of ab. *inæqualis* (undersides varied in coloration from blackish grey to almost the normal male coloration); all from Dover, August, 1903.

Cyaniris argiolus ; series of deep-banded females, from Worthing, August, 1902; the black bands exceptionally deep and rich in colour.

Heodes phlæas ; series from Dover, August, 1901, 1902, and 1903. Males of 1903 are much more suffused than usual; two females with a row of blue dots on under wings.

Arctia caia ; series bred from Tottenham larvæ, 1903. One specimen with markings running lengthwise, giving it a curious appearance.

Callimorpha dominula ; series bred from larvæ taken Easter, 1903, Walmer. Three with the under wings much suffused, more proportion of black than scarlet.

Abraxas grossulariata ; bred from Tottenham larvæ. One very dark female, one very light male, appertaining to var. *laticolor*.

Spilosoma lubricipeda and var. *radiata* ; series, ranging from a plain *lubricipeda* to darkest (almost wholly black) *radiata*.

Angerona prunaria ; showing the newly described aberrations *pickettaria* and *pallidaria* ; several deep-banded males with chocolate hind wings; a bleached male of a cream colour; a banded male appertaining to the plain orange form; a deep chocolate-banded female with right-hand upper-wing chocolate band suffused with yellow, as if going back to orange type; bred June, 1903.

Aphantopus (Epinephele) hyperanthus ; specimen attacked by a bird while sitting, showing the mark of the bird's beak on both wings; taken at Clandon, July 18th, 1903.

Mr. Cannon exhibited the following species of Lepidoptera :

Euwanessa antiopa ; series bred June, 1902, from ova deposited by female from S. of France; no variation; several imagos failed to emerge, probably owing to lack of warmth.

Limenitis sibylla ; female, underside, variety, right secondary damaged; taken at Clay Hill, New Forest, July 4th, 1897, almost identical with a figure in Newman's "British

Butterflies." Upper side not completely black, but shewed faint white markings both on primaries and secondaries.

Melitæa aurinia; series bred from Irish larvæ, June, 1903. No striking varieties. Thirty-three per cent. of the pupæ did not emerge as imagos, owing to the inclement weather. The pupæ contained perfectly formed insects, and were quite up to full size. Every care and attention were given to the larvæ, very few of which were stung by ichneumons.

Cænonympha davus, var. *rothliebii*; series taken at Witherslack, July, 1903. Typical except one male, which has the primaries partly bleached. Saw a female deposit on the beak rush, which was forwarded to Mr. Frohawk, who states that the larva will not feed on the rush, but feeds up on common grasses in confinement.

Argynnis (Brenthis) euphrosyne; a strongly marked female, taken in May, 1901, near Reading, Berks. Strongly marked on upper side of primaries, underside normal.

Carsia imbutata; series taken at Witherslack, July, 1903. One of the specimens agrees with the third figure in Newman's "British Moths."

Xanthia ocellaris; one taken in November, 1894, and another taken in October, 1899.

Mr. Manger exhibited a case containing twenty-two species of the gorgeous South American Nymphalid genera *Catagramma*, *Perisama*, and *Callicore*, including *Perisama (Catagramma) oppelii*, *Perisama (Catagramma) lineata*, *Perisama (Catagramma) alicia*, *Catagramma peristera*, *Callicore (Catagramma) nystographa*, *Callicore (Catagramma) marchalii*, *Catagramma hydaspes*, *Catagramma columbiana*, *Catagramma cyllene*, *Catagramma humboldtii*, *Catagramma eunomia*, *Catagramma mionina*, *Catagramma janeira*, and *Catagramma sorana*. Most of the species of these genera are of a velvety black, with blue, green, crimson, or ochreous bands and markings on the upper sides, while on the under surfaces of the wings there are numerous types of curious arrangements of spots, bands, and rings, one section being known as the "Eighty-eights," on account of the similarity of the markings to the figures 88.

Mr. Schooling exhibited a varied series of *Spilosoma fuliginosa*, bred from ova, and also a fine series of *Xylocampa areola (lithorhiza)*.

Mr. E. Step exhibited a series of fifty-six photos. of British fungi, illustrating the genera *Scleroderma*, *Lycoperdon*, *Phallus*, *Sparassis*, *Helvella*, *Clavaria*, *Thelephora*, *Merulius*, *Dædalea*, *Polystictus*, *Fomes*, *Fistulina*, *Boletus*, *Coprinus*, *Hypholoma*,

Paxillus, *Pholiota*, *Cantharellus*, *Hygrophorus*, *Pleurotus*, *Laccaria*, *Lactarius*, *Russula*, *Tricholoma*, *Amanita*, and *Xylaria*.

The following members brought microscopes and exhibited a considerable number of objects under them:—Messrs. Cant, Edwards, Fremlin, N. D. Warne and West (Streatham).

DECEMBER 10th, 1903.

The PRESIDENT in the Chair.

Mr. R. S. Smallman, of Herne Hill, and Mr. Ansorge, of Kingston-on-Thames, were elected members.

Mr. Edwards exhibited an example of a floral mimetic Orthopteron, and contributed the following note:

“The specimen that I exhibit is closely allied to, if it is not identically the same as *Gongylus gongyloides*, a floral simulator, a species found at Midnapur, where Sontál women and children hunted them out and brought them in, hanging on twigs of a bush. They are said to be found on rose bushes, and at Midnapur were known as rose-leaf insects, from the circumstance that when the insect is more developed and furnished with wings, the foliaceous appendages are said greatly to increase in size and exactly to resemble rose leaves. Dr. Anderson, however, was disposed to think that more than one species might probably occur in the Midnapur district. They feed upon houseflies and grasshoppers, the former being preferred, as the latter are too strong for them; but they will also eat small fragments of plaintain and custard apple. The species was shown to the members of the Asiatic Society of Bengal in 1877 by Dr. I. Anderson.”

Mr. McArthur exhibited (1) a male specimen of *Hepialus humuli* from Shetland, showing white patches on the under-side of exactly the colour of the white upper side. The scales were noted to be fully developed. (2) Two examples of *Dianthæcia nana (conspersa)* from the Isle of Lewis, both of which were very dark, together with five examples from Shetland, all of which were lighter, two considerably lighter, from the presence, more or less, of orange patches.

Mr. West, of Greenwich, exhibited two species of aquatic Heteroptera from near Montreal, the huge *Belostoma americana*, and the smaller *Zaitha fluminea*. He also exhibited a Cicadid from the same locality, *Cicada tibicen*.

Mr. Dobson exhibited a very light specimen of *Amphipyra pyramidea*, taken in his garden this year. He stated that, although he had sugared persistently in the same place for thirty-eight years, he had never before taken the species at Malden. For comparison he showed an ordinary New Forest form which was distinctly suffused with mahogany colour.

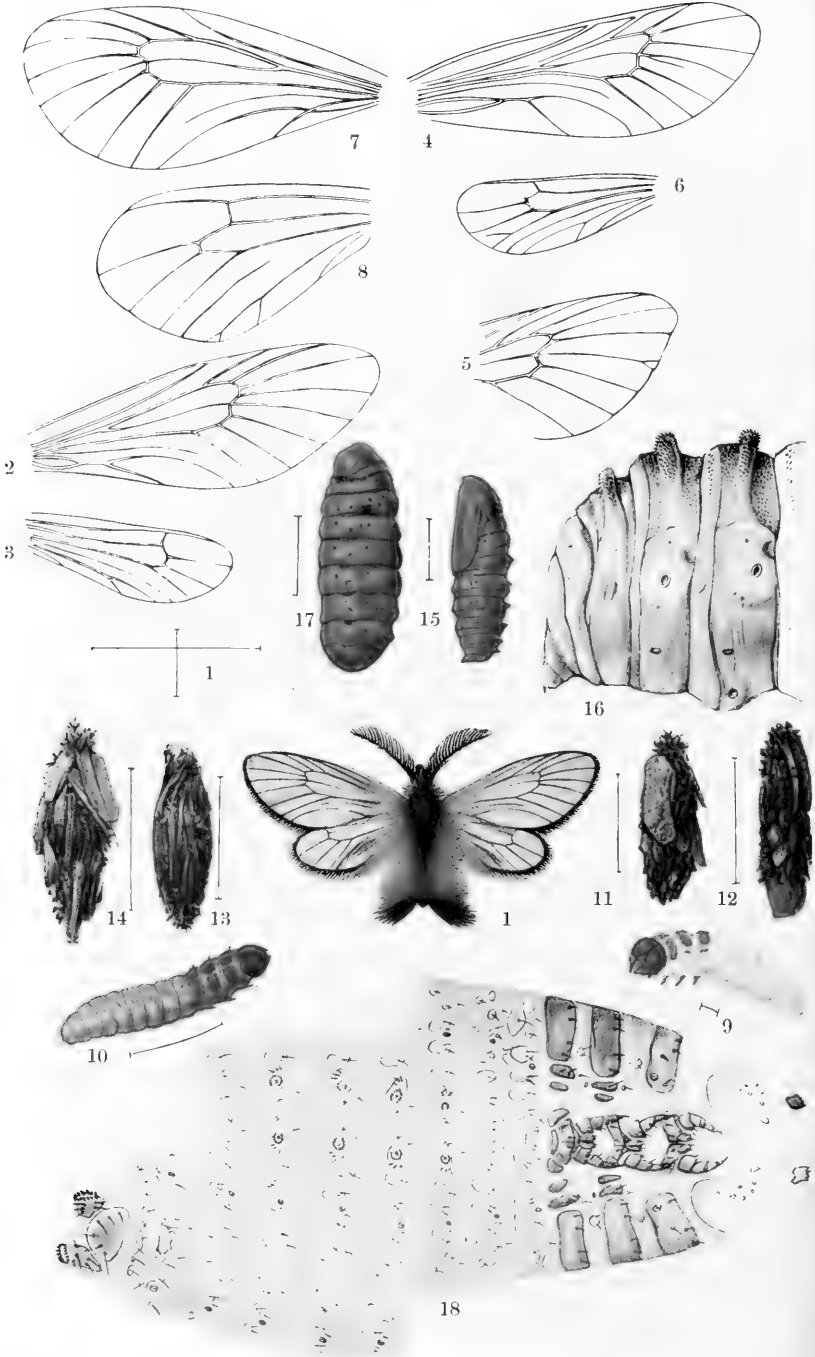
On behalf of his son, he exhibited (1) a bred specimen of *Pygæra curtula*, which was deep in colour, with a light-coloured example taken on a lamp at Malden; (2) a series of large and rich examples of *Spilosoma fuliginosa*, bred, with a small one captured in the New Forest on June 8th.

Mr. Hy. J. Turner exhibited a book on fungi containing nearly forty plates. It was published in 1759 in Italy. The author, Battara, was one of the pioneers in the study of fungi, and a genus is named after him.

Dr. Chapman read a paper on an excursion to Spain last summer. He detailed his route, some travelling experiences, and some of the features of the collecting grounds visited. He exhibited a number of the specimens taken, calling attention specially to the *Erebia evias* and *E. stygne*, taken flying together, and resembling one another very closely in size, colour, and in the *E. evias* losing the apical eye, and so approaching in marking to *E. stygne*; differing in these respects from the better-known alpine form of the species, which seldom or never fly together, and differ considerably in size, colour, and markings. Some *E. evias* very much approached *E. zapateri*, a species in an adjacent region, but with which *E. evias* cannot occur, as *E. zapateri* is a month or more later in emergence, even should they occur on the same ground, which is not improbable. A group of homæochromatic butterflies from Guéthary were also remarked on, viz. *Satyrus dryas*, *Canonympha adipus* and *Heteropterus morpheus*, all very dark in colour, flying lazily together in small swamps, and wholly unmixed with the butterflies of various other colorations, abundant both in species and specimens, in the country around. Especial attention was called to a new form of *Heterogynis* (*H. canalensis*) to *Pyrausta alborivulalis*, new to Western Europe, and to a new Psychid, *Pyropsyche moncaunella* ("Ent. Record," xv, p. 324).

The Society is indebted to Dr. Chapman for copies of the plate illustrating the life-history and structural details of *Pyropsyche moncaunella*.





Horace Knight, del.

André & Sleigh, Ltd.

Pyropsyche moncaunella. Chapm.

EXPLANATION OF PLATE.

FIG. 1.—Imago ♂, *Pyropsyche moncaunella*, rather over twice natural size; the large specimen figured is 22.5 mm. in expanse.

FIG. 2.—Neuration of fore-wing of *P. moncaunella* from camera drawing.

FIG. 3.—Neuration of hind wing of *P. moncaunella* from camera drawing.

FIGS. 4 and 5.—Neuration of fore-wings of *P. moncaunella* from camera drawings, from two specimens in which a missing vein is partially represented; Fig. 4 would indicate that the missing vein is vein 5.

FIG. 6.—A similar example from hind wing, the reappearing vein is probably vein 3.

FIG. 7.—Fore-wing of *Phalacropterix muscella* for comparison, there is practically no portion of 1b between its union with 1a and its bifurcation, this is, however, represented in some specimens (1a arising from 1b, as shown in figure, is a slip in copying).

FIG. 8.—Hind wing of a variation of neuration in *P. muscella*. 1b is usually simple; in this specimen it branches not only as in *P. moncaunella*, but a second time. On the other side of the same specimen it branches much as in *moncaunella*. These variations found in a few specimens illustrate the plasticity of the neuration in Psychids. [The wing form in *P. angustella* (which is hardly congeneric with—*atra*, Heyl.=*plumifera*, Ochs.) is nearest to *P. moncaunella* of any Oreopsychid, but the neuration is less close than that of *P. muscella*. It would possibly result from the plasticity referred to that a sufficiency of specimens would bridge over the differences.]

FIG. 9.—Newly-hatched larva × 13 diam.

FIG. 10.—Fullgrown larva ♂ × rather more than 2.

FIG. 11.—Case of ♂ × about $\frac{5}{2}$.

FIG. 12.—Case of ♂ × $\frac{5}{2}$, pupa-case protruding.

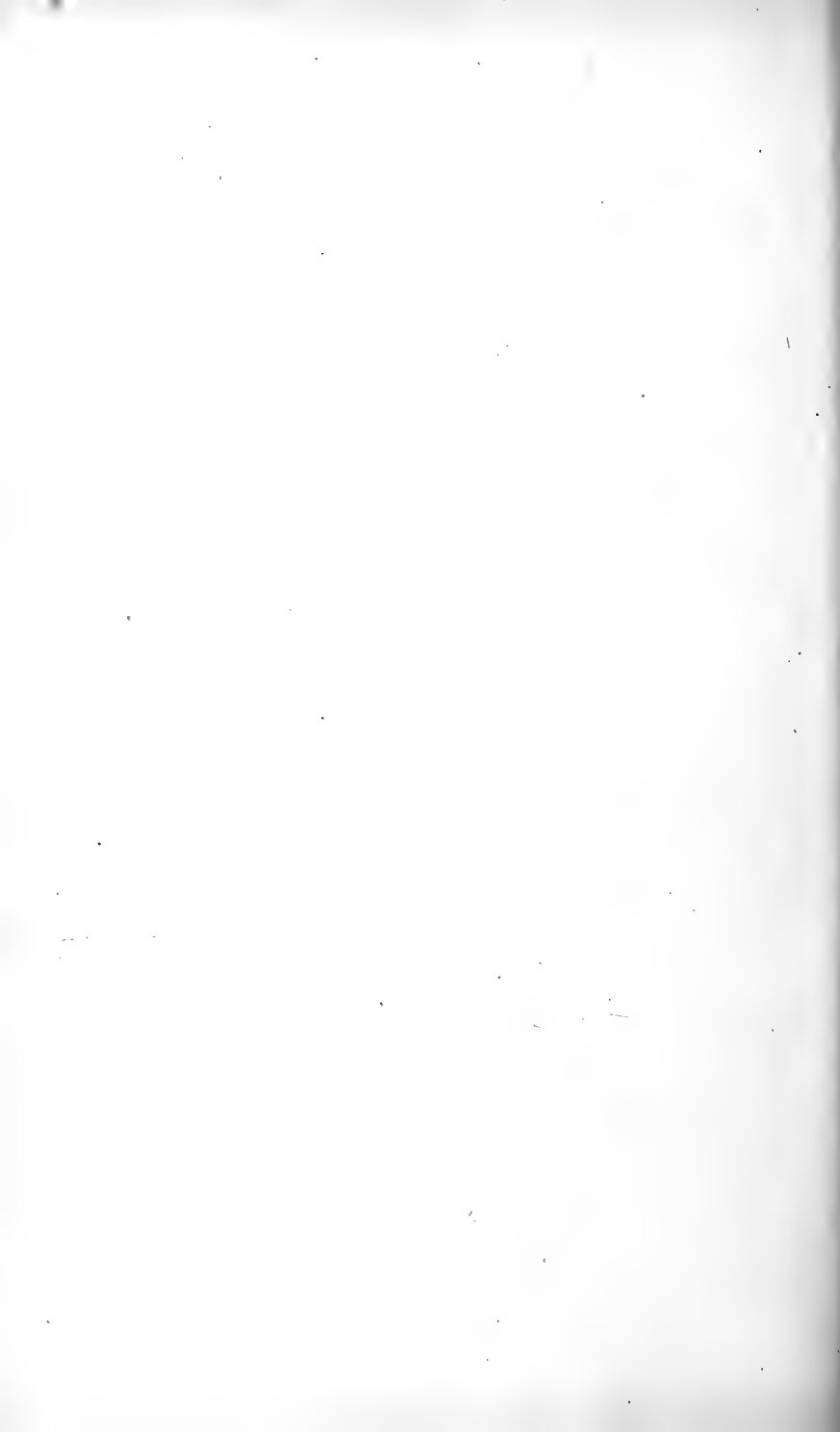
FIGS. 13 and 14.—Two cases ♀ × about $\frac{5}{2}$.

FIG. 15.—Male pupa × 3. The dorsal ridges are perhaps a little exaggerated.

FIG. 16.—Male pupa, abdominal segments 6, 7, 8, 9, and 10 more magnified to show the mounting of dorsal armature on ridges. The reversed hooks of the intersegmental membrane are hardly large enough to show even with this magnification. The ridges end in a point instead of fading out, as shown.

FIG. 17.—Female pupa × 3.

FIG. 18.—Skin cast by ♀ larva on changing to pupa (from camera sketch). The specimen is unusually perfect, and satisfactory for one obtained in this way. The head is crushed, and the ventral aspects of 8th, 9th, and 10th abdominal segments are obscure, and there is a fold (on each side unfortunately) which makes the lower lateral plate of the second thoracic doubtful; for the rest, the sketch gives all the tubercles of the larva, but to make them at all visible, the very minute secondary ones at anterior borders of segments and against spiracles are a little exaggerated.



JANUARY 14th, 1904.

The PRESIDENT in the Chair.

Mr. East, of Stoke Newington, was elected a member.

Mr. Adkin exhibited a series of *Acontia luctuosa*, reared from ova obtained from a moth taken at Eynsford in June, 1902. He said that he understood that the species was generally supposed to be double-brooded, but in this case, whether from the coolness of the season or other circumstance, the whole of the pupæ remained over the winter. The eggs hatched on July 1st, 1902, and the larvæ went down in from four to five weeks of that date, but the first moth did not emerge until June 29th, 1903, and the last on July 10th. In reply to a question he said that the larvæ fed up readily on *Convolvulus arvensis*.

Mr. Edwards exhibited a batch of ova of *Hybernia rupicapra*, and also a specimen of the large and curious Orthopteron, *Dinarchus dasypus*, Illig., from near Bucharest, sent to him by M. Montandon.

Mr. Dennis exhibited the fruit of the butcher's broom from Epping Forest, where, although the plant was common, the fruits were seldom obtained. It was stated to fruit more freely in the counties south of the Thames, and very freely in the New Forest. He also exhibited the fruit of the western plane, and called attention to the curious loose fibrous stems by which they were suspended from the twigs, and said that this gave such a freedom of movement that the slightest breath of wind was considered to facilitate the distribution of the seeds when ripe. He also pointed out the withered staminal flowers, which had not yet fallen.

Mr. Tonge exhibited another series of photographs of the ova of Lepidoptera, including *Argynnis thore*, *Hybernia rupicapra*, *Hemerophila abruptaria*, *Eugonia quercinaria*, *Eubolia cervinaria*, *Tiliacca citrigo*, *Anhocelis rufina*, *A. pistacina*, *Mellinea circellaris*, and *Arctia fasciata*.

Mr. West exhibited *Dermestes lardarius*, which he had bred from almonds, among which it had occurred somewhat freely.

Mr. G. B. Browne exhibited a large number of Lepidoptera captured by him at Dawlish between July 23rd and August 7th, 1903, and contributed a paper descriptive of Dawlish and his exhibit (see page 22).

Mr. Turner added some remarks on a few species not included in Mr. Browne's list, together with a list of Tortrices and Tinea observed, and a notice of a few captures in other orders (see page 27).

The Secretary read the Report of the Field Meeting held on July 11th, 1903 (see page 18).

JANUARY 28th, 1904.

ANNUAL GENERAL MEETING.

The PRESIDENT in the Chair.

The first meeting was devoted to the business of receiving the Report of the Council 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 (page 29).

The following is a list of members elected as Officers and Council of the Society for the Session 1904-5.

President.—Alfred Sich, F.E.S.

Vice-Presidents.—H. Main, B.Sc., F.E.S., E. Step, F.L.S.

Treasurer.—T. W. Hall, F.E.S.

Librarian.—A. W. Dods.

Curator.—W. West (Greenwich).

Hon. Corresponding Secretary.—Stanley Edwards, F.L.S., etc.

Hon. Report Secretary.—H. J. Turner, F.E.S.

Council.—R. Adkin, F.E.S.; F. Noad Clark; F. B. Carr; H. S. Fremlin, M.R.C.S., L.R.C.P., F.E.S.; W. J. Lucas, B.A., F.E.S.; H. A. Sauzé; W. West (Streatham).

Mr. Thompson, of "Garlands," Redhill, was elected a member.

Mr. Tonge exhibited another short series of photographs of the ova of Lepidoptera, including those of *Petasia cassinea*, *Epineuronia popularis*, *Epione apiciaria*, *Hybernia aurantiaria*, and *Cidaria populata*, all magnified twenty diameters, together with a photograph of an imago of *Theretra porcellus* in the position of rest.

Mr. Step exhibited *Nephrops norvegicus*, the Norway lobster, a Crustacean found on our northern shores and along the Irish coasts, especially in Dublin Bay, from which circumstance it is known as the Dublin prawn. Under this name

it has lately been frequently on sale at certain oyster shops in London. Messrs. Newberry and W. West, L.D.S., testified to its excellence from a dietetic point of view.

Mr. H. J. Turner reported that he had heard from Mr. A. J. Croker, one of the old members of the Society, who had recently emigrated to Assiniboia, Canada, and gave the following extracts from his letters:

"October 22nd.—The trip up the St. Lawrence, I can never forget. Just imagine 500 miles of beautiful wooded banks, with the maples of a lovely tint of pink. The river is very dangerous for navigation, and we had to anchor two nights before reaching Montreal. Ontario is a very wild country, but most interesting. It is mountainous and well wooded, not of excessive elevation, but continuous for hundreds of miles. Upon reaching Fleming we had six miles to drive, but the rain was then so terrific that we could not drive through and had to wait until the next day. Since that time up to now (October 22nd) we have had no further rain. We have had continuous sunshine every day, very hot, but cold at night, half an inch of ice on the "slews," or shallow ponds, but thawed clear by ten o'clock. This is what the Canadians call the "Indian Summer." The sunset is simply grand. I think this will be a fine country for insects; of course just now the cold nights have stopped any collecting, but I was surprised to take a *Colias*, allied to our *edusa*, on October 18th. I also took a *Plusia* much like our *gamma*, and another *Noctua*, allied to *Plusia*, and this morning in the house I met with a specimen of *Alucita hexadactyla*. One of my brothers had saved some pieces of butterflies, and among them I recognised a species of *Danais* and a fine species allied to *Enodia hyperanthus*. The country is, I am told, exceptionally rich in dragonflies, which is due, no doubt, to the abundance of "slews." Strange to say, *Artemisia maritima* is one of the most common plants on the prairie, but that can doubtless be explained by the soil being mostly charged with alkali or very salty. I wonder if *Phorodesma smaragdaria* occurs. We are exceptionally rich in birds, and have already had grand sport shooting amongst the prairie chicken; in England we should call them grouse. It is nothing to see seventy or eighty go up at once. Many species of wild duck, mallard in countless numbers, teal (blue and green-winged), widgeon, pintail, heron, crane, bittern, crake, and numbers of small birds. They say that they are simply swarming in the spring, as there are so many "bluffs" all over the place for breeding in. Among the mammals I

have seen a prairie wolf (could have shot it), musk rat, red fox, gophers, and prairie dog. Deer are common about twenty miles away, I understand."

"December 14th.—My homestead will be at Redvers, about twenty miles from the Moose Mountains, and is very wooded. I have been down there once and had a rough time of it. There are 160 acres, and a certain amount has to be broken up each year. I shall try some entomological work, but fear I shall not be able to do a lot until I get the place a bit forward. On our road to Redvers we had to cross a river about as big as the Catford stream, but banks about three quarters of a mile one side to the other. A very gentle slope, wooded and broken, just the sort of place to fire one's ardour. What it must be like in the summer I don't know, but they say it is a veritable paradise, and just the sort of place for fritillaries and blues. They say the wild plants are numberless, large lilies as big as any hot-house ones, and grow in millions. The butterflies, too, fly up in clouds, so I think there is a good time in front. Later on I may get up farther, into Alberta, British Columbia, etc. Apple trees do not grow in Assiniboia as yet; all manner of means are being tried to grow them, but Ontario is the spot, or British Columbia. Have not done much shooting lately, only jack rabbits (pure white). Wolves are fairly common, but have not had a chance of a shot yet, as it wants a rifle, a shot gun is too fine. The country is now covered with snow, and will remain so until spring. We have just had a very cold "snap" the last three days, 30°, 35°, 40° below zero. I have had my nose frozen, but it soon recovered with care. This happened through driving two hours in a blizzard, after horses that broke and joined a herd of fifty or sixty. We now have the journey to do again. The houses are kept very warm, stoves in the centre of the room, and I guarantee warmer here at 20° below zero than at 10° of frost in London. A great many of the birds nest here, especially water-fowl, with such facilities for breeding. The land is studded with "slews," with scrub growing round them, which makes fine cover; but I find nearly all the birds migrate in winter, and only snow-birds, hawks, owls, prairie chicken, grouse, and sparrows remain with us. The last are very common, but of brighter plumage than our British."

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1887 ... "	1904 ... A. SICH, F.E.S.
1888 ... T. R. BILLUPS, F.E.S.	

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. ARMSTRONG, 4, Lingard's Road, Lewisham,
S.E. *m.*
- 1903 ANSORGE, E. C., 12, Addison Road, Bedford Park, W. *l.*
- 1901 ARMSTRONG, RICHARD R., 55, Granville Park, Lewisham
S.E. *e, l.*
- 1895 ASHBY, SIDNEY R., 41, Canterbury Terrace, Elgin Avenue,
Paddington, W. *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.*
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1896 BARNETT, THOS. L., 81, Royal Hill, Greenwich, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1900 BARRETT, J. P., 3, St. John's Villas, Margate. *l.*
- 1888 BENNETT, W. H., F.E.S., 15, Wellington Place, Hastings. *h, c.*
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road
Peckham, S.E. *h, o, c, d, he.*
- 1897 BISHOP, E. B., 2, Hunter Road, Guildford. *l.*
- 1898 BLISS, M. F., Coningsburgh, Monpelier Road, Ealing. *l.*
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*
- 1898 BOUSKELL, F., F.E.S., Sandown Road, Knighton, Leicester. *l.*
- 1895 BOWMAN, K., Castle Road, Upper Walmer, Kent. *l.*
- 1902 BOXER, C. R. L., 151, Burnt Ash Hill, Lee, S.E. *l.*

YEAR OF
ELECTION.

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. MEAD, 8, High Street, Canterbury. *l, orn.*
- 1887 BRIGGS, T. H., M.A., F.E.S., Rock House, Lynmouth, R.S.O.,
N. Devon. *l*.
- 1890 BRISTOWE, B. A., F.E.S., The Cottage, Stoke d'Abernon,
Surrey. *l*.
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *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*.
- 1897 BURR, MALCOLM B., B.A., F.Z.S., F.L.S., F.E.S., 23, Blomfield
Court, Maida Vale. *o*.
- 1890 BUTLER, W. E., F.E.S., Hayling House, Oxford Road, Reading.
l, c.
- 1903 CANNON, F. G., 7, Fordwych Road, Hampstead, N.
- 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.
- 1886 CARPENTER, J. H., F.E.S., Redcot, Belmont Road, Leather-
head, Surrey. *l*.
- 1899 CARR, F. B., 46, Handen Road, Lee, S.E. *l*.
- 1899 CARR, F. M. B., Hadfield Hall, Durham. *l, n*.
- 1872 CHANEY, W. C., 38, Woodside Road, S. Norwood, S.E.
(*Hon. member*). *h, l, c.*
- 1897 CHAPMAN, T. A., M.D., F.E.S., F.Z.S., Betula, Reigate, Surrey. *l*.
- 1898 CHATTERTON, F. J. S., F.E.S., 5, Camden Studios, Camden
Street, N.W. *l*.
- 1888 CHITTENDEN, D., 98, Court Hill Road, Lewisham, S.E. *l*.
- 1896 CLARK, F. NOAD, Paddington Infirmary, Harrow Road,
W. *mi.*
- 1887 CLARK, J. A., F.E.S., L.D.S., M.P.S., 57, Weston Park,
Crouch End, N. *l*.
- 1898 CLARKE, H. SHORTRIDGE, F.E.S., 2, Osborne Terrace, Douglas,
Isle of Man. *l*.
- 1879 CLODE, W. (*Life member*).
- 1899 COLTHRUP, C. W., 127, Barry Road, E. Dulwich, S.E. *l*.
- 1902 COWHAM, F. W., 19, Brook Road, Stoke Newington, N.

YEAR OF
ELECTION.

- 1899 CRABTREE, B. H., The Acacias, Levenshulme, Manchester. *l*.
- 1885 CROKER, A. J., Hurst Farm, Fleming, Assiniboia, Canada. *l*.
- 1898 CROW, E. J., 26, Tindal Street, North Brixton. *l*.
- 1888 DAWSON, W. G., Shortlands House, Shortlands, Kent (*Life member*). *l*.
- 1900 DAY, F. H., 27, Currock Terrace, Carlisle. *l, c*.
- 1889 DENNIS, A. W., 12, Brownlow Road, Dalston. *l, mi, b*.
- 1884 DOBSON, H. T., F.E.S., Ivy House, Acacia Grove, New Malden, Surrey. *l, orn*.
- 1901 DODS, A. W., *Hon. Librarian*, 61, Dynevor Road, Stoke Newington, N. *l*.
- 1897 DRURY, W. D., F.R.H.S., F.E.S., Rocquaine, West Hill Park, Woking, Surrey. *l, b*.
- 1904 EAST, F. J., 42, St. Kilda's Road, Stoke Newington, N. *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., 42, Salisbury Road, Bexley, Kent. *d, mi*.
- 1891 FILER, F. E., F.E.S., 122, Stockwell Road, Brixton, S.E. *l, mi*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex (*Life member*). *l*.
- 1889 FORD, A., Hillside, Sunninghill Road, Pokesdown, Bournemouth, Hants. *l, c*.
- 1891 FORRESTER, A. C., 35, Old Queen Street, Westminster. *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., 86, Minet Avenue, Harlesden, N.W. *l*.
- 1899 GADGE, S. W., 9, Longley Road, Tooting Graveney, 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*.
- 1902 GOULTON, E. C., 4, Cornford Grove, Balham, S.W. *l*.
- 1895 GRIFFITHS, G. C., F.Z.S., F.E.S., 43, Caledonia Place, Clifton, Bristol. *l, e l*.
- 1904 GROSVENOR, T. H. L., 8, Gloucester Road, Redhill, Surrey. *l*.
- 1893 HALL, A., 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*.
- 1903 HARE, E. J., 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*.
- 1902 HARRY, S. P., 29, Rowland Road, Balham, S.W. *l*.
- 1900 HEWITT, R. L., "Hlabisa" Coalfield, Natal, S. Africa. *l*.
- 1903 HICKMAN, J., 16, Aldred Road, Kennington Park. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1888 HOPKINS, H. E., 5, Haseldean Road, Brockley, 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*.
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow. *l*.
- 1904 JOY, E. C., 34, Fairholt Road, Stoke Newington. *l*.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreask House, Monaghan, Ireland. *l, mi, marine invertebrata*.
- 1898 KAYE, W. J., F.E.S., Caracas, Ditton Hill, Surbiton, Surrey. *l*.
- 1900 KEMP, S. W., B.A., F.E.S., 37, Trinity College, Dublin. *l, c*.
- 1900 KIRKALDY, G. W., F.E.S., Sugar Planters' Association, Honolulu, Hawaii. *ex. rhyn.; fresh. arth.; ethnology*.
- 1888 KNIGHT, E., 2, Lichfield Grove, Church End, Finchley, N.
- 1898 LEMANN, F. C., F.E.S., Blackfriars House, Plymouth. *l*.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l*.
- 1903 LISTER, W. K., 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. *l, o, n, m*.
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1892 MAIN, H., B.Sc., F.E.S., *President*, Almondale, Buckingham Road, S. Woodford, Essex. *l*.
- 1886 MANGER, W. T., 100, Manor Road, New Cross, S.E. *l, c, cr*.

YEAR OF
ELECTION.

- 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., The New Club, Calcutta, India. *mi, b*.
- 1888 MITCHELL, A. T., 594, High Road, Chiswick, W. *l*.
- 1896 MONTGOMERY, ARTHUR M., F.E.S., 34, Thalimar Gardens,
Pembroke Road, N. Acton, W. *l*.
- 1880 MONTIERO, Señor A. A. DE C., F.E.S., 70, Rua do Alecrinar,
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.
- 1903 NEWBERRY, Councillor C., Annandale Road, E. Greenwich,
S.E. *l*.
- 1901 NEWNHAM, C. E., The Eyot, Hersham, Surrey. *l*.
- 1889 NICHOLSON, W. E., F.E.S., School Hill, Lewes, Sussex. *l*.
- 1900 NOTTLE, EDWARD, Lanyar Vale, Portland Road, South
Norwood. *l*.
- 1903 OLDAKER, F. A., The Parsonage House, Dorking, Surrey. *l*.
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South
Woodford, Essex. *l*.
- 1903 OVENDEN, J., Post Office, Frindsbury, Rochester. *l*.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology*.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b*.
- 1905 PENN-GASKELL, W. W., Halcyon Lodge, Lyford Road, Wands-
worth Common, S.E.
- 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, Mary's Buildings, St. Martin's Lane,
Charing Cross, W.C. *zoology, mi, pond life*.
- 1889 PERRY, Rev. J. F., Catholic Church, Brixton Hill, S.W. *l, c*.
- 1899 PICKIN, J. R., 2, Industry Terrace, Brixton, S.W. *l*.
- 1887 PORRITT, G. T., F.L.S., F.E.S., Mayfield, Edgerton, Hudders-
field. *l, n*.
- 1903 PRATT, W. B., 10, Lion Gate Gardens, Richmond, Surrey. *l*.
- 1897 PREST, E. E. B., Arva, Dakers Road, Forest Hill. *l*.
- 1903 PRISKE, R. A. R., Thirlmere, Spencer Road, Acton, W. *l, m*.

YEAR OF
ELECTION.

- 1902 RAYWARD, A. L., Lessington, Grosvenor Gardens, Walington, Surrey. *l*.
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l*.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. *orn*.
- 1904 RICHARDS, PERCY, Wellesley Cottage, Kingston Hill, Surrey.
- 1902 RILEY, E. F., 94, Drakefield Road, Upper Tooting, S.W. *l*.
- 1887 ROBINSON, A., B.A., 1, Mitre Court, Temple, E.C. *l*.
- 1894 ROBINSON, LEIGH, Parliament Mansions, Victoria Street, Westminster, London, S.W. *l*.
- 1888 ROBSON, H., 9, Trump Street, E.C. *l, b*.
- 1887 ROUTLEDGE, G. B., F.E.S., Tarn Lodge, Heads Nook, Carlisle. *l, c*.
- 1900 ROWDEN, ALFD. OLIVER, 6, Eastgate, 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., The Limes, Southend, Catford, S.E. *l*.
- 1886 SALWEY, R. E., F.E.S., Springbank, Wokingham, Berks. *l*.
- 1897 SANDISON, JOHN, 2, Francis Grove, Wimbledon, Surrey. *l*.
- 1888 SAUZÉ, H. A., 22, Earlsthorpe Road, Sydenham, S.E. *l*.
- 1902 SCOLICK, 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., Wressil Lodge, Wimbledon Common. *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*.
- 1903 SPITZBY, J. H., 1, Douglas Road, Canonbury Road, N.
- 1873 STANDEN, R., F.L.S., F.E.S., Townlands, Lindfield, Sussex (*Life member*). *l*.
- 1872 STEP, E., F.L.S., *Vice-President*, Oakwood House, Barnett Wood Lane, Ashtead, Surrey. *b, m, orn, cr*.
- 1902 STONELL, B., 25, Studley Road, Clapham, S.W. *l*.
- 1894 TARBAT, Rev. J. E., M.A., Fareham, Hants. *l, ool*.

YEAR OF
ELECTION.

- 1904 THOMPSON, A. B., Garlands, Redhill. *l*.
- 1901 THORNTHWAITHE, W., Hersham, Surrey. *l*.
- 1895 TOLHURST, J., Glenbrook, Beckenham, Kent. *l*.
- 1902 TONGE, A. E., Aincroft, Grammar School Hill, Reigate. *l*.
- 1899 TOOMBS, G. W., 40, Shrubland Grove, Dalston Lane, N. *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., Sussex Lodge, Newmarket. *d*.
- 1889 VINE, A. C., 45, Temple Street, Brighton, Sussex. *l*.
- 1889 WAINWRIGHT, C. J., F.E.S., 2, Handsworth Wood Road, Handsworth, near Birmingham. *l*.
- 1880 WALKER, J. J., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c*.
- 1888 WALLER, R., 2, Grand Parade, Upper Richmond Road, Putney, S.W. *l*.
- 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*.
- 1903 WARNE, ERNEST, 45, St. John's Hill, Clapham Junction, S.W. *l*.
- 1888 WARNE, N. D., 8, Bedford Square, W. *l*.
- 1888 WEBB, S., 22, 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., 75, Lewin Road, Streatham Common, S.W. *l, mi*.
- 1887 WHIFFEN, W. H., 12, Garlands Road, Redhill. *l*.
- 1905 WINKWORTH, J. T., 290, Burdett Road, E. *l*.
- 1899 WOOD, Rev. FRANCIS HENRY, M.A., Brabourne Cottage, Bromley Park, Kent. *l*.
- 1905 WRIGHT, J., 30, Coleman Street, Woolwich, S.E. *l*.
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *l*.

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

<i>Receipts.</i>	<i>£. s. d.</i>	<i>Expenditure.</i>	<i>£. s. d.</i>
By Balance in Hand from 1903...	... 16 17 6	... ..	... 17 12 6
„ Entrance Fees from General Fund...	... 0 15 0	... ..	... ..
	<hr/>	To Balance	<hr/>
	£17 12 6		£17 12 6

LIBRARY FUND.

<i>Receipts.</i>		<i>£ s. d.</i>	<i>Expenditure.</i>		<i>£ s. d.</i>
By Fines	To Debit Balance from 1903 ...	...	2 5 0
" Debit Balance	Grant's Account for Books	...	2 13 0
			" Holland's Account for Books	...	0 12 10
			" Andrews, Binding Account	...	0 14 6
			" Warner, for Paper for Herbarium	...	1 8 1
			" Postages	...	0 0 10
<hr/>			<hr/>		
£7 14 3			£7 14 3		

PUBLICATION FUND.

<i>Receipts.</i>		<i>£ s. d.</i>	<i>Expenditure.</i>		<i>£ s. d.</i>
By Donations	To Debit Balance from 1903 ...	...	22 18 0
" Sale of " Proceedings	" Knight's Account for 1903 'Transactions'	...	28 15 2
" Debit Balance			
<hr/>			<hr/>		
£51 13 2			£51 13 2		

ASSETS AND LIABILITIES.

<i>Assets.</i>		<i>£ s. d.</i>	<i>Liabilities.</i>		<i>£ s. d.</i>
By Balance, General Fund	To Debit Balance Library Fund	...	7 9 7
" " Suspense Account	" " Publication Fund	...	35 14 11
" Arrears of Subscription, £24 19s. 6d., valued at	" Balance	...	38 1 6
<hr/>			<hr/>		
£81 6 0			£81 6 0		

Examined, compared with vouchers, and found correct this 21st January, 1905.

FRED. NOAD CLARK, }
ALFRED W. DENNIS, } *Auditors.*

REPORT OF THE COUNCIL, 1904.

THE Council of the South London Entomological and Natural History Society, in presenting the Thirty-third Annual Report, is pleased to state that the Society still continues in a satisfactory condition.

During the past twelve months eight new Members have been admitted, four have resigned, and we have to record with sorrow the deaths of three Members—Mr. C. G. Barrett, a former President of the Society, Mr. McLachlan, for many years an Honorary Member, and Mr. J. A. Helps. At present, therefore, the Membership stands at one hundred and seventy-eight, comprising three Honorary, five Life, thirty-five Country, and one hundred and thirty-seven ordinary Members.

The Treasurer's Balance-sheet, duly audited, is printed at pages x and xi, and is eminently satisfactory, a result for which the best thanks of the Society are due to Mr. T. W. Hall.

The Society has again had to regret the long absence of its President, who through domestic affliction has been compelled to reside abroad. Members, however, will be pleased to know that his family are now thoroughly restored to health, and may hope that he, as Vice-President, will be able to give valuable aid to the Society during the coming year.

The Meetings have been as well attended as in former years, and even the Summer Meetings were on no occasion badly attended. The general exhibits have not been quite so numerous as the Council could wish.

The Council suggested, early in the year, that it would be

well to devote an occasional evening to the exhibition of lantern slides prepared by the Members. This was acted on, and the lantern was placed at the disposal of Members on three evenings during the year. The Council is pleased to report that a ready response was made by the Members, and a large number of admirable slides of biological subjects were exhibited on each occasion. At all those meetings, and on other evenings also, when the lantern has been in use, Mr. F. NOAD CLARK carried out the necessary arrangements, and the Council desires to thank him most heartily for his valuable assistance.

The Annual Special Exhibition of Varieties was held as usual in November, and was again a very successful gathering, in spite of the particularly unpleasant weather which prevailed. The objects were more numerous than in 1903, and in scientific interest were second to none of those exhibited on previous occasions.

The average attendance at the Ordinary Meetings has been about thirty. In accordance with Bye-law XVI the Council appointed Mr. R. Ashby as Recorder of Attendances, an arrangement which has acted very well.

Six papers, two addresses, and six reports of Field Meetings have been contributed to the Society, and of these the following Members were the authors: Mr. E. STEP, four; Messrs. LUCAS and MANGER, two each; Messrs. R. ADKIN, ROWLAND-BROWN, BURR, A. SICH, J. W. TUTT and Rev. F. H. WOOD, one each. The Council desires to thank these gentlemen for their kindness in thus coming forward to aid the Society in its work.

In reply to a communication from the South-Eastern Union of Scientific Societies on the protection of rare and local plants, your Vice-President, Mr. E. STEP, wrote a few remarks which were adopted by the Council and in due course forwarded to the Secretary of the Union.

Seven Field Meetings were held during the year, but there was somewhat of a falling off in the attendance. The following is a list of the places visited:

ASHTED, on May 14th; conducted by Mr. STEP.

BOOKHAM, on June 4th; conducted by Mr. STEP.

EYNSFORD, on June 25th; conducted by Mr. R. ADKIN.

MICKLEHAM, on July 9th; conducted by Mr. STEP.

BYFLEET, on July 23rd; conducted by Mr. LUCAS.

EPPING FOREST, on September 10th; conducted by Messrs. HARRISON and MAIN.

OXSHOTT, on October 1st; conducted by Messrs. LUCAS and STEP.

The Council wishes to thank these gentlemen for the trouble they took in making all the necessary arrangements, and to intimate its regret that so few members were able to attend these most pleasurable gatherings.

It having been found somewhat difficult to prevail upon members to take the office of President, your Council thought it advisable to alter Bye-law IV, Section 3, so that it would not be absolutely necessary to elect a new President every year. This matter was submitted to a Special Meeting held on November 10th, when it was decided by an overwhelming majority that the word "two" should be substituted for the word "one," so that the rule now reads: *No Member shall hold the office of President for more than two years consecutively.*

The Society's Collections still remain under the able care of Mr. W. WEST (Greenwich), who reports that :

"The donations to the Society's Collections during the year have been very poor. Mr. TONGE, with a kind gift of nearly fifty specimens, comprising thirty-five species of British Lepidoptera, and Mr. R. ADKIN, a further kind contribution of about fifty specimens in the same Order, were the only donors. I hope that during the year 1905 there will be an improvement, as I have marked fresh lists of the Lepidoptera. These can be had on application to either Mr. ASHBY or myself. During the year I have had much assistance from Mr. ASHBY in the supervision of the cabinets. There are still a few of the commoner species which want renewing, and which perhaps some of our younger members will be able to assist in replacing. I am pleased to say that at nearly every meeting Members consult the collections."

Your Council early in the year considered the question of the "Tugwell" Herbarium, and a small sub-committee was

appointed to investigate its condition. As a result it was decided to have the collection carefully gone through and placed in such a condition as to be of service to any member who wished to consult it. Mr. STEP most kindly undertook to carry this out, and there has been handed to the Curator the species in nineteen families of plants.

The Library has been under the care of Mr. A. W. Dods, the new Librarian, who reports that although only a fair number of books have been borrowed, yet members have made considerable use of the Library before and after the meetings.

The following is a list of the books, pamphlets, magazines, etc., which have been added to the Library during the year:

BOOKS.

BATES' "History of British Sessile-eyed Crustacea," by purchase.

HINCK'S "History of British Marine Polyzoa," by purchase.

HINCK'S "History of the British Hydroid Zoophytes," by purchase.

CUNNINGHAM'S "Marketable Marine Fishes," by purchase.

FLOWER and LYDDEKER'S "Mammalia," by purchase.

"Handbook of Instruction to Collectors," and "Guide to the Coral Gallery at the British Museum," from the Trustees of the Museum.

HOLLAND'S "Moth Book of North America," from Mr. GIBB.

PORRITT'S "List of Yorkshire Lepidoptera," from the AUTHOR.

TUTT'S "British Lepidoptera," vol. iv, from Mr. STANLEY EDWARDS.

BARRETT'S "British Lepidoptera," vol. ix, from the AUTHOR.

STEP'S "Wayside and Woodland Trees," from Mr. N. D. WARNE.

"Miscellanea Entomologica," by Dr. CHAPMAN, from the AUTHOR.

PERIODICALS, MAGAZINES, ETC.

The "Entomologist," 1904, from Mr. SOUTH.

The "Entomologist's Monthly Magazine," from the late Mr. McLACHLAN.

The "Irish Naturalist," by exchange.

The "Canadian Entomologist," by exchange.

The "Entomologisk Tidskrift," by exchange.

The "Transactions of the Texas Academy of Science," by exchange.

The "Rochester Naturalist," by exchange.

The "Proceedings of the Perthshire Society of Natural Science," by exchange.

The "Transactions of the Norfolk and Norwich Natural History Society," by exchange.

PAMPHLETS, REPORTS, ETC.

"Annual Report of the Lancashire and Cheshire Natural History Society," by exchange.

"Bulletin of the New Mexico College," Nos. 48 and 49, from Mr. T. D. A. Cockerell.

"Transactions of the City of London Entomological and Natural History Society," by exchange.

"Report of the Horniman Museum," from the London County Council.

"Colorado College Studies," from Mr. Cockerell.

"Report of the New Mexico College of Agriculture," from Mr. Cockerell.

"Natural Ornamental Plants of New Mexico," from Mr. Cockerell.

The usual "Abstract of Proceedings" of the Society for 1903 was issued at the beginning of May, and consisted of a volume of 110 pages, with a coloured plate and a chart, generously presented by Dr. CHAPMAN and Mr. R. ADKIN respectively. For financial aid in producing this Report the Society are much indebted to those members whose names are mentioned elsewhere,

Notes on the Genus *Coleophora*.

By ALFRED SICH, F.E.S. *Read February 11th, 1904.*

To the fifteenth volume of the "Entomologist's Record" our worthy Secretary, Mr. Henry J. Turner, contributes a valuable paper on the Coleophorids.

On page 88 he writes: "I know there are other lepidopterists equally interested in the group, and possibly some mutual help with material, and a checking of observations made, ought to be arranged, so that an advance in our knowledge of the group might be chronicled."

During the past season I have endeavoured to qualify myself, so that I might be accounted worthy to be reckoned among the "other lepidopterists," and with this end in view I beg leave to bring forward these rough notes.

I propose, firstly, to give an outline life history of *Coleophora fuscadinella*; secondly, a few remarks on the Coleophorid case; and, thirdly, some notes on the Coleophorid larva.

Coleophora fuscadinella, Zeller.

The female moth, flying around the food-plant at dusk, alights on the underside of a leaf, near the apex. She walks down the centre of the leaf, feeling the surface with the ovipositor as she proceeds.

By this method, sooner or later, she will find the angle formed by the midrib and a lateral rib, the two ribs forming an obstruction to the ovipositor in its course. Having thus found the angle, she adjusts her position so that by curving the abdomen under her the ovipositor is brought parallel with the surface of the leaf. It is then thrust well into the angle, among the long hairs, springing from the ribs, and the egg is laid. Occasionally more than one egg will be laid in the same angle, but not often more than two. In a confined space the moth, like other moths, will lay large batches of eggs on leaves or in niches of cork, or even on a smooth surface such as glass. I believe, however, in freedom that one only, or two ova generally squeezed together, to be the usual number. With regard to the total number of ova which one *C. fuscadinella* is capable of laying, I do not think it can be very large. One female laid fifty-one eggs before I let her fly, but I do not think she had then parted with all her ova, though probably with the greater proportion.

Though, like many of the ova of the Microlepidoptera, their shape is much modified by their surroundings, they may be described as ovoid. The micropylar end is somewhat truncated and usually rather less in diameter than the nadir, which is normally evenly rounded, though it readily takes the shape of any surface against which it may have been pressed by the moth's ovipositor.

The long axis measures 0.4 mm., and the shorter ones 0.25 mm.

The micropylar area may be described as a shallow basin. In the centre lies the micropyle. This consists of a minute but deep pit with seven grooves running down it. Under a low power it appears merely as a rosette composed of seven elongated cells. The micropyle is surrounded by an irregular collar or raised flange. Beyond this is a second, larger ring of raised points connected with the inner collar by about nine cross-ribs. These ribs are continued over the edge of the micropylar area, where they are raised so high at the border that they have the appearance of papillæ. These nine ribs, with others, perhaps less prominent, between them, run down the egg-shell to the nadir, where they become less distinct. They are all crossed at irregular intervals by lesser raised lines running round the egg at right angles to the ribs, the interspaces forming quadrangular cells. In other words, the sculpture on the walls of the ovum might be described as consisting of a series of shallow pits arranged in irregular longitudinal rows.

When first laid the colour of the ovum is pale yellow, but in nine or ten days the colour becomes rather deeper in tint. A minute red dot is also usually visible. About the fourteenth day the ovum shows a large dark fuscous spot at the micropylar end. This is caused by the dark head of the young larva showing through the egg-shell.

On the seventeenth day the first batch of eggs hatched. I should say that about seventeen days would be the average length of time that *C. fuscedinella* passes in the egg stage. Of course the length of this stage depends very greatly on the type of weather prevalent during the period. Two batches which I had during this cold summer took twenty-one days to hatch. The greater bulk of the eggs will hatch out on the same day. When about to leave the egg the young larva gnaws a hole at the micropylar end, through which it finally escapes. It does not eat the egg-shell. The empty shell does not collapse, but remains stiff. It is almost colourless, the yellow tint of the ovum before hatching being due to the yellow body of the larva showing through the shell.

Many authors state that the Coleophorids begin life as leaf-miners, and so they do, but as Coleophorid leaf-miners, not as true leaf-miners. The true leaf-miner eats its way out through the base of the egg into the leaf without ever coming in contact with the atmosphere. The genus *Nepticula* and also that of *Phyllocnistis* furnish good examples of true leaf-miners.

But the Coleophorids, at least *C. fuscedinella*, comes out of the

egg and wanders about until alighting on a suitable place to commence the mine.

C. fuscedinella will wander about for some hours before starting the mine. The place chosen for entrance into the leaf lies usually at the angle formed by a rib and the lamina of the leaf. Here it appears to be less difficult for the larva to bite through the cuticle of the leaf, probably on account of the substance lying behind the cuticle at this point being less solid than it is in other parts of the leaf. Here the young larva bites out a minute circular hole and commences to eat its way into the parenchyma between the upper and lower cuticle of the leaf. At first the larva mines steadily forwards, being apparently anxious to get its body hidden in the mine. One I had under observation on July 30th, 1903, had mined a sufficient distance into the leaf to completely cover itself in rather over two hours after commencing the mine. When well within the leaf the larva does not confine itself to the forward movement, but eats irregularly on all sides, just as a Coleophorid does in its later larval life. The mine from this cause mostly assumes a pear-shaped form. It is well known that the Coleophorid larva while feeding periodically leaves the mine and crawls backwards to the end of its case in order to eject the excrement. The young larva also crawls to the entrance of its mine for the same purpose, and having this habit a long, narrow mine would be inconvenient. It therefore confines its operations to a space lying not very far from the original entrance to its mine.

Usually it remains in the first mine till it has cut out its case, but if for any reason the first mine becomes untenable, it will come out and re-enter the leaf at another point, or even go to a fresh leaf, differing again on this point from a true leaf-miner.

From eight to ten days after hatching the larva will stretch itself out flat to undergo its first ecdysis, thrusting the old head well forward. The body then has a peculiar barred or striped appearance. To what this appearance is due I cannot say. I suggest that the old larval skin turns a brownish colour on the dorsal area of each segment, but that the inter-segmental membrane remains colourless.

The skin being stretched, the colourless portions are brought into view, alternating with the brownish dorsal area; hence the barred appearance. In about twenty-four hours the larva will have changed its first skin and, after recovery, commences to make its first case. It moves round the edges of the mine, eating out any portions which would come in the way of its case. It then cuts a slit in both the upper and under cuticle of the leaf on one side of the space in which it intends to make the case and fastens these two cuticles together with silk. It then repeats this operation on the other side of the space, taking care, however, to leave a portion at the apex and at the base of the case uncut. When the sides are firmly spun together the small space of uncut cuticle at the apex of the case is severed from the leaf, but the two cuticles are here not sewn together, as

they form the aperture at that end of the case. The larva then crawls down to the base and finally completes the case by biting through first one and then the other cuticle, thus cutting it completely away from the leaf. It then, bearing its case, walks off in well-deserved triumph, though the way in which the newly acquired habitation flops about borders on the ridiculous.

The larva now soon finds a suitable spot on the under side of a leaf where it can fasten its little case and bore into the leaf. Here it recommences to feed in the usual coleophorid manner. As the larva increases in size the case becomes too small to contain it comfortably, so the larva increases the size of the case, for *C. fuscedinella* does not at this period form another fresh case, as I believe *C. gryphipennella* does. The case is enlarged in two ways: When the larva, having fastened its case to the leaf, has mined all round to a convenient distance, it loosens the case from the leaf and moves to a fresh place. In freeing the case it does not sever the silk strands by which the case was attached, but cuts a ring out of the leaf cuticle, thus freeing the case and adding to it at the same time. So that, after the larva has mined in three or four different places, the case will have been prolonged by the attachment of three or four rings, composed of silk and leaf cuticle, to its basal aperture.

At the same time the larva increases the width or depth of the case by spinning a silk border along the ventral and apical margins of its dwelling. After eight or ten weeks the original first case will appear as a black patch on the back and sides of the now enlarged case, but, unless examined carefully, it will be difficult to see where the piece of leaf which formed the first case ends and the added silken portion begins.

The case at this period has some superficial resemblance, but of course in microscopical miniature, to the bivalve mollusc, *Mya truncata*, in its living state, when the epidermis is still on the shell and the wrinkled tube which encases the syphons is still attached.

The larva now prepares for hibernation. It crawls off the leaves, seemingly being aware that if it remained on them it would fall with them to the earth. It now attaches its case by the basal aperture very firmly to the bark of a tree of the food-plant. The site frequently chosen is the angle formed by the stem of a twig and the next year's leaf-bud. In this situation it braves the autumnal gales and the winter's cold without any further protection.

In the early spring, when the leaves are still very small, the larva loosens its case from the bark and recommences to feed. It still continues enlarging its case by rings of cuticle and silk as previously described, but the silk and the rings now added are of a much lighter colour, and, after a few weeks, the old winter case, which has now become almost black, contrasts strongly with the pale additions of the spring. When the leaves of the food-plant, be it birch, hornbeam, or hazel, have grown sufficiently large, and when the leaf

cuticle has become sufficiently stout to provide the materials for the second and, in this species, final case, the larva attaches the enlarged winter case to the cuticle of a leaf near the base, bores into the leaf and mines out a long space beside the margin of the leaf. Out of this space it perfects a new case exactly in the same manner as *C. hemerobiella*, to be presently described. The new case, however, is very different to the old one in appearance, being straight and fairly cylindrical.

It is perhaps one of the earliest mistakes made by the young collector of the Coleophorids when he finds the small bent cases and the long straight cases, all on the same birch-tree, and erroneously concludes, from the different size and appearance of the cases, that he has got two different species of the genus.

The larvæ in their new cases continue to feed in exactly the same way as in the earlier stages, but of course they make much larger and hence more conspicuous blotches in the leaves. After feeding in this manner, chiefly on the under side of the leaves, for a few weeks, the larvæ leave the under side and fasten their cases very firmly either on the stem of the food-plant, or, as is more often the case, on to the centre of the upper side of a leaf, usually choosing a leaf which has not been mined by them. With the case in this position the larva is, so to speak, standing on its head, but after some time it turns round inside the case and reverses its position. It now undergoes pupation, the larval skin finding its way to the bottom of the case with the head uppermost so that the pupa rests upon it. In about a month or six weeks the moth escapes through the apical opening of the case.

As the Coleophorid pupa is not protruded from the case in emergence, and as the case remains exactly the same in appearance after emergence of the moth, it is difficult to tell, on finding a case in July, whether the moth has emerged or not. The best way to settle the point is to examine the apical aperture of the case with a lens, and if any lepidopterous scales are observed we may safely conclude that the moth has flown, and a delicate squeeze of the case will prove that it is empty.

I know nothing of the method of emergence adopted by the Coleophorids, though I have sat hours with them before me in hopes of witnessing their manner of leaving the case, or cocoon, as at this stage it has become. In confinement, the moths pair a very few hours after emergence, and the female will begin laying one or two days after pairing.

CASES OF THE COLEOPHORIDS.

The case of the Coleophorid larva is in no way analogous to the shell of a Mollusc, which is firmly attached to the muscles of the animal itself. The Coleophorid case is not essential to the larva's

existence, but must be looked upon merely as a convenience. The case forms while the larva is feeding a shelter from the inclemency of the atmosphere, and a retreat or hiding-place from its enemies, and when the larva is full fed it has no need to go to the trouble of spinning a cocoon, for the case already built is admirably suited to the purpose. The Coleophorid larva is quite free to quit or abandon its case at any time should this act be necessary. The larva may be taken from its case, examined, and replaced in its case without suffering injury, provided always the operation be delicately performed. In fact, an exchange of cases may be made, not only between individuals but between species, and the larvæ will walk off in their strange cases apparently quite unconcerned. Of course, it is a well-known fact that several species of this genus habitually make entirely new cases, but only, however, at certain periods of their existence. Nevertheless some of these species may be induced to make a new case at a time when under ordinary conditions they would not do so, and even a species like *C. lineolea*, which increases its case by the addition of "leaf fragments," as Meyrick aptly puts it, will make an entirely new case if circumstances favour such a proceeding. The cases are therefore merely shelters for the larvæ. Flimsy as they are when newly made, they become very tough, forming a most efficient protection. From their great variety and from the skilful methods employed in building them, we may argue that they must be of very ancient origin.

Although the cases differ so greatly in appearance, the fundamental form is the same—that is to say, a hollow cylinder, open at one extremity and more or less closed at the other. The principles of construction appear to be of two kinds—one, the commoner, that of joining together the margins of two more or less symmetrical walls, so that a flat case is made like the scabbard of a sword, which is afterwards formed into a hollow cylinder by pushing out the walls; the other by addition of parts on the same principle that beads are threaded on a string. Sometimes both principles are employed, as in the case of species like *C. lineolea*, where one flat case is added to another.

In all instances that have come under my notice the interior of the perfect case is always lined with silk. The exterior of the case usually harmonises with the larva's surroundings; and in many instances, such as the case of *C. onosmella* on the tip of a bugloss leaf, or more especially the case of *C. juncicolella* on a sprig of ling, the resemblance of the case to portions of the food-plant is so exact that the case is practically indistinguishable. On the other hand, the almost black pistol cases of species like *C. ibipennella* and *C. anatipennella* are quite conspicuous, as they rest on the upper side of a leaf. But these, especially when the newest portions are spun of white silk, have a strong similitude to a bird's dropping.

When the Coleophorid larva is very small, it makes a minute case, but as the larva grows it has to enlarge its shelter. The enlargement

is usually carried out in one of the four following methods: firstly, by addition of silk only, as, for example, *Coleophora ibipennella*; secondly, by the addition of portions of food-plant and silk, as *C. albitarsella*; thirdly, by addition of portions of food-plant without visible silk, as *C. lineolea*; and, fourthly, by quitting the small case and making an entirely new larger case, as *C. hemerobiella*. The individuals of a species invariably construct and enlarge their cases by the same method. I have bred many specimens of *C. ibipennella* and *C. anatipennella*, both of which increase their cases by the addition of silk only, but how they do it I have not yet observed. The cases seem to grow gradually. I believe the larva spins intermittently at the margins of the case. When the larva of *C. albitarsella* is about to enlarge its case, it first, by means of silk, firmly fixes the case on to the edge of a leaf of the food-plant, usually ground ivy (*Glechoma hederacea*). It then mines out a more or less rhomboidal space at this edge of the leaf, cuts out and joins together the two then empty cuticles, which are already fast to the case, and eventually lines the cuticles with silk. This is the way in which the case is lengthened. As the larva grows not only longer but also stouter, it requires at the same time to widen its case, or rather to make it deeper. This is effected by cutting open the lower seam or margin of the case and extending the margins by silk to the required depth. This silken extension is pale in colour at first, but becomes darker with age, though frequently a sharp keel of whitish silk may be seen in quite old cases. At first sight the case of *C. albitarsella* appears homogeneous, but if examined with a lens the added leaf-segments may be easily observed, as well as the hairs which grow on their surface, while the keel of the case will be found to consist of silk only. In fact, the complete case really is formed of a silken tube strengthened by segments of leaf cuticle laid saddle-wise in a row over the back.

C. lineolea, a common species feeding on the black horehound (*Ballota nigra*), when about to enlarge its case, also fastens it on to the edge of a leaf where the larva mines out a comparatively large space—in fact, as far as it can conveniently reach without quitting the case. This large piece is then added to the case, the larva cutting it out of the leaf, and thus the case becomes both lengthened and widened at one and the same time. The dentations of the leaf included in the portion mined become the ornaments of the case. The larva as soon as the new portion of the case is cut out from the leaf walks off; it does not wait to complete the lining. After the larva has fed the case gradually becomes opaque, as though the larva required a certain amount of food for the secretion of sufficient silk to complete the lining. This method of case enlargement is adopted by many species, such as *C. onosmella*, *C. bicolorella*, *C. viminetella*, etc., but there is another method of case enlargement by leaf fragments, which we can very well observe in such species as *C. juncicolella*, *C. genistæ*, and *C. saturatella*. These species, feeding

on small-leaved plants, such as *Calluna* and *Genista*, cannot hide themselves on the undersides of leaves like *C. lineolea*, *C. viminetella*, and others. Therefore they make themselves inconspicuous by so constructing their cases that these shelters have the appearance of being actually portions of the food-plant itself. When the case is formed of such small leaflets as those of *Calluna* or *Cytisus*, it usually follows the principle of the beads on the string, but the hole through which the string passes is occupied by the larva itself. I have watched *C. saturatella* on a broom-leaf enlarging its case. The process is as follows: the larva mounts to the apex of the leaf and commences to mine a little on one side of the midrib. It mines out sufficient parenchyma to clear the tip of the leaf, which it then splits down the centre, wedging its case into the slit thus formed. The case, with half the leaf sticking out on either side, is then fastened by silk firmly into the split leaf, the rest of which is then mined out, and lastly, the whole cut off at the base. The basal half of the leaf now forms the additional habitable portion of the case, while the projecting tip of the added leaf on one side and the split off portion on the other, form the ornaments of the case. In drawing the added leaf to shape the larva causes it to wrinkle a great deal in that part which forms the tube or prolongation of the case.

When, in early summer, the hawthorn leaves have grown sufficiently large and the cuticles have become firm enough, we may find the larva of *C. hemerobiella* spinning its curiously curved first case to the base of a hawthorn leaf. When the case is firmly attached the larva commences mining out—that is, eating out the parenchyma in a straight line close to the edge of the leaf for a distance of about twice the length and double the width of its own body. To do this it must, of course, come quite outside its old case. When the mine is completely cleared of the parenchyma the larva cuts a slit in both cuticles by gnawing along the inner margin of the mined space, from the base, where the old case is attached, to the apex. It then spins the two severed cuticles firmly together. The new case is now a sheath composed of two walls, and is still attached to the leaf at base and apex. The larva now mounts to the apex and severs one and then the other cuticle from the leaf, but does not unite the lately severed portions. It then returns to the base and treats that in the same manner, clinging to the leaf with its thoracic legs as it finally cuts the case clear of the leaf. It now crawls off in its new case, leaving the old one attached to the leaf as though it were still inhabited. After a day or two it completes the new case by forming three valves at the apical aperture and by lining the case thickly with silk. This process is adopted by the *C. fuscadinella* group and also by the *C. limosipenella* group, except that the latter does not afterwards close the apical aperture by three flaps.

These, as far as I know, are the four chief methods adopted by the Coleophorids in enlarging their dwellings. I must, however, mention that the methods of case enlargement, though differing so greatly, do

not at all point to a wide or, perhaps, any difference of origin, or even to any very remote separation of the groups, but, on the contrary, rather serve to show how strictly the Coleophorids are bound together. For certain species use two or more methods in the course of their existence. For instance, *C. fuscadinella* begins by cutting out a case from the leaf; it then enlarges it with silk and also by addition of leaf fragments, and, finally, in making its last case, returns to the cutting-out process.

THE LARVÆ OF THE COLEOPHORIDS.

So far as I know them these all have very marked characteristics. They are stout, with a smooth polished appearance, and are armed with plates on the thorax and on the anal segment. I believe that the shape and position of these plates will be found of great use in determining the species of this genus, when in the larval stage. The legs are large and strong—a usual feature in case-bearing larvæ, while the abdominal claspers, except the anal pair, are small and weak. When the larva is taken from the case it holds the body in an arched or curved position and progresses by means of the true legs, never attempting to make use of the ventral claspers. This is even noticeable in the newly-hatched larvæ when it leaves the egg. It crawls by means of the thoracic legs, arching the body so as to lift the venter high above the surface on which it crawls, supporting the weight of the body by resting the anal segment on the surface. It never adheres by the anal claspers like a geometer larva, but rather drags them after it, remotely reminding the observer of a *Melolontha* larva. So highly arched is the body that an inequality in the surface or a breath of air may overturn the larva. It soon, however, rights itself, but retains the curved position even when lying on its side.

It is curious that this arched position of the abdomen is again adopted by the female moth when seeking a suitable situation on the surface of a leaf where she may safely deposit an egg.

When in the case or when mining in the leaf the ventral claspers may be of great use to the larva, but I believe the strong anal claspers are chiefly used for grasping the case when the larva is moving from one leaf to another. When a larva, feeding in the mine, has stretched itself almost entirely out of its case and is startled, it suddenly, in about two quick movements, withdraws itself into the case. This is, I believe, accomplished by the larva, already securely anchored by the anal claspers, suddenly contracting its extended body and so withdrawing it into the case. The ventral claspers do not appear to play any part in the movement; it seems to have nothing akin to the rapid backward wriggle of the Tortrix larva.

One would imagine that in a genus where the prolegs apparently are of very little use there would be a tendency among the more advanced members to lose the prolegs. That such a tendency exists among the Coleophorids we have, I think, abundant proof. In

the first place these ventral prolegs, in all the species I have yet examined, are very small and weak when compared, for instance, with Sphingid, a typical Noctuid larva. When the larva is dead it is difficult to see them at all, though usually the very imperfect circles of black hooks situated on the discs of the prolegs serve as a guide.

When, however, a living larva is held in such a position that a lateral view of the ventor is obtained these prolegs may be very easily observed, for the larva will thrust out one pair after another in its vain endeavours to free itself from restraint.

If we carefully examine, by this and other means, certain species of this genus, we shall see that they, like the Gracilariids, are without prolegs on the sixth abdominal segment. They have already lost one pair.

When, in prehistoric days, the Geometrid larva began to find some of its ventral prolegs more hereditary than useful, it was, no doubt, as Mr. Tutt suggests ("Brit. Lep.," vol. i, p. 53), merely a matter of speed which determined which pair of the ventral prolegs should go first. The Geometrid larva, when arching the body to crawl quickly, and bringing up the posterior segments rapidly, gave the anterior pairs of prolegs less time in contact with the surface crawled on—that is to say, made least use of these pairs, and therefore these anterior pairs of ventral prolegs were the first to be lost. Then, as more work was thrown on the last pair of ventral prolegs, namely, those situated on the sixth abdominal segment, this pair became strengthened and enlarged, and, subsequently, to such a degree that the third pair situated on the fifth abdominal segment became unnecessary and therefore disappeared too. As examples illustrating this idea we may compare the larvæ of *Gonodontis* (*Odontopera*) *bidentata*, *Anisopteryx æscularia*, and other Geometrids.

The movements of the Coleophorid larva are of the methodical order. For instance, even when making a new case there is none of the excitement and rapid motion that we see in some other families of the Tineina when making new dwellings. Therefore in the Coleophorid larva there is no question of speed involved, and consequently we should not expect the process of losing the prolegs to be of the same nature as it was in the Geometrid larva. From the persistent manner in which the abdomen of the Coleophorid larva is held in a curved position, as previously described, we may, I think, argue that the position itself offers some advantage to the larva, and that, also, this advantage was enjoyed by, and this position adopted by, the early ancestors of the modern Coleophorids. Now when the larva is crawling by aid of its true or thoracic legs and holding the abdomen in the arched position with the anal segment persistently incurved and resting on the surface crawled on, the pair of ventral prolegs least likely to come in contact with the surface crawled on will be those nearest the incurved anal pair. My meaning may be made plainer by making the sign used as a note of interrogation represent the larva by writing it horizontally, thus— , the straight

part of the sign standing for the head and thorax of the larva. As this last pair of ventral prolegs, *i.e.*, those on the sixth abdominal segment, will be the least often used, it follows that this pair will also be the most liable to be lost, and it is this pair on the sixth abdominal segment, or, as some writers might say, on the tenth segment, which in certain species is absent. A careful examination of the larvæ of *Coleophora fuscadinella*, *hemerobiella*, and *limosipennella* will reveal the fact that besides the anal claspers there are only three pairs of ventral prolegs, the sixth abdominal segment being destitute of prolegs. In the first-named species this fact holds good in the newly-hatched larva, and I presume that this is also the case with the other two species. Meyrick ("Handbook," p. 642) suggests that the rush-feeding Coleophorids are the most primitive of the genus, and this view is, I suppose, generally accepted by those who have taken thought on the subject. The egg of the only species of this section that I know is certainly of a lower type than that of *C. fuscadinella*. If, then, the early or ancestral Coleophorid larva had four pairs of abdominal prolegs we should at least expect to find a trace of the fourth pair in the less advanced rush-feeding species. If we examine the larva of *C. caespiticiella*, a common representative of this section, we shall notice that the fourth pair—that is, the prolegs on the sixth abdominal segment—are as well developed as the other three pairs. It is the same with *C. murinipennella*. The fourth pair, however, persists also in some less primitive species, as, for instance, in *C. bicolorella*.

Réaumur, Zeller, Frey, Stainton, and Heineman all agree in stating that the larvæ of the Coleophorids have sixteen legs. Meyrick has not noted the fact that some species have only fourteen, and therefore it is to be presumed that he was also unaware of this fact. The fact, however, appears to have been noticed by the artist who drew the figures of the larvæ of *Coleophora limosipennella* and *C. conspicuella* in Stainton's "Natural History of the Tineina" (vol. iv, pl. II, fig. 2a, and vol. v, pl. IX, fig. 2a respectively), as both these larvæ are shown without pro-legs on the sixth abdominal segment.

In conclusion, I will venture to prophesy that in the near future the present convenient genus *Coleophora* will be split up into certain genera or sub-genera, and we shall therefore have to burden our memories with a few more names, but whether the study of insects will be enhanced by this process we must leave time to discover.

Modern Requirements in Oval and Larval Description.

By J. W. TUTT, F.G.S.

(*Abstract of Address March 10th, 1904.*)

MR. TUTT referred to the admirable work which was being done by a number of members of the Society in obtaining photographs of the ova, larvæ, and pupæ of Lepidoptera, but strongly expressed the view that this work, good as it was, did not go far enough for our modern requirements. He desired that those who took the trouble to obtain and photograph these objects should add to them a summary of all the obtainable details as to form, structure, colour, comparison, etc., so that future workers may have a mass of detail upon which to generalise and our science may benefit and progress thereby. Dr. Chapman's papers during the last few years had produced a complete revolution in our ideas concerning these early stages, and his methods of study had given us a mass of detailed information of inestimable influence on all the more modern schemes of classification.

Broadly speaking, he said that the eggs of all Lepidoptera are divisible into two groups, which are known technically as "upright" and "flat" eggs. Every egg has a tiny little rosette of minute cells, which contains a number of microscopic canals leading into the interior of the egg, and by means of which the fertilisation of the egg is effected. This rosette is the micropyle, and if the egg be laid so that the micropylar axis is vertical to the surface on which it is laid, it is called an "upright" egg, and if laid so that the micropylar axis is horizontal to the surface on which it is laid, it is called a "flat" one. Eggs of butterflies are upright eggs, while the greater number of those of moths are flat eggs. It will be found on closer examination, that the upright eggs are, as a rule, eggs with only two axes of measurement, the vertical and the horizontal, the latter being the same in all directions, a horizontal section being circular. In the flat egg there are three different measurements, length, width and height, the two horizontal axes being of different lengths, and the horizontal section roughly elliptical in outline.

Upright eggs are generally ribbed vertically, hemispherical or rather more than a hemisphere, showing very fine sculpture and with the micropyle at the top. Flat eggs are generally comparatively smooth, with scarcely any or no trace of markings or reticulations and with the micropyle at the end. Besides the above characters, notes should be made of the sculpture of the shell, the more or less transparency, the character and completeness or incompleteness of the ribbing, the colour and its changes at different ages of the eggs, and the smoothness or roughness, dulness or glossiness, of the surface.

Attention should also be given to the general habit of the egg-

laying of a species, where, at what time of day, in large or small batches, whether naked or covered, whether protected or exposed. How long does the egg stage last? and what is the relation between this and the habit of deposition? Are the eggs numerous or few; and what are the sizes of the batches; or are the ova laid singly? What changes take place with the fertile eggs which are or are not to be observed when the ova are infertile? The sizes of the ova should be very carefully measured, and to all photographs should be appended the magnification.

Turning to the consideration of the larvæ, Mr. Tutt called attention to the generally cylindrical shape, the segmentation, the regional division into head, thorax and abdomen, etc. He then stated at some length what has now become of far more importance than these, viz. the position, numbers and character of the tubercles that bear setæ or hairs, and which are found on certain well-defined areas of the body. He described their position on the various segments, their absence or presence at different instars, their varying position in the different groups, and their various peculiarities and modifications; at the same time his remarks were illustrated by numerous diagrams very kindly prepared and lent him by Mr. Bacot. The special nomenclature of these tubercles was as follows: Tubercle i (the two front ones on the dorsum of each segment); Tubercle ii (the two hinder ones on the dorsum); Tubercle iii (above each of the spiracles); Tubercles iv and v (just below the spiracles, but often moved to neighbouring positions); Tubercle vi (between iv and v); and Tubercle vii (on the upper outside margin of the legs). These are known respectively as: (i) anterior trapezoidals; (ii) posterior trapezoidals; (iii) supra-spiraculars; (iv and v), sub-spiraculars (v sometimes becoming pre-spiracular, and iv becoming post-spiracular); (vi) laterals; and (vii) marginals.

Besides all the usual statements as to colour, markings, detailed measurements and appearances of head and various segments, the number of sub-segments and their characters and appendages, the number and position of the prolegs, etc., there should also be noted—the position of the spiracles, the character, arrangement, and completeness of the hooks on the prolegs, the structure of the primary and secondary setæ and their variation in number, position and development, the presence of any secondary tubercles, and whether any hairs are present not connected with the definite tubercular structures.

It was necessary to note all these points at the successive instars, and particularly was it all-important to most carefully make a detailed description of the newly-hatched larvæ, for often such records were found to be of immense value for classificational purposes, when perhaps details at any other instar may be of comparatively little value.

For fuller details see Dyar, "A Classification of Lepidopterous Larvæ," *Ann. New York Acad. Sci.* viii, p. 18; Tutt, "Nat. Hist. of Brit. Lep.," i, pp. 6-54; viii, pp. 1-22; "Hints on Collecting Lepidoptera," pt. iii, pp. 3-32 (1905).

The Spondylidæ (Thorny Oysters).

By W. T. MANGER.

(Read April 14th, 1904.)

THE shells which I have selected to say a few words to you about belong to the family Spondylidæ (thorny oysters), coming immediately after the oysters proper, which, however, they do not resemble either in their internal structure or in outward appearance ; they more closely resemble the Pectens (scallops), but are more spiny and heavier, and united by strong interlocking teeth. They have no byssus, and the ligament is internal, whilst the mantle margin has a row of eyes like the Pectens ; like them, also, they are sometimes brilliantly coloured, and they live, with few exceptions, attached by one of the valves to rocks, stones, coral or shells. *Spondylus aurantius* is sometimes found attached to *Chama lazarus*. *Chama* is totally different to the *Spondylus*, being one of the principal families of the sub-order *Cardiacea* (to which belong the cockles). From the fact that small quantities of water are sometimes enclosed in cavities in the inner layers of the shell, they have been called water-clams or water *Spondyli*. Woodward tells us that the secretion of colour by the mantle depends greatly on the action of light ; shallow water shells are as a class warmer and brighter coloured than those from deep water, and bivalves which are habitually stationary (like *Spondylus*) have the upper valve richly tinted, whilst the lower one is colourless ; this is not, however, always the case. *Spondylus leucantha* is richly coloured on both valves. There are about seventy living species of *Spondylus*, and about eighty fossil, and they are met with in depths up to about 100 fathoms of water. They are to be found in all the warmer seas, the Pacific, West Indies, West America, Mediterranean, etc., but it has no representative in Britain.

Spondylus, like the oysters, are free swimmers at birth, but in a very short time they settle down and become attached to something, and some species are contorted and twisted in very curious shapes. Pearls are sometimes found in *Spondyli*, more especially in *Spondylus gædaropus*, and they are usually of a green or rose colour. As a consequence of the great beauty of most of the species they have always been eagerly sought after by collectors, and years ago, when these things were rare, they have fetched very high prices.

Notes on *Argyroneta aquatica* and some other Spiders.

By REV. F. H. WOOD, M.A. *Read April 28th, 1904.*

AMONG what writers of little handbooks on aquaria used to call "interesting objects," few perhaps can compete in attractiveness and pleasing qualities with *Argyroneta aquatica*, known as the diving water spider.

It is, however, a question, whether in most cases this Arachnid has not been kept and observed more for its appearance and interesting habits than for purposes of scientific study. Still, there must have been a strange lack of observation if a desire for more knowledge as to the habits of this and other spiders has not been, in some way, kindled. And, further still, the whole question of sub-aqueous respiration is brought into prominence by the silvery gleam of the sheath of air, enclosing the whole of the abdomen, and extending along the sternum, or breastplate, under the cephalothorax.

The same fundamental scientific axiom, that organisms breathing atmospheric air must be in possession of a sufficient supply if life is to be maintained under water, has been, perhaps, already noticed in evidence in the case of aquatic Coleoptera: for instance, in such arrangements as the anal bubble retained by the Dytiscidæ and Gyrinidæ, closing and revealing the supply of air lying over the spiracles under the elytra; and the film of air lining the whole under-surface of the Hydrophilidæ, accomplishing the same life-sustaining work in a different way, as again in the case of Hemiptera like *Notonecta glauca*.

There is, however, one broad, universal method in the retention of external air, made use of alike by spider, beetle, or bug, namely, its entanglement on a hairy, or downy, and somewhat oily surface. This will be found to be the case whether we examine the hairy fringe slightly visible on the upper surface of the abdomen, beyond the elytra, of *Dytiscus marginalis* or *Gyrinus natator*, or the strongly marked pubescence of (say) *Hydrous piceus* and *Notonecta glauca*. But, in the case of spiders, this adaptation is most conspicuous, not only in *A. aquatica*, but in members of the family Lycosidæ, of the Genera *Dolomedes* and *Pirata*, to which I hope to refer further on.

The abdomen of *A. aquatica* is very hairy, the hairs on the under surface are of considerable length, as well as those which are thickly set on the sternum. Sufficient air is thus retained to cover and supply the breathing-holes on the lower side, near the base of the abdomen, and also to prevent its soft covering from becoming

sodden by undue exposure to the wet. I have noticed, in cases where water spiders have been kept without an opportunity of leaving the water, that they have eventually succumbed, and even the temporary refuge of a leaf or piece of cork is not sufficient. These spiders leave their watery haunts at times, it would seem, for hygienic as well as hunting purposes. An interesting little notice from the Rev. O. Pickard-Cambridge's "Spiders of Dorset" (vol ii, p. 471) may be quoted. He once kept, he writes, a male spider of this species for three years in Durham; and every night this spider came out and wandered about the room. It came to an untimely end, as it was found one morning in a dying condition.

As a parallel case, I need only refer to the well-known fact that the hirsute covering on the thorax and abdomen of a beetle like *Hydrous piceus* will, in time, lose its gloss and air-retaining power; and the same applies again to Hemiptera like *Notonecta glauca*.

But a unique feature comes before us for our study, when we consider this air-breathing organism, as not only passing the greater part of its existence under water, but as emerging from ova laid and hatched in a silken chamber of captive air. The development of a spider being merely one of growth, without transformations, there is not, of course, as in some insects, e.g. the Odonata, any adaptive larval or pupal form with respirative processes suitable for sub-aqueous life, until the great change takes place to the airy flight of the imago. The water is, to *Argyroneta*, merely a surrounding medium through which it passes, and in which it lingers and works, as a diver might carry on his avocations under the sea. In either case, the very element in which occupations are carried on is the one from which danger is to be feared, and from which, as far as respiration is concerned, no aid but only destruction is to be expected.

The little water spider, at birth, not only finds in its little dome all the life-sustaining properties of an airy chamber into which it at once enters from the egg, but it has around it a supply from which it can freely draw and carry away round itself all that it needs for its passage through the water, and to which it can return for further supplies. It is evident that without the air carried into the nest by the mother before she lays her eggs, there would not only be no medium in which the young could live, but also no means of obtaining any protection in the first journey for surface-air. The alternative would be that the eggs might be laid and hatched on dry land; but then the habits of *Argyroneta* would be entirely altered, becoming more like those of *Dolomedes* or *Pirata*, and no longer entitling her to the distinct epithet "*aquatica*."

Before passing on from this part of the subject, I should like to draw attention to an apposite little paragraph which caught my eye in the January number of "Knowledge" (1904): "At the Meeting of the Zoological Society Mr. R. L. Pocock called attention to some Australian spiders (of the genus *Desis*). They live in crevices of

rocks between the tide-marks on the shore, and, by spinning a closely-woven web of silk over the entrance, imprison a mass of air in which they are able to live during the flood-tide." The interesting point here is not the carrying down of air to be used under water, but the capturing and retaining of air already possessed. The closely-woven web of silk, besides enclosing air for use, would, no doubt, also act as a protection, preventing the Australian spider from being washed out of its crevice by the waves. At the same time, the situation is precisely that of *A. aquatica* living in air enclosed by a closely-woven web of silk under water, and able to prevent the water from penetrating into its haunt.

Passing now to matters purely descriptive, and in a small measure personal, as far as observation is concerned, it may be well to state, by way of preface, that this spider, included by Mr. Blackwall in the family Drassidæ, seems to have definitely found its place among the Agelenidæ. Among other structural reasons Mons. E. Simon ("Les Arachnides de France") notices that *A. aquatica* has three, not two, tarsal claws (*griffes tarsales*), a fact which alone would exclude it from the already somewhat crowded family Drassidæ. In *A. aquatica* the two upper claws are toothed, the lower plain. The striated or indented cephalothorax, which Mons. Simon mentions among the features of the Agelenidæ, is also noticed in *A. aquatica*, the sides of the shield being strongly wrinkled. The legs and cephalothorax are brown with a reddish tinge, the abdomen is dark olive. The female averages half an inch in length, the male being still larger—an unusual feature among spiders; but Mons. Simon draws attention to the fact that the males of Agelenidæ are, on the average, equal in size and strength to the females, and, though severe struggles sometimes take place on the web they are not, as in the case of Epeiridæ, overcome and eaten. The legs of this species are long and hairy, well adapted for swimming. The order is somewhat remarkable: male, 1, 4, 2, 3; female, 4, 1, 2, 3. When we remember that the female, when making her nest, brings down a considerable globe of air, which she holds with her hind legs, and releases into the dome which she is making, the advantage of their length is obvious.

I had frequent opportunities, many years ago, when living in North London, of obtaining these spiders from ditches near the Lea, at Tottenham. The following are the proceedings of a female, before laying her eggs, which were hatched in due course in my tank. A silken dome was spun among some leaves of *Anacharis alsinastrum*. This was the mere roof of the dwelling. The spider then rose, and, elevating her abdomen out of the water, entangled a quantity of air, which, joined to the bubble usually around her body, gave her an extra supply. She then descended, holding this air with her hind legs till she came under the dome, when she released it. The silk which she had spun and the leaves and stalk of the plant held the bubble; and the spider kept bringing down fresh supplies of air till a bubble about the size of a hazel-nut was formed. Round this she

kept spinning till she had made a diving-bell, into which air was introduced from time to time, till the whole of the interior was dry. In this nest the spider laid her eggs, which, of course, I could not see. The spider was captured towards the end of August; I am not certain of the date, but, from a note made at the time, it was on September 17th that I first saw the little spiders spreading over the water-plants. Their appearance was that of little silver beads. In those busy days I am afraid the safety of infant spiders did not receive sufficient attention. There were three small Prussian carp on the scene, who had always treated the mother with distant respect; but, on my return home after a short absence, I considered the fish responsible for the disappearance of the young *Argyroneta*.

The places where I have been able to meet with *A. aqualica* bear out the accuracy of the Rev. J. G. Wood's statement, that this species is especially fond of inhabiting quiet and rather deep ditches. But on one occasion I caught it, unexpectedly, in the bed of the River Nene, near Northampton. It is possible that it may have been living in the stream, but there was a quiet backwater quite near, leading to a mill. I have never heard of its being found in that river on any other occasion. It was with some surprise that I read in the Rev. O. Pickard Cambridge's "Spiders of Dorset" that he had never found it in that county; but, as his record goes back to 1881, it is quite possible that it has been found since. And, of course, it would need searching for in a special way. The ditches near Oxford draining into the Cherwell and the Isis seem to have supplied this spider somewhat plentifully (J. G. Wood).

The "Other Spiders" mentioned at the head of this paper are entirely distinct in family and habits from *A. aqualica*. The fact of their being more or less aquatic in their habits, and being frequently seen on, if not in, the water, seems to give them some title for inclusion in our present study.

The whole family, Lycosidæ (wolf-spiders), includes spiders of distinctly predatorial and hunting habits. The genera have undergone considerable re-arrangement since the division adopted by Mr. Blackwall. I purpose to consider briefly members of two genera, *Dolomedes* and *Pirata*. And here, already, we may notice that a spider often seen carrying its cocoon attached to its body, in the same way as *Dolomedes fimbriatus*, no longer ranks among the Lycosidæ by the name of *Dolomedes mirabilis*, but has been placed in a family of its own (Pisauridæ) as *Pisaura mirabilis*. In the genus *Dolomedes* we still retain the one English species, *D. fimbriatus*. I must crave indulgence in treating of this spider, as I have never seen it alive. It is a large spider, we are told (Staveley), common in the fens of Cambridgeshire. The female sometimes measures three quarters of an inch in length. She carries her cocoon, says Mons. Simon, in her chelicerae, and when the young spiders are about to come out, she places it upon some plant near to the water, and fastens it by means of irregularly woven threads.

The spiders of genus *Dolomedes*, says the Rev. O. Pickard-Cambridge, all seem of aquatic habits, and run on the surface or dive under the water. The colour of this handsome spider is rich dark brown, with a broad band of yellowish buff down each side, and a double row of little white spots on the abdomen (J. G. Wood).

These rows of white spots are very conspicuous in several species of this family, and especially in spiders of the genus *Pirata*, which we next consider. Five species are recorded by the Rev. O. Pickard-Cambridge as British: *piscatorius*, Cl.; *hygrophilus*, Thor.; *piraticus*, Cl.; *knorrii*, Scop.; and *latitans*, Bl. The separation of the genus *Pirata* from that of *Lycosa*, in which several authors, such as Blackwall, included it, is a distinct gain in accuracy. The genus *Pirata* (again to quote Simon) has its habits analogous to those of *Dolomedes*. Its members are always found on the banks of ponds, marshes, rivers, etc. *P. knorrii* is commonest in mountainous countries, near rapid streams and waterfalls.

When our Society visited Wisley on July 5th, 1902, many yellowish brown spiders, mostly *P. piraticus* or *P. hygrophilus*, might be observed running on the edge of the lake, the females carrying their little whitish cocoons attached under the abdomen by means of silken threads, and differing in this respect from *Pisaura* and *Dolomedes*, which carry the cocoon by means of the palpi and falces, and, I may add, *Pholcus phalangoides*, which also holds it by the falces.

The tenacity with which the Lycosidæ will hold on to their cocoon, and fight for it, is well known. A spider of the genus *Lycosa* (*Paradosa*, Sim.), *L. amentata* (*saccata*, Blackw.), which I brought home from Wisley with her cocoon, became separated from her charge as I was putting her into a glass jar. As I have already mentioned, in notes made at the time, though the cocoon lay hidden for a considerable time from the spider, it was carefully sought for and re-attached by threads to her abdomen. Eventually, she deposited it under a root of grass, and many of the young spiders emerged, and lived for some time in my care. I fed them on aphides from the rose-trees, a diet which I have found acceptable to most infant spiders. They also sucked, with still greater relish, midges and gnats; but the skin of a house-fly proved too tough for their tender falces. I give these few observations of a species allied to *Pirata* merely as a general indication of the habits of the family.

With reference to the semi-aquatic habits of *Pirata*, these spiders run with great ease and rapidity. They do not seem able to swim. I have often compelled them by touch to seek refuge under water, and their action has been simply that of crawling down the nearest plant. Their habits, in this respect, are more like those of the Parnidæ, among Coleoptera, than of the Dytiscidæ, of which we are reminded by the bold, open swimming of *A. aquatica*. While most of the life of *Pirata* is spent on the surface of the water, where they display great swiftness and catch their prey, it would appear that their

descent below the surface is merely a protective measure. An arachnid of these habits would not require the complete and lasting supply of air which is so conspicuous in the appearance of *A. aquatica*. All that we notice, for instance, when *P. piraticus* is driven under water is the formation of bubbles entangled by the hairy abdomen, constituting a sufficient temporary protection, but no deep and complete atmospheric envelope like that of *A. aquatica*.

To return again to this last-named spider, before closing this paper, Mons. Simon suggests that Rossi has fallen into some confusion in mentioning three species of *Argyroneta* (*trilineata*, *palustris*, *bicolor*) as occurring near Nice, and that he has included in the genus young specimens of *Dolomedes* and *Pirata*.

This remark explains to some degree why, in treating of *Argyroneta*, I have added notices of some other spiders. I can only wish that I had been able to add the results of more personal knowledge and observation; but, while I hope that time and diligence may entitle me, later, to speak with more certainty and precision on the *Araneidae*, I can, at present, only bring before you the impressions of a learner in this interesting but complicated branch of biological study.

Notes on British Orthoptera.

By W. J. LUCAS, B.A., F.E.S. *Read May 12th, 1904.*

IN dealing with the Orthoptera it is unnecessary to state that we have to do with one of the neglected orders of insects, which really means, I suppose, that the insects comprising it do not appeal to the collector as such—he who has the courage to attack them must be a naturalist also, which it is needless to say a collector may not always be. If this is so, it is rather surprising that so few among the many active workers of our Society have turned their attention to this really interesting company of insects.

Those members of the order that may fairly be considered British comprise a satisfactory little group of only thirty-nine species. By British we, of course, mean those that are known, or reasonably suspected, of breeding in Britain, whether they are truly indigenous or not.

This paucity of species puts the order well within the range of a naturalist whose time is limited, although he will very soon discover that there is plenty of scope for his activity. For, thanks to the neglect with which the Orthoptera have been treated, life-histories, habits, distribution, and so on are in most cases still to be found out.

It is noteworthy that, as soon as a few entomologists began to turn their attention to our dragon-flies, a *certain* *sedes* was found for practically all the *doubtful* species, and two *new* ones were added to the British list. We do not feel at all certain that such would not be the case with the Orthoptera also if they were given an equal amount of attention.

Earwigs, cockroaches, Mantids, Phasmids, grasshoppers, locusts, and crickets constitute the Orthoptera, but of these the Mantids and Phasmids are not represented in Britain. The order is well defined, and few systematists seem to wish to readjust the boundaries.

But perhaps *the* great point in favour of studying the Orthoptera is the fact that, leaving out the Apterans—the Thysanura and Colembolla of Lubbock—this order contains the oldest insects that have survived to the present geologic age.

In support of this statement it is sufficient to point to the geologic record, the very incomplete metamorphosis, the frequent absence or slight development of the wings and elytra, and the mandibulate mouth. Another point testifying, I think, to the age of the group is the presence of the cerci—posterior antennæ perhaps in some cases—throughout the British species. These cerci are very characteristic of the apterous insect *Campodea staphylinus*, which may or may not be a *very* primitive insect come down to our time, but at any rate is of an early type. This simple insect calls to mind a newly-hatched

and therefore wingless, earwig, in which the forceps (cerci) are proportionately much longer and simpler than they are in the imago. It should be noticed also that cerci are present in many cases in another old order—the Neuroptera.

Yet another point in favour of this group of insects! Those who take it up will be practically free from the wearisome strife over names—that incubus of modern entomology. There is, in fact, very little controversy with regard to priority in the case of the British Orthoptera. It may be that as it is not a show-order those who take it up do so from the naturalist's point of view only—from the interest attaching to the insects themselves, their habits and life-histories—and so do not worry themselves about such unessentials as the dry bones of nomenclature.

We might divide the British Orthoptera into three groups according to their status in our fauna:

(1) Those considered to be indigenous.

(2) Not indigenous, but naturalised, as shewn by their breeding here

(3) A large but uncertain number of casuals—interesting no doubt, but whose names should not appear upon our lists:

1. INDIGENOUS.

Forficulodea.—1, *Labidura riparia*; 2, *Labia minor*; 3, *Forficula auricularia*; 4, *Forficula lesnei*; 5, *Apterygida media* (= *albipennis*).

Blattodea.—6, *Ectobia lapponica*; 7, *Ectobia livida*; 8, *Ectobia panzeri*.

Acridiodea.—9, *Mecostethus grossus*; 10, *Stenobothrus lineatus*; 11, *Stenobothrus viridulus*; 12, *Stenobothrus rufipes*; 13, *Stenobothrus bicolor*; 14, *Stenobothrus elegans*; 15, *Stenobothrus parallelus*; 16, *Gomphocerus rufus*; 17, *Gomphocerus maculatus*; 18, *Tettix bipunctatus*; 19, *Tettix subulatus*.

Locustodea.—20, *Leptophyes punctatissima*; 21, *Meconema varium*; 22, *Xiphidium dorsale*; 23, *Locusta viridissima*; 24, *Thamnotrizon cinereus*; 25, *Platycleis grisea*; 26, *Platycleis brachyptera*; 27, *Platycleis roeselii*; * 28, *Decticus verrucivorus*.*

Gryllodea.—29, *Nemobius sylvestris*; 30, *Gryllus campestris*; 31, *Gryllotalpa gryllotalpa*.

2. NATURALISED, BUT NOT LIVING IN THE OPEN.

Forficulodea.—32, *Anisolabis annulipes*; 33, *Chelidura arachidis*.

Blattodea.—34, *Phyllodromia germanica*; 35, *Blatta orientalis*; 36, *Blatta americana*; 37, *Blatta australasica*; 38, *Leucophaea surinamensis*.*

Gryllodea.—39, *Gryllus domesticus*.

* These three insects occupy at present a somewhat precarious footing on the list.

The Pectens (Scallops).

By W. T. MANGER.

Read November 10th, 1904.

Order—**Lamellibranchiata** (Plate-gilled Molluscs).

Family—PECTENIDÆ.

I SUPPOSE there is no member of the great class Mollusca that is better known to the majority of us than the Pectens (scallops). Most of us have eaten them, and all of us have seen them exposed for sale in the fishmongers' shops. I don't know that I can add anything new to the numerous descriptions of this animal that have appeared (notably that able work of our President, entitled "Shell Life"), but I thought that a few foreign specimens for comparison with our English forms would be both interesting and instructive. In their scientific order they follow on closely to the oysters, but they differ from them very much, both in their internal economy and in their form, colour, and sculpture. The British Pectens, of which there are ten or eleven species, vary very much in colour and appearance, and also in size. The species commonly eaten is *Pecten maximus*, but *P. opercularis* is also eatable. *P. maximus* is the largest British Pecten, and may be taken as the type of the family. It is not within the scope of these notes to give you a scientific description of the animal that makes this shell; it is sufficient to remind you that the two valves are held together by the adductor muscle, and joined with a strong ligament. The action of this india-rubber-like ligament is in opposition to that of the adductor muscle, so that when the latter close the valves they compress the ligament. The ocelli are placed along the two edges of the mantle so as to receive the light when the shell gapes; these eyes are remarkably large and prominent and vary in number very much. In *P. maximus*, *P. opercularis*, and *P. jacobæus* there are 80 to 120. They are highly developed, and bear a considerable resemblance to the vertebrate type of eye, but for all that their range of vision does not appear to be very great. The Pecten has ceased to use its foot as an organ of progression, but they can flit or fly (especially when young) for considerable distances in the water by flapping the valves together; as they grow older they become more sedentary, and are often found thickly covered with acorn-shells, *Serpula*, Zoophytes, etc. They get their living in the shape of minute particles, animal and vegetable, which are contained in the water which they breathe. Most of the Pectens spin a byssus when young, by which they can attach themselves to rocks, etc. There are about 180 species of Pectens known, and over 400 are recorded as fossil from the

carboniferous striata. They are world-wide in their distribution, and are found at depths from a few to 3000 fathoms. The British Museum has lately acquired a *Pecten* which was dredged in the Antarctic Ocean, in Victoria Land, by the Newnes expedition in ten fathoms of water.

The British *Pecten opercularis* is a beautiful shell, nearly round and very variable in colour, as you will see by the specimens exhibited. It is found in 15 to 25 fathoms. *Pecten varius* also, as the name would indicate, is very variable, and is found on all our coasts. *P. tigrinus* is a small, beautifully marked species; but the smallest British *Pecten* is *P. similis*, which is very small indeed and very fragile. The specimens shown are from Loch Fynne; they are not immature as one would suppose from their appearance, but adult and never get any bigger. *Pectens* are generally hermaphrodite, but sometimes the sexes are separate. One species, *Pecten jacobæus*, from the Mediterranean, we are told, was worn in the hat as a badge by pilgrims who had been to the Holy Land.

In foreign *Pectens* we find all the characteristics of the English in an exaggerated degree, whether it is size, colour, sculpture, or variableness. Some of the tropical species are perfectly fascinating in their beauty and colouring; notably I would call your attention to *Pecten glaber* from the Hebrides and *P. senatorius* from Amboyna.

Woodward tells us that the secretion of colour by the mantle depends greatly on the action of light. Shallow-water shells are, as a class, warmer and brighter coloured than those from deep water. The usual shape of the valves is for the lower one to be hollowed out and the upper valve flat or nearly so; in *Pecten sinensis* from China this is exaggerated, as you will see. The colour of the valves usually differs very much; notice *P. japonicum* from Japan—one side is quite white and the other a warm brown, exactly the colour of the sand on which it is found. The valves are often unequal; an exaggeration of this may be seen in *Pecten yessoensis* from Japan. At first sight it would appear that the valves were not pairs, but on comparison with several specimens of this species at the British Museum I find the form is very constant. *Pecten magellanicum* from the Straits of Magellan is a shell not often met with; notice the strength of the valves and the absence of colour, characteristic of all shells from that stormy region. I would also point out a series of *Pecten latus* from the Island of Hiro Shima, Japan, that land of curious things; there are seven specimens, all the same species of this beautiful shell, ranging in colour from pure white to a rich dark brown. I call your attention to it, as it is a rare shell. Another beautiful thing is *Pecten pallium* from the East Indies; you will notice in this species the valves are both alike in form and coloration.

All *Pectens* are more or less beautiful, and you can well understand that they have always been highly prized by conchologists and collectors. There are many questions that one would like to

ask about these things. To what end is all this wealth of colour and sculpture? We can understand the beautiful markings and colours in the plumage of some birds when it is displayed before the admiring female; we can in some measure account for the superior beauty in the male Lepidoptera and Coleoptera; but this beauty in the lowly Pecten living 200 feet below the surface of the water—who can explain its uses? Who can give us a reason for the prodigality of beauty, which is revealed to us by the microscope, in the lowest forms of life? One becomes lost in speculation, and it is, I suppose, only by patient and persevering observation and study that we can hope to unravel any of Nature's mysteries which are waiting to be solved.

Report of a Field Meeting held at Ashted and Epsom, May 14th, 1904.

By EDWARD STEP, F.L.S. *Read September 22nd, 1904.*

A CONSIDERABLE amount of faith in the weather was required on the part of members undertaking to attend the first field meeting of the year ; but that faith was abundantly justified by the glorious sunshine that greeted the advance section when they alighted in the morning. The time prior to the arrival of the afternoon section was spent in exploration of an eastern portion of Ashted Common, and the lanes around Ashted Park and the Downs above. The united party ascended the Common and skirted the woods to its northern boundary, and then struck across Epsom Common to the town, spending some time *en route* at the Stew Pond and a smaller pond close by.

Very few lists have been received from members present, so that the subjoined record of captures and observations must not be regarded as at all complete.

The plants in flower included : Hawthorn (*Crategus oxyacantha*), blackthorn (*Prunus spinosa*), crab (*Pyrus malus*), lady's smock (*Cardamine pratensis*), stitchwort (*Stellaria holostea*), wood violet (*Viola sylvestris*), jack-by-the-hedge (*Sisymbrium alliaria*), goldielocks (*Ranunculus auricomus*), bugle (*Ajuga reptans*), winter cress (*Barbarea vulgaris*), water crowfoot (*Ranunculus trichophyllus*), wood anemone (*Anemone nemorosa*), primrose (*Primula vulgaris*), cowslip (*P. veris*), slender tare (*Vicia tetrasperma*), wayfaring tree (*Viburnum lantana*), beaked parsley (*Cherophyllum sylvestris*), thyme-leaved speedwell (*Veronica serpyllifolia*), germander speedwell (*V. chamaedrys*), celandine (*Chelidonium majus*), bluebell (*Scilla nutans*), needle-whin (*Genista anglica*).

The Stew Pond on Epsom Common, and a small pond surrounded by willows near it, yielded spiked water-milfoil (*Myriophyllum spicatum*), water thyme (*Anacharis alsinastrum*), water starwort (*Callitriche verna*), ivy-leaved duckweed (*Lemna trisulca*), floating pondweed (*Potamogeton natans*), stonewort (*Chara vulgaris*). From these ponds Mr. West, L.D.S., obtained a number of microscopic organisms, including *Vaginicola*, *Vorticella*, *Volvox globator*, *Stentor mülleri*, *Floscularia cornuta*, *Stephanoceros cichorii*, *Melicerta ringens*, as well as the two polyps *Hydra vulgaris* and *H. viridis*. In the same ponds were many of the aquatic Coleoptera and Hemiptera, chiefly attended to by Messrs. West (Greenwich and Ashby), and, of course, the smooth newt (*Lissotriton punctatus*), and the warty newt (*Triton cristatus*).

The birds or nests noted were: nightingale (*Dautias luscinia*), cuckoo (*Cuculus canorus*), lapwing (*Vanellus cristata*), starling (*Sturnus vulgaris*), jackdaw (*Corvus monedula*), thrush (*Turdus musicus*), blackbird (*Turdus merula*), hedge-sparrow (*Accentor modularis*). A single specimen of the ringed snake (*Tropidonotus natrix*) was found.

The Coleoptera were more abundant than anything else, and the list from the hon. curator (Mr. West), included fifty-five species, all generally common in the South of England. Mr. Ashby gives seven additional species, and I believe others were taken by Messrs. Ansorge, Ashdown, and Priske; but these gentlemen have not yet reported. Mr. West also took three species of Hemiptera, all common.

Respecting the Lepidoptera, Mr. Turner again devoted attention to the *Coleophora*, and he contributes the following notes:

"Among the group of the "Micro"-Lepidoptera the genus *Coleophora*, to which I devoted my attention during the ramble, was represented by the following species: *C. solitariella*: larvæ and cases in considerable numbers on its food-plant, *Stellaria holostea*, in the lane leading from the northern end of the common east of the railway. Its congener *C. olivacella*, however, did not put in an appearance. *C. genistæ*; larvæ and cases were common on the *Genista anglica*, after crossing the line to the west. *C. cæspititiella*? and *C. glaucicolella*? were in countless numbers on the two species of rush growing in the swampy portions of the common to the east of the line after re-crossing. *C. fuscadinella*; this species was brought to me by various members, and, as usual, beaten out of various bushes—sloe, white thorn, birch, elm, etc. *C. gryphipennella*, one case beaten from rose by Mr. Edwards, who also met with numerous larvæ of *C. nigricella* while beating sloe. Four fine cases of *C. currucipennella* were met with on birch by Mr. Sich and myself, after considerable searching. Other species were looked for, such as *C. lutipennelle*, on oak, and *C. albicosta* on furze, but without success. Even the common *C. murinipennella*, one of the earliest to emerge, and which should have been flying over the wood rush (*Luzula*), was conspicuous by its absence. As a whole the representatives were decidedly scarce as compared with other years."

Mr. A. W. Dods took a pair of *Lophopteryx camelina* in cop., and larvæ of *Miselia oxyacanthæ*. Mr. B. Stonell's labours with the beating tray were rewarded by larvæ of *N. cucullatella* (common), *P. pedaria* (common), *H. defoliaria*, *H. aurantiaria* (common), *M. oxyacanthæ* (one), *M. margaritaria* (one), also *Cheimatobia boreata* and *C. brumata*. Mr. Ashby reports *Panagra petraria*.

The ramble finished up at Epsom, where twenty-six members and friends took tea together.

Report of a Field Meeting held at Bookham Common, June 4th, 1904.

By EDWARD STEP, F.L.S. Read September 22nd, 1904.

THE attendance at the second field meeting showed a falling off from the numbers of the first, though we were again favoured with fine weather. A small party went down in the morning and investigated the eastern border of the Common, working towards Fetcham. The main body in the afternoon brought the total attendance up to nineteen. Some time was spent around the large ponds, but these were not found so productive as usual. Then a course was taken through the woods to the north.

The plants in flower noted included: Lesser marsh wort (*Helosciadium inundatum*), birds-foot (*Ornithopus perpusillus*), marsh speedwell (*Veronica scutellata*), water speedwell (*V. anagallis*), germander speedwell (*V. chamaedrys*), brooklime (*V. beccabunga*), wood loosestrife (*Lysimachia nemorum*), lousewort (*Pedicularis sylvatica*), eye-bright (*Euphrasia officinalis*), petty-whin (*Genista anglica*), bugle (*Ajuga reptans*), tuberous bitter vetch (*Lathyrus macrorhizus*), water-cress (*Nasturtium officinale*), bush vetch (*Vicia sepium*), broad-leaved pond-weed (*Potamogeton natans*), green-winged orchis (*Orchis morio*), spotted orchis (*O. maculata*).

The mud-horsetail (*Equisetum limosum*) with which one of the ponds is filled was in fruit, and Mr. Lucas reports the adder's tongue fern (*Ophioglossum vulgatum*) in the green lane leading to Effingham Junction. The same gentleman reports the parasitic fungus *Epichloë typhina* on grass, and on it were the larvæ of the fly *Anthomyia spreta*, which devours the fungus, making radiating excursions from a central shelter made by itself something after the manner of a coccid.

The Lepidoptera have been reported by Messrs. South, Scollick, Turner, Bishop, and Ashby. The list includes:

Euchloë cardamines, *Lycaena icarus*, *Cænonympha pamphilus*, *Syrichthus mævae*, *Drepana binaria* (= *hamula*), *Heliaca tenebrata* (= *arbuti*), *Tephrosia punctularia*, *Zonosoma punctaria*, *Acidalia remutata*, *Panagra petraria*, *Bapta temerata*, *Eupithecia castigata*, *E. vulgata*, *E. exigua*, *Melanippe unangulata*, *Coremia designata*, *C. unidentaria*, *Penthina pruinana*, *Pardia tripunctana*, *Catoptria ulicetana*, *Glyphipteryx fuscoviridella*, *Pieris rapæ*, *P. napi*, *P. brassicæ*, *Polyommatus phlœas*, *Nisoniades tages*, *Thecla rubi*, *Gonepteryx rhamni*, *Asthena candidata*, *Eupithecia lariciata*, *Larentia pectinataria*, *Melanthia ocellata*, *Melanippe sociata*, *Apamea basilinea*, *Hadena geniste*, *Larentia viridaria*, *Noctua plecta*, *Cidaria truncata* (= *russata*), *Cabera exanthemaria*, and *Piedisca solandriana*.

In addition, the following were taken in the larval stage: *Nola cucullatella*, *Porthesia similis* (= *auriflua*), *Teniocampa cruda*, *Pseudoterpna pruinata* (= *cytisaria*), *Hybernia defoliaria*, *Cheimatobia brumata*, *Xylophasia sublustris*, and *Tortrix viridana*.

The Coleophorids found (all in the larval stage) were *Coleophora lutipennella*, in numbers on oak, but local; *C. geniste*, in vast numbers on *Genista anglica*; *C. fuscidinella* very general on various trees and shrubs; *C. gryllipennella*, a few on rose, and a few *C. solitariella* on *Stellaria holostea*. Whilst searching the oak, the curious boat-shaped cocoon of *Hylophila bicolorana* was found, from which a fine example of the perfect insect has since emerged.

Of Neuroptera Mr. Lucas reports: Psocidia: *Cæcilus flavidus*; Perlidia: *Nemoura variegata* (a stone-fly); Ephemeridia: *Leptophlebia helwipes* (= *submarginata*) (a May-fly); Odonata: *Agriion puella* was plentiful on the Common, both sexes being taken; a larger species observed on the Common was apparently *Libellula depressa*, either a ♀ or an immature ♂; Planipennia: *Panorpa germanica* ♂ (a small scorpion-fly); Trichoptera: *Limnophilus centralis* (a small caddis-fly).

Diptera also recorded by Mr. Lucas: *Empis tessellata*, F.; *Helophilus trivittatus*, F. (♀ figured in Verralls' 'British Flies,' vol. viii); *Argyra*, sp.; *Scatophaga*, sp.

Orthoptera.—Near Effingham Junction Mr. Edwards beat out *Forficula auricularia* (♀) and a couple of very small green grasshoppers, which Mr. Lucas had no doubt were nymphs of *Meconema varium*.

COLEOPTERA.—The following list is contributed by Mr. S. R. Ashby: *Dromius linearis*, *Meligethes rufipes*, *Byturus tomentosus*, *Attagenes pelli*, *Athous hæmorrhoidalis*, *A. vittatus*, *Agriotes pallidulus*, *Dolopius marginatus*, *Telephorus rusticus*, *T. hæmorrhoidalis*, *Rhagonycha limbata*, *R. pallida*, *Dasytes ærosus*, *Callidium alni*, *Grammoptera ruficornis*, *Tetrops præusta*, *Bruchus atomarius*, *Orsodacna cerasi*, *Anaspis frontalis*, *A. geoffroyi*, *A. ruficollis*, *A. maculata*, *Anthonomus pedicularius*, and *A. rubi*.

The Mollusca were not worked, but in a rivulet from one of the ponds very dark specimens of *Limnea palustris* were clustered together in vast numbers; *Planorbis complanatus* was also observed.

Mr. West's search for microscopic material was rewarded by *Daphnia pulex*, *Cyclops quadricornis*, *Cypris*, *Hydra viridis*, *Stentor mulleri*, *Vorticella nebulifera*, *Closterium lunula*, *Tardigrada* sp., *Floccularia cornuta*, *Rotifera vulgaris*, and *Paramæcium*.

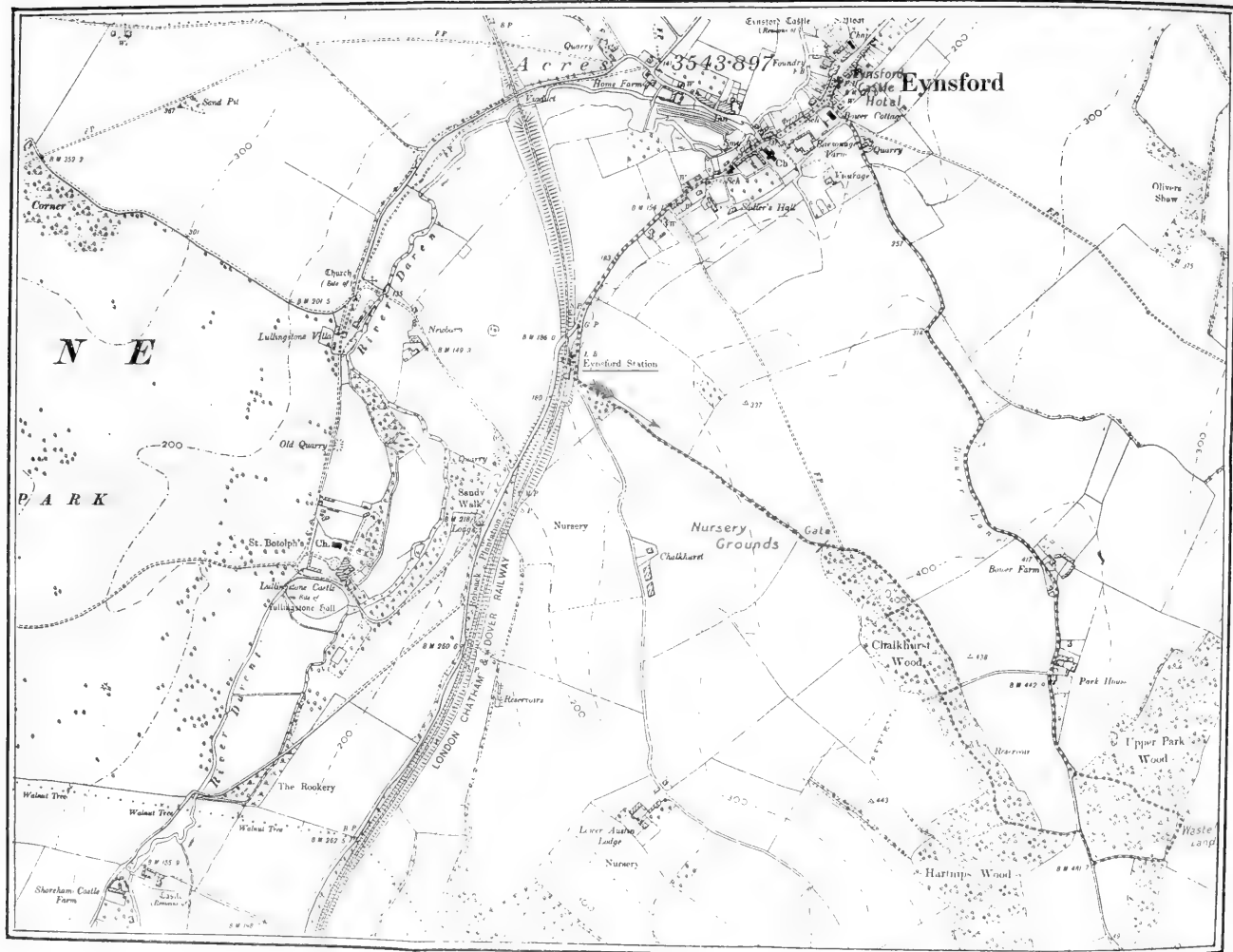
A party of eighteen took tea together at Merrylands Hotel, and a little work was done afterwards.

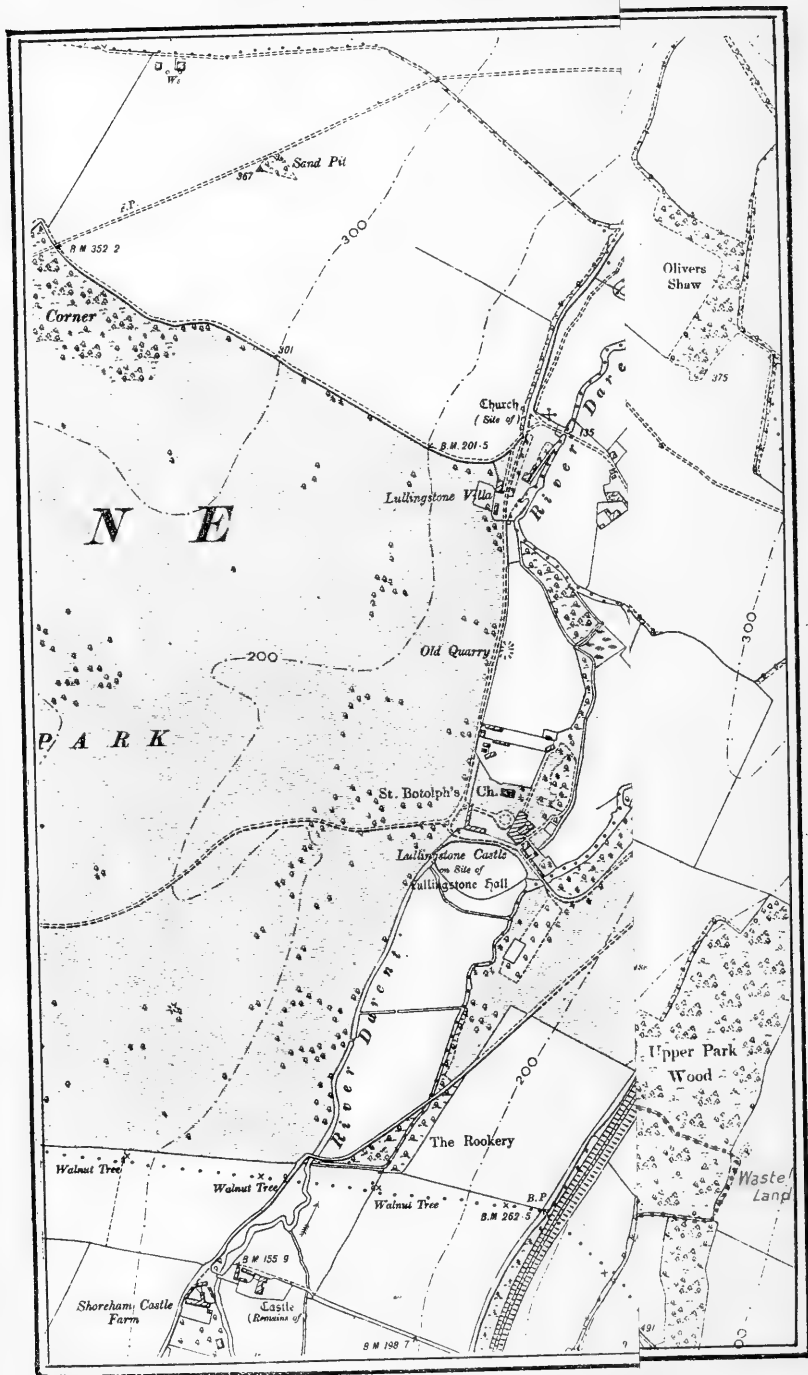
Report of a Field Meeting held at Eynsford, Kent, June 25th, 1904.

By ROBERT ADKIN. *Read January 12th, 1905.*

EYNSFORD is another of those villages on the banks of the river Darent that offer facilities as a convenient base from which a half-day field meeting may be held. From London it is distant some eighteen miles, and is situated on the cross road between Farningham and Sevenoaks. It has a railway station about half a mile from the village, on the Swanley and Sevenoaks branch of the L.C. & D. Railway. Ranges of hills rise to the east and west of it, the former, with which we are at the moment more intimately concerned, attaining by a gentle rise an altitude of, in round numbers, 500 feet. Of the districts already visited in this series of Field Meetings it most nearly resembles Otford, from which it is distant some five or six miles, and the country is of quite a different type from that of the "Charts" at Brasted and Lympsfield. The woods are all of modern origin and consist chiefly of narrow strips or comparatively small patches, no doubt planted with the primary object of affording protection for game, and the open land is pretty closely cultivated. At first sight one might be inclined to think that there was little chance of profitable collecting of any sort, but on closer acquaintance one finds that the woods are fairly prolific; indeed, the profusion of moths, chiefly Geometers, that I met with during a hurried ramble through these same woods on May 28th was greater than I had seen elsewhere for many years. Almost every tree trunk was tenanted, sometimes by half-a-dozen specimens and perhaps as many species, and every tap at the undergrowth set numbers of individuals hurrying off to fresh cover. These woods are also interesting in that they are one of the nearest places to London, if not the nearest, where one may find the columbine (*Aquilegia vulgaris*, Linn) growing wild. The green hellebore (*Helleborus viridis*, Linn) also is very abundant on their borders, but I fear the former of these plants is doomed to extinction, for, whereas where not twenty years ago it was to be found commonly one has now a difficulty in finding even one or two examples. Many of the hedgerows also in the district are of unusually heavy growth and afford good cover for moths and suitable feeding-places for their larvæ. Occasionally a bit of waste ground, too poor for cultivation, but covered with an abundance of rough herbage, may be met with, and suggests possibilities for the micro-lepidopterist and the hymenopterist. So much for the district.

The meeting was hardly the unqualified success that it had been hoped it would be. Arrangements had been made for the accommo-





dation of a party fully up to the average numbers that attend our field meetings, but at the time when members and their friends should have been assembling at Holborn Viaduct Station rain was falling in a perfect deluge ; it was but a shower, it is true, but one of those showers that drive one to any shelter that may be at hand irrespective of trains to be caught or ever so pressing engagements to be kept, and as a consequence only some ten members left by the 2.37 train and in about an hour's time reached Eynsford. Such showers as that which we had experienced in London are often local, and we had great hope that this particular one had not travelled in the same direction that we had, but on leaving the station and taking the footpath almost opposite it under a few trees and then along the upper end of Channell's Nurseries, we soon found that it, or one of equal severity, had preceded us and made walking unpleasant, and the hedgerows, which all along this path are very dense, unworkable, added to which a fitful breeze that was blowing from the north-west was at times distinctly chilly. It was therefore thought well to push on for the woods, in the hope that the higher trees and thicker brushwood might have kept the ground dry and would form a protection from the breeze. Accordingly little time was spent on investigating the hedgerows, and any nests of larvæ of *Eriogaster lanestris*, not the only species that is often to be found commonly on this spot, that may have been there were passed by. Arriving at the brow of the hill and passing through a gate that stands at an angle rather to the left hand, then skirting the first portion of a wood which is fenced in with barbed wire and adorned with numerous boards warning people not to trespass, another path leading from the village joins up ; a little further on a grassy path on the right leads into the wood, and shortly after, turning abruptly to the left, traverses the centre of it. Any hopes of drier work in the woods were here soon dispelled ; for not only were the trees and undergrowth dripping, but walking through the long grass which covered the path was suggestive of wading through the borders of a reedy pond rather than walking on land, and it is needless to add that, under such conditions, insects of any sort were not readily to be found. Continuing along this path for perhaps rather less than half a mile, avoiding any abrupt turnings on either hand, but following the trend to the left where it divides at about two-thirds of the distance, we arrived in a by-road, Bower Lane by name. Turning to the right—that is, still going away from Eynsford—for perhaps a couple of hundred yards and then turning to the left along the edge of another wood brought us to an uncultivated hillside. Here the breeze had dried the herbage, but it was getting late in the afternoon ; and as sunshine is an all-important element for the successful working of rough open ground, it was hardly to be expected that we should retrieve our fortunes, and I fear that more attention was paid by most of the party to the wonderful crop of wild strawberries that were here found in full perfection than to any very serious attempt

at collecting insects, but the majority of such captures as were made were obtained hereabouts and along the borders of the adjacent wood. Working along this waste land, keeping the wood on the left hand, another track passes through the wood, the entrance to it being behind a slight projection from the border of the wood. This track leads back to Bower Lane, along which a walk of approximately a mile, more or less down hill all the way, brought us to the village of Eynsford, and a few paces to the right to the Eynsford Castle Hotel, where mine host, one Godfrey by name, had spread a sumptuous repast for our edification of which an abundant supply of freshly gathered strawberries formed but one of the features, and, it was generally agreed, to some extent compensated for the disappointments experienced in the earlier part of the afternoon. The repast finished, a pleasant walk, variously estimated by the natives at from "about five minutes" to "half an hour," but which in reality is a little more than half a mile, brought us to the station again, and the party, which had now reached the total of thirteen, returned to London by the 7.30 train.

As is customary, I append a list of species noted during the meeting, compiled from notes very kindly sent in by those members who were present; but it will be readily understood that, having regard to the adverse climatic conditions under which we laboured, it cannot be regarded as by any means representative of the species that one may ordinarily expect to find in the district either entomologically or botanically; and for the guidance of those who may wish to further investigate the capabilities of the neighbourhood an outline map, showing at a glance the route taken, is attached.

List of species noted—

Insects—LEPIDOPTERA: *Epinephele ianira*, *Cœnonympha pamphilus*, *Lycæna icarus*, *Hesperia thaumas*, *H. sylvanus*, *Euchelia jacobææ*, *Leucoma salicis* (pupa), *Zanclognatha grisealis*, *Asthena candidata*, *Cabera pusaria*, *Melanippe rivata*, *M. montanata*, *M. fluctuata*, *Camptogramma bilineata*, *Mimæseoptilus phæodactylus* (larvæ and pupæ), *M. pterodactylus*, *Aciptilia galactodactyla* (pupæ), *Tortrix viridana*, *Xanthosetia hamana*, and *Laspeyresia nigricana*. Of the last-named species Dr. Chapman mentions seeing four and five specimens resting together on *Viburnum*.

Plants: *Reseda lutea*, *Fumaria capreolata*, *Helianthemum vulgare*, *Bryonia dioica*, *Dipsacus sylvestris*, *Knautia arvensis*, *Melampyrum pratense*, *Scrophularia nodosa*, *Echium vulgare*, *Euphorbia amygdaloides*, *Helianthemum vulgare*, *Lychnis vespertina*, *Silene inflata*, *Fragaria vesca*, *Helleborus viridis* (in fruit), *Orchis maculata*, and *Ophrys apifera*.

Report of a Field Meeting at Leatherhead Downs, held on July 9th, 1904.

CONDUCTED BY EDWARD STEP, F.L.S.

THE attendance of members at this meeting was small in spite of the fine weather. The party met at Ashted station, some of the members having journeyed by each of the two routes, and proceeded by the village and Crampshaw Lane to the Downs. On the partly open plantation beside the footpath here the tall broomrape (*Orobanche elatior*) was again conspicuous, and among the other plants in flower we noted the following: *Centaurea scabiosa*, *Calamintha acinos*, *Anthyllis vulneraria*, *Hippocrepis comosa*, *Papaver rhæas*, *Helianthemum chamæcistus*, *Ononis repens*, *Pastinaca sativa*, *Daucus carota*, *Viola tricolor*, *Tragopogon pratense*, and *Convolvulus arvensis*.

Along the Ermyn Way we found *Campanula trachelium*, *Bryonia dioica*, *Papaver somniferum*, *Atropa belladonna*, *Spiræa filipendula*, *Phyteuma orbiculare*, *Thymus serpyllum*, and at Cherkley we encountered Mr. Turner with spikes of *Neottia nidus-avis*, which he had brought from Mickleham, where he reported having also seen plenty of *Verbascum lychnitis*.

Observations and captures of insect life include the following: Mr. Turner—larvæ of *Cucullia lychnitis*, most of them covered with ova of an ichneumon. A few hours next day resulted in the successful cleansing of these, and Mr. Turner had the satisfaction ultimately of rearing and pupating them. Lepidoptera on the wing, he reported, were scarce, but in the afternoon a quiet corner had produced plenty of *Mimæseoptilus fuscodactylus*, and later he pointed out a linnet's nest in a juniper-bush.

Among Lepidoptera Mr. Ashdown reports *Cidaria fulvata*, *C. dotata*, *Emmelesia decolorata*, *Melanippe procellata*, *Eubolia limitata*, and *Scopula olivalis*. Mr. Edwards' list includes: *Epinephele ianira*, *Cænonympha pamphilus*, *Lycæna icarus*, *Augiades sylvanus*, *Adopæa thaumas (linea)*, *Pieris rapæ*, *P. brassicæ*, *Drepana falcula*, *Melanthia bicolorata (rubiginata)*, *M. albicillata*, *Melanippe rivata*, *Cidaria fulvata*, *Eubolia plumbaria (palumbaria)*, *E. limitata (mensuraria)*, *Hemithea strigata (thymiararia)*, *Hecatera serena*, *Crambus pascuellus*, and one example of the Dipteron, *Volucella bombylans*. Mr. South, in addition to the Lepidoptera previously named, mentions: *Habrosyne derasa*, *Acontia luctuosa*, *Hypena probocidalis*, *Acidalia dimidiata*, *Eupithecia sobrinata*, *Asthena luteata*, *Coremia designata*, *Eucosmia vetulata*, *Crambus perlellus*, *Alucita (Aciptilia) pentadactyla*, and *Orthotenia striana*. Mr. Lucas contributes the following: Orthoptera: Nymphs of *Leptophyes punctatissima*, *Meconema varium*,

and an earwig, no doubt *Forficula auricularia*. The locality seemed suitable for *F. lesnei*, but none were found. One earwig nymph, about half grown, had on it no less than six large bright-red Acari. A wrinkled black thread protruding seemed to be the fæces—about half as long as the insect. Was this apparently diseased condition due to the presence of the Acari? Neuroptera—Planipennia: *Panorpa communis* ♀ (the larger scorpion-fly).

The Ermyn Way was followed as far as Cherkley, and then the party descended by way of Downs Lane to Thorncroft, thence by the cricket-field and Leatherhead Bridge to the Old Running Horse, where, to the number of fifteen, they sat down to tea. Some of the party returned from Leatherhead station, others proceeded along the lanes to Ashted, and did a little dusking around Barnett Wood on the way.

Report of a Field Meeting held at Byfleet, July 23rd, 1904.

By W. J. LUCAS, B.A., F.E.S. *Read January 12th, 1905.*

THREE years in succession this Society has organised a field meeting on the bank of the Basingstoke Canal, and on each occasion, though the morning was fine, rain came on in the afternoon. On the date of the last excursion, however, the rain was neither heavy nor lasting—it was necessary to keep up a reputation, and that being accomplished, the weather speedily improved.

Thirteen members and three visitors arrived in detachments by various trains, the last one patronised being that reaching Byfleet station at 3.18 p.m. Collecting, observation, and photography were the order of the day, till 7 p.m., when full justice was done to an excellent meat tea at a very moderate charge served at the Victoria Inn at Woodham on the further side of the canal. Most of the party returned to town by the 8.19.

Anyone who has not seen the Basingstoke Canal, and has in his mind the recollection of some unlovely midland canal, laden with coal-barges, will be delightfully surprised should he visit the T-shaped piece of water having Woking, Weybridge, and Wisley at its three extremities.

That stretch of the canal passing between the villages of Byfleet and Woodham which has for three successive years been visited in July by our Society lies on a low-lying part of the Bagshot beds of the Upper Eocene geologic age, the height of the land above sea-level being roughly from sixteen to thirty yards only. The district is more or less swampy, there being much higher ground bordering the valleys of the Wey and the Bourne, both of which streams flow near on their course to the Thames by Weybridge. Though geology proper is out of the question, yet the botany and zoology of the district, which depend upon its geological formation and situation, are particularly interesting, species, both vegetable and animal, being numerous, and often worthy of more than ordinary attention.

As regards the botanical side of the life of the district, some of the most noticeable plants met with were: The white water lily (*Nymphaea alba*), yellow water-lily (*Nuphar lutea*), arrowhead (*Sagittaria sagittifolia*), a rather local plant, water plantain (*Alisma plantago*), branched bur-reed (*Sparganium ramosum*), smaller cat's-tail (*Typha angustifolia*), great reed (*Phragmites communis*), lesser reed (*Calamagrostis epigeios*), yellow loosestrife (*Lysimachia vulgaris*),

purple loosestrife (*Lythrum salicaria*), marsh wound-wort (*Stachys palustris*), meadow-sweet (*Spiraea ulmaria*), gipsywort (*Lycopus europæus*), tufted vetch (*Vicia cracca*), tansy (*Tanacetum vulgare*), sneesewort (*Achillea ptarmica*), flea-bane (*Pulicaria dysenterica*), greater skull-cap (*Scutellaria galericulata*), great valerian (*Valeriana officinalis*, var. *sambucifolia*), comfrey (*Symphytum officinale*), hemp agrimony (*Eupatorium cannabinum*), water bistort (*Polygonum amphibium*), harebell (*Campanula rotundifolia*), fine-leaved heath (*Erica cinerea*), cross-leaved heath (*Erica tetralix*), yellow-pea (*Lathyrus pratensis*), false cyperus (*Carex pseudo-cyperus*), and Canadian-weed (*Elodea canadensis*).

On first reaching the canal from the station in the afternoon a kingfisher was observed, and Mr. Step reports the presence of the moorhen, coot, female wild duck with young, and the finding of a nest of the whitethroat containing three eggs.

Turning to the insects, a number of dragon-flies were recorded, but none that were not previously known for the district. Those found were *Eschna grandis*, two; *Calopteryx splendens*; *Platynemis pennipes*, one on the Common; *Erythromma najas*; *Pyrhosoma nymphula*, one seen, I believe; *Ischnura elegans*, numerous, one var., *rufescens*, being taken; *Agrion pulchellum*, one taken by Mr. South; *Enallagma cyathigerum*, numerous. *E. najas* and *A. pulchellum* are local insects, and this part of the canal is one of their well-known haunts:

Of the Planipennia two were taken, a lace-wing (*Chrysopa ventralis*), and a suspicious-looking scorpion-fly. This latter was a female which bore some resemblance to the scarce *Panorpa cognata*. Consequently I sent it, for his opinion, to Mr. K. J. Morton, of Edinburgh, who returned it to me named as *cognata*. Though it is not easy to distinguish species of *Panorpa* in the absence of males, I think we may regard this as belonging to the scarce species. The range of *P. cognata* in Britain does not seem to be very clear, but the only other localities I know are Folkestone and the New Forest. It is, at any rate, I think, an addition to our county list.

Of Coleoptera there is a fairly good array: *Loricera pilicornis*, *Ilybius fenestratus*, *Tachinus rufipes*, *Meligethes æneus*, *Scirtes hemisphericus*, *Donacia versicolora*, *Lema lichenis*, *Phyllodecta vitellina*, *Galerucella sagittaria*, *Chetocnema subcærulea* (one specimen), *Cassida equestris*, *Apion ulicis*, *A. frumentarum*, *A. vicie*, *A. hookeri*, *A. minimum* (scarce and local), *A. unicolor*, *A. hydrolapathi*, *Strophosomus coryli*, *Gymnetron antirrhini* (= *G. noctis*), *Nanophyes lythri* (common on purple loosestrife).

Of Diptera two species were identified as *Polietes lardaria* (♀) and *Leptis lineola*.

Notes on the Lepidoptera are far from numerous. Mr. Ashdown reports *Aphantopus (Epinephele) hyperanthus*, and an uncommon-looking lepidopterous larva, which none of the party could identify, but which produced common enough ichneumons. Mr. Priske found

cocoons of a burnet moth, most probably *Anthrocera* (*Zygæna*) *filipendulæ*, all of which contained an ichneumon in a very tough inner cocoon of its own. After opening one of these cocoons in October he found that the parasite was still in the larval state.

Amongst the Hemiptera the last-mentioned observer found the shield-bug, *Picromeris bidens*, in the larval stage, and kept it till it matured, and Mr. Jennings took the Homopteron, *Aphrophora salicis*, on sallows.

Mr. Step was able to add the mollusk *Helix arbustorum* to the list for the district.

As regards pond-life of the minuter kind, both botanical and zoological, Mr. W. West considers the captures as a whole were particularly good. He reports as follows: The Bryophyte: *Ricciella fluitans*. Algæ: *Volvox globator* and *Closterium moniliferum*. Polypes: *Hydra viridis* and *H. vulgaris*. Entomostraca: *Daphnia pulex*, *Cyclops quadricornis*, *Diaptomus castor*, and *Cypris tristriata*. Rotatoria: *Lacinularia socialis*, *Conichilus volvox*, *Melicerta ringens*, *Limnias ceratophylli*, *Floscularia ornata*, *Stephanoceros eichornii*, and various unrecognised free-swimming Rotiferæ. Infusoria: *Vorticella nebulifera*, *Vaginicola crystallina*, *Zoothamnium arbuscula*, *Actinophrys sol*, and *Epistylis*, as well as the freshwater sponge (*Spongilla fluvialis*). There were also numerous water-mites of various shapes and colours.

In conclusion I should like to thank Messrs. Ansorge, Ashdown, Jennings, Priske, Step, Ward, and West for sending me notes, with the help of which I have been enabled to draw up this report.

Report of a Field Meeting held in Epping Forest, September 10th, 1904.

By A. HARRISON, F.L.S., F.E.S., and H. MAIN, B.Sc., F.E.S.
Read January 26th, 1905.

THE route taken on this occasion was practically the same as on the 1902 excursion, viz. from Theydon Bois station through Epping Thicks to Epping village. About a dozen members turned up, and the walk, although not very successful as regards entomological results, was most enjoyable.

After tea at the Old Thatched House at Epping, some members tried sugaring in the "Thicks," but very few insects were attracted.

Mr. F. M. B. Carr reports the following captures :

ODONATA : *Sympetrum striolatum*.

Lepidoptera : *Chrysophanus (Polyommatus) phleas*, *Cænonympha pamphilus*, *Orgyia antiqua*, *Ennomos erosaria* (one, female), *Cidaria testata* (one), *Hepialus sylvanus*, *Agrotis suffusa*, *Triphena pronuba*, *Calymnia trapezina*, *Xanthia ferruginea*, *Amphipyra pyramidea*, *Gortyna flavago* (pupa). Larvæ : *Halias prasinana* (common), *Porthesia similis* (one), *Dasychira pudibunda* (one), *Lophopteryx camelina* (one), *Clostera reclusa* (in dwarf willow), *Drepana lacer-tinaria* (three), *D. binaria* (three), *Acronycta psi*, *Amphidasys betularia* (common), *Odontopera bidentata* (common), *Metrocampa margaritaria* (common), *Rumia luteolata*, *Cabera pusaria*, *Numeria pulveraria* (one), *Hemithea strigata*, *Ephyra trilinearia* (common), and *Bapta temerata* (a few).

Mr. Harry Moore adds the following observations :

Stenobothrus parallelus (Zett) was not as common as usual.

Hymenoptera were represented by two or three species of *Bombus*, *Halictus*, etc., and a solitary example of *Ichneumon luctatorius* (Linn).

A few species of Diptera were very numerous, Tipulidæ especially ; the Syphid *Helophilus pendulus* (L.) was almost as common, but of the larger *Sericomyia borealis* less than a dozen specimens were seen.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History
Society.*Read January 26th, 1905.*

By ALFRED SICH, F L.S.



GENTLEMEN,—When my illustrious predecessor, Mr. Step, commenced his memorable address last year by deploring the fact that our Bye-laws compel a President to deliver an address I certainly did not in the least agree with him, because I thought, and hold the same opinion still, that from the comfortable point of view of a member not in office it is the one moment of the year which provides a small thrill of excitement.

When a President rises to deliver his address the other members present have one thought in their minds: they feel that someone is in rather a tight place and they are interested to see how he will wriggle out of the net which Bye-law 19 has cast around the presidential chair.

Being myself now in this glorious fix, I feel the force of my predecessor's argument, but if I can make one tithe of the impression on you that he did on us all last year I shall feel also that my torture has not been entirely in vain.

I think perhaps my first duty should be to ask for your kind indulgence and pardon for my prolonged absence during the year. This, as I think you all know, was caused by illness in my family, which necessitated a sudden journey of over 900 miles. I am happy to say now that my family has been quite restored to health. I think our worthy Secretary will bear me out when I say that up to my departure and since my return I have not missed any meeting. And,

gentlemen, I feel assured that one and all of you will endorse the remark when I affirm that during my absence the affairs of this Society have been watched over by our able vice-Presidents, Mr. Step and Mr. Main, in so careful and thorough a manner that the Society has rather benefited than otherwise by the prolonged absence of its temporary head.

You have heard the Council's Report read, and also that of the Treasurer. Though our cash balance stands at rather a lower figure this year than last, it is simply a matter of transfer. During the year we had the opportunity of adding to our assets some valuable scientific works; these had to be paid for, and by the expenditure of another small item we have greatly increased the value of our herbarium. So that in reality our total assets compare very favourably with those of last year.

Your Council have thought fit to recommend to you during the past year an alteration in the Bye-laws, which alteration was duly made at a special meeting held on November 10th. We are therefore now able, if we so desire, to re-elect a President for a second year of office.

There is another matter which your Council have taken in hand; that is, the reparation of the Tugwell Herbarium. This, I consider, is for the Society a most important matter. The late Mr. Tugwell, a former member of this Society, and its President in 1891, formed an excellent collection of dried plants which were subsequently presented to the Society. This collection has now been put into thorough order in such a manner that any plant may easily be referred to and also its place ascertained in the last—I think 9th—edition of the "London Catalogue of British Plants." But please mark, for this is important, all this reparation has been carried out without interfering with either the specimens or their labels, so that the collection is still the *Tugwell* collection.

Now, gentlemen, I said the Council had taken this work in hand; they did so, but the real labour has been borne entirely by one member of the Council. I know that his modesty, had I allowed it to interfere, would have prevented me making special reference to this point. But I feel really that Mr. Step truly deserves the gratitude of this Society.

I think, perhaps, that one of the features of our meetings of 1904 has been the frequent exhibition of photographs of lepidopterous ova, larvæ, and imagines, besides other insects, and also of wild flowers in a living and natural condition. These photographs are not only of great scientific value, but also in many cases of great beauty. The chief contributors

have been Messrs. Dennis, Noad-Clark, Goulton, Lucas, Main, Step, and Tonge. It is extremely desirable that entomologists should now be able to compare the ovum of one species with that of another species, and matters would be greatly aided if a series of microphotographs of ova were easily procurable. I hope I shall not be guilty of betraying a State secret if I say I have heard a whisper that Mr. Tonge and Mr. Tutt are seriously considering the joint publication of such photographs, with descriptions. I only hope it is true.

Another feature which must not pass without mention is the great number of the species of the genus *Coleophora* which have been exhibited in one or more stages by our indefatigable honorary secretary, Mr. Henry J. Turner.

Before terminating my remarks on the special affairs of this Society, it is my sad duty to have to record the passing away from our midst of two entomologists, both members of our Society.

Robert McLachlan, who died on May 23rd last, in his 67th year, was born near Ongar, in Essex. He seems very early to have shown a leaning towards natural history studies, and began, like so many of us, by turning his attention to the butterflies. In order to increase his knowledge of their food-plants, showing even at this early age the true naturalist he was, he took up the study of botany. When eighteen years old he went on a voyage to Australia and China, and brought back a large collection of plants. Later he seems to have made many journeys to the French and Swiss mountains, and while on the Continent made the acquaintance of several men of entomological eminence; thus his mind was early widened and freed from that insular prejudice which is so apt to hinder the development of a stay-at-home Briton. His first contribution of any length on the Trichoptera was, I believe, published in the "Entomologists' Annual" for 1861. Later, in the "Transactions of the Entomological Society," he wrote a monograph of the British Caddisflies, one of the British Neuroptera-Planipennia, and a catalogue of the British Neuroptera. In the "Ent. Mo. Mag." he published a monograph of the British Procidæ. His chief work, however, was his "Monographic Revision and Synopsis of the Trichoptera of the European Fauna," with a supplement. This work, containing over 600 pages and some 2000 figures of structural details from his own drawings, appeared in nine parts during the decade 1874-1884. Of his works, these are perhaps the most useful to the student of the British Neuroptera, but he contributed articles and Reports

to the journals of almost every important Entomological Society of Europe. He joined the Entomological Society of London in 1858, was President in 1885 and the following year. In 1877 he was elected a Fellow of the Royal Society. He was also member of numerous continental societies. He was elected an hon. member of this Society in 1872, and, to show the interest that he took in its welfare, I will call attention to a note from his pen which was read at the meeting held on July 10th, 1902. In his decease the entomological world loses a great naturalist and a ready but an exceedingly careful writer. His works will long remain a storehouse of entomological treasure, and his memory will be kept green by those who knew him personally, for they realise that they have lost a genial and sincere friend.

Charles Golding Barrett, who left us so recently, only passing away on December 11th last, was born at Colyton, Devonshire, in 1836. He entered the Civil Service at the age of 20, and his occupation causing him to reside in various parts of the British Isles, gave him an opportunity of studying the Lepidoptera, which was his especial order, in many and varied localities. Owing to his great energy and unsparing pains he took full advantage of this circumstance and amassed a vast store of first-hand information. I think it safe to say that Mr. Barrett took with his own hands more species of British Lepidoptera than any other entomologist. He was, however, much more than a collector, for he worked out the life-histories of many species which were not previously known, and contributed a large amount of literature to the different periodicals in the shape of papers and notes. In 1880 he joined the editorial staff of the "Entomologists' Monthly Magazine," and his "Notes on British Tortrices," which ran for eighteen years, are among the best of his writings. Since 1893 he was engaged on his large work, "The Lepidoptera of the British Islands," of which nine volumes have been issued. I think it would have been to the greater benefit of entomological science had he commenced this work with the consideration of the Tineina, for we have so many works on the larger moths and so few on the smaller ones, and now, alas! we shall be unable to share in the great knowledge of the smaller species which he undoubtedly possessed. It is, however, pleasing to hear that his prepared manuscripts will probably enable the Tortricina to be completed.

In 1889 Mr. Barrett joined this Society, and was elected President for 1892.

It is not, however, for his valuable writings that many of us hold our late friend most dear; his heart was ever open to the call of anyone desiring knowledge, which he gave freely and in so delightful a manner that he endeared himself to all who knew him.

In March last Joseph Merrin died at Gloucester, at the age of 82. Though of late years he seems to have been less active, yet at the time of his death he was engaged on a county list of the 'Victoria Natural History.' He will be most widely remembered by his useful "Lepidopterists' Calendar."

I now come to the list of new species which have been added to our Fauna during 1904. Though the Lepidoptera remain stationary, the year is remarkable on account of the additions to other orders.

In considering the Mammals, the most important event has undoubtedly been the discovery of the Orcadian vole (*Microtus orcadensis*, Millais), a species entirely new to science. It is very much larger, much darker, and the fur has a softer and denser appearance than that of the common field vole, but the fundamental difference lies in the molar teeth, which are of a distinctly different pattern. This highly important addition to the Fauna of the world was noticed by Mr. Millais on the Island of Pomona, the main island of the Orkneys, I believe two or more years ago, but was only brought forward definitely this year. The account of the discovery and specific description will be found in the "Zoologist," July 15th, 1904, page 242.

One expects to see new insects discovered in our islands every year, but the recording of a mammal new to science is an important event.

The chief event recorded in the annals of British ornithology for the year is the breeding in Britain, I cannot say where, as this is very properly not disclosed, of the black-necked grebe (*Podiceps nigricollis*). Mr. Aplin writes of this in "Zoologist"; as there were more nests than one it looks as though the birds were really established.

The only new species in Mollusca recorded as British this year is, I believe, *Paludestrina anatina* (Drap.). This has for our Society a special interest, as Mr. Le Brockton Tomlin discovered it in some shells gathered from Oulton Broad by Mr. Claude Morley ("Journal of Conchology," 1904, p. 11).

Another record seems worth mentioning, that is, the occurrence at Box Hill of a *left-handed* specimen of the Roman snail *Helix pomatia*. This was picked up by Mr.

Hy. J. Turner on May 1st last, and is recorded by F. B. Jennings in "Conchological Journal," 1904, p. 96. On page 106 of the same Journal Mr. Denison Roebuck gives an interesting account of the discovery in some numbers in pine forests, situated in four different places in Scotland, of the little slug *Limax tenellus*, which was beginning to have a somewhat shadowy claim to our Fauna. All naturalists will welcome the re-establishment of this member of Limacidæ, which are none too common in our islands.

We now arrive at the Insecta, and the names of the new species combined form rather an overpowering phalanx, and I therefore propose only to read out to you those which appear the most interesting. To the Coleoptera eight new species have been added:

Aulonium sulcatum (Oliv.) is rare on the Continent. It was discovered in July last by Mr. C. J. C. Pool at Enfield, in all its stages, showing that it was not absolutely a chance capture; but unless it is found in other British localities its record as British seems likely to be a short one, for bricks and mortar will, I fear, soon exterminate it in Enfield.

Ocyusa nigrata (Fair), taken by Mr. Claude Morley in Suffolk in 1900, but first recorded by Mr. Newberry, in the "E. M. M.," 1904, p. 251.

Criocephalus rusticus (Dej.), taken by Col. Yerbury in Scotland this year. This differs from many of the new insecta of 1904 in being of a large size. It is now in the collection of the British Museum ("E. M. M.," 1905, p. 15).

Euconnus mäklini, taken by Dr. Norman Joy in Berkshire in 1901, but first described as British in 1904 ("E. M. M.," 1904, p. 6).

Catops sericatus, separated from *C. sericeus* by Mr. Champion ("E. M. M.," 1904, p. 78).

Malachius barnevillei, taken by Mr. Thouless at Hunstanton in 1899 and recorded by Mr. Champion ("E. M. M.," 1905, p. 15).

Agathidium badium, taken by Dr. Chaster under bark, near Lake Ulleswater, in 1903 ("Ent. Rec.," 1904, p. 18).

Longitarsus curtus, taken by Mr. Tomlin in the Isle of Man in 1903 ("E. M. M.," 1904, pp. 60 and 179).

DIPTERA.—The dipterists have been most active during the last year, and their efforts have culminated in the discovery of no less than twenty-seven new species, of which three are new to science.

Callicera yerburyi (Verr.) was taken in 1904 in Scotland by Col. Yerbury ("E. M. M.," 1904, p. 229).

Threticus compar. (Eat.) and *gemina* (Eat.) were described by the Rev. A. E. Eaton in his paper in the "E. M. M." on the Psychodidæ, which will always be an important contribution to the literature of the diptera, as he therein describes five new genera ("E. M. M.," 1904, pp. 57-59).

A paper of great importance published in the "E. M. M." during 1904, and to be continued, is Mr. Verrall's "List of British Dolichopodidæ, with Tables and Notes," in which at least seven new British species have been or will be described.

Other new Diptera are:

Corethra obscuripes, found at Newmarket and exhibited at the Ent. Soc. meeting, May 4th, 1904, by Mr. Collin ("Ent. Soc. Lon. Pro.," xxxiii).

Neotamias cothurnatus, taken by Mr. Holland at Oxford and exhibited by Mr. Verrall at the above-mentioned meeting.

Asteia elegantula, taken in 1903 by Mr. Jenkinson on the banks of the Findhorn in Scotland ("E. M. M.," 1904, p. 4).

Dilophus ternatus, near Cromer, 1903.

Chyliza vittata, near Bungay, 1902.

Tanypeza longimana, near Bury St. Edmunds, 1899.

These three species identified by Mr. Collin and recorded by Rev. E. N. Bloomfield ("E. M. M.," 1904, p. 61).

Callimya elegantula?, *Agathomyia boreella*, *Homalomyia difficilis* and *Palloptera latabilis*, all four taken in Herefordshire by Dr. Wood in 1904 ("E. M. M.," 1905, pp. 5 and 8).

Periscelis annulata and *Ochthera mantispa*, both taken by Mr. Lamb in 1904, the former in the New Forest and the latter at Padstow ("E. M. M.," 1904, p. 277).

In Mr. Verrall's list of the Dolichopodidæ ("E. M. M.," 1904, p. 165) the following new British species occur:

Chrysotus monochætus.

Dolichopus analusiacus ("E. M. M.," 1904, p. 226).

Dolichopus laticola (Verr), a species new to science, described "E. M. M.," 1904, p. 197.

Hydrophorus rufibarbis.

Porphyrops patula.

Sympycnus spiculatus.

Systemus adpropinquans.

The following four species are first recorded as British in the "Ann. Scot. N. H.," 1904:

Sciara rufiventris, p. 30.

Oncomyia sundervallii, p. 221.

Hydrotæa pilipes, p. 158.

Sapromyza affinis, p. 129.

For these particulars I am indebted to the kindness of Mr. Verrall.

Three species of Hemiptera have been brought forward during the year to enrich our Fauna: *Drymus confusus*, from Dorsetshire, and *Salda setulosa*, from Hampshire, both recorded by Mr. E. A. Butler ("E. M. M.," 1904, p. 275); *Ripersia europæa*, first taken by Mr. Tomlin near Swanage, in the nests of *Formica rufa* ("E. M. M.," 1904, p. 282).

We have four new species of Hymenoptera recorded during the year:

Crabro styrius, taken as far back as 1894 at Shiere and other places.

Halictus semipunctulatus, taken at Lyme Regis in 1903. Both these are recorded by Mr. Saunders in "E. M. M.," 1904, p. 10.

Halictus fulvicornis, separated from *H. subfasciatus* by Mr. Saunders ("E. M. M.," 1904, p. 250).

Rhadinocæra micans, hitherto confused with other species, is separated by Rev. F. D. Morice ("E. M. M.," 1904, p. 100).

Mr. Morley describes ("E. M. M.," p. 37) for the first time the male of the ichneumon, *Barichneumon heracleana*.

Two Trichoptera, *Oxyethira mirabilis*, a species new to science, and *O. sagittifera*, new to Britain, were taken at Rannock by Mr. Kenneth Morton, to whose kindness I am indebted for these particulars.

I have received much assistance in drawing up these faunistic notes from the following gentlemen, besides those already mentioned: Messrs. W. L. Distant, W. F. Kirby, E. A. Smith, H. St. J. K. Donisthorpe, and A. H. Hamm, to all of whom I tender my best thanks.

I am sorry that in Lepidoptera we have nothing new to record; let us hope we shall be able to discover some new species during the coming season.

The year has been perhaps remarkable on account of the great number of specimens of *Phryxus (Deilephila) livornica* which have been captured. It compares in this way with the year 1860, which was also a *livornica* year, and curiously, too, in that year a specimen of *Gonepteryx rhamni* resembling *G. cleopatra* was taken near Rotherham. This year Mr. Lucas ("Entom.," p. 240) records a similar specimen as reared from a larva taken by Mr. Weir.

In Mr. Claude Morley's *Ichneumonologia Britannica* we have a volume which as far as Great Britain is concerned breaks entirely new ground. It is a comfort to know that we can

now have a reasonable chance of naming some of those beautiful insects with which most of us are more or less acquainted. There may be those who would like to name them in order more effectually to breath anathemas on them. It is to be hoped that another volume of this work will be issued before long.

"Catalogue of British Coleoptera," by Professor Beare and Mr. Donisthorpe. The coleopterists of Britain must have eagerly looked forward to the issue of this catalogue, and must now be grateful to the authors whose joint labours have given them such an eminently useful, up-to-date working list.

"Eleanor Ormerod, LL.D., Economic Entomologist, Autobiography, and Correspondence," edited by Robert Wallace. This contains, as Mr. Lucas writes ("Entom.," vol. xxxvii, p. 219), a delightfully fresh autobiography, followed by a biographical sketch by the editor, and a large amount of correspondence.

"The Mammals of Great Britain and Ireland," by J. G. Millais, F.Z.S., vol. i. This sumptuous work, when completed by the issue of vols. ii and iii, will be *facile princeps* of any books ever written on this subject. The present volume deals with the Bats, Insectivora, and Carnivora, as far as the end of the seals. Some of the numerous and beautiful plates are produced by the aid of the camera, but many of them are reproductions of highly artistic pictures by the author. As this work in its present form must really be looked on as an *édition de luxe*, it is to be hoped that a cheaper edition may subsequently be issued.

Part X of Mr. Taylors' most excellent work, the "Monograph of the Land and Freshwater Mollusca of the British Isles," was published in June. It deals with only four species of slugs, but these are treated very thoroughly, except, perhaps, in the accounts of their habits, which might have been extended. We have as yet only plates of *Limax maximus* and *L. cinereo-niger*, but hope soon to see the figures of the other species.

"Wayside and Woodland Trees," by Edward Step, F.L.S. This is a delightful book to put in one's pocket when on a country ramble, or if read after returning, it will most certainly incite to further rambles, and the perusal of it will surely increase even the tree-lover's love of trees.

To the foreign as well as to the British lepidopterist, the most important work of the year is Volume IV of Mr. Tutt's "British Lepidoptera"; for although this volume only deals

with twelve species, these few insects are so exhaustively treated, and on such a wide basis, that no student of the Lepidoptera, whether his study be general or specialised, can afford to be without a reference work of such marvellous utility. A comprehensive work such as this, however, has its thorn as well as the rose. When it reaches the young and aspiring entomologist, it may for a time cool his ardour. He may feel that he has neither the time nor, if he be modest, the capacity to attempt anything approaching the same compass. Let the aspirant, however, not be discouraged, but let him continue his observations in the lines he has chosen, and sooner or later he will discover new facts or will be able to confirm doubtful ones. When he has in this way added something to knowledge, let him record it as soon as possible, that others may have the new light, however feeble, thrown on their work. For from the accumulation of notes and records of observations arises the material out of which the more comprehensive scientific works are largely composed.

Perhaps I may here take the opportunity without being considered presumptuous, to remind the older as well as the younger entomologists that it is really their duty to record as soon as practicable any fresh truth that they have discovered. We all know there are several entomologists of great experience who are still more or less active in the field, but whose pen, unfortunately for their brethren, is almost idle, and we can, alas! recall the names of many, now no longer among us, whose great knowledge, never published, has almost entirely passed away with them.

The subject I desire to bring before your notice to-night is one that, I believe, has not been brought forward at this Society on any previous occasion. I wish to call your attention to the joy of animal existence; I want to emphasise the triumph of animal life. Of course by this I do not allude to mere animal existence, to the dull life of a beast, as exemplified by the life, for instance, of a prize pig, that spends all its time either in sleeping or eating. Such an existence is certainly without care, but as surely without joy. What I do mean is the joy of the wild life, of the life that the free creatures of the field and forest lead when left to themselves, uninterfered with by the hand of man.

It is many years ago since the first idea of this fact dawned upon me; but since that time my observations have brought it home to me again and again, so that for some years now it has been with me a settled conviction.

As soon as I became aware of this fact I altered my method

of studying Nature. I almost gave up collecting altogether, because to collect meant to destroy, to bring prematurely to an end the joyous life of the creature collected.

And besides, I had found that to observe the wild free life in Nature, to draw conclusions from observation and to prove or attempt to prove those conclusions, was a far higher and much more fascinating pleasure than that of collecting.

Yet collecting has its pleasures, for it satisfies one of man's natural instincts, the inborn love of hunting. It is also the surest, most rapid, and perhaps the only way to acquire an accurate knowledge of the distinctions of the various species of any special class under study, and of the names by which they are known to other men. Of course if we only wish to observe creatures for our own benefit, we need not trouble in the least about the names that men have given to them. Observation will usually teach us soon enough the difference between one creature and another. But if, as we very soon do, we desire to read what others have observed or more especially if we wish to record our own observations for the benefit of others, we must with the greatest accuracy determine the name of the creature whose habits we are studying.

Collecting is therefore by no means to be depreciated, for it is a splendid introduction to study and usually a most healthful pursuit, besides being the source of innumerable pleasures. However, the pleasures of collecting are not to be compared with the pleasures derived from the study of the life-histories of the living creatures. By life-history I mean much more than the life-cycle. The more we study the living things and the closer we get to the real truth of their lives and to the laws which govern these wild beings and form their habits, the greater becomes the fascination of study and the more intense the desire to penetrate yet farther into the heart of Nature and, not to wrest from her, as some say, but ask her to reveal to us more of her wonderful laws, to light up for us more of those secrets which are still hidden from our understanding.

Now, if we go into the wilds, whether it be the bare, wind-swept uplands, or the forest with its tangled growth of brambles and undershrubs below and its tall trees rising up into the airy regions above, or whether it be the stretch of sand between high- and low-water mark on the sea coast, with innumerable rocks and pools or hung with seaweed; if we go to these wilds and study the creatures that have their

homes in such places, we shall probably be struck, firstly, by the wonderful fitness of each wild creature to the particular kind of wilderness which it inhabits; and secondly, it will gradually dawn on us that the life of these wild beings, so admirably suited to their homes, is one full of joy, if not of exultation.

I believe the popular notion of an animal's life might be summed up somewhat in this manner: It comes into the world with a perpetual desire to eat and with an ever-present fear of being eaten. All its actions are governed by what is termed "instinct," which teaches it blindly to satisfy its animal desires on the one hand and to escape its enemies on the other. It may, of course, have moments of pleasure, but in any case it is ever haunted by the fear of death either by starvation or by some sudden calamity.

That an animal's life may not only be free from care, but may even be a career of triumphs such as man hardly knows on this earth, is not, I believe, a popular notion. Yet I am convinced that, in the majority of cases, the triumphant career truly expresses the essence of animal existence.

This is an idea which is very easy to state, but, I fear, difficult to prove. And though I have long been convinced of it myself, I would scarcely have brought it forward had I not been emboldened by lately reading a book written by one in touch with wild life, which expresses in a clearer and more delightful manner than I am able to do the main issues of this idea.

The animal life, that of the American woods, of which William Long writes in his "School of the Woods," is widely different to that with which I am acquainted. My experience is chiefly of the insect world of England. Yet I venture to say that while listening to the smaller voices of Nature in the English wilds, I have caught the notes of the same joy of life which Long describes, and which seem to ring like music through the wild life of the larger and more highly organised creatures of the American forests. Perhaps one of the most convincing lessons of the joy of animal life may be obtained by watching, if Fortune favour us, any family of young animals at play, for in that case we can hardly fail to be impressed by the joyful spirit of their gambles.

Everybody has, no doubt, noticed how squirrels will, when disturbed on the ground, run to and ascend the nearest tree. As soon as they know they are safe they will peer round the branches and watch the intruder without the slightest fear.

In England squirrels are, of course, well acquainted with human beings; but in wilder countries, where man is a scarcer animal, squirrels show even a greater curiosity and more boldness. In fact, curiosity is one of the leading points in the animal character.

I have often watched the lizards sunning themselves on the hot walls of the more southern parts of Europe. They will remain the whole morning basking in the sun. If any danger threatens them, they slip instantly into their holes, where they are in perfect safety, but only to peep cautiously out again the very next moment. When the weather is wet or cold they do not quit the hole. When they feel hungry, which appears to be about once or twice a week, they stalk the insects on the wall. The alert and confident way in which they hold up their heads and survey the surroundings, and the lance-like rapidity with which they throw themselves on their prey, both go to show that the lizards are masters of the situation, and they know it, and rejoice accordingly in their powers. But what about the insects which also love to bask in the hot sunshine on the same walls with the lizards? I have watched them too, and they appear to be equally happy. If a lizard is hunting and he comes their way, all they have to do is to quit the wall in haste. If the insect be too lazy or too stupid, it pays the extreme penalty, and the lizard gets its dinner. On the other hand, if the insect escapes, it soon settles down again, perhaps coolly beside another lizard that is clinging quietly on the wall. The flies and other insects may, perhaps, avoid the onslaught of the lizard in the same half-unconscious way that man draws back his head if any near object suddenly comes across his line of vision. I do not believe they can possibly understand that the object which causes them to change their situation is a lizard, and that it wants to eat them.

Everyone must have noticed the bold, rapid movements of *Sesia* (*Macroglossa*) *stellatarum*, the humming-bird hawk moth, when on the wing. Here is an insect endowed with marvellous flight. It can pass through the air at an enormous speed with apparently hardly an effort; it can turn this way and that way, up and down; it can even remain suspended, hovering in the air. Man when seated in a motor-car, or more happily on a toboggan, enjoys the rush through the air, the exhilarating movement, but he has to keep, more or less, in close contact with the ground. *Sesia stellatarum*, however, is under no such restriction. Its realm is the air, and it follows its own sweet will in its wanderings, often, I believe,

revisiting the same spot, at the same hour of the day, for several days in succession.

How far it roams no man knows. It visits the violas high up on the mountains, it flies along the very sea shore. It dashes into the market-places of the towns, probing the flowers on the stalls, and even those held in the human hand; it feeds among the choicest blossoms in imperial or royal gardens, and it finds its way to that one solitary pot of geraniums on the window-sill, perhaps the only spot of colour in that dingy back street of the great city. But everywhere it exhibits the same rapid, joyous, confident flight. Surely its career is one of triumph!

Many times in the gloaming of a summer's evening I have watched the flight of that beautiful little tineid, *Tinea cloacella*. It will fly gently hither and thither in a quiet corner, almost as if it were a kind of pendulum. It is not seeking its lady-love, for then its flight is different; it is not even searching for food, but simply flying to and fro in idle enjoyment.

If on one of those delicious days of the merry month of May so often dilated on by the poets, and which most of us have occasionally experienced, we go towards sundown into a meadow where *Luzula* grows, we shall most probably be able to watch the desultory flight of that grey-green little moth, *Glyphipteryx fuscoviridella*. We shall find it sitting crosswise on a bent of grass, moving its wings up and down like fans. Then it flies off, threading its way among the taller grass-stems, till it finds a blade of grass bending over horizontally on a spike of *Luzula*, on which it can settle in its favourite manner and fan its wings. After a few seconds it will take another flight, and again settle, only to fly off again. Thus it will pass an hour or more, never going very far, but always taking things easy and enjoying the warm, soft air of the late afternoon.

Stainton appears to have noticed this joy of existence; for he writes thus of one of the smallest of all moths, *Nepticula pygmælla*: "It is a pleasant sight to see this minute insect darting backwards and forwards among the hawthorn-leaves, evidently in the *acme* of enjoyment" ("Insecta Brit.," p. 296).

I have mentioned the joyous flight of these species, not because they appear to have an exceptional enjoyment of life, but because they are all common and easily to be observed. Many more examples might be cited, and I believe that the same joyous life is common to all species, but I

think that these few examples will serve to show my meaning and support my idea.

Were I well acquainted with the other orders of the Insecta, I could no doubt bring forward examples from the Coleoptera, Odonata, etc. It seems to me that the mazy dance on the surface of the water indulged in by the species of the genus *Gyrinus*, and also the triumphant flight of *Æschna grandis* as it skims over the pond, cleverly avoiding the net of the acquisitive and all too sanguine collector, are both manifestations of the joy of life. However, as I have never studied these insects, I know nothing of their method of life, neither of their joys nor of their sorrows, if they have any.

You will perhaps have noticed that in citing these examples I have in almost all instances used the word *watch*, and for a very distinct reason. If we merely see these creatures at play, if we only look at them in passing, we shall not be aware that they are playing—that they are simply enjoying life. We shall merely have a picture of creatures at rest or creatures in motion, with this or that background. But if we watch them—that is, if we observe them attentively to-day, to-morrow, this year, the following year, as long and often as opportunity may allow, we shall perceive much more of their life, we shall begin to understand, not only what they are to us, but we may in part discover what their existence really means to them. And to the pure biologist this latter point is of the utmost importance.

So much for the bright, joyous side of insect life; now let me turn your attention to the reverse—to the fears and sorrows of animals, or more particularly of insects, for it is with them that I am now chiefly concerned.

Fear is apprehension of danger or pain. Our fears are born of experience, or perhaps more often of imagination. I do not believe that insects possess the faculty of imagination, so that we may at once dismiss this factor from our consideration. Experience may, perhaps, in some rare cases induce fear in insects, but even this appears to me very doubtful. Insects, as a rule, can have so very little experience that would be likely to induce fear. For the accidents that an insect can meet with which do not end in death seem to be extremely few. Should an insect meet with a bad accident it can scarcely recover—death in some form is sure to overtake it speedily. For instance, should a winged insect be badly injured by a bird or a bat, and yet escape, it will fall to the ground, only to become sooner or later the prey of a shrew

mouse, toad, or predacious beetle. Besides, an insect's life is mostly of too short a duration to allow it to gain any experience, especially in those insects which have a complete metamorphosis, for even if experience were gained in the earlier stages, it could scarcely be of use in the later ones. Then, again, an insect can hardly have any knowledge of, and therefore any fear of, death itself. What can an insect know of death? The carnivorous beetles that live by the death of other creatures, though they continually see death, can scarcely recognise that their own end will also soon come. They cannot apply the idea of death to themselves, neither can the burying beetles, when engaged in hiding the body of a dead animal. Besides, what is death to an insect? I do not believe that the natural death of an insect is ever a painful disunion. In the great majority of cases I believe that death to an insect either comes swiftly and suddenly, as when it falls a prey to some other creature, or steals gradually over it, as when an insect dies of cold or desiccation. In no case do I believe there can be any foreboding.

This is possibly also the case even with the more highly organised animals.

Of course, we know that insects are destroyed in vast numbers by those mammals, birds, reptiles, and insects which feed on them, and perhaps in far greater numbers by insect parasites. But I do not believe that an insect has this knowledge, and therefore, though surrounded by so many dangers, it has no fear of them. While an insect has life I maintain that its life is a joyous one, though there seems to be some melancholy exceptions, such as the poor creatures which the butcher bird impales on a thorn.

There is another and very different factor—our old friend the survival of the fittest—which exercises a great influence on the enjoyment of life among wild animals and insects. The weakling, the physically unfit, and the aged all soon die in one way or another, so that those creatures which retain life are the stronger and more perfect individuals, which consequently are more capable of enjoying life.

Therefore, it seems to me that the terrors which many people appear to believe haunt the wild animal, and make its life one of misery, have in reality little, if any, existence at all. Now, with regard to an animal's enjoyment of life—I mean the higher animals. I put it in this way: The fact is, an animal does not *worry*. It is extremely watchful, and the moment danger is perceived it takes measures to escape. But when danger is not present the animal enjoys its life

because its great powers of recognising and avoiding danger give it that feeling of security which brings peace and contentment.

But I believe the joyous life of an insect stands really upon a totally different ground. As I have endeavoured to show, an insect can scarcely have any experience of danger, it can hardly have any *wisdom* derived from the previous avoidance of danger, because if it does avoid danger, it does so unconsciously, without ever recognising the danger it has avoided. An insect enjoys life, not because it rejoices in its knowledge and power of escaping danger, as I think the higher animals may do, but because it is absolutely ignorant of danger. It is a perfect organism, and enjoys its perfection in total ignorance of the dangers which surround it.

Let me here quote a verse from the poet Rogers, written perhaps some seventy or eighty years ago :

"Child of the sun ! pursue thy rapturous flight,
Mingling with her thou lov'st in fields of light ;
And where the flowers of Paradise unfold
Quaff fragrant nectar from their cups of gold."

Anyone who has paid the *slightest* attention to insect life will readily admit that insects can and do, without doubt, enjoy the pleasures of life thus described by the poet. But these pleasures do not alone constitute that joy of life which, I claim, insects possess. By the joy of life I mean, not only the absence of fear and pain, but a positive actual pleasure in existence, arising from the perfection of their constitution, from the fitness of the creatures to their environment.

And now, gentlemen, before I descend from this height to which by your kindness you elevated me, I have one more duty to perform. It is, I am glad to say, a very pleasant one—in fact, the only solace left. I have the pleasure to introduce to you my successor, Mr. Hugh Main, Bachelor of Science, Fellow of the Entomological Society, and member of other scientific societies. He is a keen student of the Lepidoptera, an excellent photographer, and versed in microscopical lore. I am aware that this is well known to you all, just in the same way that we all know at least two of Mr. Main's excellent personal qualities, his clear insight and his modesty. I have just tried to prove to you that an insect enjoys its life on account of its fitness to its surroundings, and for the same reason I feel assured that Mr. Main will enjoy his presidential existence.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 11th, 1904.

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

Mr. MONTGOMERY exhibited examples of *Ocneria dispar*, in which a large semicircular portion at the apex of each hind wing was wanting. He stated that a friend was breeding the insect in some numbers, and a few of this aberrant form appeared. Two of them were paired, and nearly the whole of the progeny of this pair were similarly affected. Mr. Enock remarked that in 1878 he had a brood of the same insect, which showed exactly similar characteristics.

Mr. South exhibited several albino and xanthic aberrations of *Epinephele tithonus*. The specimens were taken by Mr. G. M. Russell on the Chalk Downs in S. Hampshire, one in 1898, two in 1899, six in 1900 (species abundant in 1900). The yellow specimens seem to be referable to *ab. mincki*, Seebold. For the whitish form, Mr. Verity of Florence, Italy, who took two ♂ and one ♀ examples in August last on Mount Matanna, proposes the name *subalbida*. Mr. Verity has also named a similar form of *E. ida* as *ab. albida*, the latter from the Tuscany coast.

Mr. Kaye exhibited several photographs of the Potara river, British Guiana, and made remarks on the localities adjoining.

Mr. Robert Adkin exhibited a series of *Leucoma (Liparis) salicis* reared from pupæ collected in July last at Herne Bay, Kent. He said that his chief object in making this exhibit was to obtain information. The pupæ were sent to him by Mr. Lachlan Gibb, who during a visit to Herne Bay found the pupæ in great numbers in folded leaves of the poplar-trees that grow near the sea front. Mr. Gibb had told him that while on a similar visit in 1901 he had noticed the moths swarming about the same trees; so abundant were

they that the street boys were hunting them with their caps as a pastime. There appeared to be good reason for believing that migratory swarms of this species arrived on our east coast from time to time, and any evidence tending to confirm this supposition would be valuable; and although, in this instance, it might not now be possible to obtain direct evidence, it would be useful if any one was in a position to say whether the species had been common in Herne Bay in the seasons immediately preceding 1891, or, indeed, in any recent years. It would also be interesting to know whether the insect continued to occur in considerable numbers in the district in years to come.

Mr. Newberry exhibited several fine species of Indian Coleoptera, and a large water-bug, together with an example of the Dublin prawn (*Nephrops norvegicus*).

Mr. West (Greenwich) exhibited an example of the very rare beetle *Gynandrophthalma affinis* taken at Wychwood, Oxfordshire, in 1899. The species was recognised as new to the British List by Mr. Holland in 1902.

Mr. H. Moore exhibited specimens of large species of Coleoptera from Natal, together with a very prettily marked larval form of a large Orthopteron.

Dr. Chapman exhibited a series of brilliant but very small specimens of *Cyaniris argiolus* from Moncayo, Spain, with specimens of the gorgeous *Arctia fasciata*, which he had recently bred from larvæ obtained in the same locality. He also showed a fine series of the beautiful *Chrysophanus amphidamas*, bred from pupæ obtained from Germany. The amount of "shot" colour on some of the examples was unusually large.

Mr. Sich read a paper entitled "Notes on the Genus *Colcophora*" (see page 1), and a short discussion took place.

FEBRUARY 25th, 1904.

The PRESIDENT in the Chair.

It was announced that three valuable works on the British Fauna had been purchased for the Library by the Council, viz., Hinck's "Marine Polyzoa," Hinck's "Hydroid Zoophytes," and Bate and Westwood's "Sessile-Eyed Crustacea."

Mr. Edwards exhibited a striking variety of *Hyphenastrum rostralis*, having a broad light-brown costa, a large blotch about the middle of the hind margin extending one third

into the wing, and a narrow streak from the angle along the inner margin, both of the same colour as the costa.

Mr. Colthrup exhibited a very light variety of *Abraxas grossulariata*, in which there were only a few black dots and spots on the disc and at the base of the fore-wings, and a marginal row of dots on the outer margin of both fore and hind wings. The yellow clouding was confined to a small basal area and to a narrow area along the submarginal line of dots. He also showed a blotched form of *Argynnis (Brenthis) euphrosyne*, and a series of photographs of various varieties and aberrations in his collection, including very dark *Strenia clathrata*, almost white *Bryophila muralis*, very light *B. perla*, very light and dark forms of *Lymantria (Psilura)*, *monacha*, and dark *Polia chi*.

Mr. Manger exhibited a very curiously stained form of *Callidryas drya* from Demerara. It was probable that the marking had been caused by the fluid, expelled from the abdomen soon after emergence, having touched the wings. He also showed an example of *Helicopsis cupido* of the typical form from Brazil, and a specimen of the very beautiful light form found in Demerara, together with examples of *Megistanis baotus* found in New Grenada.

Mr. Alfred Sich exhibited a specimen of *Bedellia sommitellata* with its pupa-case. The pupa reminds one of the Pierid pupa in miniature. He also exhibited a lantern slide of a twig of currant, from Chiswick, very much like the larva of a geometer moth.

Mr. Montgomery exhibited very long and varied series of *Pieris napi* reared from ova.

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

Mr. Tonge exhibited slides of larvæ and ova of Lepidoptera.

Mr. Warne exhibited slides of orchids and choice flowers.

Mr. Lucas exhibited slides illustrative of protective resemblance, on behalf of Mr. Hamm. He also showed slides of plants, lepidopterous larvæ, and of interesting spots in the New Forest.

Messrs. Harrison and Main exhibited slides of Diatoms, Foraminifera, and plant life.

Mr. Goulton exhibited slides of lepidopterous larvæ.

Mr. Dennis exhibited slides illustrative of the haunts of flowers and the characteristic and varying aspect of trees.

Mr. Noad Clark exhibited slides of Foraminifera and Polycistina.

MARCH 10th, 1904.

The PRESIDENT in the Chair.

Mr. Colthrup exhibited a number of eggs of the Lesser Tern, showing considerable variations in the markings.

Mr. Tonge exhibited specimens of the following species of butterflies he had just received from Siam: *Anosia plexippus* and the form *archippus*, *Junonia atlites* and *Aphnaeus himalayanus*. He also exhibited photographs of female *Lycana iolas*, bred by Dr. T. A. Chapman, natural size, showing resting pose; ovum of *Thera juniperata*, *in situ* on a juniper-leaf, magnified 20 diameters, kindly lent by Mr. H. Main; and ova of *Hybernia ruficapraria*, magnified 20 diameters.

Mr. Manger exhibited the remarkable seed vessels of *Martynia proboscidea*, a native of Mexico, which terminate in two long curved beaks or hooks. The genus contains about ten species of herbaceous plants.

Mr. H. Moore exhibited a living specimen of the locust *Acridium ægyptium* (Linn), and contributed the following note: "This specimen was brought to me by a flower-hawker, who found it in a basket of *Mimosa*, on February 29th last. Although I have tried it with various sorts of green-stuff, it appears to have eaten little or nothing. It has been kept on the kitchen mantelpiece, and becomes lively towards evening. I have not heard it myself, but those about the house say it has been chirruping like a little bird. Singularly enough, Fischer, in a note on this species, says that 'it has not only a song deceptively like that of a bird, but also a mimicry of habits, for if anyone approaches the perch on which it is sitting it at once flies off to another at a short distance.' The species is solitary in its habits, but is now more or less familiar to Londoners, as quite a number during recent years have been introduced in crates of vegetables—chiefly, I believe, from N. Italy."

Mr. Robert Adkin exhibited (1) a male variety of *Bupalus piniaria*, in which the usual dark markings were represented by two small ill-defined dark spots on the costa of each fore-wing and dark spots on the fringes, the whole of the remainder of the wings being of a pale brownish yellow, with the veins darker brown. The specimen was taken at West Wickham Wood in June, 1888.

(2) Also an example of *Callimorpha dominula*, in which the usual red colour of the hind wings was replaced by yellow. It was taken at Dover in July, 1897.

Mr. Sich exhibited sketches of several species of larvæ, illustrating the main characters of the various groups of the Lepidoptera.

Mr. McArthur exhibited two specimens of the extraordinary S. American moth *Thysania agrippina* (*strix*), the larger specimen measuring more than ten inches across the expanded wings. Mr. Kaye said that he had seen the species alive. It was accustomed to sit on the trunks of trees with expanded wings, geometer-like, although it was really a noctuid.

Mr. Tutt then gave an address entitled, "Some Modern Requirements in Oval and Larval Description," illustrating his remarks by blackboard sketches and a large number of diagrams, prepared by Mr. Bacot (see "Practical Hints for the Field Lepidopterist," Part III, chapters 2 and 3).

A considerable discussion ensued. Mr. Sich wished to know if there was any hard and fast line between flat and upright eggs, and instanced the egg, a species of *Colcophora*, which had been described as belonging to opposite sections by two observers. Dr. Chapman said that oval and larval description was by no means an easy matter. In some instances flat eggs simulated those of the upright section and *vice versâ*. As a fact, the two groups necessarily ran into each other, and no definite line of demarcation could possibly be made between upright and flat eggs, which would hold good in every instance. Mr. Clark asked Mr. Tutt if he could suggest the use of the complicated grouping of the setæ in larvæ, and was answered in the negative. He also noted that glycerine was a good medium for keeping material for microscopical examination. Dr. Chapman said that for permanent preservation no doubt some form of alcohol or formalin was the better preservative, but as this hardened the tissues it was much better to use glycerine as a temporary preservative for material it was desired to examine. Mr. Tonge wished to know the best way of using the micrometer with the microscope, and several members were desirous of similar information. Mr. Clark very kindly offered, later on, to give a demonstration of the various methods of microscopical measurement. Mr. Tutt replied, and stated that he had expressly omitted to mention the difficulties of the subject. He had only touched upon the main features of what was required for scientific purposes, and again urged the members to do more than merely photograph the ova and larva, to add as close descriptions as possible on the lines he had detailed in his address.

MARCH 24th, 1904.

The PRESIDENT in the Chair.

Mr. Main exhibited (1) Coleoptera from Cape Colony, (2) Hemiptera from W. Africa, and (3) a spider taken among a cargo of sugar from Java.

Mr. Goulton exhibited photographs of the ova of *Ptilophora plumigera* and *Eubolia cervinata*. He also showed photographs of the larvæ of *Amphidasys strataria*, *Drepana unguicula*, *Biston hirtaria*, and *Odontopera bidentata*.

Mr. Manger exhibited a large beetle, *Macrodonia cervicornis* from Demerara.

Mr. West exhibited an example of the rare British longicorn beetle, *Monohamnus sutor*, taken at Great Yarmouth, on a doorstep, in 1903.

Mr. McArthur exhibited a bred specimen of *Pachnobia hyperborea (alpina)* which had no trace whatever of the left hind wing.

Mr. Malcolm Burr gave a very interesting address on his tour in the countries bordering on the eastern shores of the Adriatic Sea, with especial reference to Montenegro. He illustrated his remarks upon the characteristics of the people, the topography, and the peculiar entomological fauna with a large number of lantern slides, made from photographs taken by himself during his journey.

APRIL 14th, 1904.

The PRESIDENT in the Chair.

Mr. Tonge exhibited a further series of photographs of the ova of Lepidoptera, including *Augiades (Pamphila) comma*, *Anticlea badiata*, *Biston hirtaria*, *Oporina croceago*, *Cerastis vaccinii*, and *Hybernia marginaria*.

The President exhibited specimens of the shells of *Limnæa peregra* from the fountain basins in Trafalgar Square. They were of the typical form although the shells were somewhat thin. Mr. Clark said that their origin in that situation was due to the custom of the sellers of watercresses washing their market purchases in the basins in the early morning. The thinness of the shells was no doubt due to the paucity of lime in the water.

Mr. B. Adkin exhibited examples of *Pachygastris* (*Bombyx*) *trifolii* and contributed the following note :

"The examples of *Bombyx* or *Pachygastris trifolii* shown comprise six of the pale variety, probably ab. *flava* (Tutt), and two of the darker variety, possibly ab. *rufa* (Tutt), which perhaps show something like the two extremes of the variation in the colouring of the species found in England. Some in Mr. Woodforde's collection were from the N.-W. Coast, and of a colour intermediate between those shown. I consider this an interesting insect, from its showing so much variation even in the same locality."

The very dark ♂ and ♀ were bred from larvæ taken in Scilly, while the pale ♂s and ♀s were bred from Kent larvæ. Several members testified as to their want of success in breeding this species from the egg.

Mr. Main exhibited photographs of *Gonepteryx cleopatra* received from Dr. Chapman, *Nyssia hispidaria*, from Epping Forest, the larvæ of *Sclenia bilunaria*, and imagines of *Endromis versicolor*, and *Leucophasia sinapis*.

Mr. Moore exhibited a fish taken from the Thames, which was said to be a salmon. It was, however, identified as a carp. It weighed about 1¼ lbs., and was caught off Rotherhithe.

Mr. Manger exhibited a beetle, *Homophæta albicollis*, taken on a steamer by his son while cruising among the West Indian Islands, where it is generally distributed.

Mr. Step exhibited specimens of the British saxirrage *Chrysosplenium oppositifolium* from Westcote, Surrey.

Mr. Main exhibited ova of *Colias edusa*, var. *helice*, laid by a female specimen sent to him from Hyères by Dr. Chapman. They were deposited either singly or in small batches. In a short time they changed from white to a bright red, and in one stage were prettily variegated. They were deposited upright on a glutinous, pellucid base.

Mr. Manger exhibited a large number of shells of the family Spondylidæ, to illustrate his paper on this section of the Mollusca (see page 14). The President and others took part in the discussion which followed.

APRIL 28th, 1904.

The PRESIDENT in the Chair.

Mr. Tonge exhibited an album of photographs of the ova of various species of Lepidoptera, including those of *Asteroscopus nubeculosa*, *Pachnobia rubricosa*, *Taniocampa munda*,

Xylina socia (*petrificata*), *T. instabilis*, *T. cruda*, *T. populeti*, *Asphalia flavicornis*, *Endromis* (*Dimorpha*) *versicolor*, *Larentia multistrigaria*, and *Colias edusa*, var. *helice*, the last from ova laid by a female sent from the South of France by Dr. Chapman.

Several members had experienced great difficulty in breeding *A. nubeculosa*, and Mr. Adkin said he had found that success could be obtained by (1) very carefully washing the food-plant before giving it to the larvæ, (2) giving sufficient friable earth for the larvæ to pupate in, and (3) allowing the pupæ to remain even for two or three years if the imagines did not come out the season following pupation.

The Rev. H. Wood exhibited the following spiders to illustrate his paper: (1) *Epeira angulata*, ♀; (2) *E. gibbosa*, ♂; (3) *E. diademata*, ♀; (4) *Philodromus margaritatus*, ♀; (5) *Theridion vittatum*, ♂; (6) *E. cucurbitina*, ♂; (7) *Cyclosa* (*Epeira*) *conica* ♀, all obtained for him by Mr. Carr in the New Forest; and also *Argyroneta aquatica*, ♂ and ♀, *Pisaura* (*Dolomedes*) *mirabilis*, ♂, and *Pirata hygrophilus* (the last two species with their cocoons), taken by himself. The *A. aquatica* were alive in their chambers in a jar of water.

Mr. Carr exhibited a specimen of *Elater pomorum*, a rare beetle taken from rotten birch-wood in the New Forest.

Mr. Clark exhibited an abnormal bloom of the common primrose from his garden. Last year the plant was obtained from the woods and showed no sign of a stalk upon which the flowers were borne. This year a polyanthus-like stem had been produced. Mr. Stepsaid that in the primrose the stem existed in a very diminutive form in the crown of the plant, and often when placed under exceptional circumstances became developed. He considered this to be a reversion to the family form of flowering, as all the other members of the genus had fully-developed stems to support the flowers. Several members asked if this were the oxlip. Mr. Step said that the oxlip was a very local plant, and only existed wild in a very restricted area in the Eastern Counties.

Mr. Garrett exhibited ova of *Brephos parthenias* from a female taken on Wimbledon Common April 3rd, 1904. He said that he had obtained these ova by keeping the moth under a glass shade in which were twigs of birch, and by admission of sunshine. This is the only way in which he had been able to get this species to lay. The ova are oval in shape and without any markings.

Mr. Tonge exhibited a photograph of the ova of this species.

Mr. E. Step exhibited living specimens of the hairy violet (*Viola hirta*) from Mickleham Downs, and called attention to

several points by which it may be readily distinguished from *V. odorata*, to which it bears some general resemblance. The leaves are narrower, more triangular, hairy beneath on leaf stalks, and with the edges more or less incurved, the spur longer and ending in a slight hook; the lower position of the bracts on the flower-stalk, and the shortness or entire absence of runners. White flowers are almost as plentiful at Mickleham as those of the normal purple tint, whilst an intermediate form has much paler flowers with a white centre.

Mr. Manger exhibited a very perfect specimen of the elephant beetle, *Megasoma elephas*, from Venezuela. The delicate pile with which the thorax, head, and elytra are covered at first was practically intact.

Mr. Edwards exhibited specimens of *Papilio neptunus* from the Malay, *P. karna* from Java, *P. andræmon* from S. America, and *Morpho anaxibia* ♂ and ♀ from Brazil.

Mr. Hy. J. Turner exhibited living larvæ and cases of:

(1) *Coleophora lixella*, with its case made of pieces of the various grasses upon which it feeds. He noted that in its pre-hibernating stage the larva feeds exclusively on *Thymus serpyllum*, from the calices of the flowers of which it forms a rough case. These cases may occasionally be found abandoned in the spring and affixed to the stems of grasses. It was a somewhat rare species.

(2) *Coleophora conyzæ*, with its case made of portions of the cuticle of the leaves of *Inula conyzæ* or *I. dysenterica*. In its young stage it has a straight case, very dark and apparently made of silk, in which it hibernates and feeds for a time in spring. This it later on abandons and mines into a leaf, leaving its young case behind. It soon builds a new case from the cuticle of the leaf, which is very hairy. When this is too small it abandons it and forms another, leaving the old one affixed to the mine. Thus it differs from many cuticle-builders, which enlarge their cases rather than build new ones. This species, he stated, was an exceedingly local one.

(3) *Coleophora troglodytella*, with its smooth case made of silk. This species was feeding on *I. dysenterica*, and was fairly common in some districts of Great Britain; it often occurred on *Eupatorium cannabinum*.

He stated that he was indebted to the kindness of Mr. Eustace Banks, of Corfe Castle, Dorset, who had sent him numbers of larvæ of all three species. They were all found in the Isle of Purbeck.

Mr. Sich exhibited a short series of *Crambus chrysonuchellus* from the chalk hills east of Guildford, and ♂ and apterous ♀s.

of *Talæporia tubulosa* (*pseudo-bombycella*), together with cases of the larvæ, some of which showed the empty pupa case sticking out of the end.

Rev. H. Wood, M.A., read a paper entitled "Notes on *Argyroneta aquatica* and other Spiders" (see page 15).|

In answer to various questions, Mr. Wood said that *A. aquatica* often left the water for long periods, even so long as six months. At night they were prone to wander, and when kept in the confinement of a small jar did not survive long, possibly owing to all facility for wandering being cut off. It must also be remembered that the ♂s must leave the water to seek the ♀. The air in the chamber did not need to be changed frequently, as, for instance, during hibernation it remained unchanged for a lengthy period. Feeding took place always in the air, either of the chamber or above the water, or with the head immersed in a bubble of air. The prey was often entangled in the threads spun for the purpose in the water. The changes of skin necessary for growth always took place in the chamber, and the old skin was pushed out into the water.

MAY 12th, 1904.

The PRESIDENT in the Chair.

Mr. Goulton exhibited photographs of several species of spring larvæ, including *Aventia flexula*, *Hepialus humuli*, *Phibalapteryx lapidata*, *Noctua xanthographa*, *Leucania pallens*, and *Aphantopus hyperanthus*, var. *arete*.

Mr. Ansorge exhibited four males and one female of *Dytiscus circumflexus*, taken from one small pond at Northwood, Middlesex. It was stated to be an unusual occurrence for so many of these beetles to be taken together.

Mr. Lucas exhibited the lichen *Sticta pulmonaria*, called "lungs of oak," from the New Forest. The peasantry of the Forest considered it a cure for coughs, and to prepare it for this purpose the lichen was boiled with a little liquorice.

Mr. Stonell exhibited and gave notes on (1) varieties of *Thera variata* from Brockenhurst and Oxshott. Those from the former place emerged from the pupa April 3rd to May 8th. Those from Oxshott began to emerge on May 1st. The larvæ of these were full grown on April 17th, when they were collected. All the New Forest specimens were small and indistinctly marked, a few having the colouring reversed,

i.e. area of wings dark brown, with a paler band. The Oxshott specimens were very large and brightly coloured, the band traversing the fore-wings being almost black.

(2) *Anthrocera purpuralis (minos)*, taken in Perth. These were considered to be more distinctly marked than is usual in this species.

(3) A variety of *Abraxas grossulariata*, believed to be peculiar to Perth. It was a small, rather dark, prettily-marked form, of which a great many individuals have the markings asymmetrical on the fore-wings. There is also a form, believed to be peculiar to Hawick; unfortunately, he did not possess a specimen to exhibit. This form is very large and pale, the usual spots on the fore-wings being replaced by thin black dashes. Hind wings pure white, sometimes slightly spotted.

(4) A number of specimens of *Epinephele ianira*, taken at Lyndhurst, each having one or more wings more or less bleached. This phase of aberration was rather common at Lyndhurst in 1902, and was very conspicuous, the pale mark giving them a strange appearance when flying.

(5) *Epinephele tithonus*, taken at Lyndhurst, having the dark band of the right hind wing replaced with fawn colour.

(6) *Melanippe sociata*, a specimen taken at Wimbledon, having the median band greatly reduced; within a few yards of this specimen, on the same fence, a similar var. of *M. fluctuata* was taken.

Mr. Rayward exhibited ova of *Pachnobia rubricosa* and of *Saturnia pavonia*, from females taken at Wimbledon and in the New Forest respectively. He also showed the larva of *Noctua baja* and an ichneumon, bred from a larva of *Pericallia syringaria* (Brockenhurst), together with the pupa-case, showing the silken thread, three inches or so long, by which it hangs suspended from a leaf or twig of the plant on which the host has fed.

Mr. Dennis exhibited a photograph of a fine plant of *Petasites officinalis* from the Lea Valley. Mr. Turner remarked that Mr. South and he had met with a very large quantity of this plant in full bloom on May 5th, 1903, adjoining the canal beyond Rickmansworth.

Mr. Tonge exhibited an album of another set of photographs of ova recently taken by him. They were all magnified 20 diameters: (1) *T. polyxena* var. *cassandra*, received from Dr. Chapman; (2) *C. argiolus*, received from Dr. Chapman; (3) *D. pudibunda*, received from Mr. L. W. Newman; (4) *S. carpini*, received from Mr. L. W. Newman; (5) *N. chaonia*,

received from Mr. L. W. Newman; (6) *D. coryli*, received from Mr. L. W. Newman; (7) *T. stabilis*, received from Mr. H. Main; (8) *X. lithoriza* (*areola*), received from Mr. H. Main; (9) *B. notha*, received from Mr. L. W. Newman; (10) *S. illumaria* (colour orange-red), received from Mr. L. W. Newman; (11) *T. biundularia* (colour light green), received from Mr. L. W. Newman; (12) *B. cinctaria* (colour light green), received from Mr. L. W. Newman.

Mr. Turner exhibited the following larvæ and cases of the genus *Coleophora*, *C. pyrrhulipennella*, on heather, from the New Forest, taken by Mr. Main, and from Shirley, taken by Mr. West (Greenwich); *C. alcyonipennella*, from near Ranmore Common, on *Centaurea nigra*; *C. solitariella* on *Stellaria holostea*, from Chiswick, taken by Mr. Sich, and from Lewisham; *C. hemerobiella*, on hawthorn, from Chiswick, taken by Mr. Sich; *C. albitarsella*, on marjoram, from Dorsetshire, sent by Mr. Banks; *C. olivaceella*, one case only, on *Stellaria holostea*, from Lewisham; and *C. lincollea*, on *Ballota nigra*, from Lewisham.

Mr. Main exhibited a very large species of "silver-fish," which came over in a cargo of sugar from Java, together with a spider from the same place.

Mr. McArthur exhibited a nice series of finely-marked *Agrotis cinerea* from the neighbourhood of Brighton.

Mr. Barnett exhibited *Plusia moneta*, from Welling, Kent.

Mr. Manger exhibited a specimen of the crab *Grapsus maculatus* from the West Indies. It was stated to be a very active species, jumping on the faces of the races, and to be distributed in both the Eastern and Western Hemispheres.

Mr. Carpenter exhibited a photograph of a pupa of *Euchloë cardamines*, and stated that the pupæ of larvæ which pupated on the zinc top of the breeding-cage were of a decidedly zinc colour, those on the green stems of the food-plant took on the green colour of the seed pods, while those on the drab-coloured food were of a drab colour.

Mr. Sich exhibited a small snail, *Hyalina crystallina*, from the County of London, gathered at Hammersmith the same day.

Mr. T. W. Hall exhibited a twin flower head of *Narcissus poeticus*. It was a case of fasciation of the flower stems, and not, as was more usual, a duplication of the flower.

Mr. Lucas gave a very interesting address, with lantern illustrations, entitled "Notes on British Orthoptera," and asked specially for particulars of the occurrence of the various species (see p. 21).

MAY 26th, 1904.

The PRESIDENT in the Chair.

The President reported the death of Mr. R. McLachlan, F.R.S., a member of the Society, and referred in suitable terms to his scientific attainments, and to the work he had carried on for so many years in the less worked orders of the Insecta. Mr. Rowland-Brown also paid a tribute to the deceased gentleman, whom he had known very intimately for some years as a fellow-officer on the Council of the Entomological Society of London. Dr. Chapman wished to associate himself with the expressions of regret at the loss sustained. Mr. Adkin, as a near neighbour for many years, spoke of him as a staunch and faithful friend.

A vote of condolence was passed, the members standing.

Mr. Lucas exhibited spikes of the true *Ophrys aranifera*, the spider orchis, and of *Orchis militaris*, they were both from Wye, Kent.

Dr. Chapman exhibited (1) a few butterflies taken at Pont du Gard (South France), the most interesting, perhaps, being a few *Chrysophanus gordius* and some *Syrichthus sidae*; (2) a larva of *Thais polyxena* var. *cassandra* suspended for pupation, showing the girth, which is afterwards attached to the cephalic cremaster, turned round the first abdominal segment, in a similar position to that in other girthed pupæ; (3) pupæ of *Libythea celtis* showing how the structure of the cremaster and bend of the last segments causes the pupa, though a suspended one, to lie against the surface of attachment much as a girthed pupa would do.

Mr. Carr exhibited the larva of *Phorodesma bajularia*, to show its habit of clothing itself for protection, with the *débris* of the male flowers of the oak.

Mr. West (Greenwich) exhibited a short series of ♂s and ♀s of the rare beetle *Asphyra punctata*, and pointed out the extreme sexual dimorphism. They were sent to him by Mr. J. Edwards, who took them at Colesbourne, Gloucester. He also showed fifty-eight species of Coleoptera and three species of Hemiptera he had taken at Ashted on May 14th during the Society's Field Meeting.

Mr. Sich exhibited the pupa of a beetle, and it was generally considered to be that of *Ocyptus olens*.

Mr. Turner exhibited four more species of the genus *Coleophora*, viz. cases and larvæ of (1) *C. viminetella*, taken at Chalfont on willow; (2) *C. badiipennella*, taken at Lewisham

on elm; (3) *C. ochrea*, sent to him from Dorset by Mr. Eustace Banks, feeding on *Helianthemum vulgare*; and (4) *C. curruc-pennella*, feeding on birch, and found by Mr. Sich and himself at Ashted during the Field Meeting on May 14th. He then exhibited white flowered examples of the bugloss, *Ajuga reptans* and *Orchis mascula*, the early purple orchis, and stated that the bluebell and foxglove both occurred with similar white forms in the same wood, at Chalfont, Bucks. In the same place the hybrid between the primrose and cowslip was by no means uncommon. From Chenies Wood he exhibited a fine spike of the bird's nest orchis, *Neottia nidus-avis*, and stated that quantities of the plant were to be obtained. In close proximity, in moister parts, the white yellow and brown forms of the slug, *Arion ater*, were observed by him in abundance. In an adjacent hedge he had taken a specimen of *Helix nemoralis* in which the whole of the five bands were coalesced into one for the whole length of the helix. This was considered to be an unusual form. He also showed specimens of the candle-snuff fungus (*Xylaria hypoxylon*); the pupa-case with pupa-skin protruding of *Adela viridella* taken from the stem of an oak-tree; and a bunch of the "flowering" moss (*Polystrichum communis*), all from Amersham Common district.

Dr. Chapman, referring to the white flowers exhibited by Mr. Turner, asked if any member could suggest a theory for the occurrence of white examples in some localities, and a discussion ensued. It was generally thought that such a variation was possible in all plants and anywhere as a mere sport, although some members would suggest insufficiency of proper nourishment or defective organisation. The change of colour in the bluebell in Mr. Adkin's garden Mr. Step did not think was caused by the crossing with cultivated hyacinths, as the two plants were not sufficiently close in relationship to produce hybrids.

Mr. Main had visited the New Forest at Easter and reported that everything was backward and scarce. Larvæ of *Agrotis agathina* was the only species in anything like abundance. Members generally have found the season late.

Mr. Rowland-Brown read a paper entitled "Collecting Butterflies in the Alps." In the ensuing discussion it was remarked that butterflies often came up from the valleys with ascending currents of air, although Mr. MacArthur's experience in the Himalayas was exactly opposite to this. Dr. Chapman said that with regard to *P. delius* and *P. apollo*, he had never yet met a doubtful specimen, the antenna difference

being at all times constant. It was noted that these two species were accustomed to roost in holes in banks and walls, which they carefully investigated previous to occupation.

JUNE 9th, 1904.

The PRESIDENT in the Chair.

Dr. Chapman exhibited ova of *Coleophora laricella*, laid by a female bred by Mr. Turner from the Isle of Purbeck. He stated that they were upright eggs with the micropyle at the top, which was composed of 5 to 7 large "cells," from which thirteen or fourteen very bold ribs sprang and ran down to the base. They were laid on the lower sides of the needles of larch. He also showed the cocoon of *Thais polyxena*, which consisted of a few strands of silk attached to twigs.

Mr. Lucas exhibited a fungus, *Epichloe thyphina*, very commonly parasitical on grasses, upon which the larva of a fly was feeding. He showed photographs of the ova, the larva, and the channels of the larva in the fungus. The incipient spore-bearing under-layer was the portion consumed. (The resulting imagines bred from these larvæ were afterwards determined by Mr. G. H. Verrall to be a dipterous species—*Anthomyia spreta*, Giraud).

Mr. Lucas also exhibited ova of the large ladybird, *Halysia ocellata*, and specimens of parasites (Mymaridæ) on the ova of *Orgyia antiqua*.

Mr. West exhibited specimens of the Capsid *Harpocera thoracica*, the females of which he had taken, at dusk, on Ranmore Common; he called attention to their curiously knotted antennæ.

Mr. Carr exhibited ova of *Acidalia remutaria*.

Mr. Turner exhibited cases and larvæ of *Coleophora bicolorella*, a very local species, which he had met with in some numbers at Chatham feeding upon nut. He stated that unlike most species of the genus the larvæ fed upon the most exposed part of the bushes, three and four cases being frequently found on one leaf at the top of the highest shoot.

An interesting discussion took place on the Season. Mr. Harrison said that in the early spring insects were fairly common, but at Whitsun in the New Forest collecting was practically a failure. Nothing could be obtained by beating, and what insects he met with were late in appearance. Larvæ on heath were plentiful, especially *Agrotis agathina*, and earlier in the year *Scodiona belgiaria* larvæ had

been numerous. A few *Nemeobius lucina*, *Hemaris tityus* (*bombyliformis*), and *H. fuciformis* were noted. Reports had come to him that in Delamere Forest larvæ were also scarce.

Mr. Carr had done a considerable amount of beating for larvæ, but found all things very scarce.

Mr. Bishop reported that at Horsley *Nemeobius lucina* were abundant, but that most species were late and scarce. Of *Polyommatus icarus* he had only seen three or four; *Gonepteryx rhamni* had been unusually scarce, but *Euchloë cardamines* had been in fair numbers. In the New Forest he too had found beating for larvæ a decided failure. He had, however, obtained the larvæ of *Tæniocampa populeti* in considerable abundance.

Mr. Brown said that he had met with some species of spring larvæ in numbers—*Triphæna fimbria* and *Boarmia repandata* for example. Imagines were, however, extremely scarce everywhere. It seemed to him that low-feeding larvæ were as common as usual, but that larvæ feeding on trees and bushes were exceptionally scarce, as were the larvæ of all sun-loving species.

Mr. Turner remarked that he had found but little evidence of larvæ on the various trees and shrubs which he had examined for species of the genus *Coleophora*. In letters he had received from correspondents in various parts of the country were expressions of the great scarcity of larvæ and imagines during the present season.

JUNE 23rd, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Carr exhibited a double-sized cocoon of *Lasiocampa quercus*. It differed also in colour from the normal cocoon, in being of a dirty cream-white.

Mr. Moore exhibited a very small frog which he had found among a number of insects in papers received from Peru.

Mr. Ashby exhibited specimens of *Callidium alni* and *Orsodacna cerasi*, two species of Coleoptera taken by him on the occasion of the Field Meeting at Bookham on June 4th.

Dr. Chapman exhibited larvæ of *Agdistis bennettii*, sent to him by Mr. Ovenden from Rochester, and also ova of the same species laid on dock.

Mr. South exhibited living larvæ of *Nyssia lapponaria* feeding on birch. He remarked that as a British insect

this species was extremely local, but apparently plentiful in two localities in Scotland.

Many members remarked on the general scarcity of insects this season, except as regards a few species which were locally abundant.

JULY 14th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Stonell exhibited two series of *Triphæna fimbria*, bred from larvæ taken in the New Forest in two successive years on the same restricted area. The first series was composed entirely of light forms, while the second year's series was composed of specimens, all of which were dark, with one exception, and this approached, but was not as light as, the first year's series. He also exhibited a series of *Lalia cænosa* from various collections; one of the specimens showed black spots on the hind-wings.

Mr. Dennis exhibited the green fruit of the almond-tree, and said that this was being produced freely in most places this year, whereas for the last few years it had been very scarce.

Mr. Enoch exhibited on behalf of Mr. Newman, of Bexley, living larvæ from two eggs laid by a female *Notodonta dromedarius* that had paired with a male *N. ziczac*, also typical larvæ of each species for comparison. The hybrid larvæ more nearly resemble the larvæ of *N. dromedarius* than the larvæ of *N. ziczac*.

Mr. Priske exhibited examples of the Coleoptera *Apoderus coryli*, *Rhynchites aquaticus*, and *Otiorrhynchus sulcatus* from High Wycombe, Bucks.

Mr. Step exhibited a series of photographs of plants, including a series of the Surrey orchids.

JULY 28th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Percy Richards, of Kingston Hill, Surrey, was elected a member.

Mr. Enoch exhibited for Mr. Newman, of Bexley, a cocoon of *Eutricha quercifolia* (*in situ*).

Mr. Edwards exhibited specimens of *Volucella bombylans*, and *V. pellucens*, from Leatherhead, taken at the Field Meeting on July 9th.

Mr. West (Greenwich), exhibited a large number of insects collected at Great Yarmouth, from June 13th to 25th, comprising eighty-four species of Coleoptera, eighteen Hemiptera, and three species of Tenthredinidæ. Among the Coleoptera were: *Donacia dentipes*, *D. thalassina*, *D. simplex*, *D. vulgaris*, *D. sericea*, *Erirhinus nercis*, *Galeruca calmaricensis*, *Polydrusus confluent*, *Scirtes hemisphæricus*, and *Hippuriphila modeeri*?

Among the Hemiptera were *Plagiognathus pulicarius*, *P. saltitans*, *Pæcilocythus vulneatus*, a species recently added to the British list by Mr. Thouless, and *Onychumenus decolor*.

AUGUST 11th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Ashby exhibited a specimen of *Liparus germanus*, one of our rarest weevils, taken at Folkestone in July, 1904.

Mr. West reported that during two weeks' collecting in the New Forest, near Brockenhurst, from July 10th to 23rd, he had obtained ninety-nine species of Coleoptera, twenty-seven of Heteroptera, thirty-eight of Homoptera, and a few species of other orders: *Strangalia quadrifasciata*, *Telephorus testaceus*, *Phyllobrotica quadrimaculata*, and *Orchestes iota* were the most notable amongst the Coleoptera; *Picromerus bidens*, *Monanthia dumetorum*, and *M. humuli* were the best Heteroptera. Of Homoptera the best capture was the very rare species *Oliarus leporinus*.

Mr. H. J. Turner exhibited several fossils obtained at Watchet in N. Somerset, from the Lias formation, including small *Ammonites* and shells of the genus *Gryphæa*, together with specimens of the local "alabaster," a form of gypsum.

Mr. Main exhibited pupæ and small larvæ of *Everes argiades*, from ova deposited by a female sent from South France by Dr. Chapman. The larvæ were feeding on the seed-pods of *Lotus corniculatus*, in which they bored holes and extracted the seeds. He stated that the larvæ were very great cannibals and attacked the pupæ as well as other larvæ. Both larvæ and pupæ were very difficult to see on the food-plant on account of their protective resemblance.

Mr. Priske exhibited a specimen of the British Cicada, *Cicadetta montana* taken in the New Forest during the first week in August. He also exhibited a poplar kitten (*Dicranura bifida*) which had emerged from a larva obtained this year.

Mr. Step, for Mr. Priske, exhibited a leaf of *Clematis jack-*

manni, a portion of which had become petaloid, an instance in support of the view that the floral organs were simply modifications of leaves. The portion of a petaloid nature was thinner, without leaf neuration, and the green chlorophyll was not present. Mr. Step stated that leaves and bracts close up under the inflorescence were the more usual to be modified in a petaloid direction.

Mr. Carr exhibited a larva of *Smerinthus ocellata* from which parasites had emerged the previous year, and noted that much of the larval skin still retained its normal green coloration.

Mr. Adkin remarked upon the unusual abundance this year of *Mania maura* in Lewisham, and several members reported from various districts that they had also met with the species in some numbers.

Mr. Edwards exhibited three male and fourteen female specimens of the *Papilio memnon*, and called attention to the sexual dimorphism and to the polymorphic forms of the female. The series included: ♂s from Sumatra, ♀s (tailless) from Hong Kong, ♀ (tailed) from Tungu, ♀s (tailed) (*achates*) from Assam, etc. Wallace says: "The polymorphism is strikingly exhibited by the females—one set of which resemble the males in form, with a variable paler colouring; the others have a large spatulate tail to the hinder wings, and a distinct style of colouring which causes them closely to resemble *P. coon*, a species having the two sexes alike and inhabiting the same countries, but with which they have no direct affinity. The tailless females exhibit simple variability, scarcely two being found exactly alike even in the same locality. The ♂s of the island of Borneo exhibit constant differences of the under surface, and may therefore be distinguished as a local form, while the continental specimens, as a whole, offer such large and constant differences from those of the islands, that I am inclined to separate them as a distinct species, to which the name of *P. androgeus* may be applied. We have here, therefore, distinct species, local forms, polymorphism, and simple variability, which seem to me to be distinct phenomena, but which have been hitherto all classed together as varieties. I may mention that the fact of these distinct forms being one species is doubly proved. The males, and the tailed and tailless females, have all been bred from a single group of the larvæ, by Messrs. Payen and Bocarmé, in Java. I myself captured in Sumatra a ♂ (*P. memnon*) and a tailed ♀ (*P. achates*) under circumstances which led me to class them as the same species."

AUGUST 25th, 1904.

MR. HUGH MAIN, B.Sc., F.E.S., *Vice-President*, in the Chair.

Mr. Barnett exhibited a short series of *Strenia clathrata*, showing three stages in the darkening and enlarging of the banded markings, and a short series of *Ematurga atomaria*, showing considerable suffused darkening of the markings. He also exhibited two larvæ of *Amorpha* (*Smerinthus*) *populi*, which were feeding on white poplar, and which were extremely light in colour, assimilating wonderfully to the colour of the food-plant, except that the orange spots were conspicuous from the greater contrast of the ground colour. Mr. Tutt believed that this form only occurred with larvæ on *Populus alba*.

Mr. West exhibited two rare species of Hemiptera, taken at Darenth Wood on August 21st—*Corizus capitatus* obtained by sweeping *Hypericum perforatum*, and *Aneurus lavis* under oak bark. The latter is a very curious species, and the flattest found in this country.

Mr. Tutt remarked that he had found insects generally abundant on the Continent, but nearly everything was worn and the higher Alps were dried up. The season had been very early, and insects had passed through their stages very rapidly. Dr. Chapman said that the season appeared somewhat advanced in Spain.

SEPTEMBER 8th, 1904.

MR. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Edwards exhibited a series of the Danaine butterfly *Tirumala hamata* from Samoa, one of the smaller species of the group and indigenous to the warmer parts of Australia.

Mr. Moore exhibited a large spider from Durban, and a specimen of that curious dipterous parasite of the common swallow *Stenopteryx hirundinis*.

Mr. Lucas exhibited a photograph of the well-known New Forest character, "Brusher Mills," and coloured drawings of varieties of *Gonepteryx rhamni*; a male bred by Mr. J. Weir from a larva taken in the New Forest about June 26th, 1904,

was similar to *G. cleopatra* in colour, but less intense orange. Also *Cyaniris* (*Lycaena*) *argiolus*, a female specimen, taken by Mr. H. J. Baker in the New Forest, August 1st, 1904, a dark form, with well-developed marginal borders; together with photographs of the bogbean, flowering for a second period this season, and of the burreed, both from the New Forest.

Mr. Step exhibited, on behalf of Mr. West, of Streatham, a spike of the orchidaceous plant *Spiranthes æstivalis*, from Lyme Regis. Messrs. Lucas and Step had met with the species in some numbers in the New Forest in mid August. Mr. Step explained the difference between *S. æstivalis* and *S. autumnalis* as follows: In *Spiranthes æstivalis* the tubers are cylindrical and the flower spike is lax, while in *S. autumnalis* the tubers are oblong and the flowers are arranged spirally, all looking one way. In the Irish form (*S. romanzoffiana*) the spike is dense, with the flowers 3-ranked. This last form is confined to Ireland.

Mr. Fremlin exhibited bred specimens of the broad-bordered hawk-moth, *Hemaris fuciformis*, some of which still retained the "deciduous" scales, and he also showed some of these scales mounted as microscopic objects. The pedicles were seen to be very short and badly developed.

Mr. Dennis exhibited the fruit and seeds of the deadly nightshade (*Atropa belladonna*), and the vice-President warned members not to handle the specimens too freely, as possibly their eyes might be affected somewhat if subsequently rubbed by the fingers.

Mr. Manger, on behalf of Mr. Pearson, exhibited a few species of butterflies from the Swiss Alps, including—*Polyommatus hylas*, *P. cros*, *Rusticus argus*, *Canyonympha arcania*, *Brenthis amathusia*, *Melitæa dictynna*, *Chrysophanus virgaureæ*, and *C. dorilis*.

Mr. West, of Greenwich, exhibited developed and undeveloped forms of *Orthostira parvula* and *Ceratocombus coleoptratus*, both species from Oxshott.

Mr. Fremlin reported that a large moth, probably *Saturnia pyri*, was abundant recently around the electric lamps in Paris.

Several members reported having taken or seen specimens of *Agrius* (*Sphinx*) *convolvuli* this season, and that *Thyatira batis* and *Agrotis exclamationis* were very common.

Mr. Turner, on behalf of Mr. Tutt, exhibited a few butterflies sent from Cairo by Mr. Groves, including *Danaïs chrysippus*, *Anthocharis belemnia*, var. *glauce*, and *A. belia*.

SEPTEMBER 22nd, 1904.

Mr. HUGH MAIN, B.Sc., F.E.S., *Vice-President*, in the Chair.

Mr. Ernest C. Joy, of Stoke Newington, was elected a member.

Mr. H. Moore exhibited a living specimen of the cricket (*Gryllus campestris*) found outside his house in Lower Road, Deptford, no doubt having been attracted by the electric light. He also showed a number of species taken during the Society's Field Meeting at Epping on September 10th, including nice series of the Diptera *Helophilus pendulus* and *Scricomyia borealis*, specimens of the grasshopper, *Stenobothrus parallelus*, and of the Ichneumon, *I. luctatorius*; also, from Tasmania, a short series of males and females of the beautiful metallic *Lamprina aurata*, a Lucanid beetle, showing considerable sexual dimorphism as well as polymorphism of the male.

Mr. A. Harrison and Mr. H. Main exhibited a nice series of *Carsia paludata*, taken at Simonswood Moss, near Liverpool, at the end of July, 1904, and a bred series of *Cirrhodia xerampelina*, from larvæ taken near Llangollen.

Mr. Edwards brought for exhibition short series of both males and females of *Gonepteryx rhamni* and *G. cleopatra* with reference to the remarks on the species at the previous meeting. Mr. Tutt said that he felt quite sure they were distinct as species, from his experience with them in the field. Although they flew together in some places, yet on the wing they could readily be distinguished by one who was familiar with them. Again, the latter species was very restricted in its area of distribution, and its usual food-plant (*Rhamnus alaternus*) was by no means generally distributed.

Mr. G. T. Porritt exhibited a male specimen of *Æschna isosceles*, one of eleven he had taken in the Norfolk Broads in June last, also a specimen of *Orthetrum cancellatum* from the same locality. He stated that the former species had been taken many years ago in the Fens by Mr. C. G. Barrett, but that up to now there had been no subsequent captures. It was only obtained by netting it from a boat.

Mr. Lucas exhibited male and female specimens of the grasshopper, *Gomphoceris rufus*, from Bookham Common. It is a somewhat local species in this country, and easily recognised by its knobbed antennæ, which are conspicuously white at the tip.

Mr. Turner exhibited specimens of the larvæ of *Phorodesma*

smaragdaria, which he had met with on the Essex marshes when searching for larvæ of the Coleophorids. He also showed a photograph of the larvæ on their food-plant (*Artemisia maritima*), to illustrate the wonderful protective resemblance. No one seemed quite certain how many larvæ there were. He had received it from Mr. W. H. Edwards, of Worcester.

Mr. Dodds exhibited a specimen of *Locusta viridissima* from Felixstowe. Mr. Turner said that it was common on the Isle of Wight and several other places on the South Coast, but he had not heard of any being taken on the East Coast.

Mr. West exhibited three out of the six British species of the coleopterous genus *Chatocnema* (*Plectroscelis*), viz. *C. subcærulea*, *C. hortensis*, and *C. confusa*, all taken by sweeping at Wisley on September 18th.

Mr. Browne exhibited several species of Noctuidæ from Deal, including specimens of *Xylophasia polyodon*, very dark, almost black, *Phibalapteryx lignata*, and *Hydræcia nictitans*, var. *paludis*, all taken in August.

Mr. Step communicated the Reports of the Field Meeting at Ashted and Epsom on May 14th, and of the Field Meeting at Bookham on June 4th (see p. 26).

OCTOBER 13th, 1904.

Mr. HUGH MAIN, B.Sc., *Vice-President*, in the Chair.

Mr. W. J. Lucas exhibited: (1) Two species of *Ascalaphus* taken by Dr. Chapman this year—*A. coccajus* in South France in May, and *A. longicornis* in Spain in July; (2) one male and two females of the earwig *Apterygida media* (*albipennis*), all living specimens from the Faversham district, not far distant from Westwood's old locality for the species. The specimens shown were taken by Mr. A. J. Chitty and sent to him this month (October). The species may be known by its russet colour, the absence of wings, and the simple form of the male forceps, with a spur near the middle.

Mr. H. Moore exhibited several specimens of an undetermined species of *Cicada* from Tasmania.

Mr. Turner exhibited imagines and cases of the local Coleophorid, *C. vibicella*. The former were from Trench Wood, taken about the year 1886 by Mr. Edwards, of Worcester, who stated that he had recently searched for the

species in its old locality, but without success. He also showed the life-history of *C. laricella*, consisting of (1) a bundle of larch needles showing depredations of the larvæ; (2) cases *in situ* on the needles; (3) cases in their position, at the bases of the needles, for changing skin and pupation; (4) the small hybernating case in the axil of the needle twig; (5) the case to show its angle of attachment to the needle; (6) cases to show the new additions which the growing larvæ have to insert in the case to make it large enough for them; (7) cases to show the reversed position of the case and mouth-opening after this addition; and (8) a pupa.

Mr. Joy exhibited a series of *Lycæna (Polyommatus) bellargus* bred from ova deposited by a female specimen obtained at Folkestone. They emerged in September and were unusually small even for a second brood. The larvæ were fed upon growing plants, but were very shy feeders; they were not cannibals. It was suggested that if fed separately they might have attained a more usual size. Mr. Main said that some *Lycæna argiades* he had bred from South France ova comprised both full-sized and small examples.

Mr. Carr exhibited the unusual sized cocoon of *Lasiocampa quercus*, which he had previously shown. As no moth had emerged from it he had opened it and inside found a crippled imago, together with a batch of ova and a distorted pupa, both, of course, dead. Mr. Harrison reported having found three larvæ of *Eriogaster lanestris* spun up in a common cocoon and Mr. Montgomery had had as many as five larvæ of *Malacosoma neustria* in one cocoon. Neither had found any imago emerge from these compound cocoons. Dr. Chapman suggested that it would be well-nigh impossible for an imago to come out, as it could not bring its power into full play to force open the cocoon. No one had met with such cocoons in nature.

Mr. West, of Greenwich, exhibited four species of grasshopper from Boxhill—*Stenobothrus parallelus*, *S. elegans*, *Gomphocerus rufus*, and *G. maculatus*.

The remainder of the evening was devoted to an exhibition of lantern slides prepared by the members.

Mr. Goulton exhibited slides of the larva of *Gonepteryx rhamni* in various positions during the act of pupation, and also of the larva and pupa *in situ*.

Mr. West, of Streatham, exhibited a very nice series of slides of corals.

Mr. Lucas exhibited—(1) several slides showing the develop-

ment of the ova of the frog; (2) slides showing larva, ova, and details of the beetle, *Halysia occellata*; (3) a slide of *Orchis militaris* sent to him from Wye; (4) slides showing lepidoptera at rest on trunks of trees; (5) various flowers; and (6) a slide from a photograph showing how roots have altered the sand through which they had grown by extracting the iron in Oxshott sand-pit.

Mr. Dennis exhibited—(1) a capital series of studies of trees at various periods of the year, together with their flowers, fruits, and seeds; and (2) slides of several species of orchids, including a white specimen of the bee orchis.

Mr. Main exhibited a series of views showing special tree combinations in Epping Forest.

OCTOBER 27th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Goulton exhibited a series of photographs of lepidopterous larvæ on their respective food-plants as follows: *Colias edusa*, from ova laid by a var. *helice*, *Hepialus humuli*, *Cosmotriche potatoria*, *Lithosia deplana*, *Thecla quercus*, and *Nola cucullatella*.

Mr. Harrison and Mr. Main exhibited series or examples of the following species of Lepidoptera: *Macaria alternata*, (bred), *Cleora lichenaria*, *Dianthæcia luteago*, var. *ficklini*, *D. conspersa*, *Leucophasia sinapis*, *Polia xanthomista*, *Ægeria musciformis*, and *Boarmia gemmaria*, all from Bude, N. Cornwall, with examples of the last species from London and Delamere for comparison with the Cornish specimens.

Mr. West (Greenwich) exhibited the case of a large species referable to the Psychidæ, from S. Africa.

Mr. Turner said that he had found a number of larvæ and cases of *Coleophora virgaureæ* on golden rod at Sevenoaks, in the neighbourhood of which place members had told him the plant occurred. Several larvæ of *Eupithecia expallidata* had also been taken by him at the same time, but these were apparently ichneumonised.

Mr. Carr reported that some ants had been very persistent in attacking his larvæ, and by no means unsuccessfully. Mr. Turner noted that he had frequently seen ants descending trees with small larvæ in their jaws.

Mr. Step communicated the following short note on the fungus foray held at Oxshott on October 1st, 1904:

“Although the afternoon was as fine as could be desired, the morning had been very wet, and the party was consequently even smaller than had been expected. But an enjoyable ramble was spent, and specimens were abundant and in good condition.

“We have already printed lists of the Oxshott fungi in our ‘Proceedings,’ and it seems unnecessary to repeat the names. It may be stated, however, that I was able to identify forty-nine species, and there were some others that had passed the identifying stage before I had time to thoroughly deal with the full collection. Seven species are additional to the lists we have previously given for Oxshott. These are—*Amanita virosus*, *Stropharia squamosa*, *Stropharia spintriger*, *Lactarius cimicarius*, *Boletus varicolor*, *Boletus impolitus*, *Polyporus keithii*.

NOVEMBER 10th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Fremlin exhibited, under the microscope, the wing of *Hemaris fuciformis* to show both the more or less permanent scales and the scales which are usually shed immediately the imago commences its active life after emergence from the pupa.

Mr. Harrison and Mr. Main exhibited a short series of *Dianthæcia albimacula*, from Folkestone; specimens of *Cymatophora duplaris*, including two melanic specimens from Simonswood Moss, Lancashire, and one typical Delamere form, together with an example of *Melanargia galatea*, with a streak of black running through the light basal patches of white in the fore-wings, and a typical specimen for comparison. Both specimens were from N. Cornwall.

Mr. Step exhibited photographs of the white-beam tree and of a species of fungus, *Phlebiium radiata*, found on the bark of tree-trunks at Oxshott. He pointed out the curious method of spore-bearing on spines which was characteristic of this fungus.

Mr. Main exhibited (1) two large Reduviid species of Hemiptera, which are said to attack human beings; (2) a species of *Dorylus* with a small asymmetrical nervure in the right fore-wing, both from West Africa.

Mr. Manger exhibited a large portion of his collection of the Molluscan shells of the Pecten group, and read a short paper on the exhibit (see p. 23).

SPECIAL MEETING.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

In accordance with Bye-Law 20 (Special Meetings) and Bye-Law 21 (Alterations of Bye-laws), a special meeting of the Society was held on the evening of November 10th, immediately on the close of the ordinary meeting, to consider an alteration of Bye-Law 4, Section 3 (Periods of Continuance in Office).

Bye-Law 4, Section 3, reads as follows :

"All shall be elected annually, and shall be eligible for re-election, with the exception that no member shall hold the office of President for more than *one year* consecutively and the two senior ordinary members of Council (seniority being reckoned by length of continuous service as ordinary members thereof) shall not for twelve months be eligible for election."

The Council unanimously recommended that the words "*two years*" be substituted for the words "*one year*," and that the rule read as follows :

" . . . that no member shall hold the office of President for more than two years consecutively, . . . "

After considerable discussion, the proposal was put from the Chair, and was carried by an overwhelming majority.

NOVEMBER 24th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. H. W. Moore, of Farnaby Road, Shortlands, Kent, was elected a member.

Special exhibition of varieties.—Mr. F. G. Cannon exhibited on behalf of Mr. Frohawk, (1) a long series of *Colias edusa* (var. *helice*) bred in the autumn of 1900, from *helice* ova, showing every gradation from typical white examples to typical *edusa* ; he also showed varieties of both *helice* and *edusa*, the latter bred from *edusa* eggs ; (2) a series of *Colias hyale* showing gradation in extent of markings, and a fine pale aberration with all the usually black markings replaced by very pale opalescent colouring.

Mr. Harrison and Mr. Main exhibited the following species and forms of Lepidoptera, and contributed notes :

(1) An example of *Argynnis aglaia*, from North Cornwall, with light, almost white patches on both wings on the left

side. The wings on this side are rather smaller than those on the right.

(2) A specimen of *Epinephele jurtina* (*ianira*), from North Cornwall. A dull, somewhat bleached example.

(3) *Zonosoma pendularia*, var. *subroseata*. Two specimens from Staffordshire, and one of the type for comparison.

(4) *Boarmia repandata*. A series from North Cornwall, with var. *conversaria*, and other series from Wiltshire, and from the Isle of Lewis. The Cornish insects have a buff or yellowish tone, and are generally lighter than the Wiltshire specimens. The Hebrides series had been exhibited here before, but were brought again for comparison with the southern insects.

(5) *Aplecta nebulosa*, series from North Cornwall, from Delamere Forest, including var. *robsoni*, and from Epping Forest. "The Cornish form is light, and practically indistinguishable from insects taken in several of the southern counties, and also in Scotland—in Argyllshire. The Delamere and Epping insects are very much alike, except that we do not find the melanic form known as *robsoni*, and intermediates between this and the prevailing form, in Epping Forest."

(6) *Miana strigilis*.—Series from North Cornwall and from Delamere Forest. In a long series taken in Cornwall there were none of the black form, but there was a considerable range of variation in colour. Almost all the specimens taken in Delamere Forest were of the black form exhibited.

(7) *Hybernia marginaria*.—A few melanic insects, and one typical and one intermediate, taken in a suburb of Liverpool last spring. The dark forms seem to be very common there.

(8) *Pieris napi*.—One cabinet drawer containing examples of the spring brood from North Cornwall, where this species seems to be somewhat larger than those obtained from other counties. "For comparison we have put in specimens of the same brood from Enniskillen. Among the Cornish insects is one female with the under-surface of a deep yellow, almost orange colour. The artificial light hardly does justice to this colour. The Cornish series is bred from ova deposited by the summer brood, whilst the Enniskillen series is from ova deposited by the spring brood, and remaining in pupa through the autumn and winter till the following spring.

(9) A drawer of the same species, being the summer brood from Enniskillen and from Delamere Forest, both series being bred from ova deposited by the spring brood. The Irish specimens are, as usual, much more strongly marked, on both upper and under surfaces, and are handsomer insects than the English."

(10) A short series, mainly females of particularly strongly marked *P. napi*, from Kilkenny, brought by Mr. Montgomery, for comparison with the other *P. napi*. These were of the spring brood, bred from ova laid by the summer brood, and showed the species in perhaps its darkest form for this brood.

Mr. Montgomery exhibited a series of *Leucophasia sinapis*, consisting of bred and captured specimens, of both broods, from Berkshire, Cornwall, Devonshire, Worcestershire, and the New Forest, showing a certain amount of seasonal and geographical variation.

Mr. Hickman exhibited an extremely dark aberration of *Arctia caia*, and contributed the following note :

“On August 1st, 1903, at Wye, in Kent, I found a pair of *Arctia caia*. They were sitting on bramble by the side of a ditch, and the female subsequently deposited about one hundred ova. Larvæ from these hatched six days later. They fed on bramble for about six weeks, then a number of them died. The others continued feeding and growing, but very slowly, through the winter, and began to pupate in April, 1904, the moths commencing to emerge on June 4th, 1904. The result was forty specimens, fourteen of which were crippled, with nothing exceptional about the markings, but of a good size. The food-plants were bramble, dock, and cabbage. The second brood from pairing of the above was from about 300 ova. At the beginning of July a number of larvæ from these hatched and fed up very quickly (others are feeding now [November 24th] after hibernating two months), pupated by August 20th, and the moths emerged in September and October. There were seventy specimens, including six aberrations, twenty deformed, and eight aberrations, also crippled. I have now a lot of ova quite green in colour from the second brood. The food of the second brood of larvæ was principally cabbage, with small quantities of bramble and dock at times.”

Mr. Crow exhibited a remarkable rosy form of *Calymnia trapezina* from Hayes, and a specimen of *Pyrameis atalanta* showing xanthic spots ; the latter reared from a larva taken at Elmer's End.

Mr. Stonell exhibited a gynandrous specimen of *Eriogaster lanestris*, the wings and antennæ on the right side male and those on the left side female, and there was a tuft on the right-hand side at the anal extremity of the abdomen.

Mr. E. C. Joy exhibited a bred series of *Pararge egeria*, reared from ova laid by a female taken in Devonshire, June, 1903. They emerged in August of the same year. He also showed two series obtained from a pairing induced in cap-

tivity from specimens of the above brood : (1) 80 per cent. hibernated as pupæ, and emerged early in the following May; (2) 20 per cent. hibernated as half-fed larvæ, emerging the following June.

Mr. Chittenden exhibited the following forms and aberrations: *Spilosoma lubricipeda*, var. *radiata*, very black, from Huddersfield larvæ, with black cilia in the fringes; *Phigalia pedaria* (*pilosaria*), blackish, from Yorkshire; *Nyssia hispidaria*, blackish, from Epping Forest; *Boarmia repandata*, very dark, from York; *Acidalia inornata*, very dark, from Ashford, Kent; *Hybernia marginaria*, melanic forms and var. *fuscata*, from Perth; *Larentia multistrigaria*, a very dark melanic form; *Hypsipetes ruberata*, bred from Aberdeen larvæ; *Cymatophora duplaris*, black, from Market Drayton; *Pharetra menyanthidis*, very dark, from Yorkshire; *Xylophasia monoglypha*, black, from Ireland; *Caradrina morpheus*, very dark, from Ashford, Kent; *Agrotis segetum*, black, from Ashford, Kent; *A. exclamationis*, black, from Ashford, Kent; *A. corticea*, black, from Ashford, Kent; *Noctua xanthographa*, from Durham, black,

Mr. Robert Adkin exhibited (1) a specimen of *Saturnia pavonia*, in which the wings and body were undoubtedly those of the female, but the antennæ were distinctly male. It was reared by Mr. H. McArthur from a larvæ collected in the Isle of Lewis in 1901, and had remained in pupæ from that time until May of the present year; (2) an example of *Syrichthus malvæ* taken at Brighton in May last, in which the prevailing colour was very much blacker than is usual in this species; (3) and a very fresh specimen of *Sphinx convolvuli* that was taken at rest on a fence high up on the downs at Eastbourne on September 18th last.

Mr. R. Armstrong Adkin exhibited a long and greatly varied series of the Mollusc *Helix virgata* from Eastbourne.

Mr. Harris exhibited a very interesting series of *Hemerophila abruptaria* bred from a pairing obtained in captivity between a male captured at Ilford on May 26th, 1904, and a female taken at Clapton on May 25th, 1904. The series showed a considerable number of the more or less extreme melanic forms originally reported from Hackney.

Mr. Goulton exhibited a series of *Eubolia cervinaria* from Purley and Littlehampton; *Hypsipetes clutata* from Ranmore, showing extreme dark forms; *Boarmia repandata* from Ranmore and Banstead, including several light vars.; *Oporabia dilutata* from Ranmore; and *Pseudoterpna pruinata* (*cytisaria*) from Bookham. He stated that with regard to *P. pruinata* four larvæ were left in the cage with some dead *Genista*, and

when noticed they had spun up. These emerged with more or less brown on the wings.

Mr. Brown exhibited the following species, with various forms and varieties: *Hydroecia nictitans*, var. *paludis*, taken at Deal in August; *Aspilates citraria*, varied forms, taken at Deal in August.

Xylophasia polyodon, a very dark form, taken at Deal in August, with three others of the more ordinary type.

Cidaria russata and *C. immanata*, a series reared from ova deposited by females taken at Horsley in July.

Polyommatus (Lycæna) corydon, varieties of undersides of males and females taken at Reigate on August 1st.

Pseudoterpna pruinata (cytisaria), a light form bred from larvæ taken at Bookham on June 4th.

Hypsipetes sordidata (clutata), varieties taken at Hailsham in July.

Boarmia repandata, a light variety, bred.

Amphidasys betularia, three bred specimens, showing light and dark forms.

Leucania conigera, a dark specimen taken at Deal in August, as against an ordinary form taken at Lee a month earlier.

Mr. Dobson exhibited the dragonflies he had taken in Hampshire and Surrey during the last two years. Total number of species 27. For Hampshire, 22; for Surrey, 18; in Hampshire only, 9; in Surrey only, 5; common to both counties, 13. In the list of the species H = Hants, S = Surrey:

Sympetrum striolatum, H. S.; *S. scoticum*, H. S.; *Libellula depressa*, H. S.; *L. quadrimaculata*, H. S.; *Orthetrum cærulescens*, H.; *Cordulia anea* H. S.; *Gomphus vulgatissimus*, H.; *Cordulegaster annulatus*, H.; *Anax imperator*, H. S.; *Brachytron pratense*, H.; *Æschna mixta*, H.; *Æ. juncea*, H.; *Æ. cyanea*, H. S.; *Æ. grandis*, S.; *Calopteryx virgo*, H.; *C. splendens*, S.; *Lestes sponsa*, H. S.; *Platycnemis pennipes*, S.; *Erythromma najas*, S.; *Pyrrhosoma nymphula*, S. H.; *P. tenellum*, S. H.; *Ischnura pumilio*, H.; *I. elegans*, H. S.; *Agrion pulchellum*, S.; *A. puella*, H. S.; *A. mercuriale*, H.; *Enallagma cyathigerum*, H. S.

Mr. H. Moore exhibited (1) a specimen of *Heliconius sicalata*, Riffarth, from Trinidad (a species of the *Melpomene* group), having a small transverse red spot on each of the hind wings towards the costal margin; (2) a series of *Heliconius cydno*, Doubl, showing the range of variation of the white markings of the fore-wings.

Mr. H. E. Garrett exhibited a series of *Pyrameis* (*Vanessa*) *atalanta*, taken at Carlton Park, Northamptonshire, September, 1904, one specimen with yellow markings in red bands on the hind wings.

Mr. South exhibited the following species and varieties: *Aplecta* (*Melanchra*) *nebulosa*, Hufn. Three specimens representing var. *robsoni*, Collins, var. *thompsoni*, Arkle, and the ordinary Delamere Forest form. These were kindly presented to him by Mr. J. Arkle, of Chester.

Examples from Ireland, N. Devon, Surrey, and Yorkshire were added to show something of the range of variation of this species in the British Isles, and each of these was typical of the district or the country from which it came.

Polia chi, var. *olivacea*, Steph. A female specimen taken at Bishop Auckland, Durham, in August, 1903, together with a selection from forty-three specimens reared in July, 1904, from ova which she had deposited. It was noted that the offspring were all of the same form as the parent.

Abraxas grossulariata, L. A specimen with buff-coloured ground but more or less typical markings. The only aberration of any note that occurred among some 200 specimens reared from larvæ obtained at Purley in 1904.

Eurrhypara urticata. A specimen with the discoidal and the inner marginal black spots of forewings confluent; the other black markings on all the wings much intensified. This example was bred in June, 1904, among many others of the typical form, from larvæ found in rolled leaves of garden mint at Balham, in the autumn of 1903.

Peronea hastiana, L. A short series reared from larvæ collected at Wisley, Surrey, and an extensive series, including several named forms, from larvæ obtained on the Lancashire coast by Mr. Baxter of St. Anne's-on-Sea.

Pædisca (*Epiblema*) *solandriana*, L. A series of sixty specimens collected in two afternoons at Oxshott in September, 1904. "Examples of the forms *trapezana*, Dup., and *ratana*, Dup., most numerous, but *solandriana* (type), *sinuana*, Hb., and *parmatana*, Hb., are well represented. One specimen seems to be referable to *sordidana*, Dup., and another appears to agree with *sylvana*, Hb. 128."

Mr. G. T. Porritt exhibited a fine bred series of *Agrotis ashworthii* from Penmaenmawr, N. Wales, this season.

Mr. J. Kaye exhibited a series of *Pseudoterpna pruinata* (*cytisaria*); one specimen, bred from Byfleet, had a very narrow dark, well-defined, central fascia, and several bred specimens from Bude showed a suppression of all markings. One

exhibited the white marginal band only, and had no trace of the central fascia. He also showed a specimen of the largest known species of Longicorn beetle *Titanus giganteus* from Potaro, in British Guiana.

Mr. Philip J. Barraud exhibited—

(1) *Epinephele jurtina* (*ianira*) ♂, var. *anommata*, having the usual apical white pupilled spot absent from fore wings, and on the under side of the hind wings only minute black specks in place of the usual spots. It was captured at Brockenhurst, June 23rd, 1904.

(2) *Spilosoma menthastri*, ♂, a brown aberration resembling the forms from Lancashire and North Ireland. Captured May 25th, 1901, on Bushey Heath.

Rev. J. E. Tarbat exhibited—

(1) ♂ *Erebia æthiops*, with bleached marks on the left fore and hind wings.

(2) ♂ *Euthemonia russula*, with band of hind wing very faintly marked.

(3) ♀ *Pacilocampa populi*, with left hind wing slightly crippled and small rudimentary wing anterior to right fore wing.

Mr. Bacot exhibited varieties of *Hybernia defoliaria*, captured Epping Forest; *Agrotis saucia*, bred, Sandown, Isle of Wight; *Ennomos quercinaria*, bred, London stock; *Malacosoma neustria*, bred, S. Devon; *Demas coryli*, bred, Epping Forest; *Spilosoma lubricipeda*, var. *zatima*, bred, Mr. Raynor's race; *Spilosoma urticae*, bred Norfolk race. He exhibited a long series of the last named species, consisting of eight broods belonging to three generations, all originating from a single batch of ova laid by a female captured in Norfolk. These showed a very wide range of variation as regards their spotting, from extreme forms that might easily be mistaken for the allied *S. menthastri* to specimens having only one or two minute spots on the fore wings.

Mr. L. B. Prout exhibited on behalf of Mr. J. P. Mutch: Fine pale aberrations of *Agrotis ypsilon* (*suffusa*) and *Phlogophora meticulosa* from Isle of Wight; also interesting aberrations of *A. saucia* and *A. segetum* from Isle of Wight, and *Cleora glabraria*, much marked with black, from the New Forest. He also showed on his own behalf—very variable series of (1) *Melitæa cinxia*, bred from the Isle of Wight, mostly in one aberrant brood reared in 1902 under exceptionally unfavourable climatic conditions; (2) *Aporophyla australis* with the blackish ab. *ingenua*, Frr., from Sandown; (3) *Melanthia ocellata*, the specimen figured in "Barrett," Pl.

338, Fig. 2 b ; (4) *Eubolia bipunctaria*, dark, from N. Devon ; and (5) exceptionally dark aberrations of *Luperina testacea* from Sandown.

Mr. Edwards exhibited representatives of the genera closely allied to the genus *Papilio* (sens. strict.) and contributed the following note :

Eurycus is a small genus including one or two species from Australia and New Guinea. The type *E. cressida* is common in Australia, and is remarkable for the dissimilarity of the sexes, and, unlike most butterflies, the ♀ is smaller than the ♂.

Eurycles is confined to the Argentine Republic and the neighbouring countries of S. America, is intermediate between *Eurycus* and some of the more typical groups of S. A. *Equitinae*.

Luehdorfa, Crüger, is a genus found in N. China, Amurland, and Japan.

Sericinus inhabits the same area as *Luehdorfa*, but is not known to occur in Japan.

Armandia thaidina, found in Western China and Thibet. It was first brought from Mou-pin by the French missionary Abbé David.

Bhutanitis lidderdalii, named after Lidderdale, who captured it in Bhutan, at a height of 5000 feet above the sea.

Dr. Chapman exhibited a drawer of specimens of *Chrysophanus* taken this year in Spain. They consisted of a series of males and females of *C. virgaureæ* var. *miegii*, from Pajares and from La Granja, and varied from very nearly the ordinary European type, though a large number more or less *miegii* as described, viz. with distal and three apical spots to well-spotted specimens, the females very highly coloured, clearly marked and large; a series of *phlæas*, chiefly from La Granja, varying from a bright "British" form to dark *eleus*; also a drawer of *Erebias* from Spain, taken during the last three years, showing the associated forms of *E. evias* and *E. stygne* from several localities, the remarkably bright and large var. of *E. stygne*, v. *bejarensis*, and a fine series of *E. palarica*, a new species that appears to be the largest in the genus, and has a very strikingly distinct facies, although said to be very closely related to *E. stygne*.

He also showed, on behalf of Mr. Tutt, a number of series of the *Chrysophanids* from various mid-European sources.

Mr. Turner exhibited a copy of Moses Harris' "Aurelian," first edition, which he had recently bought at a second-hand bookstall for a few shillings. Only one plate and one leaf

were missing ; the remainder of the plates were in very good condition.

Mr. Manger exhibited the following species of Japanese Crustacea : *Pseudo-grapsus sanguineus*, *Macrophthalmus japonicus*, *Philyra pisum*, *Leucosia unidentata*, *Goniosoma dentatus*, *Dorippe japonica*, *Lambrus affinis*, *Neptunus sanguinolentus*, *Menippe hardwickii*, *Leptodius affinis*.

Mr. Tonge exhibited three albums of photographs of the ova of Lepidoptera. Most of them had been taken with the aid of electric light, and their clearness of definition was remarkable.

Mr. Carr exhibited, on behalf of Mr. F. M. B. Carr, a specimen of *Vanessa io* in which the eye-like spots on the hind wings were most imperfectly developed and very obscure.

Mr. West exhibited the larva of the Hessian fly under his microscope, and Mr. Fremlin examples of Radiolarian ooze from the Challenger Expedition.

DECEMBER 8th, 1904.

Mr. E. STEP, F.L.S., *Vice-President*, in the Chair.

Mr. Grosvenor, of Redhill, Surrey, was elected a member.

Mr. Tonge exhibited some thirty-five species of British Lepidoptera, which he brought to place in the Society's Collection. A hearty vote of thanks was passed to him for his gift.

Mr. West, of Greenwich, exhibited a specimen of the rare coleopteron *Tropideres sepicola*, taken by him in the New Forest. He stated that only one or two other British specimens were known.

Mr. Edwards exhibited specimens of *Calioxys elongata*, a parasitical bee, and said that *Calioxys* was a genus occurring in North and South Africa, North and South America, Asia, as well as in Europe. In Britain there were only five species. Most of the species were stated to be parasitical on *Megachile* and *Saropoda*. The genus had not been observed either in Scotland or Ireland. The species exhibited flies from June to August.

Mr. Garrett exhibited several blue stones which were found in the gizzard of a Russian fowl.

Mr. Dobson exhibited a long series of *Geometra vernaria* taken at Malden, Surrey, a little after dark, sitting on the leaves of a creeper around his house, together with a nice

varied series of *Aglossa cuprealis* taken on curtains in his house, no doubt attracted into the house by the light. *Plusia chrysitis* had also been seen by him around the lights.

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

Mr. Tonge exhibited slides of the ova of a number of species of Lepidoptera.

Mr. Lucas exhibited slides of imagines, orchids, flowers, fungi, etc.

Mr. Goulton exhibited slides of lepidopterous larvæ.

Mr. Step exhibited slides of lepidopterous larvæ.

Mr. Main exhibited slides of Lepidoptera in various stages, showing their resting positions.

Mr. Dennis exhibited a series of slides showing the flowering and seeding of plants and trees.

JANUARY 12th, 1905.

The President in the Chair.

Mr. Sich referred to the death of Mr. C. G. Barrett, the well-known entomologist, and a former President of the Society, which occurred on December 11th, and it was resolved to send a letter of condolence to Mrs. Barrett and family.

Mr. Colthrup exhibited a specimen of the ringed plover in winter plumage, and pointed out its characteristics.

Mr. West (Streatham) showed a copy of the "Sporting and Dramatic News," in which an illustrated account of one of the Society's Exhibitions had been given some years ago. There were included several more or less recognisable portraits of members of the Society.

Mr. Main exhibited two species of *Panorpa*, *P. communis*, and *P. germanica* from Folkestone.

Mr. Lucas exhibited pairs of the three British species of *Panorpa*, *P. communis*, *P. germanica*, and *P. cognata*. He stated that the latter was a very scarce species, and that as the two allied species were also exhibited, a comparison could be made. Of *P. cognata* he also exhibited a female example, which had been taken during the Society's meeting at Byfleet in July, 1904. From the same place he also showed *Chrysopa ventralis*.

Mr. E. Step reported that he had been able to make considerable progress with the first half of the Tugwell Herba-

rium, and now wished to hand over to the curator the following natural orders: *Ranunculaceæ*, *Nymphæaceæ*, *Papaveraceæ*, *Fumariaceæ*, *Cruciferæ*, *Resedaceæ*, *Cistineæ*, *Violarieæ*, *Polygaleæ*, *Frankeniaceæ*, *Caryophylleæ*, *Tamariscineæ*, and *Elatineæ*. A further portion would be forthcoming at the next meeting.

In presenting this first batch he would like to report exactly what had been done. The original mounts had undergone a necessary trimming of discoloured and ragged edges, but the whole of Mr. Tugwell's data remained untouched; they had then been mounted each in a four-page cover of cartridge paper, so that in future the collection could be turned over and searched without fear of damage to the most delicate specimens. Mr. Tugwell had named and numbered his specimens by the "London Catalogue of Plants," 3rd edition (*circa* 1850). Since that date many alterations have been made in classification and older names have been revived. In order, therefore, to make the collection useful to readers of modern botanical literature, the first page of each new mount had been numbered and named in accordance with the latest (9th) edition of the "London Catalogue" (1895). By this method the collection had been brought up to date without the slightest interference with Mr. Tugwell's own identifying marks and records, many of which are of great interest as indicating the former flora of districts that have now become merged in the metropolis or undergone similar destructive processes.

Mr. Goulton exhibited a short series of photographs of Lepidopterous larvæ.

Mr. Joy exhibited specimens of *Aphantopus* (*Epinephele*) *hyperanthus* (1) having white ocelli on the upper side of the hind wing; (2) *ab. arete* and near var. *arete* having the ocelli of the underside either wholly or partially reduced to mere dots, and (3) a form with elongate ocelli on the under side approaching the form known as *ab. lanceolata*.

Mr. R. Adkin gave an account of the annual meeting of the South-Eastern Union of Scientific Societies held at Maidstone during the summer of 1904, and at which he attended as the Society's delegate.

He then read the Report of the Field Meeting held at Eynsford on June 25th, 1904 (see p. 30).

Mr. Lucas read the Report of the Field Meeting held at Byfleet on July 23rd, 1904 (see p. 35), and afterwards showed a number of lantern slides of which some had been kindly lent to him by Mr. Hamm, of the Hope Museum, Oxford.

Messrs. Step and West also showed series of slides illustrative of the Field Meeting. Messrs. Tonge, Dennis, and Clark had also brought slides.

JANUARY 26th, 1905.

ANNUAL GENERAL MEETING.

The PRESIDENT in the Chair.

The first portion of the meeting was devoted to the business of receiving the Treasurer's Balance Sheet (p. x) and statement, the reading of the Council's Report for the year (p. xii), the announcement of the results of the election of Officers and Council for the ensuing year, and the reading of the retiring President's Address (p. 39).

The following is a list of members elected as the Officers and Council of the Society for the year 1904-5:—

President.—Hugh Main, B.Sc., F.E.S.

Vice-Presidents.—Alfred Sich, F.E.S., and E. Step, F.L.S.

Treasurer.—T. W. Hall, F.E.S.

Librarian.—A. W. Dods.

Curator.—W. West (*Greenwich*).

Hon. Secretaries.—Stanley Edwards, F.L.S., etc. (*Corresponding*), H. J. Turner, F.E.S. (*Report*).

Council.—Messrs. R. Adkin, F.E.S.; F. Noad Clark; F. B. Carr; A. Harrison, F.L.S., F.Z.S., F.E.S., etc.; W. J. Kaye, F.E.S.; H. A. Sauzé; W. West (*Streatham*).

Votes of thanks were passed to the President, Treasurer, Officers, and Council for their services during the past year.

ORDINARY MEETING.

Mr. HUGH MAIN, B.Sc., *President*, in the Chair.

Dr. Chapman exhibited a living specimen of *Doritis apollinis*, bred from a pupa sent from Syria.

Mr. Step presented another instalment of the re-arranged Tugwell Herbarium, including the natural orders—*Hypericaceæ*, *Malvaceæ*, *Lineæ*, *Geraniaceæ*, *Rhamneæ*, and *Leguminosæ*.

Mr. Main reported that on the previous evening (January 25th) Mr. Harrison and he had collected *Hybernica rupicapra*, *Phigalia pedaria* (*pilosaria*), *Cheimatobia brumata*, *H.*

marginaria (*progemmaria*), and *Pterophorus monodactylus*, in Epping Forest, in some numbers.

Mr. Turner read the following notes on the entomology of Assiniboia, which he had received from Mr. A. J. Croker:

"The season opened up very late; not until nearly the end of April did the snow vanish, and then what a state trails and land were in, the ravines with water rushing along at a rapid rate! But it did not take long to dry up, and all over the prairie out came the crocuses in millions. It was well on towards June, however, before any Lepidoptera appeared, the first species being a solitary specimen, in appearance like *Cænonympha pamphilus*, but larger and darker; this was followed by a very pretty fritillary, somewhat like *Brenthis euphrosyne*, but with a different under-side. This latter occurred abundantly, and after these some fresh species were met with nearly every day, and in odd times I have managed to get together a nice little representative set, which I will send on shortly. *Euvanessa antiopa* occurs here, but not very commonly. I have only succeeded in taking one, and what a graceful insect it is on the wing! I have also bred three specimens of a very large moth, like that large American silk-producing moth, from cocoons, which I found attached to willow stems. There does not appear to be a great variety of butterflies here, but the species that do occur are very prolific, and are very closely allied to British species. Two species of *Colias* are very abundant. One day when on the trail I noticed a very brilliant patch some distance away, and when I came a little nearer, up went a cloud of one of the *Colias* sp.? What a sight! Just imagine driving into a cloud of thousands of *C. edusa*, only this species is far more attractive, and I shall be sending you a nice series later on.

In the evenings during July and August I did a bit of night-work. A long grass, called "red top," growing in low places, seemed the attraction, and I have taken many specimens of Noctuæ at it, strange to say, most of them allied to our British forms. One very common species, out in August in millions, must be *Noctuæ augur*. But perhaps it would be better for me to attach my notes to the several species when I send them on. One drawback here to collecting in August is the prevalence of boisterous wind.

CORRIGENDUM.

"Proceedings," 1903, p. 1. For "Pearly Nautilus," read "The Argonauta."

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