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THE SOUTH LONDON

ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

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1911 BLAIR, K. G., B.SC., F.E.S., "Claremont," 120, Sunningfields Road, Hendon, N.W. 4. *n, c.*

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1899 CARR, Rev. F. M. B., M.A., L.TH., The Vicarage, Alvanley, Nr. Helsby, Cheshire. *l, n.*

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1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E. 18. *l, c.*

Year of Election.

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1889 Dennis, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*

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1920 Farmer, J. B., 31, Crowhurst Road, Brixton, S.W. 9. *l.*

YEAR OF ELECTION.

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1923 FAWTHROP, R. W., Church Road Pharmacy, Mitcham. *l.*

1927 FIDGEON, J. B., 151, Romford Road, E.15. *l.*

1923 FISHER, R. C., B.SC., PH.D., Rothamstead, Exp. Stn., Harpenden.

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1920 FORD, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*

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1919 FRISBY, G. E., F.E.S., 29, Darnley Road, Gravesend. *hym.*

1912 FROHAWK, F. W., M.B.O.U., F.E.S., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*

1914 FRYER, J. C. F., F.E.S., M.A., "Chadsholme," Milton Road, Harpenden, Herts. *l, ec. ent.*

1911 GAHAN, C. J., D.SC., M.A., F.E.S., 8, Lonsdale Road, Bedford Park, W.4. *c.*

1920 GAUNTLETT, H. L., F.E.S., M.R.C.S., L.R.C.P., "Van Buren," De Lisle Road, Bournemouth. *l.*

1927 GIBBINS, F. J. F.L.A.A., F.L.A.G., 51, Weldon Crescent, Harrow, Middlesex. *l.*

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1920 GOODMAN, O. R., F.Z.S., F.E.S. *Council*, 210, Goswell Road, E.C.1, and "Hatchgate," Massetts Road, Horley, Surrey. *l.*

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YEAR OF ELECTION.

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1925 GRAVES, P. P., F.E.S., 5, Hereford Square, S.W.7. *l.*

1923 GRAY, C. J. V., BM/BRWX., London, W.C.1. *l.*

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1926 HARMSWORTH, H. A. B., F.E.S., 3, Marlborough Gate, Hyde Park, W.2. *l.*

1926 HARRIS, A. G. J., B.A., 13, Philbeach Gardens, S.W.5.

1924 HARWOOD, P., F.E.S., Westminster Bank, 92, Wimborne Road, Winton, Bournemouth. *l.*

1927 HAWGOOD, D. A., 89, Leigham Vale, Tulse Hill, S.W.2. *l.*

1924 HAWKINS, C. N., F.E.S., *Council*, 23, Dalebury Road. Upper Tooting, S.W.17. *l.*

1927 HAWKINS, F., 37, Benhill Road, Camberwell, S.E.5. *l.*

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1923 HAYWARD, Capt. K. J., F.E.S., Villa Ana, F.C.S.F., Argentine. *l.*

1920 HEMMING, Capt. A. F., F.Z.S., F.E.S., 29, West Cromwell Road, S.W. 7. *l.*

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1927 HEWER, H. R., M.SC., D.I.C., Royal College of Science, S. Kensington, S.W. 7.

1927 HEWITT, A. C., 83, Tavistock Avenue, Walthamstow, E.17.

1920 HODGSON, S. B., *Council*, 3, Bassett Road, N. Kensington, W.10.

1927 HOWARD, J. O. T., B.A., 78, St. John's Wood Court, N.W.8.

1927 HUGHES, A. W. McKenny, 22, Stanford Road, Kensington, W. 8. *ec. ent.*

1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*

1923 JACOBS, S. N. A., Ditchling, Hayes Lane, Bromley. *l.*

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1924 JAMES, R., F.E.S., 7, Broadlands Road, Highgate, N.6. *l.*

YEAR OF ELECTION.

1927 JANSON, O. J., F.E.S., 13, Fairfax Road, Hornsey, N. 8. *ent.*

1925 JARVIS, C., 12, Claylands Road, Clapham, S.W.8. *c.*

1922 JOBLING, Boris, "Neva,' Whitechurch Gardens, Edgware, Middlesex. *med. ent.*

1923 JOHNSTONE, J. F., F.E.S., "Ruxley Lodge," Claygate, Surrey. *l.*

1918 JOHNSTONE, D. C., F.E.S., "Brooklands," Rayleigh, Essex. *l.*

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1910 KIDNER, A. R., "The Oaks," Station Road, Sidcup, Kent. *l.*

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1927 LAWSON, H. B., F.E.S., "Brookhill," Horsell, Woking. *l.*

1922 LEECHMAN, C. B., 'Caral,' Brighton Road, S. Croydon. *l.*

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1919 LEMAN, G. B. C., F.E.S., "Wynyard," 52, West Hill, Putney Heath, S.W. 15. *c.*

1924 LEONHARDT, Hans, 45, Redcliffe Gardens, S.W. 10. *l.*

1922 LILES, Major C. E., 6, Hyde Park Mansions, N.W. 1. *l.*

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1924 LOWTHER, A. W. G., "The Old Quarry," Ashtead, Surrey. *ent.*

1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *Brit. o., odonata, n, m, b.*

1921 LYLE, G. T., F.E.S., "Briarfield," Stump Cross, Shibden, Halifax. *h.*

1925 MACCALLUM, C., 1, Aston Road, Ealing, W.5. *l.*

1926 MACDONALD, F. W., 82, Trinity Street, Leytonstone, E.11. *l.*

1892 MAIN, H., B.SC., F.E.S., F.Z.S., "Almondale," 55, Buckingham Road, S. Woodford, E. 18. *l, nat. phot., col.*

1922 MANN, F. G., B.SC., A.I.C., Chemical Laboratories, Pembroke Street, Cambridge. *l.*

YEAR OF ELECTION.

1889 MANSBRIDGE, W., F.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc.*

1922 MAPLES, Major S., "Monkswood," Huntingdon. *l.*

1922 MASSEE, A. M., F.E.S., East Malling Research Station, Kent. *l.*

1922 MEECH, E., 17, Electric House, Bow Road, E. 3. *l.*

1885 MERA, A. W., 5, Park Villas, Loughton, Essex. *l.*

1881 MILES, W. H., F.E.S., "Grosvenor House," Calcutta. Post Box 126. *mi, b.*

1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E.16. *l, h, d, e l, e h, e d, mi.*

1920 MORRISON, G. D., F.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marichall, Aberdeen. *ec. ent.*

1925 MOUNSEY, D., "Kirkstone," 5, Harewood Road, S. Croydon. *Ent, Ornith.*

1927 MURRAY, Capt. K. F. M., 11, Eccleston Place, S.W.1. *l.*

1923 MUTCH, J. P., "Mayfield House," Church Road, Bexley Heath. *l.*

1923 NASH, T. A. M., 16, Queen's Road, Richmond, Surrey. *l.*

1923 NASH, W. G., F.R.C.S., "Clavering House," de Pary's Avenue, Bedford. *l.*

1906 NEWMAN, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*

1926 NEWMAN, L. H., Salisbury Road, Bexley, Kent. *l.*

1918 NIMMY, E. W., F.E.S., 15, George Street, Mansion House, E.C. 4. *l.*

1926 NIXON, G. E., 315B, Norwood Road, Herne Hill, S.E.24. *h, l.*

1911 PAGE, H. E., F.E.S., "Bertrose," 17, Gellatly Road, New Cross, S.E. 14. *l.*

1927 PALMER, D. S., "Melbourne House," Portsmouth Road, Kingston-on-Thames.

1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W. 1. *l.*

1925 PORTSMOUTH, J., 15, Victoria Street, Westminster, S.W.1. *l.*

1925 PORTSMOUTH, G. B., 15, Victoria Street, Westminster, S.W.1. *l.*

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1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane.

1897 PREST, E. E. B., 1 and 2, Chiswell Street, E.C. 1. *l.*

1919 PRESTON, N. C., Harper Adams Agricultural College, Newport, Salop. *l, ec, ent.*

Year of Election.

1924 Priest, C. G., 30, Princes Place, Notting Hill, W.11. *l.*

1904 Priske, R. A. R., F.E.S., 136, Coldershaw Road W. Ealing, W. 5. *l, m.*

1919 Quilter, H. J., "Fir Cottage," Kiln Road, Prestwood, Great Missenden. *l, c, d, mi.*

1922 Rait-Smith, W., F.Z.S., F.E.S., *Council*, "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*

1925 Ralfs, Miss E. M., F.E.S., "Montford," Kings Langley, Herts.

1922 Rattray, Col. R. H., 68, Dry Hill Park Road, Tonbridge, Kent. *l.*

1902 Rayward, A. L., F.E.S., 1, "Meadhurst," Meads Road, Eastbourne. *l.*

1887 Rice, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. 4. *orn.*

1927 Richards, Percy R., "Wynford," Upton Road, Bexley Heath. *l.*

1920 Richardson, A. W., F.E.S., 28, Avenue Road, Southall, Middlesex. *l.*

1908 Riley, Capt. N. D., F.E.S., F.Z.S., 5, Brook Gardens, Beverley Road, Barnes, S.W.13. *l.*

1910 Robertson, G. S., M.D., "Bronllys," 72, Thurlow Park Road, Dulwich, S.E. 21. *l.*

1922 Robertson, W. J., M.R.C.S., L.R.C.P., F.Z.S., 69, Bedford Road, S.W. 4. *l.*

1911 Robinson, Lady Maud, F.E.S., "Worksop Manor," Notts. *l, n.*

1920 Rothschild, The Right Hon. Lord, D.Sc., F.R.S., F.L.S., F.Z.S., F.E.S., Tring, Herts. *l, orn.* (*Life Member.*)

1887 Routledge, G. B., F.E.S., "Tarn Lodge," Heads Nook, Carlisle. *l, c.*

1890 Rowntree, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*

1915 Russell, S. G. C., F.E.S., "Brockenhurst," Reading Road, Fleet, Hants. *l.*

1908 StAubyn, Capt. J. S., F.E.S., "Sayescourt Hotel," 2, Inverness Terrace, Bayswater, W. 2.

1925 Sancean, E., "The Yew," Firtree Road, Banstead. *b.*

1914 Schmassmann, W., F.E.S., "Beulah Lodge," London Road, Enfield, N. *l.*

1910 Scorer, A. G., "Hillcrest," Chilworth, Guildford. *l.*

1927 Scott, E., M.B., "Hayesbank," Ashford, Kent. *l.*

YEAR OF ELECTION.

1922 SEABROOK, Lieut. J. C., F.E.S., Brightholme, St. Leonard's Road, Surbiton. *l.*

1923 SEVASTOPULO, D. G., F.E.S., c/o Ralli Bros., Calcutta. *l.*

1910 SHELDON, W. G., F.Z.S., F.E.S., "West Watch," Limpsfield, Surrey. *l.*

1898 SICH, ALF., F.E.S., "Grayingham," Farncombe Road, Worthing. *l.*

1925 SIMMONS, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*

1920 SIMMS, H. M., B.SC., F.E.S., "The Farlands," Stourbridge.

1927 SKELTON, Hy. E., 12, Mandrake Road, Upper Tooting, S.W. 17.

1921 SMART, Major, H. D., R.A.M.C., M.D., D.SC., F.E.S., 172, High Road, Solway Hill, Woodford Green. *l.*

1922 SETH-SMITH, D. W., Curator's House, Zoological Gardens, Regents Park, N.W.8. *l.*

1927 SMITH, Capt. F. S., F.E.S., "Sunnyside," Middlebourne, Farnham. *l.*

1890 SMITH, WILLIAM, "Hollybank," 76, Oakshaw Street, Paisley. *l.*

1925 SOLIMAN, Hamid Salem, F.E.S., 130, Queen's Gate, S.W.7. *ent.*

1882 SOUTH, R., F.E.S., 4, Mapesbury Court, Shoot-up-Hill, Brondesbury, N.W.2. *l, c.*

1926 SPARROW, R. W., "Wildwood," Regents Park Road, Finchley, N.3.

1908 SPERRING, C. W., *Council*, 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*

1920 STAFFORD, A. E., 98, Cowley Road, Mortlake, S.W. 14. *l.*

1872 STEP, E., F.L.S., 158, Dora Road, Wimbledon Park, S.W. 19. *b, m, cr*; *Insects, all Orders.*

1916 STEWART, H. M., M.A., M.D., 123, Thurloe Pk. Rd., Dulwich, S.E. 21. *l.*

1922 STOKES, C. H. H., British Museum (Nat. Hist.), S. Kensington, S.W.7. *ent. bot.*

1923 STOLZLE, G. A. W., "Southcote," South Street, nr. Whitstable, Kent. *l.*

1910 STONEHAM, Capt. H. F., F.E.S., M.B.O.U., The E. Surrey Estate, P.O. Kitali, Trans-Nzora, Kenya Colony *l.*

1924 STOREY, W. H., 63, Lincolns Inn Fields, W.C.2. *ent.*

1911 STOWELL, E. A. C., B.A., Eggars Grammar School, Alton, Hants.

1916 SYMS, E. E., F.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *l.*

Year of Election.

1920 Talbot, G., F.E.S., "The Hill Museum," Witley. *l.*

1922 Tams, W. H. T., F.E.S., *Council*, 19, Sulivan Road, Hurlingham, S.W. 6. *l.*

1894 Tarbat, Rev. J. E., M.A., The Vicarage, Fareham, Hants. *l, ool.*

1913 Tatchell, L., F.E.S., Swanage, Dorset. *l.*

1925 Taylor, J. S., Dept. Agriculture, Div. Ent., Pretoria, Union of S.A. *l.*

1926 Tomlinson, Florence B., "The Anchorage," Lodge Road, Croydon. *l.*

1902 Tonge, A. E., F.E.S., *Hon. Treasurer*, "Aincroft," Grammar School Hill, Reigate. *l.*

1927 Tottenham, Rev. C. E., 60, Mt. Ararat Road, Richmond. *c.*

1887 Turner, H. J., F.E.S., *Hon. Editor*, "Latemar," West Drive, Cheam, Surrey. *l, c, n, he, b.*

1921 Vernon, J. A., "Lynmouth," Reigate, Surrey. *l.*

1923 Vredenberg, G., 38, Ashworth Mansions, Maida Vale, W.9. *l.*

1889 Wainwright, C. J., F.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*

1927 Wainwright, Chas., 8, Kingsdown Avenue, W. Ealing, W.13.

1911 Wakely, L. D., 11, Crescent Road, Wimbledon, S.W.20. *l.*

1880 Walker, Comm. J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*

1927 Walker, W. H., "Ranworth," Potters Bar. *l.*

1925 Ward, J. Davis, F.E.S., "Limehurst," Grange-over-Sands. *l.*

1920 Watson, D., "Proctors," Southfleet, Kent. *l.*

1911 Wells, H. O., "Inchiquin," Lynwood Avenue, Epsom. *l.*

1911 Wheeler, The Rev. G., M.A., F.Z.S., F.E.S., "Ellesmere,' Gratwicke Road, Worthing. *l.*

1927 White, A. G., "Hilltop," Chaldon, Surrey.

1927 Whitting, A. N., 6, Woolstone Road, Catford, S.E. 6.

1920 Wightman, A. J., F.E.S., Broomfield, Pulborough, Sussex. *l.*

1914 Williams, B. S., "St. Genny's," 15, Kingcroft Road, Harpenden. *l, c, hem.*

1912 Williams, C. B., M.A., F.E.S., Research Institute, Amani, Tanga, and 20, Slatey Road, Birkenhead. *l, ec. ent.*

1925. Williams, H. B., LL.D., F.E.S., "Little Dene," Clairmont Lane, Esher, Surrey. *l.*

1923 Windsor, F. S., "Oatlands Cottage," Horley, Surrey. *l.*

1923 Windsor, P. H., "Fern Hill," Horley, Surrey. *l.*

YEAR OF ELECTION.

1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*

1926 WOOTTON, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*

1927 DE WORMS, C. G. M., F.E.S., M.B.O.U., Milton Pk., Egham, Surrey. *l, orn.*

1921 WORSLEY-WOOD, H., F.E.S., *Council*, 37, De Freville Avenue, Cambridge. *l.*

1920 YOUNG, G. W., F.R.M.S., 20, Grange Road, Barnes, S.W. 13.

1925. ZOHEIRY, Mehammed Soliman El., F.E.S., Entomological Section, Ministry of Agriculture, Cairo, Egypt. *ent.*

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

REPORT OF THE COUNCIL, 1928.

THE Council, in presenting the fifty-sixth Annual Report, is pleased to state that the Society continues to maintain a satisfactory condition.

There is again an increase in Membership, which now reaches 260, made up as follows, 235 Ordinary Members, 2 Honorary Members, and 5 Life Members.

The Council regrets to report the death of five members, Messrs. Blenkarn, G. C. Champion, D. H. Pearson, G. B. Pearson, and G. T. Porritt.

There have been nine resignations, and seven names have been removed from the list for non-payment of subscriptions.

The average attendance of meetings shows a large increase on that of any previous year.

Owing to fog on several occasions having interfered with the Annual Exhibition, your Council changed the night from the 4th Thursday in November to the 4th Thursday in October. This change was well justified, as in spite of a wet night, 241 members and friends were present, the largest number attained in recent years; there were nearly 50 exhibitors. The same plan was adopted as last year, of having the exhibits laid on tables, and no formal proceedings. Light refreshments were again provided and the thanks of the Council are given to Mr. O. R. Goodman for having made all the necessary arrangements, and to those other members who assisted, and helped to make the evening a success. The Council would like to see the Refreshment-fund much better supported by the members generally.

Mr. J. H. Adkin, has kindly officiated as Hon. Lanternist throughout the year.

Papers have been read before the Society by Messrs. R. Adkin, A. de B. Goodman, O. R. Goodman, Lucas, Main, Capt. K. J. Hayward, and Major Hingston.

The Hon. Curator reports " Numerous additions to the Collections have been made during the year, and Mr. Robert Adkin has been a very generous donor of British Lepidoptera. Messrs. A. A. W. Buckstone, J. B. Farmer, and L. T. Ford also presented British Lepidoptera, and Mr. F. W. MacDonald Exotic Lepidoptera. The

late Mr. S. A. Blenkarn, and Messrs. E. G. Bunnett, F. J. Coulson, H. L. Dolton, P. B. Fletcher, C. Jarvis and G. E. Nixon gave specimens of Coleoptera."

The Hon. Librarian reports that the card index of bound volumes is now complete, and all the "Journals" are now bound up to date. The most important gift was from one of our members, the late Mr. Enefer, whose daughter presented 43 volumes to the Society. There has been a steady increase in the number of books on loan, and many works are consulted at our meetings. The List of additions to the Library is appended.

Field Meetings were held at Bookham, Byfleet, Clandon, Blackheath near Guildford, White Hill, Mickleham, Princes Risborough and Ranmore; the attendance at these meetings showed an improvement on that of previous years.

Your Council appointed Mr. R. Adkin to represent the Society at the British Association Meeting at Leeds, in August and September, and Messrs. Step and Turner as representatives to the Congress of the South-Eastern Union of Scientific Societies held at Hastings in May. Short reports from these gentlemen appear on pp. 82 and 97.

The volume of "Proceedings" for 1926, was published in June and consists of XIX.-156 pp., with 11 plates.

The Council, on behalf of the Society, desires to thank the numerous donors and others who rendered assistance in many ways during the year.

Appended is the List of Additions to the Library during the year.

List of Books Presented by Miss Enefer.

Balfour, J. H., Manual of Botany, 1875; Buckley, A. B., Life and her Children, 1884; Bastin, H., British Insects; Cavers, F., Plant Biology, 1910, and Life History of Common Plants; Carpenter, W. B., Vegetable Physiology; Coleman, W. S., British Butterflies; Duncan, M., Spiders and Scorpions; Darwin, F., The Elements of Botany, 1899; Darwin, C., Movement of Plants, Climbing Plants, and Origin of Species; Fabre, J. H., Bramble Bees and Others and Insect Adventures; Finn, F., Birds of the Country Side; Fish, D. T., Bulbs and Bulbculture: Grindon, L. H., Garden Botany; Hutchinson, W., Handbook of Grasses; Henslow, G., The Uses of British Plants, 1905: Hall, C., Pond Life, and Peeps at Nature; Holmes, E. M., British Fungi, Lichens etc.; Kirby and Spence, Entomology; Massee, G., Text-book of Plant Diseases, 1911; Rye and Fowler, British Beetles; South, R., British Butterflies, and

British Moths vols 1 and 2; Samuelson, The Earthworm and Housefly; Sedgwick, Beetles and Spiders; Stavely, E. F., British Insects, and British Spiders; Step, E., Marvels of Insect life; Schröter, Alpine Flowers; Wood, J. G., Insects at Home, Insects Abroad, and Common Objects of the Microscope; Westwood, Entomologist's Test-book; Wild Flowers and how to name them; Board of Agriculture and Fisheries 1-100, 101-200, 201-300; Miall, L. G., Injurious and Useful Insects, 1911; Lubbock, J., Ants Bees and Wasps.

Presented by Mr. E. Step:—

Biological Problem of To-day (Hertwig); Natural History Studies (J. A. Thomson); Exploring England (C. S. Bayne); Spring Flowers of the Wild, Summer Flowers of the Wild, and The Harvest of the Woods (E. Step).

Books.—Marine Algae (Horniman Mus.); Life-history of N. American Marsh Birds; Catalogue of American Birds; Cat. of Edgar Ayer Ornithological Library.

Proceedings, Transactions, Reports of Societies, etc. (by Exchange).—Essex Naturalist; Smithsonian Institute; Trans. and Proc. Entomological Soc. of London (Dr. Fremlin); Proc. Perthshire Soc. Natural Science; Haslemere Museum; Bournemouth Science Society; Croydon N. Hist, and Sci. Society; London Naturalist; Leicester Library and Phil. Soc.; Connecticut Academy of Sci.; S. Eastern Naturalist; British Association (Mr. R. Adkin); Bolletino R. Scuol. Agric. Portici.

Periodicals and Magazines.—Entomologist; Entomologist's Monthly Magazine (purchase); Entomologist's Record: Vasculum; Bulletin Société entom. de France; Philippine Journal of Science; Entomologische Mitteilungen; Entomological News; Canadian Entomologist; Entomologiska Tidskrift; Natural History (Am. N.H.Mus.).

Separates.—From Proc. U.S. National Mus.; Smithsonian Institute; List of Birds around Haslemere; Upsala University; Exotic Lepidoptera (Strand); Field Museum of Chicago; Zoological Bidrag XI.; Ex. Proc. Zool. Soc. Lond.; Address to Ent. Soc. Lond., 1928; also from W. G. Sheldon, and J. J. Walker.

TREASURER'S REPORT, 1927.

I am glad to be able to report another year of prosperity for our Society, and to record a substantial increase in the balance of assets over liabilities as compared with 1926.

The increased membership is reflected in the amount received from subscriptions, £140 5s. 0d., which is up by £14, and could be substantially increased next year if those members who are in arrears with their contributions would make an effort to get them paid up to date.

Our other sources of income remain as before, producing dividends annually amounting to round about £29 12s. 6d., while the capital value of our investments has appreciated a little.

Entrance fees have produced 27s. 6d. more than last year and reach a total of £3 15s. 0d., while the sum received from the Sales of our Proceedings has increased by 30s. and reaches the total of £4 19s. 4d.

These items, augmented by a few other small amounts for deposit interest, Sales of books, fines, etc., bring up the total cash receipts for the year to the very respectable sum of £181 10s. 8d., which I think you will agree is a very satisfactory figure.

On the other side of the account our regular expenditure for maintenance is just about the same as usual and stands at £62 9s. 0d.

We have also spent £3 0s. 6d. on bookbinding, and 15s. on new books for the library.

£1 5s. 6d. represents subscriptions to the South Eastern Union of Scientific Societies, and to the Commons and Footpaths Preservation Society.

Sundry postages, etc., stand at 7s. 8d.

Printing the Proceedings has been a much heavier item this time, and stands at £113 1s. 2d. against £89 10s. 6d. last year.

Even this does not represent the entire cost, as I have recently heard, since I made up the accounts, that one of our contributors, with the very laudable desire of making a donation to the Publication Fund, paid for the half tone blocks used to illustrate his paper, and also for the printing as well, to the value of about £5 ; but as he did not send me the receipted bill, this sum does not appear in our accounts, both cost of printing and the sum received in donations being lower than they really should be in consequence.

[*Continued on p.* xx.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1927.

REVENUE ACCOUNT.

Expenditure.	£	s.	d.	*Income.*	£	s.	d.
To Rent of Rooms	50	0	0	By Balance brought from 1926	62	15	1
,, Insurance	1	6	6	,, Subscriptions :—			
,, Attendance	2	10	0	Current	112	10	0
,, Secretaries' expenses	7	0	0	In advance	15	2	6
,, Treasurer	1	0	0	Arrears	12	12	6
,, Catering	15	0	0		140	5	0
,, Hire of tables	1	16	0	,, Dividends :—			
,, Lecturer's expenses		12	6	On Invested Funds	14	12	6
Subscriptions	79	5	0	Deposit interest		15	0
South-Eastern Union of S. Societies		15	0	,, Donations :—			
Commons and Footpaths Preservation Society		10	6	Tea fund	14	16	0
Vote to	1	5	6				
Publication Fund	65	0	0				
Library Fund	5	0	0				
	70	0	0				
Balance carried down	82	13	1				
	£233	3	7		£233	3	7

LIBRARY FUND.

	£	s.	d.		£	s.	d.
To Binding Books	3	0	6	By Balance brought forward		6	4
,, Books Purchased		15	0	,, Books sold		2	0
,, Postages		7	8	,, Fines			6
,, Balance carried down	1	5	8	,, Vote from General Fund	5	0	0
	£5	8	10		£5	8	10

PUBLICATION FUND.

	£ s. d.		£ s. d.
To Printing	96 11 6	By Balance brought from 1926	1 10
,, Half-tone Blocks	16 9 8	,, Donations	15 8 4
	113 1 2	,, Blocks paid for by Contributors	16 9 8
,, Balance carried down	3 18 0	,, Income from Chapman memorial fund	15 0 0
		,, Sales of Proceedings	4 19 4
		,, Vote from General Fund	65 0 0
	£116 19 2		£116 19 2

ENTRANCE FEES AND LIFE-MEMBERSHIP SUBSCRIPTIONS ACCOUNT.

	£ s. d.		£ s. d.
To Balance carried forward..	5 16 6	By balance brought forward	2
		,, Entrance fees	3 15 0
		,, Sale of books from Ashdown Bequest	2 1 4
	£5 16 6		£5 16 6

BALANCE SHEET.

Liabilities.	£ s. d.	By Balances— *Assets.*		£ s. d.
To Balance, being excess of assets over liabilities ..	770 13 4	General Fund	82 13 1	
		Suspense a/c	5 16 6	
		Publication Fund	3 18 0	
		Library Fund	1 5 8	
		,, Investments at cost		93 13 3
		£430 War Loan..		
		£290 3½% Conversion Loan		667 0 1
		,, Subscriptions unpaid :—		
		Good	12 0 0	
		Doubtful	18 0 0	
		say		10 0 0
	£770 13 4			£770 13 4

Audited and found correct, this 21*st January*, 1927. F. B. CARR, O. R. GOODMAN, } *Auditors.*

The cost of catering for the Annual Exhibition, and hire of the necessary tables and chairs, was £16 16s. 0d. exactly.

These items together make up a total expenditure of £197 14s. 10d. which is £16 4s. 2d. more than our receipts.

This would I fear indicate that our Society was living on its capital, but fortunately we have a number of good friends among our membership, who every year come to our aid with donations to the Publication and Tea funds. One of these good friends, who is always a very generous supporter of the Publication fund, paid for all his halftone blocks and illustrations to the value of £28, while smaller contributions to this fund amounted to another £3 18s. 0d., and donations to the Tea fund realised altogether £14 16s. 0d., including one of £5 from Mr. O. R. Goodman.

This supplementary income of £46 14s. 0d., has enabled us not only to pay our liabilities for the year without touching our capital, but to increase the balance carried forward by no less than £30 9s. 10d.

The thanks of the Society are especially due to all those members who have given donations to the funds mentioned and thus enabled me to put a satisfactory balance sheet before you to-night for the year just ended.

I should personally like to thank Messrs F. B. Carr and O. R. Goodman for auditing my figures, and the latter for allowing his office to be used for the audit.

A Statement of Accounts and Balance Sheet are attached. (See pp. xviii.-xix.)

Arab Horsemen.
Teniet-el-Haad.

Photos A. de B. Goodman.

The Cedar Forest.
N. Atlas Mountains, Teniet-el-Haad.

OLD BISKRA.

Photos A. de B. Goodman.

DESERT WADY

The Land of the Sheik.

By O. R. Goodman, F.Z.S., F.E.S.—*Read February 10th*, 1927.

I trust the title of this paper will not conjure up visions of the romantic beings portrayed by the late Mr. Valentino on the films; the actual is very different from the fictional, as will be seen in the course of this narrative.

The inception of this expedition to Algeria was due to the unqualified success of our previous tours to Corsica and the Cevennes, as before the latter was finished I was already asked "Where are we going next year?" This question was carefully considered, and Algeria was finally decided upon, as not being too far off for a holiday of not less than three weeks or a month.

We are greatly indebted to Lord Rothschild, for his very kind advice, and for the valuable information contained in his Presidential Address to the Entomological Society of London for 1922; also to the interesting accounts of previous tours recorded by the late Mr. A. E. Gibbs and Miss Fountaine in the "Entomologist" for the years 1911 and 1906 respectively. The time of our visit required most careful consideration, as the variations in the climate are very marked; May was finally decided upon.

Before entering upon the details of our wanderings in this entrancing country, it will be necessary to give some general description of topography and people. Algeria comprises the central position of the North coast of Africa, and forms part of the so-called Palaearctic Region, whose southern limit is the Great Sahara Desert. The insects inhabiting this country are in almost every case of Palaearctic origin, showing that the Sahara is as impassable a barrier as any sea or ocean; the few exceptions had in nearly every case entered the district from the east, spreading from the south, by way of the fertile valley of the Nile, and not along the Western African coast. The climate, however, is more similar to that of the Ethiopian Region, and consequently is quite unsuitable to many genera which exist on the shores of Europe immediately opposite. The period of separation from Europe has also been sufficiently long to have evolved many species and subspecies, although very nearly related to those on the adjacent European shores. These remarks apply not only to the insects, but also to the mammals, birds, and doubtless also to the flora. The climate of Algeria is exceedingly variable, speaking as from year to

year, and in consequence the chances of the naturalist obtaining the indigenous species is much curtailed, as an insect which is common one year may be almost absent the next; further, a species which occurs in early April one year may not emerge until mid-May in the next. It may, therefore, be a land of great disappointments. However, our own expedition can be congratulated on being one of the lucky ones.

As Lord Rothschild has so ably described in the interesting account above referred to, the country of Algeria must be divided into three zones of distinct characteristics :—

First, the Coast Zone, consisting of a somewhat flat or undulating plain from twenty to fifty miles wide, rising to a height of not more than a few hundred feet above sea level, except for two or three ranges of mountains in the east and centre. This zone, which is called the "Tell," consists almost entirely of arable land, as instanced by the plain of the "Mitidja" to the south of the town of Algiers, which consists entirely of vineyards.

Immediately south of this zone rises the mighty range of the North Atlas Mountains, which attain a height of as much as 6000 feet or more; this range runs parallel to the coast, and is backed by the second zone called the High Plateaux, about seventy to ninety miles wide, and separated from the desert by various ranges of mountains, called collectively the South Atlas. The High Plateaux attain an average altitude of 2000 to 3000 feet, lying between the two ranges of the Atlas Mountains north and south, averaging an altitude of five or six thousand feet each. The Plateaux are broken up by various smaller ranges, and the streams from the Atlas descend into the cup and form large lakes called "Chotts," which disappear or are greatly reduced, in the summer time, by the abnormal evaporation.

The High Plateaux and the Atlas Mountains, are the regions where the indigenous fauna of Algeria is to be sought; and it is here that the larger mammals are to be found, such as the Barbary Ape, the Leopard, the Caracal, the striped Hyaena, and formerly the black-maned variety of the Lion, which was presumably exterminated over thirty years ago; there are also many smaller mammals.

The third zone of the country consists of the Sahara or desert region, which extends from the very foot of the South Atlas ranges and stretches in endless undulating sandy wastes with dry rocky outcrops here and there, and dotted occasionally with oases where many springs well up from the depths. These oases are planted with date palms (*Phoenix dactylifera*) and irrigated by channels from the wells; some are of very great extent and support many thousand inhabitants; that of Touggourt containing 170,000 trees, Biskra 150,000, and Ghardaia 200,000, the latter having a population of 43,225 natives. A great part of the desert is below sea level and many

schemes to flood it have been broached, but have been abandoned as impracticable.

The History of Algeria is most interesting, but must only be touched on lightly, as it does not fall within the scope of this paper, suffice it to say that since primitive times the Berbers, Phoenicians, Romans, Vandals, Arabs, Iberians, and Turks, have held sway until the final conquest of the Turkish leader Abd-el-Kader, in 1847 by the French, under the Duc D'Aumale, on which occasion the Turkish leader parted with the celebrated blue diamond. Since that time the French have consolidated their rule in spite of the insurrection of 1870. The present inhabitants of Algeria consist of the indigenous Berbers, the Arabs, and the nearly related Kabyle race, all Mohammedans, who live the life they always have lived since Biblical times. I have, however, spent too much time on generalities. So to the details of our enthralling experiences.

My colleagues in the party were all well-known friends and fellow members of our energetic Society, namely:—

Mr. Hugh Main, who was accompanied by Mrs. Main; Major C. E. Liles, the humourist; Mr. A. W. Richardson, whom I was able to cajole by my honeyed tongue. My son, who regarded his inclusion in the party as a matter of course, and myself, weighted down with the burdens of the administration of the Commune.

The work of research was divided equally amongst the members: Mr. Richardson taking charge of the Hymenoptera, Major Liles and myself of the Lepidoptera; Mr. Main was Nature Photographer in chief with my son as pupil, who had the supplemental duty of collecting everything he could lay his hands on in all orders.

We found ourselves very weak in Botany and Ornithology owing to the unavoidable absence of our much missed colleague, Mr. Candler.

Leaving London on the appropriate day of May 1st, 1926, we arrived at Marseilles on a stormy dawn following a drenching night. We embarked on the "Marchal Buguard" in trepidation, but in the quietude of the harbour ate heartily of an excellent lunch, with copious draughts of wine to restore our flagging spirits. However, after about an hour's experience of the open sea, we decided, with one or two exceptions, to retire to our bunks, there to lie prostrate and miserable for thirty hours. The dinner-bell aroused no enthusiasm, except in the Major who most unfeelingly spent all the voyage in bibulous libations to Bacchus, being credited with drinking six bottles of wine provided for our party at each meal. However, every good thing comes to an end. The next evening we reluctantly ascended to deck, to be immediately enchanted by the magnificent view of the African coast looming dark along the skyline, over which the sun sank with the suddenness it does in these southern latitudes, leaving a brilliant red glow along the whole of the mountainous coast, on which the twinkling lights of Phillipville, our destination, shone bright.

Darkness had fallen by the time we had finally disembarked and trudged up to our Hotel, faint, and hungry. However, we were much cheered by the pantomime of the Maltese luggage-porters being ejected from the hotel by Mr. Richardson's orders on account of their demands for baksheesh, which a kindly gendarme adjusted to our entire satisfaction in return for a small personal gratuity. A dreamless night merged into a brilliant dawn, and we hurried to inspect our new continent.

There is little but the nationality of the inhabitants to distinguish Phillipville from the French Rivierian towns. It is pleasantly grouped on the low hills surrounding the lovely bay of Stora, in which basks the little "Isle du Lion", which is supposed to resemble that animal· A beautiful coast road skirts the shore from the little fishing village of Stora; now high up along the coast on wooded heights and dells, and now at the foot of precipitous cliffs. Our exploration had to be somewhat hurried, as we were to leave for Constantine in a few hours. But our unflagging energy provided most interesting results, each devoting himself to his own speciality. The lepidopterists were rewarded by typical African butterflies, amongst which was the yellow orange-tip African relative of the Rivierian "Gloire de Provence," *Anthocharis euphenoides*, Stgr., from which it differs specifically in its paucity of the green mottling on the underside hind wings, and is named *A. eupheno*, L. Its relative, *Euchloë belemia*, flew strongly on the shore road, whilst the brilliant *Gonepteryx cleopatra* occurred occasionally, in company with *Colias croceus*. Examples of *Coenonympha arcanoides*, the African form of *C. arcania*, and the indigenous brown skipper, *Adopaea hamza*, were new to us, flying with our old friends *A. flava* (*linea*), Schiff, and *Thymelicus acteon*. A very distinct dark blue form of *Zygaena trifolii* race *rusicadica*, was common on the shore, but the commonest moth was *Deiopeia pulchella*, settling everywhere amongst the grass. It was interesting to note that *Pyrameis cardui* was still abundant though worn, presumably the parents of the Vanessid larvae we found in webs on a pink mallow on the shore. A Spanish copris beetle (*Copris hispanus*) found by Mr. Main was the solitary Coleopteron.

Birds were fairly numerous amongst the eucalyptus trees and date palms; a flycatcher and a black- headed titmouse with a grey body, being numerous, whilst nightingales trilled from the thickets, and buzzards and gulls sailed over the cliffs.

Our evening departure by train for Constantine took us through a district much like England in its complete cultivation; and if it had not been for the Kabyle women with their brilliant costumes, and the blue yashmaks covering the faces of the married women, with their 8″ earrings and heavy anklets, one could almost imagine oneself in Kent. The men looked very imposing and dignified in their white flowing robes and turbans, as they galloped,

with great cracking of whips, on their fiery little Arab stallions along the streets.

As we mounted slowly to our destination, we noted pastures dotted with many small Jersey-like cattle and goats, with encampments of nomad gipsy-like tents, here and there on the hills.

We found our "Hotel Cirta" at Constantine all we could desire; and this large town is full of oriental interest, having been built at a height of 2000 feet by the Phoenicians on a rocky plateau, and converted into a modern town by the French.

One of the seven wonders of Algeria is the gorge formed by the Rummel cutting its bed through the whole plateau to a depth of three hundred feet, the town being grouped upon its very edges, and connected by flying bridges. The entrance to the gorge is approached through the native portion of the town, where fondooks or caravanserai form the primitive inns or sheds visited by the nomad Arabs, whose markets are thronged with mules, asses and camels, tethered everywhere and anywhere, interspersed with the natives cooking, quarrelling, or vending unfamiliar merchandise.

Many of the flat-topped houses, even those bordering the road, are surmounted by the great flat nests of numerous storks, built on the chimneys and guarded by one of the birds whilst its mate wheels round and round on his striking black and white pinions over the dustheaps, from which he retrieves delectable and tasty morsels, or battles over some special tit-bit with a very powerful and fierce vulture whose plumage much resembles his own, but whose short talons usually prove too grasping for the storks long red legs to resist.

The entrance to the gorge is from the parade ground, and the path is cut from the rocky sides and secured by iron railings. The width of the chasm cannot be more than forty or fifty feet in some places, but the sides are sheer and precipitous, the nesting places of hundreds of all sorts of birds, who continually fly in and out the crevices to feed their young, whilst vultures sail around high up amongst the houses clustering on the summits. Jackdaws chatter on the rocks, and brown swifts dart up and down, catching the myriads of flies and other insects humming in the hot sunshine; whilst blue rock doves clatter from their holes, or are pursued by a swift and brightly coloured kestrel, whose great numbers prove the success with which their hunting efforts are attended. All these birds can be viewed at very close quarters, and give a unique opportunity for their study. The gorge is two miles in extent, of which half a mile is subterranean. The two exits were the favoured haunts of many butterflies, which included, among others previously referred to, examples of the Bath White, *Pontia daplidice*, and *Anthocharis crameri* (*belia*) fluttering amongst the rocky sides of the hill, together with a single specimen of *Melanargia ines*, one of our forlorn hopes, besides commoner species.

No further time being available, we left at mid-day for our long journey to Biskra. Leaving the "Tell" behind, we soon mounted through the bare mountain ranges and plateaux, to the Aures Mountains, a portion of the Southern Atlas. The rail crossed a pass at a height of three thousand feet, then over vast plains of esparto grass, great bales of which were stacked at the lonely stations for transport to Europe for the manufacture of paper. The district was dreary in the extreme, with little life, except for great quantities of wild fowl on several large lakes or lagoons. We arrived at Batna at sunset; and watched the pious Arabs spread their little carpets upon the platform and execute their devotions to Allah, prostrating themselves many times to the east.

After our rapid descent to Biskra in the dark, and in spite of a stifling night at our hotel, we arose fresh and eager for a view of the Garden of Allah and the Great Sahara Desert. The party separated for the morning, my son and I visiting a small outlying oasis called Beni Mora, escorted by two small Arab boys. The surface of the desert around the oasis had been roughly sown with coarse corn, now dried up, amongst which were large patches of a black burying beetle, *Gymnopleurus*, in some cases containing more than two hundred. The oasis was of date palms, each planted in a circular hole to hold the moisture which is supplied by ditches running between the palms. The shrubs were lovely pink and white oleanders, and scarlet flowered pomegranates. The commonest butterfly (called in Arabic *bofatato*) was our old friend the Wall, *Pararge megera*, almost indistinguishable from our insular friend, flying with a small form of *Lycaena icarus*, and a few lovely little blues, *Azanus lysimon*, most difficult to follow in flight. Our afternoon excursion, in spite of the sun, and such a sun, beating down upon our heads and creating a temperature of 115° Fahr. in the shade, was by camel-back to the Desert sand dunes, passing through the native village, mostly inhabited by indigenous Berbers, whose cleanly habits compared most favourably with the dirt of the Arab Kabyle population. The flat-topped houses and walls are all made of mud bricks parged over with similar material. The mosques have a tower with a serrated castellation; and as we passed we could hear the droning of the prayers, for all the world like the hum of a hive of bees. The stately stride of the camels at three miles an hour gave ample opportunity to the camel boys to collect numerous objects for the members of the party, including white scorpions (*Buthus occitanicus*), scarabaeus beetles, and numerous smooth lizards of the skink tribe (*Scincidae*), by the simple method of pulling down the mud walls in which they hid. After leaving the oasis, the resort of a lovely little fawn turtle-dove of a distinct species, we emerged upon the desert proper and gazed across the endless wastes of sand stretching for miles to the horizon, but dotted here and there with small green oases, amongst which small

spiral columns of sand gave warning of the terrible sand storms that sometimes occur when the sirocco blows. The camel boys enlivened the progress of the caravan by their native chants, most grotesque and weird, all given with great "Joie de vivre." After an excellent tea with luscious oranges, our return by a different route took us by the side of the little railway to the oasis of Touggourt, many miles away in the Sahara. Our camels were by no means disturbed by the approach of the train, but crossed the track quite leisurely, their stately gait reminding one of the difference between the modern age of hurry as compared with the leisurely ways of the past. On our way back my mount proceeded to confute the quotation from the Bible, that a camel cannot pass through the eye of a needle, by passing through a small archway into a field, and if not prevented would have swept me from the saddle.

A visit to Mchounèche was made by motor car, to the whole party's relief, as camel riding has painful after-effects. The shimmering air of the desert played strange tricks with the eyesight; and oasis and palms were seen floating in the mirage on the horizon, as we passed across the sandy desert hills between the oasis of Chetma, and the Aures Mountains. The marvellous weathering of these hills, as we wound along the banks of the oued or river was beautiful in the extreme; and the immense beds of white and pink oleander bushes on their edges, displayed a wondrous wealth of colour. On arrival at our destination, the Oasis of Mchounèche. we were received by the whole population under the tribal Sheik. He was thin and gaunt, with turban and bernous none too clean; and his satellites were of all ages and sizes. The small boys seized our nets, and collected such Pierids as were flying. An alfresco feast was held, with the assistance of the entire male population as waiters, in what was described as "une belle jardin," in the most welcome shade of the date palms. An excursion was made by the concealed mountain gorge into the Aures Mountains. The gorge is clean-cut right through the yellow calcareous cliffs, the stream twisting and turning amongst the rugged masses, and is the haunt of many frogs of a dirty green colour with a white line down the back, and others of a brighter green. Nearly every stone concealed one or more ocellated toads; big fellows, fat as butter. High on the sides of the gorge, over the steep declivity, that rare butterfly *Teracolus nouna* was lazily flitting in the most inaccessible positions. A few were taken, mostly by the agile Arab boys with their fingers. The only other butterflies seen, besides *Pieris rapae*, were that beautiful little tailed-blue *Tarucus* (*Azanus*) *theophrastus*, which has a delicately brown-pencilled grey underside, and feeds on a prickly form of caper tree, pupating in ant nests, like our *Lycaena arion*; one or two specimens of a skipper, quite new to us, turned out to be *Hesperia stauderi*. A stroll through the village revealed the only visible signs of progress in the number of Singer's Sewing Machines

in use. Our departure was heralded by an ovation from the whole tribe.

The modern Biskra is laid out in squares, and has well-built houses and hotels with all the amenities of life, including electric light, main drainage and water supply, a most picturesque Casino and Mosque. Entertainment is provided by the "Oued Nail" or dancing girls, and an amazingly arrayed Arab or Berber who much resembled our old cockney friend, the "one man band." The native market displayed for sale everything from pots and pans of Brummagem origin to Barbary Apes and Fennec Foxes, besides the most repulsive of sweets and eatables.

Our next stop was at El Kantara, "The Gate" to the desert, the centre for the hunting of the Barbary Sheep or Mouflon, which is confined to the Aures and strictly preserved. The chief industry, however, is the exploiting of entomologists; the train being met by a deputation of Arab guides with such words as "Sir, *charlonia* is just out, but *pechi* is over." A collecting expedition to the favoured localities was thus easily arranged. Guides, mules, and donkey-boys in ranks watched our al-fresco breakfast. The route was over the bare rocky hills covered with alfalfa grass, the haunt of jackals and fennec foxes, but the lower ground was roughly cultivated with rye, etc. More "skippers" were taken, and the crests of the hills were frequented by that very brilliant form of *Hipparchia semele* called var. *algira*, in company with numbers of *Melanargia ines*, flying amongst the alfalfa grass. The party also took about a dozen *Anthocharis charlonia*, which little yellow butterfly is of considerable rarity and of only local occurrence; the two *Pierids*, *A. crameri* (*belia*) and *A. belemia* were abundant, whilst the Lycaenids were represented by *T. theophrastus*, *Polyommatus icarus*, a diminutive form, and *Scolitantides baton* of the Algerian race *abencerragus*. It was here that the guides found the first chameleons resting on the rocks, upon which they seemed perfectly concealed by their sandy colour. When handled they opened their mouths and emitted a loud hiss much like that of a snake. Some of the geologists of the party found masses of fossil oyster-shells with corrugated surface, and the conchologists a truncated bivalve. Our return to the hotel, where two species of geckos were taken round the lights the previous night, and our departure were accompanied by the guides in chief bartering for the export of entomological rarities during the ensuing summer.

The two days spent at Batna were divided between archeology and natural history. A visit to the Roman remains of Lambessa and Timgad will be better portrayed by slides than described. These two towns are situated on a cultivated plain at three thousand feet high, and are in a wonderfully excellent state of preservation, especially the latter. Amongst the ruins of the former the haunt of the beautiful green-blue spotted lizard (*Lacerta ocellata*), we discovered the "skipper" *Hesperia onopordi* and *Melanargia lucasi* in

great numbers, the latter superficially hardly distinguishable from our own Marbled White.

The other excursion was perhaps the most memorable of our trip, visiting the massif of Belezma, which approaches six thousand feet in height and is crowned by the remnants of a cedar forest. The slopes are clothed with undergrowth of genista and other bushes, studded with many lovely orchids, squills of four species and masses of blue pimpernel, amongst which the brilliant yellow orange-tip (*Euchloë euphenо*) flitted in numbers. It was here that we obtained our chief entomological prizes. As the lepidoptera of these mountains seem distinct from any other, and may perhaps be mentioned in detail:—

Satyrus abdelkader var. *lambessana*. We obtained four specimens of this rare variety, which forms a May brood of the better known type species, from which it differs by having several blue spots in the forewing, resembling *dryas*.

Everes lorquinii, very similar to *Cupido minimus*, but larger.

Polyommatus hylas, unique form never before recorded from Algeria, and considered by Lord Rothschild as a new race.

Scolitantides fatma, one of the rarest and most beautiful of all the palaearctic blues, until lately considered to be a variety of *S. bavius*, whose nearest habitat is Lebanon in Syria; it has, however, now been separated from that species.

Issoria lathonia, *Pararge megera*, *Colias croceus*, and its var. ♀ *helice*, besides *Aporia crataegi*; one of the two Algerian *Melitaea*. *M. aetherie*, which only occurs in Europe at Gibraltar, and many other species, including a belated Theclid, presumed to be *Callophrys rubi*, but might possibly be *C. avis*.

After this delightful day, we departed by the night train for Blida, changing trains in the early morning at Alger.

Blida is situated in the "Tell," on the plain of the Mitidja, at the immediate foot of the North Atlas Mountains; and our hotel was situated near the summit at an altitude of 4,000 feet, and was approached by immense lacets up a projecting spur. The name of the hotel was "La Glacière," nor did it belie its name, as the temperature during our stay was never more than 5° above freezing point and much of the time at zero, accompanied by hail and snow. This contrast between the burning heat of the desert was trying, but failed to depress the spirits of the company, and all sallied forth in macs. and overcoats to explore the cedar forests in the cloud and mist, and in the few bright intervals we found an enchanted land. The little glades and rippling cascades overhung with firs and mountain ash, ferns and moss, might have persuaded us that we were wandering in the hills of our own Lake District, if it had not been for the unfamiliar banks of Yellow Tulips and beds of yellow and purple Violas and Gladioli.

A visit to the Col de Chrea gave a magnificent view over the

country of the High Plateaux, consisting of range after range of high mountains extending to the remote distance. The Chalet there is the head quarters of the Alpine Club who spend the winter in skiing and sleighing. On the walls is displayed the skin of a panther shot in the vicinity. During the bright intervals some nature photography was possible, and the nests of the Tarantula spider (*Lycosa*) formed interesting subjects, whilst birds of interest were noted, consisting of the Raven, Great Owl, Cuckoo, Partridge, Tits and Black and White Buntings. The most interesting butterflies taken were a form of *Pieris napi*, somewhat approaching the alpine *bryoniae*, and the first ♀ of *Epinephele fortunata*, the Algerian meadow brown, and in one spot some numbers of *Coenonympha arcanoides*, and a single *Lycaenopsis argiolus* caught by Mr. Main.

Our departure was enlivened by a financial altercation as to cost of transport, successfully dealt with by Mr. Richardson in his usual effective manner, in spite of threats of gendarmes, etc.

The Baths of Allah, or Hamman Righa, our next resting spot, was a spa situated near Bou Medfa in the "Tell," frequented by numbers of both French and Arabs, for whom two large separate Hotels are kept. The baths are of much value for neurasthenia and similar complaints. The water issues from the ground at a temperature of over 67° Cent., and was in medicinal use in Roman times. The baths are still to be seen and are in excellent preservation. Unexcavated ruins are everywhere. The hotel is one of the most pretentious in Algeria and is situated in most lovely gardens of subtropical vegetation, including date palms, agaves, eucalyptus, pomegranate, orange, lemon, and figs, with a central magnificent cedar.

It was here that photography commenced in earnest; and the party separated daily, each after his own speciality.

Hamman Righa, although considerably cultivated, is still a prolific locality and its lower levels produced a more varied fauna, the paths up the forest proving most productive. It was here we first discovered the land-crabs, sitting at the mouth of their holes in the banks at the edge of the gullies, and we think spending the nocturnal hours in the pursuit of vast numbers of snails, which form their diet. Reptiles were also numerous, and dark green snakes over 5 feet long of the genus *Coluber* were disturbed on more than one occasion, together with several smaller of a more dangerous appearance. Slow-worms, skinks, and large green and small brown lizards were seen; and we were fortunate to get a beautiful little yellow land tortoise about 2″ long, and subsequently the natives brought the black-shelled water tortoise, or terrapin, literally by the bucketful. Coleoptera were in plenty, the most interesting noticed being a very large oil-beetle, the ♀ of which had red spots on each segment of its abdomen; and a species of *Copris*, whose life-history will be shown by my son at the next meeting by means of slides. A new and interesting spider was noted spinning a horn-

shaped web in the genista, protected by a silken trapdoor behind which it sits in wait for such insects as enter the horn.

The butterflies were numerous and exceptional, ranging in size from the uncatchable *Charaxes jasius*, "the pacha of many tails," to the familiar Brown Argus, *Aricia medon* (*astrarche*). One which demands particular attention is the Algerian representative of *Eugonia polychloros*, which is literally as brilliant in coloration as *Aglais urticae* and has been distinguished by the varietal name of *erythromelas*. The magnificent Argynnid, *Dryas pandora*, was not uncommon by an ancient shrine to an Arab Queen, a point of pilgrimage to native devotees. It consisted of four stones laid in the shape of a grave and ornamented with handkerchiefs and rugs hung around, whilst the interior was adorned with candlesticks and a bowl of charcoal.

On the Aristolochia in the cornfields were some numbers of the larvae of *Zerynthia* (*Thais*) *rumina*, of which one or two belated specimens were taken. *Papilio podalirius*, approaching the Spanish form *feisthameli*, was not uncommon; whilst the previously recorded orange-tips and Pierids were very numerous. Fine *Gonepteryx cleopatra* reminded us of the European coast, whilst *Melitaea aetherie* gave us a grand series. The interesting Lycaenids included *Lampides boeticus*, the long-tailed blue, confined to one small spot in the fir woods, and one small specimen of *Plebeius martini*, of which more later.

Hamman Righa is a noted locality for Zygaenids, and we were fortunate in being able to find for our friend Mr. Grosvenor the two following species, *Zygaena theryi* and *Zygaena algira*.

A motor excursion to the Gorge du Chiffa, in the Atlas, introduced us to the Barbary Ape, which inhabits the Gorge in tribes of thirty or forty and descends to the Hotel, perching on the roofs and balconies and importuning the visitors by clinging to their clothes whilst being fed. The mother apes bear their offspring on the breasts and backs, and thus laden, spring with the utmost agility up walls and over roofs.

On May 27th our party was broken up and we had to take a sad farewell of our kind friends, Mr. and Mrs. Main and Mr. Richardson, who returned to England with envy in their hearts.

Major Liles accompanied us on our expedition off the tourist routes into the interior portion of the Atlas, fifty miles south of Affreville, a market town in the "Tell." The route to our destination, Teniet-el-Haad, lay across a sweltering plain extensively cultivated and extending far into the mountains, and then over winding passes through the wild hills, in which were situated little native villages, where the women either fled at our approach or hid their faces from our masculine eyes by the simple device of throwing their skirts over their heads. Arriving in the little square of

the town we were much discouraged and depressed by its situation, as no signs of woods or forests were visible, but only three or four dry, bare and sandy hills, and we retired to our modest hotel contemplating an early departure. A welcome rest in the fresh mountain air, however, somewhat revived our drooping spirits, and we departed on our investigation at an early hour. We emerged on the bare hills at the back of the cemetery and were astonished to find them swarming with insects, and what is more, of many species entirely new to us. *Melanargia lucasi* was in great numbers consorting with the swarms of *Melitaea aetherie*, of which the females resembled in coloration the polymorphic forms of *didyma*, ranging from straw yellow to steel grey in colour. Much time was spent in cutting cocoons out of the genista bushes under the mistaken impression that they were Zygaenids, but the emergence of small fly-like larvae in immense numbers soon undeceived us; they turned out to be a Psychid.

Several visits were made to "The Cascade" about two miles from the village, which was at this time nearly devoid of water, but the vegetation was more prolific along the stream beds, and delightful picnics were made and the most interesting nature photos taken. It was here that we found the two long-sought Algerian Lycaenids, *P. martini* and *P. allardi;* these rarities being in some abundance, especially the former. *Cupido lorquinii* was also in some quantities, flying with a belated specimen of *Glaucopsyche melanops* of special form. We were here fortunate enough to come across four specimens of *Hesperia ahmed*, a very large "skipper" of the *proto* group, at present imperfectly described, together with the Algerian *Hesperia ali*, very near to the *Hesperia sertorius* (*sao*) of Europe.

This little valley was also the haunt of land-crabs, skinks, and scorpions, which formed ideal subjects for photography. The scorpions were a species new to us (*Scorpio maurus*), which is much browner than the desert ones and has a varnished-like surface and thicker chelae. There was also an enormous green and pink grasshopper, the females of which were 5″ to 7″ long, whilst the males did not exceed 3″ to 4″. It was identified as *Pachytylus elephas* at the British Museum.

It was near this valley that we were treated to a sight rarely enjoyed by Europeans, namely, that of an Arab Gymkana or "Fantasia" as they call it. The crowd of about two thousand Arabs are drawn up on each side of a course on the hillside. Small groups of four or five Arab horsemen on their little arab horses, all dressed in their white flowing robes and turbans bound round with thin rope, formed in ranks and at the word of command charged full speed up the opposite slope in close formation, vieing with each other's horsemanship and bearing and discharging their

rifles whilst in full career. We were lucky to get a photo or two of this fine sight.

The chief attraction of Teniet-el-Haad is, however, the Cedar forest, the most extensive in Algeria, which clothes the entire summits of the mountains above 4,000 feet high. Imagine a chain of mountains nine or ten miles long entirely uncultivated and covered for its whole length with immense cedars of sage green, many rising to a height of 80 feet on the precipitous sides and fringed by the most beautiful parklike pasturage at their foot, the meadows being full of flowers and lovely grasses. The motor drive through this enchanted wood beggars description, but was by no means easy, on account of the many obstacles that had to be removed out of the way. The flowery glades were the haunt of more insects than we had previously met with. *Dryas pandora* dashing up and down, and now and then settling on a large Umbellifer. *Melitaea* in abundance. *Pararge aegeria* common in the shady recesses. *Colias croceus* very abundant, with a large proportion of var. *helice*. Three belated specimens of *Z.* (*T.*) *rumina*. *Pontia daplidice* in ones or twos, and *Gonepteryx cleopatra* even at this height. But the catch of the day was the new *Hesperia leuzeae*; that skipper was in dozens, both ♂ and ♀, and at once struck us as exceptional. It is excessively rare in collections, there having been only 6 or 7 specimens previously recorded, and it remains at present undescribed. The *Melanargia* were also most abundant, together with many more insects.

A final visit to the bare hills to the north of the town, a most forbidding looking locality, produced the same plethora of riches, and in addition, a couple of *Anthocharis charlonia* and a colony of *Cigaritis zohra*, which little copper we feared we had missed, flitted over the dwarf thyme amongst the alfalfa grass which formed the resting place of *Epinephile pasiphaë* var. *phillipina*. Another prize worth noting was a perfect albino specimen of *Aricia medon* (*astrarche*).

A word about our headquarters will not be amiss for future visitors to this favoured locality. The Hotel Moderne is managed by a most accommodating host and wife; and although humble in the extreme the accommodation was good and the fare well-cooked and plentiful. The bedrooms opened on a central courtyard, the haunt of a tame gazelle, which, when loose, held us to ransom in the shape of a packet of cigarettes, which it consumed with great gusto, but in the case of a non-smoker, like myself, rewarded my stinginess by puncturing my puttees; and when invading the Major's bedroom was received with a flow of language reminiscent of his military career.

It was with the greatest regret that we had to leave this naturalists' paradise on June 3rd, after five weeks of the most enjoyable and varied holiday we have ever had the luck to experience.

There is little more to say, except that two days were passed in Algiers itself, a fine town, but having little of natural interest.

Our voyage home to Marseilles was very different from our previous crossing, the water being without a ripple.

Lists of our captures are in course of preparation for publication, in case they may be of use to future travellers.

Thanks are due to the British Museum authorities for their help in naming many captures; to the lanternist, and to Mr. Dennis for the capital slides he has made.

Protective Devices in Spiders' Snares.

By Major R. W. G. Hingston, F.E.S.—*Read March 24th*, 1927.

Tropical spiders have numerous enemies, the chief being parasitic hymenoptera and diptera. They are also preyed on by insectivorous birds. Many of the species which weave circular snares introduce into the network special contrivances in order to protect them when seated in the web. The following are the most important of these devices.

1. *The String of Pellets.*—Manufactured by a Himalayan species of *Cyclosa*. A number of oval pellets are strung along the vertical diameter of the snare. They are the same size, shape and colour as the spider which sits at the centre of the web and exactly resembles a pellet.

2. *The Pellet and Hub Device.*—Manufactured by *Cyclosa centrifaciens*. Found at Akyab in Burmah. This species in addition to oval pellets places around the pellets a tangled thread in order to simulate the hub and its snare. The pellet with its artificial hub is mistaken for the spider surrounded by a real hub.

3. *The Insect Heaps.*—Manufactured by *Gasteracantha brevispina*. Found in the Andaman Islands. It collects the carcasses of its insect captures, swathes them in silk, and accumulates them in heaps. The heaps are the same size, colour and irregular shape as the spider at the centre. They serve as a decoy.

4. *The String of Pellets with encircling ribbons.*—A more elaborate device than the string of pellets. A series of ribbons arranged in concentric ovals are spread around the snare. They are white, conspicuous, composed of silk. Their function is to draw the eye from the centre, to disperse the vision from the danger point. A dispersing device.

5. *The Diametrical Cylinder.*—Manufactured by *Cyclosa cylindrifaciens*. A slender cylinder of silk is placed along one radius. The spider sits at the centre where it blends with the cylinder and looks like one end of it.

6. *The Diametrical Bands.*—Manufactured by *Uloborus coeniculatus*. A flat silk band is placed in the diameter of the snare. A gap is left at the centre. The spider fills this gap and by doing so makes itself a part of the band.

7. *The Diametrical Bands with encircling ribbons.*—More elaborate than the diametrical bands. Ribbons made of white conspicuous silk are placed concentrically around the bands. These serve as a dispersing device to carry the eye outwards from the centre.

8. *The Diametrical Threads.*—Made by *Uloborus filifaciens.* Found in the Andaman Islands. A white conspicuous thread is placed in the vertical diameter of the snare. A gap is left at the centre. The spider fills the gap and looks like an expanded part of the thread.

9. *The Cruciate Threads.*—Made by *Uloborus filifaciens.* The threads are arranged in the form of a cross. The spider sits in the centre of the cross and looks as if part of the cruciate device.

10. *The Central Shield.*—Made by *Uloborus scutifaciens.* Found in Burmah. A mat composed of silk with insects and debris interwoven is placed at the centre of the snare. The spider hides behind the mat.

11. *The Central Shield with diametrical ribbons.*—An elaboration of the last example. The shield is prolonged into ribbons which run along the upper vertical radius and lower vertical radius of the snare.

12. *The Central Shield with spiral ribbon.*—A conspicuous white spiral ribbon is wound around the central shield. Another example of the dispersing device.

13. *The Oblique Band.*—Made by *Uloborus crucifaciens.* Found in Burmah. A white strap is placed obliquely across the snare. The snare is spun against the bark of a tree, and the spider hides behind the strap.

14. *The Cruciate Bands.*—Two oblique bands across one another, the point of crossing being at the centre of the snare. The spider hides behind the centre of the cross.

15. *The Central Cushion with spiral ribbon.*—A mat or cushion is made at the centre. It is composed of silk and debris. The spider sits on and blends with the mat. In addition a spiral ribbon is wound around it which acts as a dispersing device.

16. *The Central Zigzags.*—The centre of the snare is full of a complicated mass of zigzags made of conspicuous white silk. The spider is concealed in the centre of the system.

17. *The Diametrical Zigzags.*—Made by *Argyope clarki.* A conspicuous white silvery zigzag is placed in the vertical diameter. At the centre is a gap in which the spider sits and looks as if part of the zigzag.

18. *The Cruciate Zigzags.*—Made by *Argyope pulchella.* The silvery zigzags are arranged like the limbs of a St. Andrew's Cross. A space is left at the centre. The spider sits in this space and

arranges its legs in pairs, each pair being continuous with a limb of the cross.

19. *The Triradiate Zigzags.*—Made by *Argyope catenulata.* The zigzag ribbons are arranged triradially with a space at the centre. The spider fills this space. On its dorsal surface is a triradiate system of silvery markings which appear continuous with and blend with the silvery zigzags in the snare.

20. *The Stick in Snare.*—Made by *Tetragnatha baculifaciens.* Snare is always spread around a piece of straight withered stick. The spider, which is elongated and slender, flattens itself against and blends with the stick.

21. *The Leaf in Snare.*—Made by *Tetragnatha foliferens.* Found in the Nicobar Islands. A leaf is dragged into the snare then folded into a tube and lined with silk. The spider lives inside the tube and can escape at either end.

A Short Description of the Argentine Chaco.

By Kenneth J. Hayward, F.E.S.—*Read July 28th*, 1927.

The locality, about which I propose to write lies in the North East corner of the Argentine, and comprises the Northern portion of the Province of Santa Fé and the Southern portion of the Gabernación del Chaco. Nominally, the whole area is referred to as the "Chaco," and to the average Argentine of the South it is looked upon as a terrible region, uncivilised, and full of dangers. Actually, it is far from being as bad as it is painted, and in spite of the small discomforts that go with such outposts of civilisation, its comparative loneliness, and the humid heat and mosquitoes of the summer months, it might well be worse.

The Forest.—To those who imagine a forest of giant trees and dense sub-tropical undergrowth, the hardwood forest of the Chaco must prove disappointing. With stumpy trees, comparatively thin undergrowth, and flower-strewn edges, resembles it very closely the New Forest or any of the great oak woods in England. Within and away from the woodcutter's paths and wagon tracks, they are covered with low bushes and a tangle of brushwood and rank weeds and grass, but are for the most part passable, though usually only at the expense of much energy and many scratches, for nearly all the undergrowth is thorned. Near water, where the trees exceed the general height, and where their branches mingling overhead give a cavernous half-light to the place, the usual undergrowth gives way to a few stunted bushes, and the soil is covered with deep leaf-mould reminiscent of some favourite beech-wood. The soil of the forest is almost entirely heavy clay, and the cart tracks are always deeply scored with wheel-ruts and the hoof-marks of bullocks. Whilst at all times rough and difficult walking, these tracks are knee-deep in mud and water after rains, and as they are the only means of access to the deeper portions of the forest, one must then make up one's mind to wade or stay outside. Branching off from the main tracks are numerous small overgrown but fairly passable woodmen's paths that have from time to time been cut to give access to the trees to be felled. From the fact that most of the undergrowth, like the trees, is of slow growth, combined with the scoring up of roots by the dragging over the ground of heavy logs, these paths remain open far longer than one would expect. There

are patches of sandy soil to be found but with little vegetation other than a few ground creepers and low growing plants, but these spots are rare.

Large patches of forest have at times been consumed by fire, and where these tragedies have taken place there now remains a cemetery of jagged, blackened stumps, whilst the ground on which they stand, cleared of all undergrowth by fire, now produces a desolate expanse of pampas grass, which growing amidst a tangle of fallen half-burnt branches is almost impassable. These burnt areas are not only desolate to look upon, but are usually found to be quite unproductive collecting grounds. Caranchos (*Polyborus tharus*) and the Chimango (*Milvago chimango*) sit owl-like on the blackened stumps, and an occasional forest chicken may scuttle hurriedly to the deeper shelter of the living forest, but insects and small bird-life are almost non-existent. Flowers seem to shun the burnt ground and an occasional rattle proclaims the presence of a suitable guardian of the desolation around one. In the living forest, where one expects a dim light filtering through overhead branches, there is actually much sunlight, since the trees for the most part do not grow close to one another. Overhead, *Papilio thoas* r. *brasiliensis* may be seen floating gracefully down some track far above the reach of any net. Danaids and Catopsilias fly hurriedly over the low undergrowth, and one looks for brilliant Morphos, but in vain, though *M. catenarius* r. *argentinus* most certainly ought to occur, and even possibly *M. achilles* in one of its forms. *Dione vanillae* flitting along the tracks, settling here and there on some flower head or bramble, takes one back to days spent after *Dryas paphia* in more pleasant times. Many species of *Thecla* flutter around the bush-tops or settle on the tall flowering weeds that have escaped the wagon wheels, and there are places where one may watch the brilliant *T. marsyas* in dozens, flashing in the sunlight.

In the deep shadows of the bushes and in the deeper parts of the forest, many Euptychias flit in and out of the shadows, with the yellow *Terias deva*, and more rarely the white *albula*. *Phyciodes ianthe* is everywhere in all conditions of wear, from freshly emerged specimens to rags. Around the damp muddy parts of the roads where the sun has not yet succeeded in turning the soft clay into cement-like hardness, this insect with the Euptychias and a few stray Hesperiids rise in clouds, as do the yellow *T. orobia* in the forest region near the rivers. In many places along the cart tracks, where it has been necessary at some past time to raise the level of the track, the earth has been taken from alongside leaving an excavation, and these and other hollows in the forest, often right in amongst the bushes, become in wet weather and for varying periods after, small ponds. Around these, amongst the lush weeds, *Terias* and *Anartia amalthea* (form *roeselia*) are to be found, and occasionally an *Ageronia* flits moth-like further into the shadows. Skippers are

common everywhere, but for the most part the Hesperiids prefer the open land and remain outside the forest. Along the small branch paths where often the bushes meet overhead, one walks with a feeling of expectancy, but except for the ubiquitous *Terias* and Euptychias, an occasional *D. vanillae*, and perhaps the here somewhat rare *Colaenis julia*, one seldom brings much to net. In the more open glades *Papilio hellanichus* is common. Most of the local insects may from time to time be met with, but apart from those mentioned above there seem to be few true forest species. After rain, when there is much water lying about, Odonata abound, and at any time careful search of flower-heads will produce a goodly bag of small beetles and Rhynchota. I have turned many a poor day into quite a successful hunt through this means.

The commonest tree is the Quebracho (*Schinopsis lorentzii*) but around the factories this has been considerably thinned out. Some of the most frequently occurring trees apart from Quebracho are Urunday (*A. astronium*), Guayacan (*Leguminosae*) of two species, White Quebracho (*Aspidosperma quebracho*), Ibirapitá (*Peltophonum vogelianum*), Espina Corona (*Gleditschia amorphoides*), and various species of Algarobo (*Prosopis*). The undergrowth is almost entirely thorny by nature, and Coronillo (*Scutia buxifolia*) predominates, whilst in places there are thickets of *Berberis*. Yellow and white laurel (*L. hediondo* and *C. preta*) and Nangapiri (*A. pitanga*) are also very much in evidence. A few cacti grow amongst the undergrowth, often towering to the tops of the neighbouring trees, and at certain seasons there is a mass of pink or cream lily-like flowers whose pungent scent draws many insects. Where the soil is drier, two species of prickly pear (*Opuntia ficus-indica* and *O. monacantha*) bear their fruit.

Wild animals in the immediate neighbourhood of the villages are confined to an occasional "guasuncho" (a small species of deer), foxes, and a few small forest hares. For larger and more varied game one must go further afield or to the river region. Where the forests have not yet been exploited quite a number of wild beasts may be observed, especially if there is water near at hand. Game birds abound everywhere. On the open land and especially that near or under cultivation, partridges are very plentiful, with an occasional martinetta (*Rhynchotus rufescens*). Near lakes and along the forest edges two species of forest-chicken and occasionally a wild turkey may be picked up. Duck will be found wherever there is water, and there are at times geese along the rivers, and very rarely a wild swan may appear. In the marshes there are many species of snipe, and four or five species of doves and pigeon often help the camper fill his pot. Apart from these better-known birds there are a great number of lesser-known edible birds, many of them very palatable.

Along the forest edges are isolated clumps of bushes and small

trees, mainly mimosa, or *Leguminosae*, and the small fruit-bearing "nangapiri" is very plentiful. It is seldom that the pampas grass fails to give way to a riot of flowering weeds about fifty yards from the edge of the trees, and this strip is the best collecting ground we have. Practically every species of butterfly is to be found fairly commonly, with perhaps the exception of *Pieris monuste* and *Colias lesbia*, and some of the water-loving species. It is no unusual thing for an hour's stroll along a suitable strip, where there are plenty of sun-traps, to produce up to and often over thirty species. When the mauve Composite, *Vernonia chamaedrys*, is in flower, this plant which grows sparsely and in clumps, must be visited as often as possible, as it has a very great attraction for all species of Grypocera except possibly the Hesperiids, but even species of this group are at times taken at its flowers. I have stood by a single clump and taken nearly a dozen species in probably as many minutes. Many species visit this plant in numbers that are never seen during the remainder of the year. Where they then go is a mystery. The plant flowers for a few days only at the end of January or the beginning of February, and one must remember from year to year where the clumps are situated, and be ready at the exact moment, for the insects visit the flowers only in their first freshness. Moths of certain Bombycid genera swarm over it, and the careful working of a bush will often produce unexpected rarities amongst the moths. There are several flowering bushes that for some reason never produce an insect, whilst others with crude and almost colourless flowers are always full of insect life. Only experience shows which will repay a visit, and at first much time is wasted searching unsuitable plants, and missing out the attractive ones which outwardly have nothing to recommend them.

Beating for larvae has proved most disappointing. One or two plants such as *Scutia*, *Berberis*, and some creepers such as *Smilax* and the *Passiflorae*, are always worth searching, as they are the foodplants of several species; but indiscriminate beating, in which one must indulge in a land where the foodplant and larvae of most species are little known, brings very little grist to the mill. Most of the larvae I have had the fortune to find have been obtained either accidentally or by close and continued observation of the imagines, which have been watched till chance has revealed a female ovipositing. In many cases the finding of stray larvae leads no further, as without definite indication of the foodplant there is nothing to guide one in making a choice from the vast number available. This is especially the case with numerous larvae brought me from time to time by friends and natives, the former usually being delightfully vague, and the latter quite without ideas, on the subject of the foodplant. When the larva is full-fed all goes well, but only too often I have had reluctantly to file away a carefully typed, but quite useless, description in the somewhat faint hope that

some day the larva will turn up again under happier circumstances.

Searching trunks is almost useless. For two years I have spent much time in the forests at this occupation, with great expectations, but with sad results; and I believe the only moth ever found was a specimen of a common Geometer that quite possibly had but just settled on the trunk, being a day-flier. I put this lack of tree-trunk life down to the prevalence of ants, which would assuredly carry off any insect foolish enough to attempt to spend its day in such a position. One occasionally comes across cocoons and pupae on certain trees, but they hardly warrant the time one is inclined to waste over this method of searching. Nowadays, except as a means of resting, I have given it up.

Pupa-digging is also rather of the nature of a "lucky dip." I have on one or two occasions obtained a few pupae this way, but usually from trees on which I have had previous evidence of larvae feeding. One can do much more good with one's time searching for imagines amongst the flowers and foliage than attempting to add to the bag by the more specialised means of obtaining specimens. There is plenty of time to resort to these methods when the fauna is better known.

Ants, which I have just mentioned, are one of the plagues of the country. They abound everywhere and are most difficult to eradicate. Agriculture suffers severely from their ravages, but being on a large scale survives, whilst the gardener with his small patch of flowers and vegetables has to wage incessant war against the hordes that nightly strip bed after bed of every vestige of leaf, or burrowing destroy the roots. Not only must he destroy with poison and fire the nests located in and immediately around the garden, but must watch the boundaries of his land for signs of the narrow ant-path which indicates the arrival of some foraging party from a distant nest. Where they have grown and multiplied undisturbed their nests have reached vast proportions. Often the low sandy mounds are five or six yards in diameter and one can count upwards of fifty or more entrance tunnels, from which radiate to all sides a network of ant-paths varying from less than an inch to over two inches in width according to their age. These paths are cleared in a day of all vestige of vegetation; obstructions such as small twigs, etc., are all removed, and along them proceeds a double line of ants, going out unburdened and returning laden with grass or leaves. A procession that commences shortly after sunrise to continue till sunset. These paths lead often to patches of vegetation four hundred or more yards from the nest, and the labourers bring back leaves and grass of species that often grow on the nest itself, or which at worst could have been obtained a few yards from the ant-heap. It is a problem that has given me much thought, this ranging so far afield for nest material obtainable so close at hand and at the expense of so much less labour. I can only think that it is instinct that warns them to

avoid exposing the sight of their nest, or interfering with root-borne drainage by utilising and eventually killing the vegetation immediately on the site of their nest. But even then—why go so far afield ?

The River Region.—Lying some 35 miles to the East of Villa Ana, and at this point flowing due South, is the great Rio Parana, here, and for some hundreds of miles further North a waterway for river traffic. More or less parallel to this river to the West, and at a distance that varies from ten to twenty miles, runs the Paranaminí or Little Parana, whilst between these rivers is a network of intermingling streams and lakes of depth and size that have direct relation to the amount of water being carried by the parent stream, the Parana. The land here is low-lying, and at times during the later summer months the whole area is submerged, and in one of my camps in that neighbourhood where the tent was pitched some 18 to 20 feet above the level of the Rio Pindo, the trees bore traces five feet up their trunks of the previous year's "cresciente." This area is reached from Villa Ana along the small railway to Puerto Ocampo on the Parana. Leaving Villa Ana one passes through a wide belt of partially cleared forest devoid of water and in consequence lacking the usual birdlife. Coming out on the other side, the railway twists and turns its way through some thirty miles of agricultural land—full of partridges—with the village of Ocampo in its centre. In the spring this land is blue with flowering flax, and here and there numerous lapacho trees with their masses of pink flowers brighten the landscape. At a point called San Vincente the railway crosses the Rio Paranamini on a long wooden trestle-bridge, and the agricultural land gives way to low-lying ground covered with pampas grass and reeds, and dotted with woodland and large shallow lakes, which during the summer are a mass of colour from the yellow, white, pink, and blue water flowers that grow so luxuriantly on them. It is in the deeper of these lakes that one may occasionally find the great *Victoria regia* with its tray-like leaves and enormous white flowers. Whenever possible, we visit these parts to fish or shoot or collect.

It was here that I spent fifteen days camping during the spring of last year. During this time I and a friend lived entirely on our guns and rods, having left civilisation behind us with only a few indispensable dry goods. And we lived well. Leaving the railway at Pindo, where it crosses the Rio Pindo over a smaller trestle bridge, we loaded our camp kit on a canoe, and sent it North, whilst we followed along the banks shooting for the day's pot as we went. This walk up to the junction of the Rios Pindo and Paranaminí, where we had decided to make our first camp, was a revelation to us both. Only in Southern Europe have I seen such a medley of flowers as met our gaze in some of the small clearings we crossed,

and it was in one of these clearings that I first made the acquaintance of *Papilio perrhebus* which was afterwards to prove so common. It was delightful lying in camp to watch this beautiful *Papilio* flying all around one over some low growing flowers that covered the ground around the tent. We camped on the West bank of the Pindo right opposite the point at which the Paranamini cuts into it, and remained here for six days, afterwards moving back through Pindo to a site further South. This proved better hunting-grouud, camping this time on the far bank, but at a spot where it was possible to cross the river without a canoe, thus having access to both banks. The rivers here are sandy and for the most part running in deep troughs, though in places the banks are low and bare of vegetation other than coarse grass. Where the banks are high they are almost invariably covered with a fringe of woodland, varying in depth from a few yards to several hundred. Usually on the immediate edge of the bank there is a thick cane-brake, mingling with, or replacing, the trees and usual undergrowth. This bamboo is the favourite haunt of a *Lymnas* (probably a form of *aegates*), an insect I took here for the first time, and which though common is far from plentiful. It has a well marked habit of settling on the underside of leaves where it is not easily detected. Amongst these canes there are one or two other somewhat uncommon species, but so local that hard work will usually yield a good series, once they have been located. Very common also amongst this type of forest is *Phyciodes orobia*, which replaces the *P. ianthe*, that is so common in the drier forest. As in the case of *P. ianthe*, *T. orobia* loves to sit on damp patches of earth, and one day especially many thousands must have been settled in a dip where several shallow mud-holes were rapidly drying up. Along the edge of these pools sat dozens of Caranchos (*Polyborus tharus*) waiting for the luckless fish that were jumping ashore in their efforts to find deeper water, whilst several Storks (*Ardea cocoi*) waded solemnly about eating their fill. Backing on this woodland border to the rivers is flat land covered with shoulder-high pampas grass, progress through which tires one's body and temper. This grass produces little of interest except an occasional partridge, but quick handling of the gun is difficult owing to the tangle, and many a shot bird is never picked up. Dotted about amongst this wilderness are small clumps of trees and larger patches of forest, sure sign of lakes, and at times the pampas grass thins out and one finds oneself on slightly higher ground of fine turf, often graced with the beautiful yellow iris, *Cypella herberti*. Walking over this country is far from pleasant, since the surface of the ground is so rough that I doubt if one in three steps finds the foot bearing evenly on the ground. During my stay in this district I averaged nine and a half hours walking per day, and for the first few days suffered severely from bruised feet. The lakes—or lagunas as they are called locally—and water holes with which the whole district

is dotted receive their water from the periodical floods augmented by rain, and perhaps in a few cases by back filtration from the rivers. They may be divided into three types. The permanent laguna, the semi-permanent, and the simple mud-hole. These latter are just depressions in the ground filled by some previous flood, and being shallow last but a limited period. They have no trees or special vegetation around them, and one usually comes upon them unexpectedly amongst the pampas grass. They are invariably well-stocked with palometta and small dorado and often with one or two small alligators (*Caiman sclerops*) in attendance, varying in length up to about four feet. The semi-permanent lakes are either deeper, or so placed that they receive surface-drainage from a large area, and so last longer than the mud-holes, which they resemble onlv in the fact that their presence is seldom indicated by surrounding trees or tall vegetation. As one approaches they sometimes appear like a large green lawn, an appearance given by a fine trefoil water-weed, with which they are often covered, its surface brightened here and there by coloured water flowers, especially the creamy *Sagittaria montevideënsis* and several *Pontederiaceae*, of which the commonest are probably the purple *P. cordata* and the bluish *P. azurea*. On its weedy cover stalk the gaily coloured Gallito de Agua —*Jacana jacana*—whose wings bear a terrible pointed spur, and whose plumage appears at one moment green, the next red, as they change their position in the sun. An occasional ducks wims on the open patches of water, snipe of many species rise from the reedy edge, and where the bank is clear one often sees the forest chicken (*Aramides ypacaha*), which being but poorly equipped for flight, is correspondingly keen of eye and fleet of foot, betrayed time and again by its innate inquisitiveness. Wading across these shallow lakes, as I have often had to do to retrieve birds shot for the pot, is far from pleasant. The thick weed growth tangles around one's legs whilst hiding, if only in one's thoughts, alligator and anaconda, and the soft mud at the bottom continually threatens to suck one down as effectually as a Dartmoor bog. At dusk thousands of dragon-flies take toll of the small diptera that such places harbour, but otherwise these pools are of small interest to the entomologist.

The deep permanent lakes take two forms. Those that in times of flood link up to form a waterway are usually of little interest, being no more than large expanses often many acres in extent, enclosed by more or less steep banks six to twelve feet high with a narrow sandy strand. Home of many fish that often run up to considerable weight, they are the happy fishing ground for a large black cormorant-like bird—*Phalacrocorax vigua*—and for many species of kingfishers. It was alongside one of these lakes that one early morning I stumbled on a fairly large alligator back in the pampas grass some twenty yards from the beach. Which of us got the worst shock I cannot say. Finally there are the tree-girt permanent lagoons, home of

numerous alligators that in these pools reach a length of nine or ten feet, and of the giant water snake, the anaconda. Whether the species that makes its home in the Chaco pools is con-specific with the *Boa anaconda* of Brazil I cannot say, but its habits are the same. Unfortunately, this snake does not confine itself to the water, but loves to come out and sun itself on the bank, or climb into the branches of some nearby tree. The only specimen I have personally encountered alive was sunning itself in my path several yards from the bank, and was probably ten to twelve feet long, not a large specimen as they go. In my sudden shock I unfortunately allowed it to escape. The trees that surround these lakes are large since they never fail for moisture, and the undergrowth is luxuriant. The lakes themselves are usually fringed with reeds and their surface covered with leaves of water lilies and other water plants. When in flower these lilies with their yellow, blue, and pink flowers make a wonderful show. Some of the pools have large clumps of the effective *Echinodorus grandiflorum*, which rises far out of the water with its masses of whitish flower-heads. More rarely, the red *Victoria cruziana*, or the white *V. regia* may reward the searcher, but both these plants are far from common. The water is deep, dark, and forbidding, and few waterfowl venture on its surface, preferring the safer shallow and more open lakes where the alligator is less numerous. Should a shot bird fall on one of these pools there is a slow swirl, a sudden breaking of the surface, a splash, and the water closes silently over again, and the incident is forgotten by the wild, though it will linger for many a day in the sportman's mind. Around these lakes float Danaids resting on the water flowers. *Anartia amalthea* with its brilliant crimson patch flies lazily amongst the tall green weeds, forming a brilliant contrast to the bright blue Flower of St. Lucia (*Commelina sulcata*), whilst yellow *Terias* amongst the low growing vegetation, and Catopsilias flying higher or seeking out the red flowers they so love, add yet another colour to the scene.*

The forest in this region differs somewhat from that on the higher ground. The undergrowth is more scanty, probably due to constant inundations, and is mostly of faster growing vegetation, many of the trees being of the softer species of timber, quebracho being noticeably absent. For the most part the trees are taller than those having to depend solely on rainfall for their moisture, and the effect of the proximity of water is noticeable everywhere. Where there is any real tangle of undergrowth it is usually due to bamboo, which has sprung up amongst the existing bushes. In the open there are patches of scarlet-flowered algarobo (*Prosopis alba*) with its twisted oak-like trunks; and a little to the West of the Paranaminí at San Vincente, and running North and South

* Whether Catopsilias have a preference for red flowers or whether it is that the local red flowers contain most honey the fact remains that—locally at any rate—they are more often seen at red flowers than at any others.

for about a hundred miles, there is a narrow, well-defined belt of the red-flowered *Cebo* that is so well marked out, as to be noticed immediately one enters it. Within this belt the vegetation changes from that one has been passing through, and is constant throughout its length. Probably it is due to some fault that has thrown up a different soil, but I have never verified this. Parasitical growths are common in the river forest. Lianas droop over the rivers, and in the spring great masses of purple and pink convolvuli cover in places the shorter trees and the bushes. A little later the *Bignonia*, *B. unguis-cati*, often covers the largest of the forest trees with its masses of yellow blossom. Lichens are everywhere, hanging in swaying beard-like masses from the trees. In places along the rivers Pindo and Paranaminí there grows a species of mistletoe, but coarser, broader-leaved than that which graces the English apple-orchards. This mistletoe is beloved by the small green parrots who build their clumps of nests amongst it, screaming hate and defiance at anyone who dares approach. To add to the colour of the forest in spring, an occasional lapacho tree, still leafless, throws out its covering of pink flowers, or the jacarandá (*Jacaranda ovalifolia*) its mantle of deep blue. Shooting in the early hours, whilst the ground is still wet with dew, a sweet citrus-like smell often attracts one's attention, and will be traced to a small white flowering bush, but this sweet scent fades as the sun rises.

In the forest proper the insect-hunter finds little to interest him. An occasional *Ageronia* persistently returns to its appointed tree, and may at times be found in numbers on the lower sides of rotting fallen timber. Everywhere there are numbers of the shade-loving Euptychias, and at times *Terias*. The main wealth of insect-life lies on the borders of this woodland and in its flower-strewn glades. Here in well-watered suntraps one finds a fairyland of scent and colour. Purple and white petunias, red, purple, and white verbenas, tall pink delphiniums, red-berried solanums, pavonias of various colours, white and yellow daisies, heliotrope, tobacco, vetches, and countless other lesser known flowers, a wonderful riot of colour. Under the midday sun the scent from this medley of flowers becomes almost unbearable, especially that of the petunias which predominate. Nearly every species of butterfly will be found in these spots. Many skippers and all the species of *Eudamus* that occur in this district, four or five Papilios with the black and red *perrhebus* everywhere. The Danaids *gilippus* and *erippus*, *P. larinia*, *E. hortensia*, and other prairie-loving species. An occasional *Terias* or *Colias*, *Pyrameis brasiliensis* and *P. carye* in numbers, whilst around the edges fly Catopsilias. On low bushes and flying around isolated mimosa bushes will be four or five species of small blues and Theclas, prominent amongst them the beautiful metallic-blue *T. marsyas*. The commonest of the Theclas, *T. argona*, is best taken at sunset,

when at times many hundreds may be seen flying around the bushes, twisting and turning in their marriage flight. A single sweep of the net will entrap quite a respectable series, but mostly males. By day this species flies in and out of the thorny branches, and its capture is a matter of difficulty, and often damage to the net. *A. jatrophae* flies equally in the river and the drier forests, and is never common, unless it be on the purple *V. chamaedrys*. Apart from the species mentioned, there are many that may be classed amongst the rarer species, rare in most cases because they are either very local, or because they are easily overlooked. I believe the latter reason accounts for the very small number of Theclas I have taken compared with the large number of species the American fauna contains.

Camping in this region was a delightful change from the routine of everyday life. Time had no place in our arrangements, we had no watch between us and depended on the sun as a guide to the hour. That and our hunger gave quite a good enough indication of meal times. Both our camps were pitched on the river's bank at the edge of a forest glade, where both wood and water were close at hand, and our breakfast could be caught without the bother of dressing.

After a few days we automatically fell into a sort of routine, which we followed without break till the end of the trip. Dawn saw the writer already on his way to some lake or wood to shoot the day's dinner, to return to camp four hours later, sometimes earlier if sport had been good and found near at hand, ready to make short work of a dish of fried fish that under ordinary circumstances would have done a family well. Times were when the camp guard had no luck, and but for the aid of the butterfly-net worked cunningly under some unsuspecting shoal, we should have gone hungry. The mornings were devoted to entomology or shooting, and usually we returned to camp at midday for a light meal, but on those days when we visited the further portions of the forest we contented ourselves with a few scraps carried in the pocket. Luckily the water of the Pindo, though slightly brackish, is good to drink, so we avoided the trouble of having to boil or chlorinate our supply, and were able to get a drink more or less whenever we wanted one, as we seldom went far from water. On the days when we carried our midday meal, we seldom got back till dusk; but on the other days the afternoon was always treated more or less lightly. We never failed to go out fishing, shooting, or collecting, but except on a few days when the larder was low, it was more of a pleasure than a business trip. At dusk came the great event of the day, the cooking and eating of the evening meal. Cooked in the half-light of the dusk, or more often by the light of the stars and the camp fire, with the tang of the wood smoke in it, and with the hunger one can only cultivate in the open, food never tasted better. And

one rested with the feeling that one had earned it. After dinner we would sit on the river's bank and watch the fire-flies, and at times the distant lightning, smoking, and discussing the day's adventures and making arrangements for the morrow. Then bed, and almost before one had properly wriggled into the blankets the greying of the canvas of the tent walls showed that another day was dawning and it was time to be up and out again. Times were when we were soaked by tropical downpours and violent storms, and we had to build fires to dry out again; and daily almost, I was soaked from the waist down on my early morning shooting trip by the heavy dews, but walking and the sun dried everything before camp was reached again. We took a peon with us to look after the camp whilst we were away from it, but another time, if possible, we shall add a third member instead, and take turn about in camp, and so get at least one easy day in three.

Sugaring was tried at both camps with absolutely no results. Not an insect came to the sugar-patches, and the only insects taken at night were a few common Noctuids that came to the camp lights. Another year it is hoped to try both light and sugar on a bigger scale, and probably dusking would yield results, but I must admit that last year I felt very little like night-work after the long days we had, which commenced at four and included at times up to eleven or twelve hours walking over rough country. Apart from the rough surface of the ground which tired one's feet, the continual forcing one's way through undergrowth, and long treks through the pampas grass were in themselves very tiring. One of our very great regrets during the trip was the absence of an ornithologist. The bird-life was marvellous, birds of almost every size and colour, from humming-birds to toucan, storks, and geese. It would be no difficult task a get a hundred species in a short trip, but one would need a skinner, at any rate till the commoner species had been brought in. My game-book shows that I shot for the pot some seventy birds of thirteen species, and there were at least another five or six species of edible birds fairly common, that for various reasons went free. One of the interesting sights of this river region is the work of a black and red spider, that builds a giant communal web stretching for many yards across some forest ride or clearing. By day these spiders ball up in a huge football-like mass that may be mistaken for a wasp's nest. About sundown this ball dissolves itself and each pair of spiders rushes off to its own particular part of the web. Immediately, there is great activity in repairing any damage suffered during the day and as the prey commence to arrive they are duly dealt with. Towards dawn the spiders return to their sleeping place and once more ball up for the day. To see the real beauty of these huge webs, it is necessary to find one wet with dew, with the pink rays of the rising sun slanting across it. Woe betide anyone who unsus-

pectingly walks into one of these webs in the dark. He spends some considerable time afterwards in removing spiders from every part of his anatomy. They are apparently quite harmless, and do not attempt to bite, being as eager to get back to their fellows as you are to get rid of them. We had one of these webs across one side of our camp, the short cut to the fire, and one or other of us found it most nights! It was with great regret and very pleasant memories that we returned to our normal mode of living, to look forward to the next camping trip in the Chaco forests.

Open Areas.—Cultivated land covers but a small portion of the total forest area, and yields little to the entomologist that he cannot equally well obtain in the woods. Very little alfalfa is grown in this district, but wherever it appears *Colias lesbia* flies in great numbers, and one can spend a pleasant hour variety hunting. *Lesbia* varies in much the same manner as the better-known *C. croceus* (*edusa*) and all the small variations of the latter, which have received—in some cases perhaps unfortunately—varietal names, can be also found in *lesbia*. The white female form *heliceoides* appears more frequently than the yellow form in this district, and all the usual intergrades of colour may be found. Round Ocampo and in the district between this village and the villages of La Isleta and Las Toscas the pretty little *Terias elathea* flies abundantly. But both *lesbia* and *elathea* may be taken—if sparsely—away from cultivation. *Pieris monuste* favours the neighbourhood of gardens, but is never common hereabouts. I don't suppose I see more than fifteen or twenty specimens in a year, and these almost invariably when I am about on business.

Where the land is not cultivated, yet cannot be classed as forest proper, it consists either of "esterro" or somewhat higher waste-land. The latter is usually covered more or less thickly with pampas grass with large patches of tall coarse flowering weeds, especially the yellow *Solidago microglossa* and another tall Composite (probably a *Senecio*), which two flowers give the whole area a brilliant yellow hue; or a white Compuestas that grows freely in certain parts. Amongst the pampas grass, and wherever it can obtain a foothold, the pink Composite, *Eupatorium hecatanthum* struggles for existence. Scattered about these weedy patches are stray mimosas, and several leguminous bushes and small trees, chiefly *Prosopis*, often covered with some species of passion-flowers, with their sweet scent and large orange fruits. Through the tall grass cattle turned out to graze have beaten narrow tracks, and it pays to follow them instead of struggling through the grass, stumbling over roots and ant-hills (which abound), especially as the tracks lead to water or to good grazing and incidentally open ground. The grass is often too high to see over, and contains nothing of much interest to the collector, and although many birds nest in the

clumps, it is usually only by chance flushing of the parent bird that the nest is located. Partridges rise at intervals, but usually the height of the grass prevents a shot being taken, or if taken the bird is many times lost without a good retriever. There is one small and rare butterfly, that I have not identified, only to be found amongst this grass, but apart from this insect I shall always associate the country with the picture of *Danais* floating lazily overhead.

The esterros are low-lying land that in times of rain becomes huge swamps, often being covered with water to a considerable depth. They are the home of many wildfowl, both water-fowl and land-birds, and where adjacent to forest will usually contain a considerable number of other species of game. The nature of the esterro, waterlogged and productive of little of value, and usually impassable except on horseback, causes man to avoid its neighbourhood as much as possible, and it therefore becomes automatically a game sanctuary, where wild life is seldom disturbed. Only in the driest periods are these swamps open to investigation by the collector, and then apart from Odonata and certain water-loving insects they produce little of interest to the entomologist, but to the collector of birds they are rich in prizes. One must be prepared to be half-eaten alive by mosquitoes whenever one ventures into any of these swamps, be they never so dry. The most ardent of dipterists would after one trip be prepared to seek his mosquitoes, where they were less numerous. I have not previously mentioned mosquitoes, probably because they do not worry me very much, their singing and constant buzzing around annoying me far more than their bite, which in my case gives but a few minutes' irritation. They are to be expected everywhere and one must go prepared. Lying up for game when the use of strongly smelling preventatives (such as citronella which is one of the best of these preparations) is barred, and movement must be reduced as much as possible, one suffers severely. There are times after rain when even the most hardened cannot with comfort venture into the forest, and there have been one or two occasions on which I have been obliged to give the mosquito best and go home. There are many species and I regret that up to the present I have not collected them seriously, although a few I sent home some time ago gave interesting results. Apart from the mosquitoes there are few bloodsucking flies. One Tabanid is fairly common, but by no means a nuisance, though one evening when I was out dusking this insect was swarming everywhere around the forest, and only my thick clothing and use of the net saved me from its attentions, and it was such a nuisance that I had to give the forest a wide berth for two or three days.

The countryside abounds in frogs. There is the little green tree-frog, *Hyla raddiana*, that one comes across amongst the bushes, the

edible *Leptodactylus ocellatus*, and the beautiful coloured escuerzo (*Ceratophrys ornata*) so dreaded by the natives. They fear it more than any snake, as being supplied with teeth and an enormous yellow mouth that appears to stretch "from ear to ear" it is able to bite, and once it has taken hold nothing will make it let go again. They say it injects a deadly poison, but I myself think that this is more superstition than fact, although I have no intention of testing my theory. I imagine that the cases one hears of, where limbs are lost through its bite, are probably due to septic-poisoning rather than venom. It lives in holes in the ground and emits a shrill hissing sound when annoyed. There are many other commoner frogs, and during the summer months a party always assembles on my verandah under the light. They are five to six inches long, and it is a somewhat strange sight to see often as many as a dozen sitting solemnly in a row facing the wall on which the insects settle attracted by the light. They become very tame, and one gets to know each individual by some little colour difference. One with a crushed leg has been a constant visitor for over two years. A solitary specimen of the toad, *Bufo marinus*, accompanies them, and although his skin exudes a somewhat poisonous fluid, I have never suffered any effects from handling him. There are two frog cries that I shall never forget amongst the medley that greets the ear in the evenings. One is that of a kitten in distress, long and plaintive, and the other one hears all day in the forest and so like to the cooing of the doves is it, that many times when shooting I have gone out of my way in hopes of getting a shot, only to hear the sound again coming vaguely from somewhere near me, but untraceable. Although I have searched long and often, I have not yet succeeded in tracing these noises to their makers.

Snakes are very common, but are mostly found in the open spaces away from the forest. Woe betide the snake that shows himself by day along the woodland edge, for every dead tree has its carancho waiting to pounce down on so easily obtained a meal, and there are many other snake-eating birds only too ready to destroy. In the cultivated and open land away from trees the snake has more of a chance. The rattle-snake, (*Crotalus terrificus*), Vibora de la cruz (*Lachesis alternatus*), two or three species of coral snakes (*Elaps* spp.) and a species of yarará (*Jarará*), are the commonest of the poisonous snakes. There are numerous "grass-" snakes including one (*Oxyrhopus claelis*) that feeds almost exclusively on other snakes, including the poisonous species. As already mentioned, the giant anaconda frequents certain lagunas.

Scorpions are rare, but there are many species of poisonous spiders of the genera *Actinopus* and *Avicularia*, often attaining large size, and geneally found in conjunction with fallen or rotting timber.

The jigger, here known as the "pique" (*Dermatophilus penetrans*), gives trouble at times, being especially prevalent in dusty places.

Animals suffer somewhat severely from many blood-sucking and parasitical insects, from several of which man himself is not immune.

Locusts are for the most part migratory, though there are seasons when they leave their eggs and large areas are eaten up by the larval hoppers before they become mature and take to flight.

Both river and land snails are conspicuous from their large shells, empty ones being picked up all over the place. Some of the larger shells reach a height of two to three inches. There appear to be several species. Mussels up to six or seven inches in length are found in certain parts of the rivers, and there are both fresh-water and land-crabs, although both are uncommon in this district. One of the racoons is known as the crab-eating racoon, and is found along the streams where crabs occur.

Centipedes and millipedes are common and many are very poisonous, but except in certain places one need not worry about them.

Notes on the British Snakeflies (Raphidia).

By W. J. Lucas, B.A., F.E.S.—*Read November 24th*, 1927.

In general the more recently evolved insects fall into the Endopterygote division of the Insecta, that is to say, their wings are developed within the body during the feeding stage of their life-cycle, as is the case with the Lepidoptera. One of the oldest of the Endopterygote[1] orders is the Neuroptera; the oldest of all perhaps being the Mecoptera (Scorpionflies, etc.), once included in that order. In the Neuroptera there are two rather clearly defined groups—the Megaloptera (Alderflies and Snakeflies amongst British insects), and what are sometimes called the Planipennia[2] (Dusty-wings and Lacewings, as far as Britain is concerned). The Megaloptera are occasionally given ordinal rank; but if the Dusty-wings (*Coniopterygidae*), as some think, shew relationship with them, this does not seem to be a convenient arrangement. The Megaloptera are not numerous in species, and, as far as British insects are concerned, contain but two families—the *Sialidae* or alderflies, of which we have two species,[3] and the *Raphidiidae* or snakeflies, of which we have four.

Table I.

ORDER NEUROPTERA.

Larva with biting mouth, Pupa *not* in a cocoon	Megaloptera	Prothorax quadrate, *No* exserted ovipositor, *No* definite pterostigma, Larva aquatic	**Sialoidea.**
		Prothorax forming a "neck", An exserted ovipositor, Pterostigma present, Larva terrestrial	Raphidiodea.
Larva with sucking mouth, Pupa in a cocoon	**Rest of the Neuroptera.**		

[1] See the Society's "*Proceedings*," 1925, pp. 5, 6.

[2] McLachlan used *Planipennia* for the whole of the Neuroptera, including Megaloptera and Mecoptera ("Trans. Ent. Soc. Lond.," 145, 1868).

[3] For the distinction between the two alderflies see "Entomologist," 1926, pp. 289, 290.

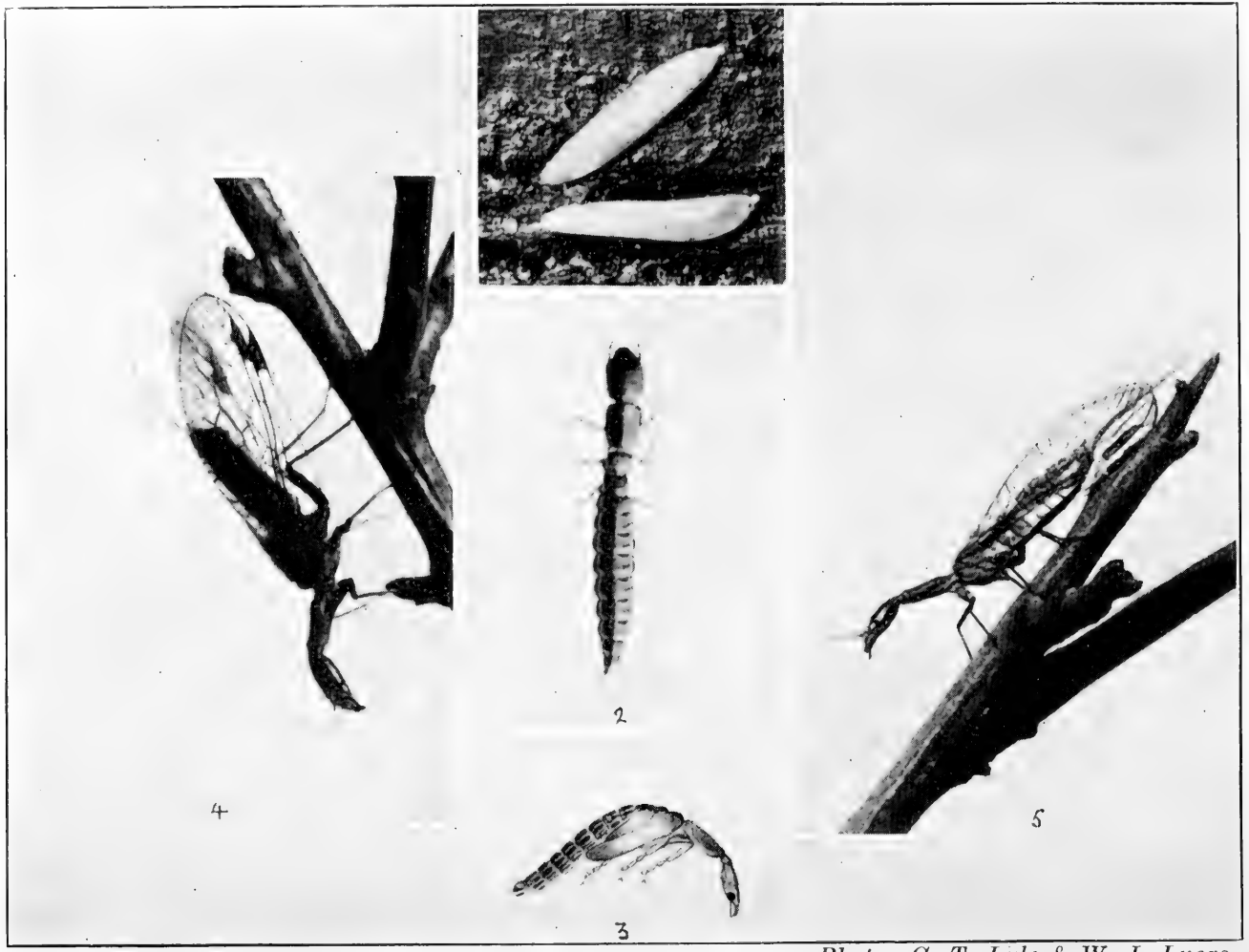


Photo: G. T. Lyle & W. J. Lucas.

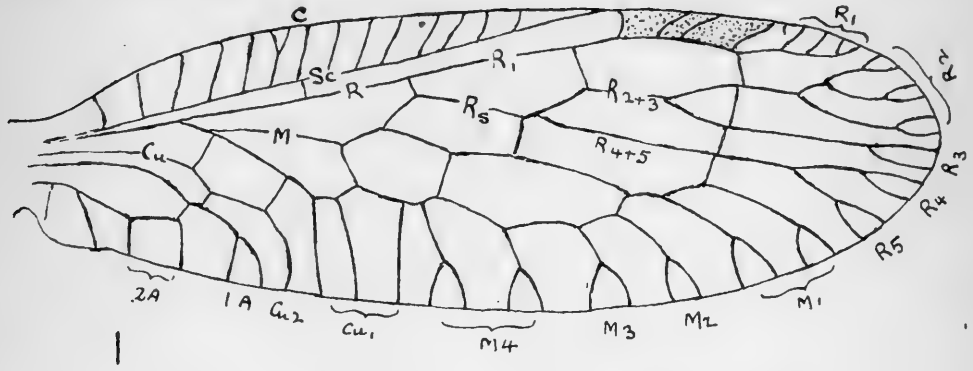
Plate III.

1. Eggs of *R. notata* (×20).
2. Larva of *Raphidia* (×abt. 2).
3. Pupa of *R. maculicollis* (×abt. $3\frac{1}{3}$).
4. Imago of *R. notata* (×abt. $2\frac{1}{2}$).
5. Imago of *R. maculicollis* (×abt. 3).

Plate IV.

1. Wings of *Raphidia notata*, Fabr. (×abt. 7·5).
2. Tip of forewing of *R. maculicollis*, Steph. (×abt. 8).
3. do. *R. xanthostigma*, Schu. (×abt. 8).
4. do. *R. cognata*, Ramb. (×abt. 8).
5. Head and neck of *R. xanthostigma* (×abt. 9).
6. do. *R. cognata* (×abt. 9).

Figures are somewhat generalised as *Raphidiae* vary a little.



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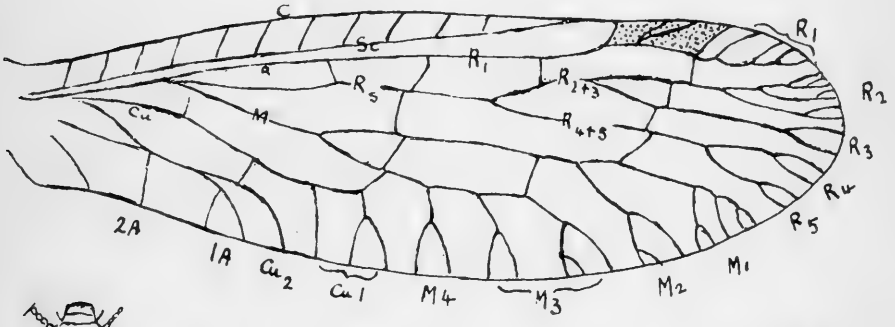

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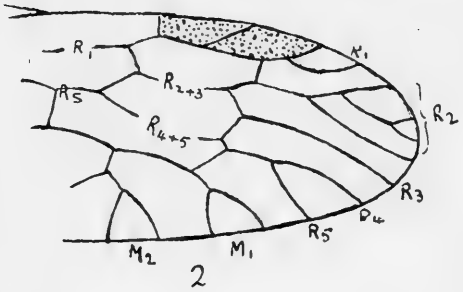

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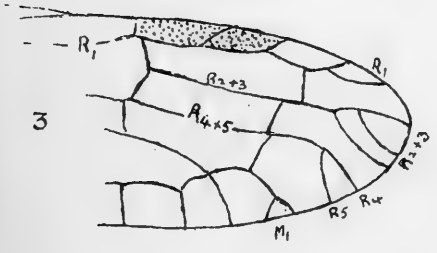

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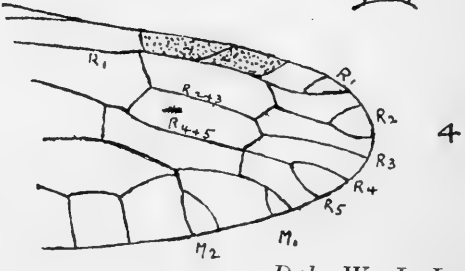

4

Del: W. J. Lucas.

So distinct in appearance are the *Raphidiidae* from other insects that we need not perhaps be surprised at finding the Spanish entomologist, L. Navas, wishing to give them ordinal rank as Rhaphidioptera.[4] The formation of a new order for them is, however, quite unnecessary. As with the rest of the Endopterygota—the Coleoptera, Trichoptera, Lepidoptera, etc.—there are in the Neuroptera, after emergence from the egg, three distinct stages, larva, pupa, and imago. Consequently the snakeflies have those three stages. The Raphidioidea include the most specialised members of the Megaloptera. They seem to be almost confined to the Palaearctic and Nearctic regions. Tillyard tells us that they are not present in New Zealand or Australia.

Two points are particularly noticeable in the imagines of the snakeflies—the much elongated prothorax in both sexes, which, together with the narrowed base of the head, forms what looks like a "neck"; and the long and slender ovipositor of the female. Of some seventy to eighty species that are known four only, as already mentioned, are British, and all are placed in the genus *Raphidia*, Linn., as usually understood. Of the only other genus, *Inocellia*, Schneider, the members may be known by the absence of a cross-nervure from the pterostigma and of the ocelli from the top of the head, all three of the ocelli being present in *Raphidia*.

Snakeflies should be looked for in wooded districts, where their feeble movements on the wing tend to betray them as they flit about the rough herbage. By means of the ovipositor the female places her eggs in chinks of the bark of trees, frequently conifers. C. G. Nurse once found a small larva of *Raphidia* in a spruce-fir cone. The long banana-shaped egg (pl. III., fig. 1), having a small appendage (or pedicel) at one extremity, is laid in dead wood, especially under the loose bark of conifers, where the larvae and ultimately the pupae may be found. The former, using their biting mandibles, feed on insects and other small animals that live in such situations. The larvae (pl. III., fig. 2) are long and slender with moderately long legs, and mouth parts of the same type as those of the imago. Their antennae have but three segments. The pupa (pl. III., fig. 3), which is of a primitive type, bears a close resemblance to the imago; but the wings are enclosed in rather small cases, and the ovipositor is turned back and lies close to the dorsal surface of the abdomen. After a time the pupa becomes active and leaves the cavity within which that state was assumed. Having found a spot to its liking it there remains till the imago emerges. This metamorphosis often takes place on a tree-trunk, and near the new born imago the ethereal empty skin may frequently be found.

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[4] According to the usual method of transliterating Greek into Latin or English, Rhaphidioptera is no doubt the better spelling.

As with other animals this consummation of its existence is not always achieved. On 6 Sept. 1902 one or two larvae (probably of *R. notata*, Fabr.) were found on a tree trunk in the fir woods on Esher Common in Surrey with abdomen very much distended, and pale in colour where the integument was soft enough to distend. One was placed in a glass tube, on the surface of which a number of spores were afterwards found, some of them evidently germinating. These were derived from the fungus, *Empusa lampyridarum*, Rol., which had proved fatal to the larva. It is very similar to the fungus, *Empusa muscae*, Cohn, which so frequently destroys house-flies in the autumn. On 23 Sept. 1922 one dead larva at least was found on Ockham Common in Surrey, attacked presumably by the same species of fungus. On the latter occasion a larva, probably of *R. maculicollis*, Steph., had been "stung" by a parasite whose cocoon was by its side.

Snakeflies are on the wing in late spring and early summer, usually in May and June, but sometimes a little earlier or a little later. Their imaginal life is probably not a long one. They rest lacewing fashion with the wings folded roof-like over the back, the "neck" being arched and the head deflected. This gives the fore part of the insect a very snake-like appearance and accounts readily for its popular name. It is sometimes found at rest with head downwards, and this may be its usual attitude. Examination of the imago shews that the antennae are moderately short. The eyes and ocelli are conspicuous. The maxillary palpi have five segments, the labial palpi three, the tarsi five, and the abdomen ten. There are two pairs of thoracic spiracles and eight pairs of abdominal ones.

In the south of England—in Surrey and Hants for instance—the species met with at the present day seem almost always to be *R. maculicollis* and *R. notata*, the former perhaps the more frequently. A few notes on experiences in the "field" in connection with these two insects should be of more interest than the preceding general remarks, and may give some confirmation of them.

On 20 May 1903 with the late G. T. Porritt a systematic search was made near the Black Pond on Esher Common for *Raphidia maculicollis*. As a result of some two hours' beating about 28 were taken, both sexes being represented. Most, if not all, were but recently out, as evidenced by the glossy appearance of the wings. One that had recently emerged was near its pupa case, which was holding on by the legs to the trunk of a tree. The empty skin, which was not far above the ground, was extremely thin and fragile, and pale yellowish brown in colour. The wings of the freshly disclosed imago were yellowish and clouded, like those of a dragon-fly which has recently left its naiad skin. The joints of the body were pale brown, the rest of the insect being dark. One imago, placed in a box with some specimens of *Hemer-*

obius humuli, Linn., judging by the results observed, attacked two of the latter and ate part of their body. On 24 May 1908 three specimens were found on Esher Common—two that had just emerged, with wings clouded and not completely expanded, the other, judging by the glossiness of its wings, also recently out. A male and a female of the larger species, *R. notata*, both freshly disclosed and near the empty pupa skins, were found on tree trunks by the Black Pond on 7 June 1903; and on 10 June 1906 three females were taken from tree trunks near the same pond, when again apparently the species had but lately commenced to appear. Several empty pupa skins, no doubt of this species, were found on the tree trunks. G. T. Lyle bred a female (presumably from a New Forest larva) in 1916 at the abnormally early date of 27 April; but possibly the conditions under which it was bred may have forced it a little.

On 9 April 1909 the naturalist just mentioned found in the New Forest a snakefly pupa alive in a piece of decaying wood about 3 inches in diameter; but not in a very advanced state of decay. The pupa (figured in pl. III., fig. 3) had free limbs and was quite active. Nothing could be seen in the nature of a cocoon. It was in general pale yellowish in colour; but the abdomen was adorned with large brown spots symmetrically arranged. The eyes were dark, the jaws brownish. The pupa was about 1 cm. long, and the wing cases were about 3 mm.[1] Later it became much darker than when caught, at any rate dorsally, and in particular anteriorly. It rested on its side with its body curved. It was kept amongst loose pieces of decaying wood in a small glass-topped box. In the evening of 29 April the pupa had crawled up the side of the box, and so was using its legs in the normal manner for walking. By the next morning the imago—a male of *R. maculicollis*—had appeared and the pupal skin was on the side of the box. Emergence had probably taken place quite recently, for the imago seemed to be rather teneral and its colouring became darker during the day. Towards evening it was running about the box in a very lively manner. Though apparently somewhat afraid of a gnat (perhaps *Chironomus dorsalis*, Mg.) placed in the box, it at length seized and appeared to be eating it. The gnat was, however, soon set free and was but partly crippled.

In the New Forest on 20 April 1913, with G. T. Lyle, a long search was made for larvae and pupae of snakeflies in Irons Hill Inclosure. At length it was found that a favourite habitation was the base of branches left on the trunks of Scotch firs after the remainder of the branch had been broken off. Though decayed these were more or less dry inside; so apparently larvae and pupae do not need much moisture. Two larvae were under bark of a

[1] Figured in "Entomologist," June 1909.

dead, but standing, Scotch fir.[1] Judging by size alone the larvae and pupae found—a dozen or more—belonged to both *R. notata* and *R. maculicollis*. Pupae were sometimes noticed to be in a distinct chamber; but whether they were occupying one ready made by a beetle, or whether they had made it themselves was not clear. Usually the pupae seemed to be nearer the edge of the wood, where more sunshine reached them, while those examples still in the larval stage were deeper in the shade of the trees.

With C. B. Williams a special search was made on 15 March 1914 for larvae and pupae of *Raphidia* on Esher Common. A good number of each were found. For the information of those who know the Common a good locality seemed to be at the head of the Black Pond. Some of the larvae were quite small. They were found chiefly in the layers of bark on the decaying stumps of Scotch firs left in the ground when the trees were cut down. Unlike those found in Irons Hill, these seemed to be living under quite damp conditions. All appeared to be *R. maculicollis*.

On 21 Aug. 1922 a larva of *Raphidia* (species undetermined) was found near Lyndhurst in the New Forest. In captivity it was fed on freshly killed house-flies, which it seemed to like. Its method of procedure was to clean out the contents of the abdomen, leaving the dorsal skin intact. On a flat surface the larva "progressed backwards" with fair rapidity by a series of "steps" something like those made by a looper caterpillar. It was still a lively larva on 27 April 1923. On 9 May it looked as if it might be preparing to pupate, but unfortunately it met with its death soon after that date.

During an excursion of this Society to Ockham Common on 23 Sept. 1922 a number of larvae of *Raphidia* were found under the bark of Scotch firs, especially on stumps left in the ground after the trees had been cut down. The larvae clearly belonged to both of the known Surrey species, *R. maculicollis* and *R. notata*, the former appearing ready to pupate. The following description was made of a larva of *R. maculicollis*:—Length about 12 mm. Head and prothorax rectangular, chestnut coloured above and below: antennae pale with three dark rings; mandibles dark chocolate; eyes black; meso- and meta-thorax yellowish blotched with brown; legs pale with slightly darker claws. Abdomen scantily hairy, pale yellow above, with dark chocolate blotches arranged so as to give the appearance of four dark lines separated by three fine yellow ones, all however interrupted, undersurface pale yellow with pale brown blotches in most segments arranged four in a segment, edges of abdomen also pale brown. The larva of *R. notata* is larger, but,

[1] At Esher Common on 7 Aug. 1920 a larva (species undetermined) was found some five or six feet above the ground, also under the bark of a dead, but standing, Scotch fir on which the bark was dry.

though of the same general colour, is more uniformly tinted, and so has a less ornamental appearance than its congener.

It now remains to distinguish the four British species, and an attempt is here made to do so as far as possible by means of points easily examined, and without going into details of the genitalia. It is assumed that all entomologists worthy of the name have at the present day made themselves acquainted with the primitive type of wing nervuration,[1] and of the particular modifications that have occurred in the order of insects they have made their own. As might be expected in a somewhat ancestral group, the nervuration in the case of the snakeflies has not been greatly modified, though the arrangement of cubitus and anals may seem a little confusing till the pupal wings have been examined.[2] It so happens, however, that we are not concerned with the base of the wing. *R. notata* is considerably larger than the rest and has a dark brown pterostigma ; but superficially the other three look very much alike. The figures of the four species in Plate IV. explain themselves, and reveal the points of difference, especially when examined in connection with Table II.

British species :—

1. **Raphidia notata,** Fabricius (J. C.), "Species Insectorum," I., p. 402, No. 1 (1781).

This species has a wide range in northern and central Europe. In Britain, judging by records that have come to hand casually, it is confined to the southern part of England, but these records are so few that no reliable conclusion as regards distribution can be drawn from them.[3] *R. notata* has been taken in or found recorded from Surrey (many places), Hants (especially in the New Forest), Middlesex, Berks, Oxon, Dorset (Dale), Wilts, and Notts. It has been met with on the wing from 16 May till 14 July ; but June seems to be the best month for it. Probably it winters as a larva (but may-be as a pupa also).

2. **Raphidia maculicollis**, Stephens (J.F.), "Illustrations of British Entomology, Mandibulata," Vol. VI, p. 131 (1836).

According to Albarda[4] it occurs in the British Isles, Holland, Belgium, Spain, and Portugal: to these Switzerland may be added. In Britain, if the casual records to hand are any criterion, the distribution is a strange one—Surrey (many places), New Forest (frequently) and other parts of Hants, Dorset, Devon, Kent, Berks, and Oxon, with Braemar and Morayshire in Scotland! Records

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[1] Comstock, "The Wings of Insects," 1918.

[2] Withycombe, "Wing venation of *Raphidia maculicollis*," ("Entomologist," 1923, p. 33).

[3] No attempt has been made to work out the distribution in this or the other species.

[4] "Révision des Raphidides" ("Tijdschrift voor Entomologie") 1891.

Table II.

BRITISH SNAKEFLIES.*

		R. NOTATA.	R. MACULICOLLIS.	R. XANTHOSTIGMA.	R. COGNATA.
1	Expanse of fore-wing, female.	Some 28mm.	Some 22mm.	Some 20mm.	Some 20mm.
2	Costal cross nervures.	12-15.	About 8.	About 8.	About 8.
3	Tip of R_1.	Branched.	Simple.	Forked.	Forked.
4	R_3.	Forked.	Simple.	Absent, apparently. (Coalescent with R_2.)	Simple.
5	Meeting of costa and subcosta.	Near pterostigma.	Nearly length of pterostigma in front.	About half length in front.	About half length in front.
6	Pterostigmatic cross nervures.	Two.	One.	One.	One.
7	Shape of head.	Conical.	Conical.	Conical.	Squarish.
8	Colour of pterostigma.	Brown.	Dusky yellow.	Yellow.	Dusky yellow.

* Specimens vary a little in size, and slightly in minor details of nervuration.

of time of flight extend from the second part of April or earlier (D. Sharp, New Forest, 1914) till 30 June; but May seems to be the best month for this species. It probably always hibernates as a larva.

3. **Raphidia xanthostigma,** Schummel (T.E.), "Versuch etc.," p. 12, fig. 2 *a* and *b* (1832).

This snakefly is well distributed throughout Europe; but records for Britain point to its distribution being chiefly in northern and central England, Cumberland, Yorks (frequently), Warwickshire, Notts, Cambridge, Suffolk, Essex, Middlesex, and Dorset (Dale), having furnished examples. It has been taken in May and June.

4. **Raphidia cognata,** Rambur (J.P.), "Histoire Naturelle des Insectes Névroptères," p. 483, No. 3 (1842).

Of this species I possess but one specimen, apparently a continental one, given me by R. McLachlan. I have not seen a living example. Albarda gives as its distribution the British Isles, Holland, Belgium, France, Alsace, Nassau, Spain, Corsica, Italy, Carinthia, and Dalmatia. F. H. Haines stated (*in litt.*) that several years ago it used to be quite common in a copse near the River Eden at Hever, Kent, frequenting brushwood in June. It was so active as to be difficult to catch without a net. K. J. Morton refers to it in West Suffolk ("Ent. Mo. Mag.", 1911). McLachlan mentions a large female which was taken by H. J. Thouless on 14 June 1886 in Foxley Wood, Norfolk, and given to J. Edwards. Obviously *R. cognata* is awaiting a rediscoverer and historian.

It is probably well known that the Neuroptera are of considerable economic importance. They all prey on insects and other small animals, many, such as the Aphides, being very noxious creatures. No doubt occasionally their prey are as useful to us as they themselves are; but this of course cannot be helped: we can scarcely expect them to discriminate in our favour!

From these discursive notes it must be obvious that our knowledge of the life story and economy of the snakeflies is indefinite, and that these insects have not received the attention they deserve. Of their British distribution we are especially ignorant. The localities here given are just those I happened to have, and, you will admit, are ludicrously inadequate for the purpose of drawing definite conclusions. By making inquiries I could no doubt have added to them to some extent; but probably even then the result would not have been much more satisfactory.

Observations on the Life-history of Scarabeus sacer.

By A. de B. Goodman, F.C.S., F.E.S.—*Read December 8th*, 1927.

Three years have passed since the following observations were made, but to me it seems only yesterday that Mr. Main introduced me to this interesting coleopteron. I date my interest in that vast field of study, often casually dismissed as "other orders," from the day when he brought to my notice the home of this insect. I take this opportunity of thanking him for his kindness in instructing me in the use of the camera for field work, and the scientific value of recording observations on living examples and their mode of life.

Our observations in the field lasted for five days, in June, 1924, during our stay in the village of Evisa, North Corsica. The breeding ground of the Scarab-beetles was a plateau of sandy soil, situated at the N.E. end of the village.

The Scarab-beetles are true dung-feeders, and are of especial interest since they model their food into the shape of a ball, which they bury beneath the ground to protect it from the heat of the sun. This process is carried out in order to keep the food moist and palatable, for the sun is so strong by mid-day that it evaporates all the moisture from the dung patches, leaving them as small heaps of crumbling dust, useless to beetles as food.

Our observations were carried out in the early morning (6 to 8 o'clock), when the food was in abundance and unacted upon by the heat; by eleven o'clock the plateau was unbearably hot, and most of the Scarabs were below in their burrows, enjoying the morning's spoil.

The burrows.

The burrows were irregular in shape, but always of the same general structure, consisting of a sloping passage about nine inches long, filled with loose earth and leading to a hollowed chamber about three inches high and two inches square, situated at a depth of four to six inches below the soil surface. They were easily found owing to the small heaps of loose dust, which are necessarily pushed out from the mouths of the passages during the formation of the chambers. In no case did we find the burrows in close proximity to dung patches, which seems to indicate that generally the dung balls, whether intended for feasting or for the food of the larvae are rolled by the beetle to a convenient spot and buried.

The dung balls.

The dung balls were of two kinds:—(1) Those made of mule-dung, which were used as food by the imagines. (2) Those made of goat-dung, which were used for the preparation of the "egg-pear," and destined as food for the young larvae when they hatch out. We had the good fortune to observe one specimen preparing a food ball from a mule-dung patch; and as I can find no previous record of the procedure, I take this opportunity of giving a detailed account.

The formation of a dung ball.

The individual under observation sat on the top of a portion of mule-dung, clinging to it by means of its hind legs, and cut away pieces of the dung from the main portion by means of its serrated frontlet, at the same time patting down the rough uneven edges by means of its broad fore-legs. It frequently shifted its position by sharp jerky movements, and by continuing its labours gradually shaped the crude mass into a rough sphere. It ascended from time to time to the top of the mass and, turning about surveying its workmanship, set about perfecting those parts which did not meet with its approval. It next seized the ball in its hind-legs, and with a sharp jerk of its fore-legs, pushed the partially formed ball over into a new position and recommenced its labours.

We then had an example of the fact that greed is not entirely restricted to the higher orders of the animal kingdom. The insect suddenly decided that it had under-estimated its capacity, and set the matter right by scraping up on the ball some of the material which it had previously discarded. The sphere formed, the beetle seized it with its hind-legs and propelled it away by sharp jerks of its fore-legs. Its movements were necessarily erratic, owing to the unevenness of the ground, but finally it pushed the ball against a stone.

The burial of the dung ball.

This appeared to be considered a favourable spot, and the beetle started the process of the burial. The ball rested firmly against the stone, and the beetle scratched away on the left-hand side of the ball, loosening the earth until the digger disappeared head-foremost below the ball; it reappeared a few seconds later, head-foremost, shovelling out the earth with its serrated frontlet. In executing this movement it necessarily turns completely around underground. It next dug in exactly the same way on the right-hand side, thus hollowing out a cavity below the ball. The beetle then descended below the ball which began to rotate, gradually sliding into the cavity which had been formed below it. The scratching, shovelling, and rotating continued until finally the ball disappeared below the mass of loose dust.

The egg-pear.

Unfortunately no direct observation was made of the formation of a ball intended as material for the egg-pear. Fabre states that, in captivity, the beetle when supplied with dung and loose earth, makes the burrow first, and then takes down the raw material in armfuls, the ball and pear being formed entirely below the surface. In certain cases, he states, the beetles make the balls on the soil surface, then break them up, finally remaking them and dragging them underground. He explains that the reason the ball is destroyed is that the parent thus eliminates all small foreign larvae present, which may prove injurious to its offspring.

It seems to me that the above cases are exceptional, and probably due to unnatural conditions of captivity. It appears more reasonable to assume that under natural conditions the burial of a dung-ball intended for the formation of an egg-pear should be the same as that of a ball intended for food.

As regards the elimination of foreign larvae, Fabre himself, later in his account, remarks on the numbers of *Aphodii* and other larvae in the egg-pears which do considerable damage; further, Mr. Main on several occasions found dipterous larvae in the egg-pears.

The ball when buried in a normal manner has a rough crust of earth, which is taken up during the rolling, but the balls and egg-pears found "in situ" are always immaculate. The food-ball (the formation and burial of which has been described), was dug up the following day, and all traces of dust and earth had been removed.

The old view was that the egg was laid in the ball which the beetle trundles along, but it is now known that the egg is contained in the apex of a pear-like body which the beetle forms from the ball. The Egyptian Horus Apollo wrote in Hieroglyphica:—"the scarabeus deposits this ball in the earth for the space of twenty-eight days (for in so many days the moon passes through the twelve signs of the Zodiac). By thus remaining under the moon the race of scarabaei is endowed with life; and upon the twenty-ninth day, after having opened the ball, it casts it into the water, for it is aware that upon that day the conjunction of the moon and the sun takes place, as well as the generation of the world. From the ball thus opened, the animals, that is the Scarabaei, issue forth." According to the ancients the Sacred Beetle had no parents (the sexes being indistinguishable), but was born of the ordure which formed the ball; the "birth" being the appearance of the adult Scarab.

Fabre, by means of an ingenious device, was enabled to surprise a specimen, from time to time, at work forming an egg-pear. A synopsis of his description is as follows:—

The beetle forms a depression at the top of the ball, and by application of pressure the walls of the crater are gradually raised

making the depression deeper and deeper until finally it resembles the neck of a bottle. In this cavity the egg is laid, and the opening at the top is carefully closed by means of fibres.

We found one specimen which had just begun the formation of the neck; it had formed the depression at the top just as Fabre describes. The formation of the egg-pear from the goat-dung ball is carried out by the female in the darkness of her underground chamber. Fabre states that the female quits the cavern on the completion of the egg-pear; we, however, found the beetles in company with their pears, and in one or two isolated cases two beetles were present in one chamber (presumably the two parents).

The height of the egg-pear from the apex to the base is approximately 2 inches, the height of the apex being about half an inch; thus, the body of the pear (the larva's food store) consists of a sphere 1½ inches in diameter. The inside surface of the apex is polished, and the mouth plugged with fibres. The yellowish, drawn-out egg is situated vertically in the apex, and occupies nearly the whole of the space within the apex. The fibre plug enables the free access of air to the egg, and protects it from the intrusion of strangers.

Illustrations of the egg-pear always show it lying horizontally. The natural position, however, is vertical, since the apex is formed at the top of the ball. In the examination of a large number of egg-pears we found that, day by day, the proportion of vertical pears "in situ" varied between 30 and 50 per cent.; in every case the pear occupied the centre of the underground cavern. We came to the conclusion that the horizontal position is purely one of chance, or perhaps it may be the parent which dislodges the pear from its unstable position.

The larva.

The period of incubation of the egg varies from five to twelve days, the young larvae hatching out in June and July. Immediately on hatching, the small grub eats away at the base of the apex, downwards towards the centre of the egg-pear. It deposits its droppings behind it so that the apex becomes completely filled up, and the upper portion of the egg-pear retains its compactness, while the main portion of the egg-pear is gradually absorbed as food. The larva attains the full-fed condition in three to four weeks. The fat, full-fed larva, curves its body double within the egg-pear, occupying nearly the whole of the available space. It is transparent ivory white, with dark coloured reflections due to its digestive organs.

The most striking feature of this larva is the large swollen lump formed by the 3rd, 4th, or 5th segment of the abdomen, which is said to be due to the presence of a large pocket distended by food. The head is small and reddish, and the legs are fairly long and

strong. The last segment is cut off slantwise, carrying on its dorsal surface an inclined plane surrounded by a fleshy pad, in the centre of which is a slit. This last is used for cementing, the larva excreting a black fluid from the slit which is used to fill up any holes which may appear in the egg-pear. The fleshy pad is used to press the cement smooth.

The pupa.

The larva before pupation strengthens the now frail walls of the egg-pear by applying fluid on the inner surface, and polishing the layers by means of the fleshy pad. The larva then sheds its skin, and becomes a yellow transparent pupa, in which all the characteristic features of the adult are visible. A curious feature of this pupa is that the tarsi of the fore-legs, *i.e.*, the five-jointed appendages at the tips of the legs, are missing. This is also the case with the imago.

The imago.

Unfortunately, we have not seen the early stages of the imago, but Fabre states that at first it has a dull red head, legs of the same hue, and a white abdomen. It is said to rest within the egg-pear for four weeks, during which time it gradually develops the familiar horny black armour of the adult.

The imagines usually emerge from the earth in September, during the first autumnal showers. It is stated that, to enable them to escape from the egg-pears which have become very hard during two months dessication in the underground cavern, moisture is needed. This seems extremely likely, as some egg-pears which I brought home were not kept moist, and I found the utmost difficulty in breaking them open with a pocket knife. Fabre says that numbers of *Scarabei* perish annually through being unable to release themslves. The new generation hibernates in the ground during winter and emerges in the following May and June for the breeding season.

In conclusion, I think it will not be out of place if I make a few remarks upon the misunderstandings of Fabre's original descriptions. These last few years I have had the opportunity for observing several of the life-histories which he has described, and have found him to be extremely accurate. However, in his accounts of them he uses his vivid Southern imagination for enlarging upon simple facts, so that often the truth is obscured from the casual reader. The result being that many English translations fail to do him justice. An example of this is found in Fabre's account of the first appearance of the Scarab imago, which he describes as having dull red head and legs, and a white abdomen. This state he likens to the "scarlet of a cardinal's cassock," etc., with the lamentable result that I have seen an English translation describing the above

as bright scarlet and white. This I imagine is the last thing that the author wished to convey

The people of South France, especially those of the Departments adjacent to Provence, have been ably described by Alphonse Daudet, who rightly or wrongly, leads one to suppose that they do not mean half of what they say. This, in my opinion, is too strong a view; but I am perhaps biased, for to be perfectly candid, one of my grandparents hailed from Nîmes, a town adjacent to Tarascon. You will perceive the gravity of this statement, and I trust deduce by means of a simple arithmetical calculation that if you discount all I have said to-night by 12½ per cent, you will then be in possession of the crystal truth.

We must thank Mr. Main for the excellent slides, which he has lent me for the purpose of illustrating this paper.

Notes on the Genus Hyponomeuta. With Special Reference to H. cognatellus, H., H. padellus, L., and H. malinellus, F.

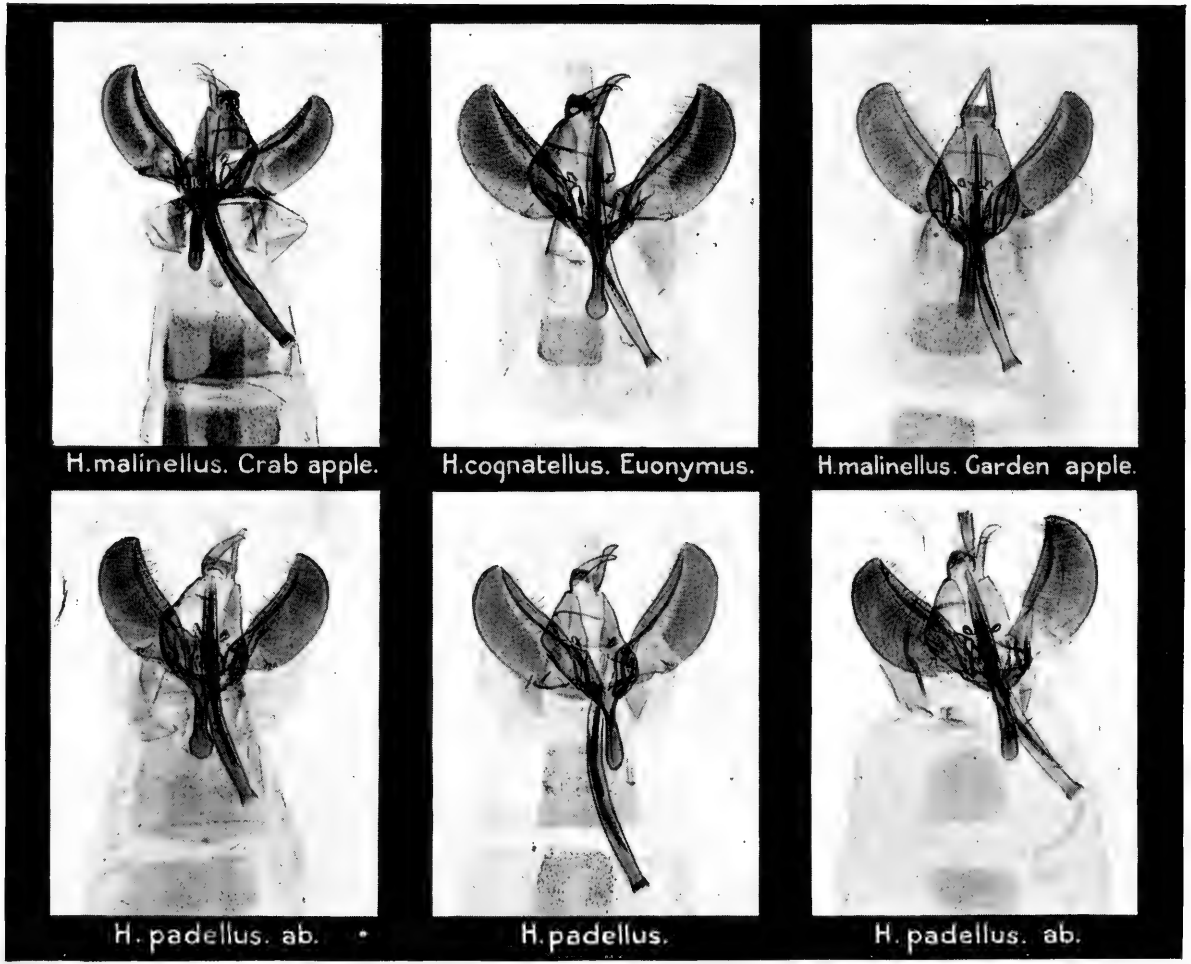
By Robert Adkin, F.E.S.—*Read January 12th*, 1928.

In June 1924 I noticed that an apple tree in my garden at Eastbourne was badly infested by the larvae of a *Hyponomeuta*, and believing them to be those of *H. padellus* I, without paying any particular attention to them, told my gardener to collect the webs and destroy them. Fortunately, he did not do his work too well, and in 1925 a few nests were again noticed on some of the other apple trees. These nests on a closer examination did not agree with my recollection of those of *H. padellus* that I had, from time to time, found on whitethorn bushes; they appeared to be smaller and of a different shape. I therefore took a couple, and from them reared seventeen moths which were certainly much whiter than any *H. padellus* that I had ever reared from larvae found on whitethorn, and it occurred to me that they might possibly be *H. malinellus*, Z. However, on consulting some of my friends who had had more experience of the genus, I was assured that they were probably only a pale form of *H. padellus*, and that if *H. malinellus* did occur in this country it was to be found only on old wild crab-apple trees as it was not a garden species.

It was many years since I had reared any *Hyponomeuta*; my specimens were consequently somewhat aged and my recollection of the earlier stages of the species rather rusty. So I determined to keep a sharp look out for larvae in the hope of being able to renew my acquaintance with at any rate, the commoner species of the genus; and in this I have been fairly successful.

In 1926, I found larvae on blackthorn at Mersea in Essex and at Oxford, and was fortunate in also obtaining a few on crab-apple growing in the woods near Eastbourne, as well as a further supply on cultivated apple, all of which produced imagines.

Then in 1927, with the assistance of my friend Mr. A. L. Rayward, we obtained larvae on blackthorn from bushes growing on the Downs; on whitethorn and on crab-apple from the woods; on cultivated apple in my garden; and from spindle (*Euonymus europaeus*) growing in the hedges bordering the country lanes, from which we reared the two commoner spindle-feeding species. Mr.



Micro. Prep.: A. L. Rayward. *Photo: A. W. Dennis.*

GENITALIA OF HYPONOMEUTA.

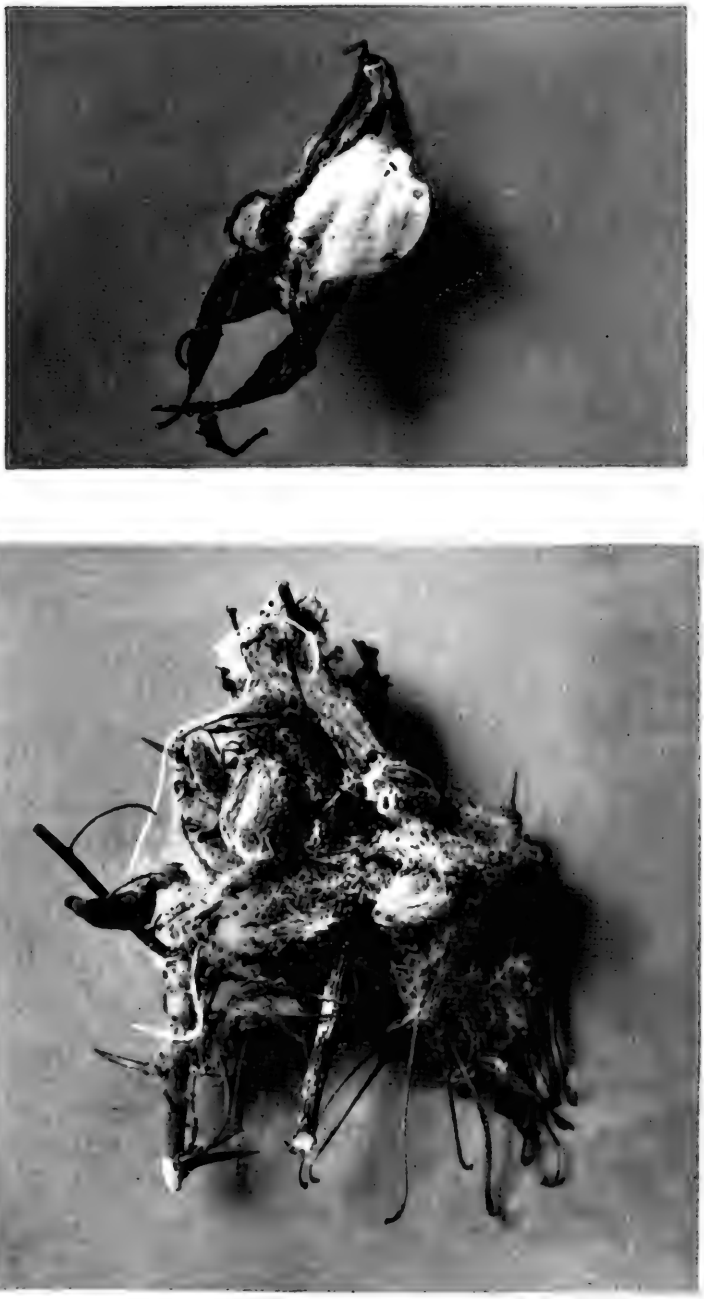


Photo: A. W. Dennis.

PUPAL COCOONS OF HYPONOMEUTA

Top, COGNATELLUS, H; *Lower,* PADELLUS, L.

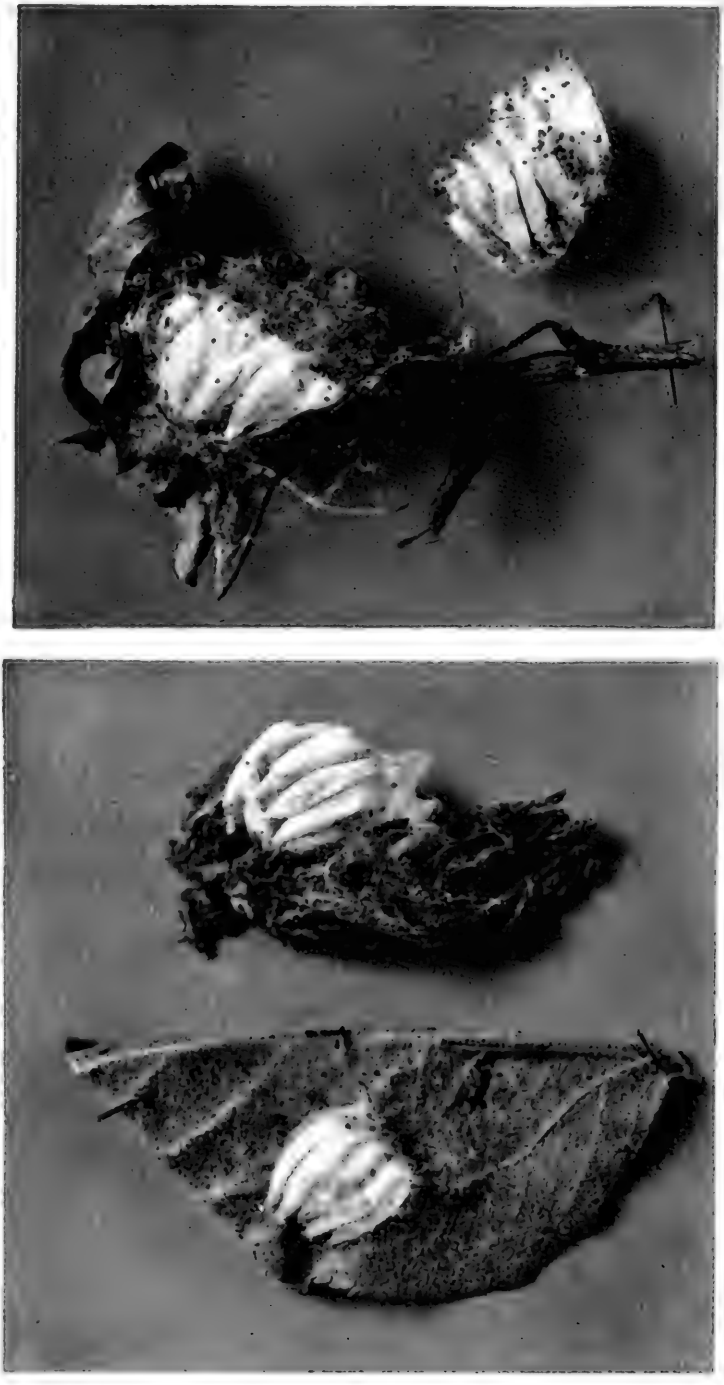


Photo: A. W. Dennis.

PUPAL COCOONS OF HYPONOMEUTA MALINELLUS
Top, CRAB; *Lower,* GARDEN APPLE

W. H. Thorpe sent me larvae on whitethorn from Cambridge and Mr. T. Greer a nest on bird-cherry (*Prunus padus*) from Co. Tyrone. We thus accumulated a considerable amount of material, which gave us the opportunity for observing the various batches of larvae as they fed up side by side; and eventually we reared fairly long series of imagines from each of them, which, with material previously accumulated, gave us a serviceable stock to work on.

A brief description of these broods here may not be out of place. The *H. evonymellus* reared from the bird-cherry and the *H. plumbellus* from the spindle need no comment, they were both true to type; as were also the *H. cognatellus* from the same plant, which also agreed perfectly with a series reared from *Euonymus japonicus* some twenty years ago. The various broods reared from the crab-apple and from the cultivated apple, each lot consisting of a hundred or more specimens, were just alike and might be described as white, although in each series there were a few specimens showing a faint greyish suffusion. The whole of the broods from whitethorn, whether from Cambridge or from the woods near Eastbourne, were distinctly grey (lead colour), not one of them could be called white; and it is perhaps interesting to note that the whitethorn bush from which the Eastbourne larvae were obtained was actually growing under one of the crab-apple trees from which some of the crab-feeding larvae were taken. The blackthorn larvae from the clay soils of both Essex and Oxford, like those from the whitethorn, produced nothing but grey insects, but the brood from the chalk soil of the Downs had a small percentage almost white, otherwise it agreed with the other blackthorn and whitethorn series.

The genus *Hyponomeuta* as we know it in Britain includes some eight or nine species. They are for the most part grey or white insects with small black spots, and some of them are attached to special food plants. The majority of them are easily separable by their superficial characters: thus, *H. stannellus*, Thursby, a recent addition to the British list, is a grey species and the only one that is devoid of spots; *H. vigintipunctatus*, Ratz., which is perhaps the most like it, has three rows of black spots; both probably feed on *Sedum telephium*. *H. rorella*, Hb., another recent addition, has white forewings with a light greyish suffusion towards the costa, and four rows of few very small black dots: it is said to feed on willow (*Salix alba*). *H. plumbellus*, Schiff., one of the three *Euonymus*-feeders, has a black cloud at the apex of the wing and a large black spot near the inner margin which at once distinguishes it from all the other members of the genus. *H. irrorellus*, Hb., and *H. evonymellus*, L., both have a very large number of very small black dots; but the former is a grey insect while the latter is pearly white, moreover *irrorellus* is a *Euonymus*-feeder while *evonymellus* appears to be restricted to *Prunus padus* (bird-cherry).

The remaining three species (if there be three) are by no means

so easily separable. My present object is to see whether our apple-feeding insect is the same as that described by Zeller under the name of *H. malinellus*, and if so whether *malinellus* is specifically separable from *cognatellus*, H., and *padellus*, L. The first part of the question I have no hesitation in answering in the affirmative: the series that we have reared agrees exactly with that in the Zeller collection, and the notes that he gives of the earlier stages might well have been taken from the larvae that we have reared. I am also convinced that the crab-apple and cultivated apple insects are alike. The latter part of the question is, however, by no means so easily settled.

But before considering the insects themselves it may be well to deal with their synonymy. Linnaeus, "*Syst. Nat.*" Ed. X. p. 534, No. 239, described a species under the name of *evonymella(us)* as having white fore-wings with 50 black spots, and as occurring on Evonymo, Pado, Sorbo, etc. He gives a number of references to both figures and decriptions by earlier authors, most of which are too crude to be of any value, and those that are recognisable are certainly referrable to more than one species. I have, however, by the courtesy of the officials of the Linnean Society, been able to examine the specimens in the Linnean collection. The series consists of four specimens all exactly alike, one of which bears Linnaeus's own label, and they are without doubt the bird-cherry species. I fear, therefore, that, however inconvenient it may be, we have no alternative but to use the name *evonymellus*, L., for that species and to call the common *euonymus*-feeding species by the name of *cognatellus*, Hb.

Linnaeus, "*Syst Nat.*" Ed. X. p. 535, No. 240, described under the name of *padella(us)* a species having lead-coloured fore-wings with 20 black spots, and occurring among fruit-trees (*in Arboribus pomonae*). Here, again, his references are of little help; and on referring to his series of seven specimens, most of which are unfortunately in rather poor condition, one finds insects varying from white to distinctly grey and evidently including more than one species. Apparently he recognised only two species, one with a large number of small black spots and one with a lesser number of larger black spots, and those specimens that did not conform to the former he put into the latter series.

In the "*Isis*" for 1844, p. 214,, Zeller proposed the name *variabilis* for admittedly the same species as Linnaeus had named *padellus*, on the ground that "Of all food-plants which have been ascribed to the larva of this species, that is the least suitable of which Linnaeus has borrowed the name. The name *padellus* has also been erroneously ascribed to other species. It is chiefly on the first ground that I have considered myself entitled to dispense with this name which is liable to give rise to perpetual confusion, and

to create a new one." But we cannot overlook the fact that Linnaeus described his insect as lead-coloured with black spots, and that there are in his series specimens which agree with his description. We must, therefore, I think, retain the name *padellus*, L., for the common whitethorn and blackthorn-feeding species.

Zeller, *Isis*, 1844 p. 220., described under the name of *malinellus* a species having white forewings, with three rows of black dots; the fringes of the inner angle light grey on the under surface, and he tells us that it feeds on apple trees. Referring again to Zeller's series now in the British Museum collection, although the description "white" applies very well to the series taken as a whole, some of the individual specimens show a very decided tinge of grey shading.

The synonymy of the species that we have now to consider therefore runs thus:—

H. cognatellus, Hb. 391-2 (misspelt *cagnagella*). *Evonymi*, Zell, "*Isis*," 1844 p. 223, = the common *Euonymus*-feeding species.

H. padellus, "*L.S.N.*" ed. X. p. 535. *Variabilis*, Zell, "*Isis*," 1844 p. 214. = the still commoner whitethorn, blackthorn, etc., feeder.

H. malinellus, Zell, "*Isis*," 1844, p. 220, = the apple feeder.

When Zeller first suggested the name of *malinellus* for the apple-feeding species in a "Critical Determination of the Lepidoptera appearing in Reaumur's Memoirs" which he published in the "*Isis*" 1838, p. 670, he says, after quotations from Reaumur, "We have here a moth which judging according to Treitschke, IX. 1, p. 221, should be held to be *cognatellus*, but which is certainly different therefrom, and which I name *malinellus*. For, *cognatellus* has a snow-white upper surface of the fore-wings and on both sides of the same, snow-white fringes; *malinellus* has barely white, and towards the centre grey (which however becomes whiter a few months after emergence) fore-wings, the fringes of which are distinctly grey on the underside." He then goes on to say "It is much more easy to confuse *malinellus* with *padellus*, H. (*Padella*) fig. 393-95. Both have a grey shade in the middle of the fore-wings, and on both sides of these wings grey fringes. Only with *padellus* is the shade in almost every case very distinct and dark, and this, so far as I am able to say at present, is the sole difference between the moths." He also deals with differences in the earlier stages of the species. But when, some five years later, he came to the formal description of *malinellus* ("*Isis*." 1844. p. 220), he says, "As a moth it approaches most nearly to the following one (*cognatellus*). I find only the following distinctions: *H. malinellus* is small; there is usually a row of small dots on the inner margin passing on to the margin of the inner angle. The fringes on the inner angle are coloured on the under side outwards very light blue and the fringes on the hind wing are darker and remain evenly coloured to the wing-tip. (The other distinctions which I stated in the *Isis* were given in error.)" This

last remark is unfortunate, for he had really given a very good description of his new species (*malinellus*), but one gathers that the further he went into the matter the greater he found the difficulty of differentiating between the three species by means of their superficial characters. Indeed, he seems to contradict himself, for a little further on he says of *malinellus*, "The fringes are white, on the under surface to the inner angle mostly very light and sometimes only becoming grey at the tip of the hairs; more seldom also are they grey at the apex of the fore-wing on the root-half of the hair."

There is no doubt that the three insects are very closely allied to one another, but when series are placed side by side there are differences which are easily apparent which must be of some significance. Thus, *cognatellus* is invariably brilliant white; *malinellus* also is white, but the white is of a duller tone, and may occasionally be partially replaced by a greyish suffusion; *padellus* is generally distinctly leaden grey, occasionally with a lighter tinge, seldom whitish. On the underside, the fore-wings of all three are dark grey; those of *cognatellus* with white fringes; of *malinellus* with grey, lighter than the wings; and *padellus* with the same colour as the wings, except in the whitish specimens which have fringes slightly paler.

Venation, a useful generic character is seldom of much use as between species, and as Kosminsky tells us that of a large number of *malinellus* that he examined he found anomalies in nearly 50%, further examination in that direction seems to be useless. The genitalia, however, often furnish a good specific character and we have examined a large number of preparations very kindly made by Mr. Rayward. There is a strong similarity in those of the *Hyponomeuta* as a whole, and they are peculiar in having a very great prolongation of the saccus, the shape of which appears to vary. In *cognatellus* this is stout and strongly bulbous towards the tip; in *malinellus* it is by comparison slender and almost straight throughout, and in both species appears to be fairly constant. In *padellus* normally there is a gradual thickening throughout its length, but occasionally a specimen is found that is even more bulbous at the tip than in *cognatellus*, or almost as straight as in *malinellus*: in *padellus* therefore this character is evidently liable to considerable variation.

Although, as we have already seen, the distinctions between the imagines are slight, there are very considerable differences in the methods of the larvae. In appearance, like the imagines, they have much in common. They all have black heads and rows of black spots along their sides, and are all more or less greyish in colour, but the larva of *cognatellus* is pale yellowish grey, that of *padellus* dark leaden-grey, so dark in its final stage that the black markings are not very conspicuous, while that of *malinellus*, almost

orange-coloured when young, retains a yellowish tinge in its greyness throughout its life. Both *cognatellus* and *padellus* spin large, loose webs embracing in them several twigs of the food-plant, and on these being consumed, increase the web to take in others. *Malinellus*, whether feeding on crab in the woods or on cultivated apple in our gardens, spins a somewhat compact web, at first drawing a single leaf towards the twig and devours only the cuticle; when this is consumed, it spins a narrow gallery up the twig to the next leaf or pair of leaves which it treats in the same way, and so continues until the whole of the leaves on the twig are consumed. If the first twig is not sufficient for the needs of the larvae they move to another and continue their operations, so that one may often find a twig webbed throughout its whole length but not a larva on it, these being on another twig, possibly at some little distance from the first, in a comparatively inconspicuous new web.

When full-fed they all spin their pupal cocoons within the web. Those of both *cognatellus* and *malinellus* are dense, white, spindle-shaped structures placed symmetrically side by side in a compact bundle and further, those of *malinellus* are almost invariably attached to a leaf. *Padellus* spins loose, transparent, grey cocoons, placed in no particular order, some often being at right-angles to others and not infrequently scattered over a considerable portion of the web. Thus it would appear that *malinellus* differs from *cognatellus* in the colour of its larva and method of feeding, and from *padellus*, not only in its larval habits but also in the pupal cocoons that it constructs and the manner in which it places them.

It is perhaps not well to rely too much on food-plants, but in my experience *cognatellus* is confined to species of *Euonymus*; *malinellus* to apple; but that *padellus* is equally well at home on white-thorn and black-thorn, and I have little doubt that it also at times attacks apple. I have specimens, given to me some years ago, that were reared from larvae found on apple in a London garden, which I have no hesitation in referring to that species.

I understand that Mr. W. H. Thorpe has been carrying on investigations, at Cambridge, on somewhat different lines from those which we have followed, and we shall await his results when complete, with interest. In the meantime, to summarise our own observations, we have three insects superficially resembling one another in some of their forms very closely, but in which certain details, which are fairly constant, appear to be sufficiently definite to distinguish one from the others. The genitalia in two of them, *cognatellus* and *malinellus*, show fairly constant differences; sufficient to separate them, but in the third, *padellus*, they vary considerably in the one differing organ, but it is doubtful whether it ever agrees very closely with either of the other two. Their habits in the earlier stages, as has already been shown, vary very

widely from one another. The conclusion that I come to, therefore, is that Zeller was right in giving specific rank to *malinellus*, and that as to the occurrence of that species in Britain there is no doubt. Further, I think there is no question that it is *malinellus*, that usually attacks our cultivated apple-trees, but there is some evidence that *padellus* may also at times feed on them.

[Mr. Thorpe's paper on "Biological Races in *Hyponomeuta padella*, L.", was communicated to the Linnean Society on April 19th, 1928.]

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 26th, 1928.

By E. A. Cockayne, D.M., A.M., F.E.S., F.R.C.P.

LADIES and GENTLEMEN. Once more the reports of the Council and of the Hon. Treasurer show an improvement in the affairs of the Society. The average attendance at the meetings has increased again, and affords one of the best indications of its vitality. Those field meetings with which the unusually wet summer did not interfere, were well supported and successful. A small innovation was made by printing on the notice of one meeting the names of a few insects likely to be encountered, and with a view to stimulating interest in the field meetings the Council has decided to mention in future some of the more local fauna and flora of the district to be visited. The decision of the Council to hold the Annual Exhibition at an earlier date was amply justified by the record number of 241 members and visitors, who came from far and near to see the finest exhibition of its kind in the country and to renew old friendships and form new ones.

The balance-sheet shows a balance on the right side, but it must be remembered that we are not yet self-supporting. Our Proceedings, well illustrated and full of valuable papers, are a legitimate source of pride; but were it not for the continued generosity of one of our members we could not publish them in their present form. We have also undertaken a further financial burden by providing refreshments at the Annual Exhibition, and the cost this year was not entirely defrayed by voluntary subscriptions. Until these expenses can be met out of our ordinary annual income, we cannot be wholly satisfied with our financial position.

To do this we require more than sixty new members. So large

an increase in our numbers can only be obtained by determined and sustained efforts, and I hope every member will make it one of his New Year's resolutions to introduce a new member during the current year.

We have lost by death during the past year five members. My brief account of their attainments and of work they have done within the Society and outside is, I feel, sadly inadequate to the occasion.

George Charles Champion who died at the age of 76 was the last survivor of the founders of our Society, and was made an honorary member in 1922, when its fiftieth anniversary was celebrated. By his contributions to our knowledge of the Coleoptera and Rhynchota he made a world-wide reputation; and that unrivalled work, the "*Biologia Centrali-Americana*," owing much to his untiring labours as a collector of material, and as a contributor of his own work and a sub-editor of the work of others, will stand as a lasting monument of his fame.

Stanley A. Blenkarn was cut off in the prime of life by a tragic accident. He joined the Society in 1911, and soon making his presence felt was rewarded by a seat on the Council. A man of modest but charming personality, he was a regular attendant at our meetings, an exhibitor, and a donor of Coleoptera to our collection. His untimely death has ended a life full of promise and left a gap in our ranks, which will be felt for years to come.

Douglas H. Pearson of Nottingham became a member less than a year ago, but for years he had shown his interest in the Society by coming to the Annual Exhibition and showing choice aberrations of British and continental Lepidoptera. He made frequent visits to the Alps and Pyrenees and was well acquainted with both the fauna and flora of these regions.

G. B. Pearson, who joined the Society in 1915, lived in Florida and was known personally to few of us, but he kept in touch with us by sending to our Secretary, Mr. H. J. Turner, notes on the local fauna and specimens of Lepidoptera which were exhibited from time to time.

George T. Porritt was a member for forty years, and in former days attended many of the meetings. He did much to encourage the study of the fauna of his native county, Yorkshire, by supporting the local societies and by founding and editing "*The Naturalist.*" Living in Huddersfield, one of the centres of industrial melanism in the Lepidoptera, he became greatly interested in the subject, and

created interest in others by the facts he published and by his explanation of the origin of melanism which was founded upon them. He contributed numerous notes and papers to the "*Entomologist's Monthly Magazine*," of which he was an editor for many years, and published a list of the Lepidoptera of Yorkshire; but his most valuable contribution to science was embodied in the "*Larvae of the British Butterflies and Moths*" published by the Ray Society, which he edited after the death of William Buckler.

I have taken as the subject of my address this evening certain aspects of Larval Variation, and I have chosen it, because in comparison with variation in the imago it has been much neglected, though as a study it is in some respects even more interesting and more likely to repay the investigator.

The most extensive series of experiments on the colour of lepidopterous larvae are those which were carried out by Professor Poulton. He experimented with a large number of Geometrid larvae and found that they were very sensitive to their surroundings. The most striking results were obtained with *Opisthograptis luteolata* and *Amphidasis betularia*. In the case of the former species he found that the larvae reared amongst green leaves produced the green form with a red hump and red head, whereas those reared amongst brown twigs produced brown forms. Mottled forms resembling lichen were never bred in these experiments, though—as my exhibit to-night demonstrates—there is a wonderful range of lichen-like forms in this species. In *A. betularia* the results were similar; and here again no mottled form appeared, though a very rare mottled form occurs in nature. In addition to green and brown forms an opaque white form, which does not appear to have been taken wild, was bred by keeping the larvae in a cage with spills of white paper amongst the leaves. Larvae of other species, which have a series of brown forms but no green ones, were found to be susceptible to their environment in the same way, the depth of the ground colour depending on the darkness of the twigs they rested on. Of the Geometridae, *Crocallis elinguaria*, *Ennomos angularia*, *Selenia lunaria*, and *Melanippe montanata*, and of the *Noctuidae* various species of *Catocala*, were found to be sensitive. The experimental results agree well with observations made in the field. Most of us must have noticed the difference in the larvae of the same species beaten from trees of different kinds or even from trees of the same kind, from young bushes with green stems or from

old trees with dark branches and few leaves. *Betularia* is a good example of this. Larvae from herbaceous plants, hops, and lime, are generally green, those from blackthorn and birch are dark brown, those from oak may be either green or brown, and those from sallow are putty-coloured. *Strataria* on the other hand feeds almost exclusively on oak and is almost always brown; but there is a dark green larva in my box beaten from a young oak, and Mr. Hawkins beat one from the sallow; so that it would most likely prove to be sensitive like its ally, though to a lesser degree.

Later on, Poulton produced lichen-marked larvae by keeping them in cages with bits of white paper mixed with their food. He was most successful with *G. bidentata* and *Eutricha quercifolia*. Observations on larvae in their natural surroundings confirm these experiments in a most convincing way. In the New Forest I found large numbers of beautifully mottled larvae of *Miselia oxyacanthae* on blackthorn covered with lichens, and the more lichen there was the higher the proportion of lichen-marked larvae; whereas in the London area I have never met with this form at all, nor have I seen it near Sheffield nor in Lincolnshire, where lichens are absent or scarce. Last year, in Scotland, I found the same correspondence between the colour of the larvae and the character of the trees from which they were beaten. In the low part of the wood at Gight nearly all the mountain-ash trees are dying and covered with lichen even on the small twigs, and here there was a high proportion of green larvae of *luteolata*, many mottled ones and very few brown ones. In the higher part of the wood where the trees were healthier, more leafy and much less lichen-covered, green larvae of *luteolata* were still the preponderant form, but there were very few mottled ones and many more brown ones. In the case of *bidentata* lichen-marked larvae were common in the low part of the wood and brown ones rare, but higher up all were brown. Unfortunately, *betularia* was scarce and I did not get a lichen-marked one amongst the eight or ten I succeeded in beating. In the London area I have never beaten a mottled larva of these species. *Metrocampa margaritaria* has a lichen-marked form, but I have never been fortunate enough to get one. Other Geometers have larvae mottled in a less striking manner, and to illustrate this I show a larva of *B. hirtaria* beaten from an ash at Horsley, though the light parts are darker than they were when it was alive; and two *Boarmia consortaria* from an oak with mottled branches at Limpsfield.

Two questions at once arise. At what period are these larvae

sensitive and how is the change in colour brought about? Poulton found that the larvae he experimented on were quite insensitive in their first instar, and pointed out that at this stage they rest on the leaves and that, if they were sensitive at this stage, nearly all would produce the green forms. He showed that they became sensitive in the second instar, but were most easily influenced by their surroundings in the third. After that very little change could be induced, though some could be influenced to a small extent even in the last instar. The effect was a cumulative one, and there was no particularly critical period, during an ecdysis for instance, but the longer they were exposed to a special environment the more definite was the effect produced by it.

The difference in colour is produced by the difference in the character of the light reflected from their immediate surroundings on their skin. Whether it is a direct effect on the skin itself or whether the action is an indirect one through the nervous system is, I believe, unsettled. I think it is true that in all the larvae Poulton used in this series of experiments the blood and fat in both the green and brown forms are an equally deep green, the green colour being due to a chlorophyll-derivative, and the only difference is in the degree of pigmentation of the epidermis or in its distribution. The distribution of the pigment is interesting, because in the mottled forms of all these larvae the same areas tend to be either light or dark. The mottling is by no means haphazard, though all parts of the skin must be subjected equally, at one time to light reflected from lichens and at another to light from twigs. Some parts of the epidermis are more sensitive than others, and even in the wholly brown forms there is a deeper pigmentation in them, though it is not as conspicuous as one would expect.

A number of other Geometers have larvae, brown and green, differing only in the pigmentation, and these would probably prove to be sensitive in the same way. *Cabera pusaria* and *C. exanthemaria*, *Hybernia rupicapraria*, *Tephrosia extersaria*, and *Macaria alternata*, for example, have green blood in all their forms. *Pusaria* is particularly interesting because, in addition to green and brown forms, it has a white form on aspen, like that produced artificially in *betularia*.

Dimorphic forms of larvae, green and brown, are even commoner amongst the *Noctuidae*; often, as in *Hadena pisi*, both forms are equally numerous, but in some cases, as in *Euplexia lucipara* and *Calocampa vetusta*, the brown form is scarce, and in others, for

instance in *Stilbia anomala*, *Triphaena pronuba*, and *Epunda lichenea*, the green is the scarce one. In the majority of cases the blood and fat in both forms are green and the difference is merely pigmentary. *Pisi* is a good example of this. The experiments on the sensitiveness of these Noctuid larvae were few and inconclusive: neither Miss Gould nor Professor Poulton found any indication that they were influenced by their surroundings. Observations in the field support this. Most of the larvae of this group hide in the daytime as far from the light as possible. Both the need and the opportunity for acquiring colours like those of their environment are much less than is the case in Geometers. *Pisi*, however, rests fully exposed on its food-plant during the day; and at Achnasheen I noticed that there were rather more brown than green ones on the bracken, though the plant is much more green than brown.

The effect of feeding larvae in closed tins is interesting, as any of the influence exerted by the environment is avoided. In a large brood of *strataria*, bred from eggs, all the larvae were brown, but in a large brood of *consortaria* both forms were numerous. The explanation seems to be that in the former species all had strong bias towards a pigmented state, and in the latter some had a bias in one direction and some in the other. Poulton found that some of his larvae were much more easily influenced than others and some were quite refractory. Here is a question that requires further investigation. I suspect that even in Geometers there is a hereditary difference, though it can to a large extent be overcome by environment. In the case of Noctuids, a large brood of *vetusta* kept in the dark gave all green larvae, but *Anchocelis litura* gave both forms, green being in the majority. Unfortunately, no exact count was made, but I think it was about two green to one brown. In Noctuid larvae the difference is, perhaps, due solely to heredity, but nothing short of careful experiment will show the truth or falsity of this hypothesis.

The larvae mentioned so far have green blood and green fat, and in many the skin too is green, but this is by no means the case in all larvae. Some have no green substance either in the blood or fat: for example, *Perizoma affinitata*, most species of *Dianthoecia*, and of *Tapinostola*, and *Nonagria typhae* and *N. neurica*. *Nonagria cannae*, on the other hand, has deep emerald green blood, but there is no green substance either in the the fat or skin. The yellow pigments of the blood are derived from carotinoids and the green substance is derived from chlorophyll, but there must be several different compounds formed

from the latter. I have noticed that in some cases, as in the genus *Thera*, very slight warmth turns it yellow, whereas in others, as in *Colias edusa*, it remains green at a much higher temperature. Only a difference in chemical constitution would account for this. The identification of this group of chlorophyll-derivatives and the determination of their relationship to one another awaits a chemist skilled in microspectroscopy.

A very interesting proof of the existence of more than one green compound in a single larva is afforded by the blue-green mutant of *Colias philodice* bred by Gerould. He showed that in ordinary larvae two substances, which he calls chlorophyll and xanthophyll, with different spectra, were present, but in the blue-green recessives only the former was found.

This long discussion is in part preparatory to the consideration of green and brown dimorphic larvae different from those already mentioned. In the genus *Cosymbia* (*Ephyra*) the green form of larva with a green skin always changes into a green pupa, but the brown form gives rise to a brown pupa and there is no green substance in the blood of either. Thus there is a metabolic difference as well as a difference in epidermal pigmentation. Both green and brown forms are quite common in *pendularia* and *linearia*. In *annulata* the brown form is very rare, though a figure of a pupa in the *Trans. Ent. Soc.* for 1884, proves that it exists; in *orbicularia* the green form is the rare one. In *porata* and *punctaria* the green seems to be less common than the brown form. Poulton experimented with *annulata* and failed to obtain a brown larva, however brown the surroundings; and *pendularia* also showed no response to environment. In a case of this kind, where there is a profound metabolic difference, the dimorphism is most likely hereditary. A simple breeding experiment with larvae kept in the dark would settle the question, and for this *pendularia* would be the most suitable species.

Other species show a metabolic dimorphism of the same kind. It is met with in some of the *Eupithecia* species. *E. expallidata* for instance, has a form with a white ground colour and colourless blood and fat and a less common form with green ground and green blood and fat. Here, too, I expect the difference is hereditary, and the forms are probably simple dominant and recessive.

I will now turn to another form of variation. Almost all Geometrid larvae with protuberances of the epidermis show considerable variation in this character. I have noticed this in species

in which the larva is invariably brown, such as *Aspitates strigillaria*, *Numeria pulveraria*, and *Ennomos erosaria*, but it is most interesting in those which have both brown and green larvae. In *A. betularia* the warts on the fifth abdominal somite are smaller in the green than in the browner larvae, and in the green larvae of *Boarmia consortaria* there is only one pair of dorsal humps, that on the second abdominal somite, whereas in the brown larvae large lateral humps are present on the third, and smaller ones on the fourth and fifth abdominal somites in addition to the dorsal ones. *Tephrosia extersaria* has a green form of larva with two tiny raised dots on the eighth abdominal somite, and commoner green and brown or brown forms with pairs of raised knobs on the fourth and eighth, and in some cases an additional pair on the ninth.

Ennomos angularia has a unicolorous yellowish green form of larva without humps or projections, and various brown forms with pairs of dorsal knobs on the second, third, and fifth abdominal somites, pointed projections on the eighth, and lateral prominences on the second and third. In *Ennomos fuscantaria* there is a green form of larva either perfectly smooth or with a pair of pointed projections on the eighth abdominal somite; and a grey form with a row of red warts on the dorsum of the second thoracic somite, and on the abdominal somites pairs of large red humps on the dorsum of the second and fifth, and small ones on the fourth, pointed projections on the eighth, lateral red prominences on the first, second, and third, and a ventral one on the third. Intermediate forms occur and they are usually intermediate both in colour and in the degree of development of prominences. Are these differences hereditary or are they the result of environment? There are several points in favour of the latter hypothesis. There is no clean-cut division into two forms in these larvae, but various intermediates are found. The observation that the greener the larva the fewer and smaller the humps, if it is borne out by more ample material than I have at my disposal, is a still stronger argument. We know that the green colour is retained by larvae that rest on leaves, which are smooth, and that the brown colour is acquired by those that rest on twigs, which have excrescences. It is difficult to resist the conclusion that the smoothness of the green larvae and the excrescences on the brown ones are as much a response to surroundings as the colour; but, if this be so, it seems to me far more wonderful that a structural change can be called forth in this way than a pigmentary one. It would be most interesting to have the matter solved by experiment, for, until suitable experi-

ments have been carried out, no certain answer can be given to my question.

Though the following facts give no real help, they are perhaps worth mentioning. Amongst larvae of the hybrid *Philosamia ricini*, male, and *P. cynthia*, female, some had no tubercles and some had the tubercles reduced in size. The latter proved to be recessive to the normal. In *Bombyx mori* larvae with knobs, raised evaginations of skin, in the subdorsal line, appeared as a mutation, and were found by Tanaka to obey the Mendelian Law. These cases show that structural variations may be hereditary, but throw no light on the variations of this kind that are found wild and are, in consequence, so much more interesting.

In other families dimorphism as conspicuous as any in Geometrids or Noctuids occurs, but little is known about it. The larva of *Saturnia pavonia* has tubercles either pink or orange. Poulton found three with pink tubercles amongst eighty larvae bred from one batch of eggs, a ratio not at all like a simple Mendelian one. Moths bred from two of these gave a ratio of about three larvae with pink to one with orange tubercles, which would be expected, if the parents were heterozygous for pink and orange and pink were a dominant. Neither the colour of the tubercles, nor the ground colour, nor the extent of the black markings in the larva of this species were affected by the food-plant or surroundings. Polymorphism in *pavonia* seems to be governed entirely by hereditary factors, but further experiments are needed to confirm it.

In the Notodonts, *Dicranura vinula* has as a rule a larva with a green saddle on aspen and with a red saddle on other trees, a difference attributable to environment. *Phaeosia tremulae* has both green and brown larvae, but its close relative *dictaeoides* has only a brown form. *Notodonta dromedarius* has both green and brown larvae, but *ziczac*, though closely allied, has no green form, but possesses in addition to the brown form of larva, a purplish one almost confined to aspen and a white one to sallow. *Lophopteryx camelina* has an uncommon pink variety of larva, which I found on both beech and birch, as well as the common green one. Amongst the *Liparidae*, *Dasychira pudibunda* has yellow, pink, and blackish larvae, and *Orgyia gonostigma* has in both sexes one form of larvae with white hair and another with yellow hair. Amongst the *Lasiocampidae*, *Trichiura crataegi* is polymorphic, having more than five very different forms, but the account given by Tutt of Briggs' experiments with three of them is too brief to be of value. One may

venture to guess that in the Notodonts the variation is environmental and in the others hereditary, but evidence derived from experiments and not guesses are required.

Reverting to the Noctuae, *Acronicta leporina* has a white form of larva and a yellow one with a dark head and other dark markings, supposed to feed on alder and birch respectively, but Chapman has shown that the food is not the cause of the difference and believes them to be inherited characters. *Demas coryli* has white, chestnut, and black larvae which are probably due to hereditary factors, though evidence on the point is lacking.

Some work has been done on the *Sphingidae*. The difference in ground colour in larvae of *Amorpha populi* and *Smerinthus ocellatus* is due to environment. Both develop a pale grey or bluish green on aspen, and a deeper brighter green on other species of *Populus* and on *Salix*. Exceptions occur under natural conditions, though in captivity the relation between ground colour and food-plant was very definite. In *Smerinthus* the green pigment, unlike that of most geometers, is confined to the skin, the blood being colourless and the fat white. Much less, however, is known about the lines of red spots that may be present in either species. Red-spotted forms of *ocellatus* have been bred from moths derived from red-spotted larvae ; but this is inconclusive, whereas the observation of Mr. Newman that red-spotted larvae of *populi* are obtained commonly by breeding from the egg on aspen and rarely on other trees suggests that they are an effect of environment.

Reference to Piepers' paper on polymorphic Sphingid larvae shows that *Sesia stellatarum* has a green and a blackish form, and that *Herse convolvuli*, *Chaerocampa elpenor* and *C. porcellus* all have a common brown form and a rare green form of larva. *Elpenor* has been carefully studied by Federley, who found that all the larvae were green at first, but that in one brood 103 suddenly became dark brown at the third ecdysis and 37 at the fourth, and in another 9 became brown at the third ecdysis and 64 at the fourth. Had he been dealing with a larger number no doubt a few would have become brown even as early as the second ecdysis, though at this change of skin the great majority remain green. In this respect the larva of *elpenor* is like those of many Noctuae, in which the change from green to brown is equally sudden and complete, and equally variable in the period at which it occurs. Argument by analogy is notoriously dangerous, but the similarity suggests that a similar cause is at work. Federley starting with a brood in which there were 42 brown larvae and 10 green

ones believed that green would prove to be recessive to brown, but he obtained the following results in the next generation: green × green gave 73 brown larvae, green male × brown female gave 140 brown larvae, brown male × green female gave 18 brown larvae, and brown × brown gave 56 brown larvae. Not a single green larva was bred. He concludes that the brown and green larvae of *elpenor* are genetically identical; and one must assume that the difference is due to environment. The result is most unexpected, because the larger larvae hide by day like noctuid larvae and are not exposed like geometrid larvae to their surroundings. There must be a simple explanation. Perhaps there is a comparatively short period during which these larvae, and possibly those of some of the *Noctuidae* too, are sensitive to reflected light instead of the long sensitive period found in *Geometridae*. If so, it may occur when they are beginning to form the habit of leaving the food-plant to conceal themselves in the day-time on or near the ground, and those that acquire the new habit unusually late are the ones that retain the green coloration, or there may be a critical period during or just after an ecdysis.

Mr. L. W. Newman has supplied me with some interesting facts about *elpenor*. He tells me that of larvae collected wild in their last instar, 30 to 40 per cent are green; but that when he breeds them from the egg, as he does almost every year, in large open-air cages with an ample supply of growing food-plant, a green larva is a great rarity. Last year he had one amongst about three thousand brown ones, and the usual proportion is approximately one green to ten thousand brown. This is very puzzling, because the conditions in his cages are so similar to those of the natural habitat, but by means of a carefully planned experiment it should be possible to discover the reason for the apparent anomaly. These facts indicate too, that, if the dimorphic noctuid larvae really do respond to their surroundings, any experiment with them to show the effect of environment would have to be carefully designed and carried out, and to be conclusive would have to be checked by a breeding experiment like that of Federley with *elpenor*.

Thus, there is overwhelming proof that some larvae are influenced by their surroundings, though the difference in susceptibility of members of the same brood suggests that even in these species there are inherited differences. In other larvae it is probable that heredity is the sole factor accounting for the various forms. The black larvae of *Abraxas grossulariata*, for instance, may be a mutation; and there is little doubt that this is so in the case of the velvety black larva of

Miselia oxyacanthae. In the domesticated silkworm many forms are known that stand in Mendelian relationship with one another; but in the case of our native larvae, though we may surmise that such relationships are common, actual proof is almost completely lacking. I can think of only two cases, in which it is forthcoming. Professor Poulton has discovered that in *grossulariata* the form of larva with a black head and no other black markings, that appeared in his and in Raynor's cultures, is a recessive; and the rare recessive aberration of *Lasiocampa quercus* ab. *olivaceofasciata*, Ckll., has a larva with very dark fur and hair, which is distinguishable at a glance from the ordinary form. The latter is especially interesting because it is an example of a mutant larva giving rise to a mutant imago, though as a rule mutations in the one stage are quite independent of those in the other. At least one similar case is known. Gerould has shown that the olive-green larva of *Colias philodice* is recessive to the normal grass-green larva and gives rise to a butterfly with olive-green eyes and a peculiar pigmentation on the under-side, orange in the yellow form and buff in the white female. Standfuss states that an albinistic larva of *Arctia caia* and another of *Dendrolimus pini* produced albino imagines, and these, also, may have been comparable mutations.

I know of no seasonal variation in British species, but the larvae of the North American *Colias eurytheme* shows in certain strains bred in the autumn and winter two dorso-lateral rows of black spots near the posterior margin of each somite, which are never present in the summer generation. Nothing is known about the inheritance of this winter pattern.

Geographical variation occurs in the larva as in the imago. *L. quercus* has two races in France, *meridionalis* with white fur and white hair, and *viburni* with chestnut fur and white hair, both different from our native race with both fur and hair brown; and *auricoma* race *alpina*, Frr., has bluish white warts on the fifth to the tenth somites instead of the rusty red ones of other races. These examples will suffice. I mention geographical variation, because, if dimorphism in the larva of a species is due to heredity, one would expect the proportions of the different forms to vary in different localities even on the same food-plants. This is certainly true of *oxyacanthae*, *grossulariata* and *quercus*, in which the melanic forms are confined to definite areas, and Chapman hints that the yellow larvae of *leporina* predominate in some districts in the North, the white in others and in the South. *Acherontia atropos* has a green form

of larva and a black one differing in markings as well as in colour; the black one is very rare in Northern and Central Europe, but in Spain is as common as the green one, and in North Africa is actually the commoner. The usual food-plant, however, is not the same throughout this wide area, and Federley's experiments with *elpenor* make one doubt whether it is a true example of geographical variation. Records indicate that the distribution and percentage of the various forms of *T. crataegi* differ according to locality, but they are too imperfect to be of real value. Data of this kind concerning the forms of *crataegi* and the species of *Cosymbia* might give interesting results. It is, however, in the cases in which the cause of the difference in colour is most uncertain, as in the brown and green forms of the noctuid larvae, that imformation is most needed and most difficult to obtain.

I will end my review by thanking you for the patience with which you have listened. I am only too well aware of its deficiencies, and realise that I have raised many questions only to leave them unanswered; but, if some of you by observations in the field or by experiment will supply the answers later, this part of my address will not have proved altogether valueless.

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ABSTRACT OF PROCEEDINGS.

FEBRUARY 10th, 1927.

Dr. E. A. Cockayne, A.M., D.M., F.E.S., F.R.C.P., in the Chair.

The decease of a member, Mr. J. J. Lister, F.R.S., F.E.S., was reported.

Mr. J. B. Fidgen of Romford Rd., E., was elected a member.

Mr. R. Adkin exhibited a flower-head of the sweet coltsfoot (*Tussilago fragrans*), which he said, although not a native of this country, had established itself on some of the rougher parts of the banks along the Parades at Eastbourne, where it had spread out into great patches many yards square, whose fragrant blossoms were to be found from Christmas time until the end of February.

The President remarked that it was very abundant in the east of Scotland, and was also found at West Marina, St. Leonards. Mr. Step said that it was common on the London Rd. near Mickleham; he had seen half an acre of it along a roadside in South Cornwall. It was often called the "Winter Heliotrope." Mr. Gosvernor reported it from near the Suspension Bridge, Reigate Hill; and Mr. Sperring, near Lee Station, S.E.

Dr. Cockayne exhibited *Erannis defoliaria* from Epping Forest, including some very fine melanic forms and one example with the bands of the fore-wing united behind the discoidal spot; also an aberration of *E. marginaria* with much displaced and distorted median lines, from Wimbledon.

On behalf of Mr. Pierce of Oundle, he exhibited an earthworm with the posterior end duplicated, a by no means common occurrence.

Mr. O. R. Goodman read a paper illustrated with many lantern slides, "The Land of the Sheik," (see p. 1) giving an account of the holiday of several members of the Society in Algeria.

FEBRUARY 24th, 1927.

The PRESIDENT in the Chair.

Mr. A. C. Hewitt, 83, Tavistock Avenue, Walthamstow, E. 17, was elected a member.

Mr. Blenkarn exhibited two cabinet drawers of British *Chrysomelidae* and *Carabidae;* and pointed out a nice series of the very local *Chrysomela cerealis*, from Snowdon.

Mr. E. Step exhibited a living patch of the Hepatic, *Madotheca platyphylla*, Dumort., from Headley Lane, Mickleham, where it is abundant on banks and tree-stumps, in large colonies. It is one of the more substantial members of the group; and the stems lie over one another in a pleasing manner. The deep green opaque leaves are arranged in two rows on the stems and alternating branches, which are hidden by the close overlapping of the leaves. There were no fruits on the specimen, as these do not appear until a month or so later in the year.

Mr. A. A. W. Buckstone exhibited an aberration of *Pseudopanthera* (*Venilia*) *macularia* in which the black markings were all much enlarged and some fused together; an example of *Zygaena filipendulae* in which the hindwings only were salmon-coloured, another in which the salmon-colour was on the forewings as well; and a *Z. trifolii*, also of salmon-colour on all the wings.

Captain Crocker exhibited a *Melitaea athalia* showing *homoeosis*; the left fore-wing having connected streaks and spots of a lighter colour, similar to that of the undersurface.

A large number of lantern slides were exhibited by Mr. A. de B. Goodman illustrating the natural history of the visit to Algeria described by Mr. O. R. Goodman, at the previous meeting.

Mr. A. E. Tonge exhibited a series of slides of eggs of Lepidoptera, mostly of species whose ova are somewhat rarely met with.

Mr. Hugh Main exhibited a series of slides on the life-history of the stag-beetle *Lucanus cervus*, showing how well adapted for the study of the subterranean activities of the larvae of Coleoptera, were his special forms of terrarium, which he also exhibited. He read a short paper on his exhibit.

Mr. Robert Adkin showed slides illustrating the life-history of *Aleurodes vaporariorum*, commonly known as the "White fly," "Snowy fly," or "Mealy wings," which he said had been only too common in his conservatory at Eastbourne during the previous autumn. The eggs, larvae, pupae and imagines were shown *in situ*

on the leaves of a *Primula* ; also a larva of the Coccus, *Pseudococcus comstocki*, to which the *Aleurodidae* were not very distantly related ; and of a white moth resting on a leaf. The superficial resemblance between the *Aleurodes* and the moth was such as to make it no great wonder that some of the older naturalists regarded the former as a Lepidopteron.

MARCH 10th, 1927.

The PRESIDENT in the Chair.

The decease of a member, Mr. G. T. Porritt, F.L.S., of Huddersfield, was announced.

Mr. D. A. Hawgood, 89, Leigham Vale, S.W.2., was elected a member.

Dr. Cockayne exhibited larvae of the *filigrammaria* form of *Oporinia autumnata* from Achnaskeen, Ross-shire, which were fed on Glastonbury thorn. The dark green colour, which matches the natural food-plant (heather), had not been affected by the pale green substitute. He pointed out that the larvae of this form were more striped than those of the typical form of *autumnata*, and he had never seen such well-marked stripes and so dark a ground colour in the latter, of which he had 150 one year all faintly marked.

Mr. R. Adkin exhibited a series of *Theria* (*Hybernia*) *rupicapraria*, bred between the 2nd and 22nd of February last, the progeny of a female taken at Eastbourne in February of the previous year. No males emerged after February 12th, on which date the females began to appear. He had often found the species wild before the middle of January.

It was generally considered that this species was to be taken during the first mild weather after the middle of January, and was soon over. Stainton once recorded the species for January 1st.

Mr. E. Step, on behalf of Mrs. Grey, exhibited a portion of sycamore branch showing fasciation by a combination of three stems. A section of the stem at the point where fasciation began revealed no abnormality which would account for the aberration.

Mr. Bliss exhibited a bred example of *Sphinx ligustri*, from Cornwall, in which the pink flush was replaced by buff.

Mr. Harris exhibited a bred example of *Saturnia pavonia*, from Hampshire, with a small inverted wing on the upper side of the

hindwing. The pupa case showed an extra wing fold. The probable cause was thought to be a larval injury.

Mr. A. A. W. Buckstone exhibited a series of *Pieris napi*; bred from ova laid by one ♀ obtained in Surrey, including the following aberrational forms.

1. Forewings angular. 2. Forewings rounded. 3. Forewings very narrow. 4. Males with extra spot on the fore-wing. 5. Females with upper discal spot very much reduced in size. 6. Females with upper discal spot absent. 7. Females with markings of a grey colour and very faint. 8. Females with the ground colour greenish. 9. Male underside with spots united by black scales. All these were of the spring emergence.

Of the summer emergence he exhibited the following aberrational forms. 1. Both sexes very heavily marked, large specimens of both sexes. 2. Females with yellow ground colour. 3. Females with spots on fore-wings united by black scales. 4. Females with the upper discal spot so reduced that it was scarcely visible.

Two pupae went over two winters and produced imagines which were of the spring form. During the heat-wave in July, 1926, he had two *P. napi* pair in the cage, which was in a room from which the sun was excluded.

He also showed aberrations of *Pseudoterpna pruinata*. 1. Blackish-banded form. 2. A male with reddish bands. Both were from Wimbledon larvae.

Mr. Hugh Main made some remarks on the Shore Earwig, *Labidura riparia*. He had noticed that the eggs were carried about by the female, who also carried the young in her mouth, and in his observation-cages would hurriedly place them under a sheet of glass at the approach of danger. He had recently found three nests of the common earwig in Epping Forest. The first had eggs with the mother: the other two had eggs only: the mothers probably had been killed. He took all three nests and placed them in a cage, when the remaining mother-earwig collected the other two layings and placed them with her own.

Mr. Sperring sent for exhibition, a further series of *Polyommatus icarus* from Ireland, and subsequently communicated the following notes:—

In connection with the exhibit of Irish *Polyommatus icarus* on my behalf by Mr. Turner on March 10th, a point was raised as to whether this insect is double- or treble-brooded. From further enquiries made among Irish collectors, it appears that, so far as

the West Coast of Ireland is concerned, this insect is only single-brooded as far as Co. Clare, and on the eastern side, as far south as Dublin.

The various specimens from Sligo, Galway and Clare were taken in June and July of 1926; but it is very interesting to point out that the *icarus* taken in Co. Down, also in July, 1926, although single-brooded are—with three exceptions amongst the insects exhibited—all of the smaller double-brooded form, and the females could readily be confused with the ordinary type of double-brooded female taken in the South of England.

At what point on the West of Ireland the single-brooded form ceases, and is replaced by the double-brood race, cannot at the moment be definitely ascertained. It is quite evident that the point is either in Co. Kerry or the North of Co. Cork, Kerry forming a barrier between Sligo and Cork. On the East-coast, the single-brooded form commences in Co. Dublin. It is quite possible that during 1927 further information will be available as to whether *icarus* is single- or double-brooded in Kerry. In connection with this question, the following extracts from answers to my enquiries will probably be of interest:

Co. Down.—"In regard to your queries about *icarus*, I think there is but one brood here. It is fairly common all round this district, and I do not think it appears until July: in the months of July and August it is in full flight. I cannot remember having seen it earlier."

Dublin.—"I have collected chiefly in the South of Ireland, and mostly to the South and West of Cork City. I have not been there *all* the season, but have been there in most months, from time to time. I have found *icarus* in early June, and have not noticed it in July. Last year I was in Cork from July 15th to August 15. During July I saw no *icarus*, but in August it came out plentifully towards the middle of the month. Round Dublin I have taken it in early June and again in August. I should say it is double-brooded round Cork and Dublin. The species is of the typical kind, *i.e.*, small and of the usual colour. Cork and Dublin females are nearly always of the blue form with large orange spots, the brown form hardly ever occurring—at least, that is my experience."

Tyrone.—"With regard to *icarus* race *clara*, as a whole, is single-brooded appearing from about the middle of June (in early seasons) to the middle of August. A very partial second-brood *may* occur in a very favourable year."

"I met with *icarus* in the first week of June in Co. Wicklow, 10-12 miles south of Dublin, and from the very small size and early appearance, these were probably the spring brood. I have no experience, on the species of the West Coast between Clare and Cork."

MARCH 24th, 1927.

The PRESIDENT in the Chair.

Mr. E. J. Bunnett exhibited a form of *Acronicta leporina*, bred from a Chiselhurst larva, in which much of the usually white ground was slightly flushed with grey scaling, as if the black of the lines and spots had run off on their outer sides; an aberration of *Hipocrita jacobaeae*, in which the two main features of the fore-wings were united, from Mickleham, April 4th, 1926; a specimen of the rare *Aventia flexula*, from Mickleham; and a form of *Euclidia mi*, from Box Hill, in which the ground-colour was pure white in place of the usual fawn-colour.

Mr. H. J. Turner exhibited an extremely large example of the fungus *Polyporus betulinus* from Chiselhurst, measuring 14 inches by 9 inches in area, and of a flat growth instead of the hoof-shaped bracket which this species usually assumes. Mr. Step said that these large, flat specimens from beech, oak or ash, were regarded as another species, *Ganoderma applanatum*, distinguished by its coloured flesh, tubes and spores; this, however, from its white interior appeared to be *P. betulinus*.

Major Hingston, a member of the recent Mt. Everest Expedition, gave an account of "Curious Protective Devices in Spider Snares," illustrated by a number of diagrammatic lantern-slides of the various snares and their devices, as observed by him in the Himalayas and in Burma. (See page 15).

Dr. Cockayne expressed his pleasure with the address, and said the Society considered it a privilege to hear the fascinating account of these small creatures just given by Major Hingston. He did not agree that the account strengthened the view that these devices were protective, and wished for further observation on the results accruing from them. He noted that most of these spiders were rare as well as small, which was contrary to expectation if the protection was in any degree effective. The expenditure of so much energy in the production of silk was a great drain on the system, and the rebuilding of an elaborate device would be well

nigh impossible. The ordinary snare of a spider is practically invisible and one would think much more effective than one with such conspicuous devices, which would be readily seen by approaching prey.

Mr. Main remarked that the British spiders lacked the powers of invention and of artistry, which were so much in evidence in these tropical spiders. He instanced the famous "signature" spider of Fabre, of which numerous specimens have been kept in the Zoological Society's Gardens, but very few of them had made any attempt to ornament their webs with the device. He wished to know if Major Hingston had met with cells of hymenoptera stored with large spiders; and had he made observations of the attacks on spiders? He was anxious to get records of attacks on big spiders. His view of the use of these bands of conspicuous silvery-white was that they could be easily seen at night. He had much pleasure in proposing a vote of thanks to Major Hingston for his most interesting account of these neglected creatures.

Mr. Bristowe said that the spiders of Britain did not make "devices" in the way that some tropical species did. Some, however, made a platform, which was probably the beginning of a "device." He noted that there were members of various groups included in Major Hingston's exhibit, not all of which were orb-web spinners, naturally; and called attention to the remarkable convergence of evolution of the devices and orb-making. Some wasps only put a single spider in each cell, whereas the Pompilids often had 20 to 30 Epeirids in each of their cells. The hard outer skin of the body, which some spiders had, did not prevent their being victims of their hymenopterous foes. He had observed that various Brazilian wasps placed foreign matter in their webs, and in one special case he met with a species which used crumpled leaves. It was remarkable that many Epeirids devoured the whole of their webs every evening; and he asked if any of the species referred to did this, consuming their bands as well? He had much pleasure in seconding the vote of thanks.

In reply Major Hingston called attention to the usually accepted opinion that the sight of insects is very limited, and that they do not see the snares but tumble into them. However, this does not apply to hymenoptera, which must have very efficient sight, for their hunting is done by sight; and in his opinion these devices were particularly protective as delusions turning off the attacks of hymenoptera. He had not met with large spiders in a hymenop-

teron's cell, but always small spiders. Many observations had been made of Diptera picking spiders from their webs. The protective shape, colour, devices, and markings would not be seen at night, but in moonlight would be equally as effective as in the daylight. He saw no reason why these spiders should not eat their snares and devices, which were formed of silk and insect remains, although he had not observed such a habit.

APRIL 14th, 1927.

The PRESIDENT in the Chair.

Mr. T. H. L. Grosvenor exhibited three short series of *Zygaena filipendulae*:—

(1) Specimens from Chattenden, taken by the late J. W. Tutt, and forming part of the series which he called *hippocrepidis*. These were taken in May and June. He considered them an offshoot of *Z. trifolii*.

(2) Normal *Z. filipendulae* taken at Felbridge, Surrey, in May and June, 1921-22 & 24.

(3) Small race of *Z. filipendulae*, which corresponds very closely with series No. 1, taken at Felbridge, Surrey, in 1923. These small specimens are the direct descendants and parents of series 2. In all of these years the species was very abundant in this marsh, but it was only in 1923 that these small specimens occurred: in that year every example taken was much below normal. It may be mentioned that these were in no way selected, as the small size was not noted until the insects were taken off the boards and put alongside specimens taken in previous years. The small form did not occur in 1924, as a special search was made for it without success. In 1925-6 the species was rare in this locality, so that no adequate comparison could be made, but the few seen were of normal expanse.

Mr. Hy. J. Turner exhibited examples of the galls made by the clearwing-moth, *Synanthedon formicaeformis*, in the shoots of sallow, *Salix caprаea*, from S. Hampshire; and called attention to the remains of the burrow made by the young larva encircling the shoot. He said that, later on, a fracture often occurred from the decay of the upper portion. He referred also to the ravages by birds, most of the shoots above the ground growth of sedge and rush being torn open as a rule.

Mr. Edwards exhibited a slab of coal showing fossil impressions of *Sigillaria* and *Phenopteris*.

APRIL 28th, 1927.

The PRESIDENT in the Chair.

Dr. G. V. Bull exhibited a halved gynandromorph of *Trichiura crataegi*, bred in 1920 from an Essex larva. The left side was ♂ and the right side ♀. Small and deficiently scaled examples of *Saturnia pavonia*, bred from Yorkshire larvae in 1923; a perfectly white empty cocoon of the same species, the pupa belonging to it being found outside; and a cocoon of the same species with rounded, instead of pointed, exit end—which appeared to be due to the smallness of the space chosen for pupation.

Dr. E. A. Cockayne exhibited—(1) A melanic *Selenia bilunaria*, bred from Witherslack larva by Mr. Wm. Mansbridge. The ground colour is very dark, and all the normal markings are visible. A melanic *S. bilunaria*; melanism in the ancestor was produced by manganese; bred by J. W. H. Harrison. Except for two thin pale transverse lines across the forewings, it is entirely dark brown but of quite a different tone of colour to that of the former. (Shown on behalf of Mr. Wm. Mansbridge.)

(2) Two melanic *S. bilunaria* treated similarly to Harrison's, bred from Yorkshire, 1915, by A. S. Tetley, of Scarborough, with a pale specimen for comparison.

(3) Larva of *Senta maritima*, and frass, etc., to show that the food in spring is the lining of dead reeds.

(4) Larvae of *Amathes litura* and of *Cleora lichenaria*, from Surrey.

Mr. C. N. Hawkins exhibited examples of *Anticlea badiata*, showing considerable difference from each other in depth and shade of markings, as well as divergence in position and direction of the transverse lines. In one specimen the paired transverse lines near the base of the forewings make an acute angle near the costa, instead of an obtuse one, thus causing the short upper portion to meet the costa at an acute angle instead of a right angle as normally. The lower portions of these transverse lines also show a slightly altered slope.

Mr. Robert Adkin exhibited larvae of *Acidalia immorata*. He said that from moths taken at the end of May last year he obtained

a large number of eggs. In due course these hatched, and the young larvae appeared to thrive on knotgrass, dandelion and so forth; but it was doubtful whether they ate the heather with which they were kept supplied also. The larvae were kept out of doors in a well-ventilated cage; and with the approach of autumn the mortality became very great, some 75% dying; they were therefore brought into a cool vine-house, and very soon settled down for hibernation. As soon as the warm, sunny days of spring came round, they began to stir and to feed, eating partially withered dandelion and *Crepis*, and possibly *Potentilla*. As soon as fresh young heather was obtainable, they ate this also, and were at the present time practically full fed. Mortality during the winter was small, and this he attributed to the larvae having been protected from the cold weather. He thought that the behaviour of these larvae threw some light on the reason for the species being so extremely local in this country, in that it suggested that it was only in very specially situated, well sheltered spots, that it could withstand the climate of our winters.

Mr. Cox, a visitor, read notes received from a relation in Rhodesia on the death of a chamaeleon. He said that a female chamaeleon that had been captured, laid about two dozen eggs after it had been placed on a piece of chintz; then shortly rolled over and died. No native will touch one of these reptiles; and when his friend did so they screamed. The local legend was that the chamaeleon was sent from heaven to overtake death, but was too slow and death got to earth first. As a punishment the chamaeleon was allowed to lay twenty or so eggs, and then to die.

Mr. Step remarked that the legend here was, that if placed on a Scotch plaid the chamaeleon burst open and died, feeling the impossibility of changing colour to match the hues of the tartan!

MAY 12th, 1927.

The PRESIDENT in the Chair.

Mr. Farmer exhibited living larvae of *Miselia oxyacanthae* and *Crocallis elinguaria*.

The President exhibited a short series of *Cosymbia* (*Zonosoma*) *pendularia*, including two ab. *decoraria*, Newm. (*subroseata*) bred in April from Worth Forest larvae.

Mr. Dennis exhibited a flower-spike of the early spider orchis, *Ophrys sphegodes* (*aranifera*), from the neighbourhood of Maidstone. Mr. Step said that Mr. Rayward had kindly sent him specimens from near Eastbourne, but that the spikes were smaller than that exhibited, bearing only three flowers. He pointed out that *O. sphegodes* was quite clearly distinct from the commoner bee orchis, *O. apifera*, in the markings and colour of its petals. Mr. R. Adkin had met with it at Eastbourne, and Mr. Grosvenor at Wye.

Mr. O. R. Goodman exhibited long series of *Satyrus abdelkader*, *Teracalus nouna* and *Tarucus theophrastus*, received from Algeria; also a specimen of the ab. *tarus* of *Hesperia malvae*.

Mr. C. N. Hawkins exhibited preserved larvae of *Notodonta ziczac*, L., and called attention to the eversible glands beneath the head in front of the first pair of thoracic legs; also of *Xanthorhoë montanata*, *Hydriomena furcata* (*elutata*), *Pseudoterpna pruinata*, *Ourapteryx sambucaria*, *Xylophasia rurea*, *Triphaena fimbria*, *Euplexia lucipara* and *Phalera bucephala*.

Mr. Hy. J. Turner exhibited a number of colour aberrations of *Colias lesbia*, sent to him by our fellow-member Captain Kenneth Hayward, from the Argentine. There was included a very curious gynandromorph in which the ♂ and ♀ colours and markings were extremely mixed. (See *Ent. Record.* xxxix. 97.)

MAY 14th, 1927.

FIELD MEETING—BOOKHAM.

Conductors—E. A. COCKAYNE, A.M., D.M., F.E.S., and H. WORSLEY-WOOD, F.E.S.

The weather was quite favourable for a nature ramble and a good number turned up making the gathering one of the most successful of the year. Most of those present obtained something of interest although only the lepidopterists sent in reports of their doings. The imagines reported were *Gonepteryx rhamni*, *Pieris napi*, *Euchloë cardamines*, *Vanessa io*, *Aglais urticae*, *Rumicia phlaeas*, *Coenonympha pamphilus*, *Euclidia mi*, *Lithina chlorosata* (*petraria*), *Bapta temerata*, *Xanthorhoë ferrugata*, *Ectropis punctulata*, and *Epirrhoë alternata* (*sociata*). Ova of *Dicranura vinula*. Larvae of *Limenitis sibilla*, *Ruralis quercûs*, *Porthesia similis*, *Nola cucullatella*, *Hylophila quercana*, *Cleoceris viminalis*, *Amathes lota*, *Miselia*

oxyacanthae, *Taeniocampa munda*, *T. cruda*, *T. miniosa*, *Calymnia trapezina*, *Dyschorista fissipuncta*, *Amphipyra pyramidea*, *Agriopis aprilina*, *Diloba caeruleocephala*, *Polyploca flavicornis*, *Erannis defoliaria*, *E. aurantiaria*, *E. marginaria*, *E. leucophearia*, *Operophtera fagata* (*boreata*), *O. brumata*, *Oporinia dilutata*, *Colotois pennaria*, *Phigalia pedaria*, *Cidaria fulvata*, *Europhila badiata*, *Acidalia virgularia* (*strigaria*), *Theria rupicapraria*, *Ourapteryx sambucaria*, *Apocheima hispidaria*, *Pseudoterpna pruinata*, *Comibaena pustulata*, and *Hydriomena furcata* (*elutata*). Also *Coleophora genistae* on *Genista anglica*.

Mr. Step reported that a Myriapod, the Bristly Millipede, *Polyxenus lagurus*, was turned out of decayed wood in a dead tree-stump, and thought on a casual inspection to be a species of Woodlouse. It resembles greatly one of the Isopod Crustaceans, the eleven body-segments being broad and furnished at their sides with tufts of scale-like hairs. Each segment is also fringed across the back with similar but shorter hairs. A longer tuft spreads on each side, flanking the two shining plates that constitute the tail; and above and between these plates is a spreading plume of long hairs. The animal has thirteen pairs of legs, but is not very active. It is yellowish-grey in colour, spotted with brown.

[See "Proc. S. Lond. Ent. S., etc.," 1902, 1904, 1910.]

MAY 26th, 1927.

The PRESIDENT in the Chair.

Mr. T. H. Brocklesby, Long Lodge, Merton Park, S.W.19, was elected a member.

Mr. Blair exhibited larvae of *Pachygastria trifolii*, from the Scilly Islands, where a more or less isolated colony exists on the extreme western boundary of the distribution of the species.

Dr. Cockayne exhibited the living larvae of *Grammesia trigrammica* (*trilinea*), *Nudaria senex* and *Odezia atrata*; with that of a sawfly, *Brachmea rufescens*.

Mr. Farmer exhibited the larvae of *Boarmia rhomboidaria* (*gemmaria*), *Theria rupicapraria*, and *Acidalia virgularia* (*strigaria*).

Mr. H. Moore exhibited an example of the New Zealand geometer, *Declana atronivea* from Wellington: a beautiful, stoutly built, black and white species, whose larva feeds on *Panax arboreum*, its only foodplant, and known as Five-fingers.

MAY 28th, 1927.

FIELD MEETING.—BYFLEET.

Conductor—STANLEY EDWARDS, F.L.S., F.Z.S., F.E.S.

This was another successful meeting, not only was there a large number of species of Lepidoptera reported, but a number of records were sent in of other orders. In the lepidoptera the imagines taken were *Pieris brassicae*, *P. rapae*, *Gonepteryx rhamni*, *Polyommatus icarus*, *Dipterygia scabriuscula*, *Hadena genistae*, *Phytometra viridaria*, *Acronicta megacephala*, *Boarmia punctinalis* (*consortaria*) a melanic form, *Ectropis punctulata*, *Lithina chlorosata* (*petraria*), *Ochyria designata*, *Epirrhoë alternata* (*sociata*), *Xanthorhoë montanata*, *Cabera exanthemata*, *C. pusaria*, *Ematurga atomaria*, *Pseudoterpna macularia*, *Perizoma albulata*, *Euchoeca nebulata* (*obliterata*) and *Cosymbia porata*. Ova of *Gonepteryx rhamni*, *Euchloë cardamines*, *Thyatira batis* and *Pterostoma palpina* were found.

Larvae of the following were reported, *Cosmotriche potatoria*, *Malacosoma neustria*, *Porthesia similis*, *Dyschorista fissipuncta*, *Amathes lota*, *Taeniocampa munda*, *T. populeti*, *Cleoceris viminalis*, *Hylophora quercana*, *Gonoptera libatrix*, *Oporinia dilutata*, *Crocallis elinguaria*, *Colotois pennaria*, *Erannis aurantiaria*, *E. defoliaria* and *Phigalia pedaria*.

In Coleoptera, *Donacia versicolorea*, *D. simplex*, *Zeugophora subspinosa* (on aspen).

In Hymenoptera, *Crabro cephalotes* (cocoons in rotten willow), *Poecilosoma luteolum*, *Blennocampa tenuicornis*, *Monophadnus geniculatus* and *Pachynematus apicalis*.

In Diptera, *Pacyrrhina crocata*, *Beris chalybeata*, *Dioctria atricapilla*, *Scatophaga maculipes* and numerous others.

In Trichoptera, *Molanna angustata*, *Mystacides nigra*, *Leptocerus aterrimus* and *Glyphotaelius pellucidus*.

In Neuroptera, *Chrysopa perla*, *C. vittata* and *Hemerobius lutescens*.

In Odonata, *Brachytron pratense*, *Calopteryx splendens*, *Ischnura elegans* and *v. rufescens* and *Platycnemis pennipes* (a new locality).

[See "Proc. S.L.E. & N.H.S.," 1901, 1902, 1904, 1907, 1908, 1912, 1914, 1920, 1925.]

JUNE 9th, 1927.

Mr. T. H. L. GROSVENOR, VICE-PRESIDENT, in the Chair.

Mr. Tonge exhibited stereoscopic slides of the wild-laid ova of *Dasychira pudibunda*, *Pygaera curtula* and *Selenia bilunaria*.

On behalf of Mrs. Brooks, Mr. Dennis exhibited a very large fasciated plant of the Meadow Buttercup, *Ranunculus acris*; the compound stems were over an inch in breadth, and the fruit heads were also fasciated.

Mr. F. B. Carr exhibited the ova of *Stauropus fagi*, and remarked on the comparatively large size of the ovum in this species.

Mr. A. de B. Goodman exhibited series of *Triphaena pronuba*, *T. orbona*, Huf. (*subsequa*, Hb.) and *T. interjecta*, showing similar lines of variation from light forms to dark; also light and dark forms of *T. fimbria* and dark forms of *T. janthina*, one specimen of the last being of reddish coloration.

He also showed *Melitaea aurinia*, from various localities on the continent to show the geographical variation, including the numerous forms of the small alpine races of *merope*, the *provincialis* form from S. France, race *iberica* from Spain and the *amasina* race from Amasia.

Mr. Mera exhibited his series of British *M. aurinia* and of *T. pronuba*, selected from the results of many years breeding and collecting.

Mr. Goodman reported that he had seen *Pyrameis atalanta*, flying in his garden at Horley, on June 9th. It was apparently a very fresh example. He also reported that in his aviary he had obtained a hybrid between the sparrows *Passer montanus* ♂ and *Passer domesticus* ♀

Mrs. Olive Grey exhibited a number of Australian Cicads, and contributed the following notes:—

The native name for the Cicadas in Australia is "Loki," and locally the various species receive a characteristic name.

The "Greengrocer" varies from pea-green, emerald, and darker greens to yellow and buff shades and light brown; these last are also called "Yellow Monday." The "Whiskey Drinker," so called from his red nose, varies in size and colour from jet black to a small grey fellow. Their song is deeper than that of the "Greengrocer." The "Union Jack" is a double-drummer, but, owing to the fact that he prefers the trunks of very lofty trees like the "Black-Butt," he is very difficult to get, and is also more active than the others. He is the largest of the Cicadas, and his wings are set more like those of a fly.

The Cicadas start their song on an instant and stop just as abruptly as if on a given signal. There are dozens of other colours and sizes from the "Union Jack" down to one the size of a

"March Fly," but they all belong to one or other of these varieties.

Mr. Step exhibited the tubular web of the so-called British Trap-door Spider (*Atypus affinis*), from Guestling Wood, Sussex, where he had found it present in numbers. It was a medium-sized example, six and a half inches in length, of which the lower two-thirds had been buried in the sandy bank. This portion has a diameter of half an inch; the exposed upper part being a third less in width. It was untenanted.

He also exhibited the longicorn beetle, *Macrotoma crenata*, from Calcutta.

A long discussion took place on the partial disappearance of various species of Lepidoptera in Britain within recent years. Natural causes, vicissitudes of climate, abundance of bird-life, prevalence of parasites, unusually mild and damp winters, and the encroachments of intensive cultivation with the spread of population, were put forward as causes. It was recognised that it was only with the utmost difficulty that a species could be planted in a new area, or even restablished in an old one; and some considered that all efforts at "protection" would be more or less futile.

Mr. E. Step then read the following Report.

South-Eastern Union of Scientific Societies.—Congress at Hastings.

As your junior delegate, it is my duty to give you a brief account of the proceedings at the Congress, which was held in the ancient town of Hastings and its western extension, St. Leonards, from May 25th to May 28th.

The early arrivals on the first day (Wednesday) made a tour of the Old Town and its venerable churches; but I was content to join them later in the ruins of the castle, where tea was served, and the Rev. C. C. Dobson gave a summary of the Castle's varied history. At the same time, Mr. Lewis Abbott, in his shop at St. Leonards, was giving an account of recent geological research and discoveries in the district, in which for many years he has played an important part. In the evening, we were welcomed to the town by the Mayor (Councillor T. S. Dymond, an old Essex Field Club member) and representatives of the Hastings Natural History Society. Dr. A. B. Rendle was inducted as President, and delivered an address on "The Flora of Sussex, Past and Present."

At 9 on Thursday morning the delegates met for business, which included the consideration and acceptance of an invitation from Rochester to hold the Congress there in 1928. Sir Martin Conway was chosen as the President-elect. Later, the Botanical Section transacted its business, and then listened to addresses by Dr. E. J. Salisbury on "The Waning Flora of England," and by Councillor Dymond on "The weeds of a St. Leonards Garden"—his own.

After lunch, there was an excursion of archaeological and geological interest to Winchelsea and Rye, and another for botanical purposes to Pevensey Marshes. In the evening, the Mayor and Mayoress held a reception in the fine, new White Rock Pavilion, which was a very enjoyable function, as it enabled representatives to renew ancient acquaintances.

On Friday morning, both Zoological and Geological Sections had their innings; but, as it was difficult to be in two places simultaneously, I naturally selected the zoological, of which Mr. Turner is Secretary. Here we listened to a succession of three admirable addresses: by Prof. MacBride on "The Nature and Origin of Mutations;" by Mr. W. H. Thorpe on "The Fauna of Brackish Pools on the Sussex Coast," and by Prof. Lloyd Morgan on "Territory in Bird-life," founded on the theory of Mr. Elliot Howard, with extensions and interpretations of his own.

The geologists, at the same time, were listening to addresses on the Submarine Geology of the English Channel by Mr. H. B. Milner, and on "Fossil Vertebrates from the Weald" by Dr. W. F. Whittard.

There were three excursions in the afternoon, but the day was our only wet one; and having got pretty damp in the morning I thought it inadvisable to occupy the seat I booked for Cliff End and Fairlight. Mr. and Mrs. Turner, being more resolute, went and were rewarded by a much finer afternoon than the portents indicated. In the evening, the Union Secretary, Mr. E. A. Martin, gave a lantern lecture on "The Amenities of the South Downs."

On Saturday morning, we had a clear-up business-meeting, and expressed our thanks to all concerned for a most enjoyable and successful Congress; and later, the Regional Survey Section listened to addresses by Prof. Patrick Geddes on "The Movement towards Synthetic Studies," and by Councillor Morgan on "The Town-planning of Hastings in the Future." I attended a cinematograph lecture to children, by Dr. Clarence Tierney on "Some Secrets of Nature."

In the afternoon, Mr. E. J. Bedford gave a lecture to the youngsters on " Wild-flowers."

There was a final charabanc excursion over a considerable slice of Sussex, including the Rother Valley; but I had a greater desire to use my feet, and in company with Mr. Stanley Austin, the President of the London Natural History Society, I walked over the Fire-hills to Pett and Guestling, where we paid a respectful visit to the tomb of our old friend, the Rev. E. N. Bloomfield, the former rector.

JUNE 11th, 1927.

FIELD MEETING—WHITE HILL, MICKLEHAM.

Conductor—E. STEP, F.L.S.

This was another very fine day and a number of members were present, but owing to the extent of the areas visited the party was never collected together and even tea, usually a reunion, was not so on this occasion.

The following records were sent in—

In Lepidoptera, *Laverna* (*Mompha*) *raschkiella* (mines in the leaves of *Epilobium angustifolia*), a local species.

In Coleoptera, *Thectura cuspidata*, *Phloeocharis subtilissima*, *Stenus solutus*, *Pria dulcamarae*, *Clerus formicarius*, *Lema cyanella*, *Psylliodes dulcamarae*, *P. affinis*, *Epithrix atropae*, *Longitarsus exoletus*, *Mordellistena neuwaldeggiana* (*brunnea*) and *Xyloterus* (*Trypodendron*) *domesticus*.

In Hymenoptera, *Cephus pygmaeus*, a corn sawfly, beside the R. Mole and an Ichneumon, *Collyria calcitrator*, parasitic upon it; a Braconid, *Colastes braconius*, reared from blotches of *Laverna raschkiella*.

In Trichoptera, *Hydropsyche angustipennis*. Near the R. Mole.

In Neuroptera, *Sisyra fuscata*. Near the R. Mole.

In Ephemera, *Habrophlebia fusca*, *Ephemerella ignita* and *Baëtis rhodani*. All near the R. Mole.

[See " Proc. S. Lond. Ent. and N.H,S." 1901.]

JUNE 23rd, 1927.

The PRESIDENT in the Chair.

Mr. Hugh Main exhibited numerous items obtained on his holiday in Spain near Barcelona, including the nymph of the

mantid, *Empusa pauperata*; antlions; the Scorpion, *Buthus occitanus*; *Clotho durandi* and other spiders; the larva of a large glowworm; several other species of Coleoptera, including *Scarites gigas* (*buparius*), *Scarabaeus laticollis*, *S. semipunctatus*, and species of *Blaps*.

Mr. Robert Adkin exhibited a series of *Acidalia immorata*, reared from the larvae of which he exhibited examples on April 25th, together with some of the cocoons from which they had emerged. He said that of twenty-four larvae that reached maturity three only spun their cocoons among heather; one in a withered dandelion leaf on the surface of the moss with which the bottom of the cage was lined, and the remaining twenty just beneath the surface of the moss and usually against the side of the cage. This, he thought, suggested that under natural conditions the species probably pupated among the rubbish, moss, etc., collected around the roots of the heather.

Dr. Cockayne exhibited a series of bred *Spilosoma urticae* from Pevensey, of the same "one-spotted" form as those bred by Mr. Adkin and Mr. Rayward from the same locality.

On behalf of Mr. Sharp of Eastbourne he exhibited pupae of *Leucania straminea*, in a very useful device used by him for the pupation of this species: a piece of corrugated wrapping paper, the folds of which the larvae readily occupied when about to change. No superposition of individuals was possible.

Mr. Hy. J. Turner on behalf of Capt. K. J. Hayward exhibited the nest of a Weaver-bird (species not definitely indentified), from the Argentine Chaco forests, in the neighbourhood of the rivers Pindo and Paranamini. This bird uses only horsehair for its building, and every hair is black. The natives call the bird the "Boyero" or "oxherd"; but this name is also applied to other species, the local bird and insect names being very loosely used. Taken in the spring (October) of 1926.

Dr. Bull exhibited the larvae of *Thera obeliscata*. Some of the specimens were so parasitised as to be only skins full of the grubs, or of the pupae, of the parasite. He also showed a suffused *Brenthis euphrosyne*, *Alucita galactodactyla*, and examples of an early form of *Zygaena filipendulae* to which the name of *hippocrepidis* had been attached by many writers.

Mr. A. W. Dennis exhibited photographs of the adder's-tongue fern (*Ophioglossum vulgatum*) with the fructification in two spikes, which were coiled spirally; from Loughton, Epping Forest. Mr.

Step remarked on the exhibit, and said that such forked and twisted specimens were rarely met with ; though Sowerby says the barren frond is often forked at its extremity, and that the fertile spike may be duplicated or even triplicated.

Mr. C. N. Hawkins reported that he had been in Devon during early June, and had noted *Z. filipendulae* as being quite common in certain dry fields. In the discussion that followed Mr. Adkin stated that the species occurred at Eynsford in June in quite a dry locality.

JUNE 26th, 1927.

FIELD MEETING—PRINCES RISBOROUGH.

Conductor—Hy. J. TURNER, F.E.S.

This was a very wet and unfavourable day. A few lepidoptera were noted with larvae of *Gonepteryx rhamni*, *Aglais urticae*, and imagines of *Polyommatus icarus*, *Epinephele jurtina*, *Coenonympha pamphilus* and *Plebeius medon* (*agestis*). A large number of cocoons of a *Zygaena* were collected and several members subsequently bred a series of a local form of *Z. lonicerae* much resembling *Z. trifolii* in size and facies.

[See " Proc., etc." 1923.]

JULY 14th, 1927.

The PRESIDENT in the Chair.

It was announced that the daughter of the late Mr. Enefer, a member, had presented to the Library of the Society a large number of books on Natural History subjects. A special vote of thanks was passed.

Dr. Cockayne exhibited the nest of a small spider from Eastbourne, spun on a current year's leaf of dewberry, together with the wingless hymenopterous parasites which had been bred from it. It was stated that probably the parasite was a species of *Pezomachus*.

Mr. Step said that a species of *Pezomachus*, very similar to that exhibited, had been bred from the egg-capsules of a spider (*Zelotes*) attached to the undersides of blocks of chalk. (See *Proc. S.L.E. & N.H.S.* 1926-7, p. 113.)

Mr. Robert Adkin exhibited a small sprig of honeysuckle, which had an empty pupa-skin and living pupa of *Limenitis sibilla* attached to it. These were found by Mr. Rayward on the previous afternoon in Abbot's Wood, where the species had become increasingly common during the past few years. In was, he said, very unusual for two larvae to pupate so close together.

Mr. C. N. Hawkins exhibited:—

1. Three distinct forms of *Ematurga atomaria*, from Surrey and Essex; 2. An asymmetrically marked ♂ of *Aspitates ochrearia* from the Isle of Wight; 3. *Angerona prunaria:* ♀ parent from Chattenden Woods and 2 ♂ ♂ ab. *corylaria*, bred in June and July, 1927, from eggs laid; 4. A pale teratological specimen of *Hipocrita jacobaeae*, of which the forewings and body were pale grey, and the anal angle of the left hindwing was excised. From Box Hill. 5. A teratological example of *Acronicta aceris*, bred in June last from an Isle of Wight larva, with a transparent patch in the central area of the left forewing below the stigmata. No scales were developed. 6. Living larvae of *Palimpsestis ocularis* (*octogesima*) and of *Hamearis lucina*.

Mr. Main exhibited a device he was using to induce the South of France spider, *Clotho durandi*, to spin its web. In the wild, the spider spins under overhanging stones; and he had made a cardboard "cornice," in an angle of which the spider had made its cocoon.

Mr. Worsley-Wood exhibited a very long series of *Perizoma taeniata* showing the two main forms: the banded ab. *latefasciata*, and the mottled ab. *angustifasciata*, with one example in which most of the markings were largely suppressed.

Dr. Fremlin exhibited a number of extreme aberrations of *Aglais urticae*, bred by him some years ago and previously exhibited by him. He wished to express the opinion that these forms were possibly due to premature development and consequent emergence resulting in poorly developed wings; suffused dull, unicolorous brown, instead of bright yellow, warm red and blue; absence of down on thorax and inner wing-margins; early death, which occurred within a day or two of emergence.

He wished to know if insect colours were developed from dull and unicolorous tints to bright and varied ones?

Mr. Sims exhibited a Hymenopteron embedded in a piece of Kauri gum from New Zealand. The insect was beautifully preserved.

Mr. Carr exhibited the pupa of *Gonepteryx rhamni* from a larva taken during the field meeting at Mickleham. He stated that the ♂ larva was green and the ♀ larva white.

JULY 24th, 1927.

FIELD MEETING—BLACKHEATH, NR. GUILDFORD.

Conductor—O. R. GOODMAN, F.Z.S., F.E.S.

In spite of dull and showery weather ten members attended this whole day meeting, the party separated at the Heath and followed their respective pursuits.

The coleopterists found much to interest them amongst the rotting silver birch trees which are abundant over the Heath. The following species were reported : *Amara spreta*, *Nitidula 4-pustulata*, *N. rufipes* on an old bone, *Necrophorus ruspator*, *Hister succicola*, *Cercyon lateralis* and *Megarthrus depressus* in a rotten *Polyporus*, *Elater balteatus* and *Orchesia undulata* in birch stumps larvae and imago, *Anomala aenea* the green form, *Cleonus nebulosus* and *Criocephalus ferus*.

In Hymenoptera Aculeata, *Myrmosa melanocephala*, *Psammochares plumbeus* and *Crabro wesmaeli*.

In Hymenoptera Phytophaga, *Phyllotoma nemorata*.

In Diptera, *Sicus ferrugineus*.

In Neuroptera, *Raphidia notata* (?) larva.

In Orthoptera, *Gomphocerus maculatus*.

In Psocoptera, *Amphigerontia bifasciata* and *Mesopsocus unipunctatus*.

Several nightjars (*Caprimulgus europaeus*), were distributed amongst the heather, and an example of the common lizard (*Lacerta vivipara*) was procured.

During the bright intervals butterflies were in evidence on the outskirts of the wood on the south side of the Heath.

One *Limenitis sibilla*, the worse for wear, was seen, and two specimens of *Aphantopus hyperantus* var. *arete* taken.

Tea was served at the " Volunteer Arms " in the middle of the Heath and was certainly appreciated ; and in spite of the generally inclement weather the meeting was much enjoyed.

JULY 28th, 1927.

The PRESIDENT in the Chair.

The President exhibited a species of *Pezomachus* (Hymenoptera) taken on a wall at Erith, but not the same species as that exhibited at the last meeting.

Mr. Tonge exhibited ova of *Apamea ophiogramma* and a photograph of the parent at rest, pointing out the curious facial resemblance of the pattern on the wings in that position; *Dipterygia scabriuscula* (*pinastri*) at rest and explained why the insect is called the "bird's wing" from the pattern of the marking; and a living *Pyropteron chrysidiformis*, bred from a larva taken in Folkestone Warren.

Mr. Farmer, on behalf of a lady visitor, exhibited a large number of insects of all orders collected in East Africa, including *Papilio nireus* form *lygaeus*, *Hypolimnas misippus*, 2 species of *Teracolus*, 3 species of *Pieris*, *Eronia cleodora*, *Catopsilia florella*, etc., in the Lepidoptera.

Mr. K. G. Blair exhibited the Hymenopteron, *Ammophila sabulosa*, in order to illustrate the folding of the long abdomen in the cocoon; also the egg of the same species attached to the larva of *Lithina chlorosata* (*Panagra petraria*). The *Ammophila* was observed digging its burrow on July 13th, 1927, and on the evening of the 26th of the same month, the larva resulting from its egg had finished feeding and was spinning its cocoon.

Mr. H. W. Andrews exhibited the dolichopid dipteron, *Campsicnemus magius*, Lw., a ♂, with extraordinarily formed front feet. It was taken near Abbey Wood on July 19th, 1927.

The President exhibited the larvae of *Eupithecia plumbeolata*, feeding on cow-wheat (*Melampyrum*).

Mr. Robert Adkin exhibited pupae of *Callophrys rubi* in situ. He said that from eggs found by Mr. A. L. Rayward, on *Genista tinctoria*, he had reared four larvae to maturity on that plant. When apparently full-fed they were supplied with moss, just under the surface of which they pupated. Although, in the case of two of them, he had been able to remove the overlying portion of the moss without disturbing the pupae, he had failed to find any semblance of cocoons, or indeed any trace of silken threads. This did not, however, preclude the possibility that the larva may draw the moss together by a few strands of silk and that these may have been destroyed in parting the moss.

Mr. C. N. Hawkins exhibited a short series of an early-appearing form of a sixspotted burnet from Sidmouth, taken in the third week in June.

Mr. Hugh Main exhibited a specimen of the burying beetle, *Necrophorus humator*, bred from ova deposited in May last, with very small larvae of the same species from North Spain.

Mr. Step exhibited living examples of early stages in the development of the Bracken (*Pteris aquilina*). He said that early in the present year he had the curiosity to examine a small flower-pot that had passed the winter out of doors, and whose soil appeared to be coated with a dense growth of one of the smaller Liverworts. A closer inspection revealed that these were really a congested company of the prothalli of some fern. From the proximity of the pot to a very fine Male-fern, it was at first assumed that the prothalli were of that species. Later development showed that they were those of *Pteris aquilina*, with the exception of one in the centre, which proved to be *Pteris serrulata*, a greenhouse fern. There were no mature plants of Bracken in the garden or the immediate vicinity; it is probable that a small cloud of spores blown down from Wimbledon Common, only a mile away, left a number sufficient to coat the soil of this small pot. Here they germinated and gave rise to the very crowded growth of prothalli that attracted attention.

It was soon evident that, on the under-surface, the sexual organs—the antheridia and archegonia—had been produced, and that in many cases fertilisation had been successful: for the clubbed heads of the unexpanded first fronds began to push up between the overlapping prothalli. A striking fact is shown by the exhibit: that there is considerable variation in the rate of development of the young plants, for this small community, agreeing in age, represents several stages of growth. Here you may see the first minute leaf unrolling to an oval shape that tapers downwards to the leaf-stalk; the second leaf shows a tendency to lobing, and later, larger leaves are progressively more distinctly lobed and then broken into trefoils. One vigorous plant has so far out-distanced the others that, whilst some of these are only now putting up their first leaves, it has already so far developed several that they show the characters of the mature plant.

There are several points here that are worthy of notice: the very young plant begins to produce its leaves in a circular tuft like most of our Ferns; and each leaf at first has its lobes or leaflets rolled into a ball. If you will look into the circlet of leaves in this more precocious example, you will see that already the rootstock of the plant

is elongating, and that it has two growing points, advancing in contrary directions. Before late autumn these will have turned downwards, so that further growth may proceed underground, where we always find the rootstock of the adult Bracken. Next year, the new leaves will have to push up though the soil, and to meet this opposition the divided leaflets will not be rolled into a ball, but will be folded into a more slender hook-shape that can pierce the earth more easily. It will no longer arrange its leaves in a tuft, but in a line with considerable intervals between them. Its underground habit is necessitated by its tenderness. Bracken, which the layman regards as the hardiest and coarsest of our Ferns, is more liable than any other native species to have its vegetation destroyed by late spring frosts.

Later, the two branches of the rootstock become long and stout, and fork repeatedly. Prof. F. O. Bower, one of our great authorities on the Ferns, is of opinion that the special efficiency of the Bracken in covering great tracts of land is due largely to its underground habit, and that it relies more upon this vegetative method of increase than upon reproduction by spores and sexuality. In his absorbing little book, *Plant Life on Land*, he states that many an observant botanist has never seen what I am showing you this evening: and continues "we can only conclude that in Nature the completion of the life-story by sexuality is a comparatively rare event."

That has always struck me as rather an extraordinary statement; for during at least fifty years I have always had good reason for regarding spore-produced plants as sufficiently plentiful to attract attention, even in situations where there could be no possibility of their becomming adult—such as about damp walls and the brick-work of railway stations where I have had occasion to wait for trains. On the sides of hollows on our heaths and commons and the trenches cut for surface drainage, I have been able, usually, to find it when I wanted specimens.

[It was discovered, later, that one of the same batch of spores had settled and developed in the jointing of the bath-room outflow pipe !]

Mr. Goodman exhibited the black-bellied tarantula spider from St. Baume, S. France, which his son obtained by introducing long straws into the deep burrows. He also showed the balls of ova made by the spider.

A paper communicated by Captain K. J. Hayward, entitled "A

short Account of the Argentine Chaco," was read by the Secretary. (See p. 18.)

In the discussion which ensued it was noted that sugaring at low elevations in the tropics was practically impossible on account of the ants.

AUGUST 11th, 1927.

Mr. T. H. L. GROSVENOR, F.E.S., VICE-PRESIDENT, in the Chair.

The death of Mr. G. C. Champion, A.L.S., F.E.S., one of the orginal members of the Society, and for many years Hon. Librarian of the Entomological Society of London, was reported.

Mr. A. de B. Goodman exhibited a series of drawings showing the life-history of the S. of France spider, *Lycosa narbonensis*.

Mr. H. Moore exhibited a small collection of butterflies made at Rueglio in N. Italy, including an unusually large and finely marked *Lycaena arion*, the form *cleodoxa* of *Argynnis adippe*, an ab. *fracta* of *Pyrameis atalanta*, summer forms of *Pieris napi*, etc.

Mr. Hugh Main exhibited and explained some further new adjustments and adaptions in his subterraria for observing the transformation of those insects, whose life is spent largely below the surface of the earth.

Mr. T. H. L. Grosvenor exhibited larvae of a Zygaenid from Blanco, near Barcelona. These hatched on June 27th, from ova laid by a female sent to him by Mr. Hugh Main. There were 78 larvae, and of these 58 have rapidly fed up, while the remainder have started for hibernation in the normal fashion.

He also showed the larva of *Amata* (*Syntomis*) *phegea*, and called attention to the Arctiid characters exhibited.

Mr. Carr exhibited larvae of *Xanthorhoë montanata* feeding on willow-herb.

Mr. J. H. Adkin exhibited sprays of sweet peas, one consisting of eight flowers. The stem was fasciated. In the short discussion that took place, Mr. Step suggested an attempt to grow the aberration from seed. Mr. Grosvenor said that in his experience blooms so produced fell off without setting seed; but that the blooms below the fasciation produced pods and ripened seeds.

AUGUST 25th, 1927.

Mr. T. H. L. Grosvenor, Vice-President, in the Chair.

Mr. Sperring exhibited two very fine aberrations of *Polyommatus icarus* from Londonderry: one an *obsoleta* form, and the other a beautiful *striata*.

Mr. H. J. Turner exhibited a long series of a Zygaenid, bred from pupae taken at Prince's Risborough during the Field Meeting in June. They were said to be *Z. lonicerae*, of a race peculiar to the Chiltern Hills, but in size and facies more resembled *Z. trifolii*. The Chairman said that he had attempted to induce pairing between this race and both *lonicerae* and *trifolii*. This took place freely with the former, but not at all with the latter.

Mr. C. N. Hawkins exhibited a parasitic larva found in an entirely cleaned out pupa of *Catocala nupta* at Upper Tooting.

Mr. H. Moore reported that a visit to Royston on August 14th, produced but very few *Polyommatus coridon*. *Polyommatus icarus* also was extremely rare; a collector on the ground was reported to have obtained a form striated on all four wings.

Mr. K. G. Blair exhibited developing catkins on a spray of sallow. Mr. Step thought this was probably due to the influence of the wet season.

Mr. H. Main exhibited *Scarites gigas* (*buparius*), a large Carabid beetle, from Barcelona; and remarked on its apparent timidity. When picked up and placed on its back, it would often remain a long time in that position without moving even in the close proximity of food. He read a long extract from Fabre on this shamming of death.

Mr. Step exhibited the Orchid, *Spiranthes spiralis*, from the North Downs where he had found it in some numbers, though inconspicuous among low vegetation. The new growth, a rosette, of leaves took place a little later. There were frequently three tubers to a plant, last year's old one, the present year's and next year's.

Mr. Dennis exhibited the gall of *Cystiphora* (*Cecidomyia*) *sonchi*: said to be somewhat rare, and confined to the S. of England. The plant (Sow-thistle) was found with several others similarly affected in a bean-field at Colne, in Essex.

Mr. Ashby exhibited the curious dipteron from the New Forest, which from its remarkable resemblance to a plant-bug, was named *Alophora hemiptera*.

SEPTEMBER 3rd, 1927.

FIELD MEETING—RANMORE COMMON.

Conductor—C. N. Hawkins, F.E.S.

This was a whole-day meeting, members leaving Waterloo for Box Hill station by the 10-25 a.m., train, intended mainly for larva-beating. Besides myself, the following 15 members of the Society attended: —Messrs. Ashby, Brocklesby, Candler, Carr, Cheeseman, Edwards, Jarvis, Macdonald, Moore, Murray, Nixon, Step, Vredenberg and Worsley-Wood: also one visitor Mr. J. J. F. X. King of Glasgow. Of Lepidoptera larvae proved to be fairly plentiful and amongst others the following were taken or noted:—*Stauropus fagi*, *Lophopteryx camelina*, *Demas coryli*, *Craniophora* (*Acronicta*) *ligustri*, *Iodis lactearia*, *Cosymbia linearia*, *Euphyia corylata*, *Eupithecia centaureata* (*oblongata*), *E. tripunctaria* (*albipunctata*), *E. absinthiata*, *E. trisignaria*, *Anagoga pulveraria*, *Gonodontis bidentata*, *Plagodis dolabraria* and *Sarrothripus revayana*.

The weather was dull and cloudy with very rare gleams of sunshine, but in spite of this, *Polyommatus thetis* (*bellargus*), on its special ground, was reported by those who looked for it, as being fairly plentiful, and in addition, the following imagines were seen or taken:—*Colias croceus* (one only), *Pieris napi*, *Hipparchia semele*, *Pararge megera*, *Coenonympha pamphilus*, *Rumicia* (*Chrysophanus*) *phlaeas*, *Plebeius* (*Aricia*) *medon*, *P.* (*Agriades*) *coridon*, *P. icarus* and, amongst a few other Heterocera, *Sarrothripus revayana* (*c.f.* list of larvae).

Mr. Jarvis reported the following Coleoptera:—*Aphodius subterraneus*, *A. fimetarius*, *A. foetens*, *A. contaminatus*, *Onthophagus ovatus*, *Dromius 4-maculatus* and *Calathus cisteloides*.

Mr. Nixon reported the Hymenoptera, *Mellinus arvensis* and *Bombus helferanus* and the Dipteron *Asilus crabroniformis*.

Messrs. Step and Edwards gave the annexed list of Fungi discovered during the day:—*Amanita rubescens*, *A. pantherina*, *Lepiota cristata*, *Armillaria mucida*, *Tricholoma terreum*, *T. sordidum*, *Clitocybe phyllophila*, *Collybia radicata*, *C. maculata*, *Hygrophorus cossus*, *H. puniceus*, *Lactarius quietus*, *Russula emetica*, *R. fellea*, *R. heterophylla*, *Cantharellus cibarius*, *Panus stypticus*, *Psalliota campestris*, *Polystictus versicolor*, *Clavaria crispula*, *C. formosa*, *C. pistillaris*, *Sclerodermа vulgare*, *Coprinus micaceus*, *Boletus scaber*.

The meeting closed with a very well set out and much appreciated

tea at the Railway Arms, near Boxhill Station, at which 13 members of the party were present, the other 3 having returned home earlier. It was decided to catch the 7.19 train to London, and on the way to the station considerable interest was aroused by enormous numbers of starlings congregated in the trees near by. Many of these subsequently passed over the station in great flocks, presumably on their way to the fields for their evening meal.

[See "Proc. S.L.E. and N.H.S." 1902, 1906, 1914, 1922, 1923, 1926.]

SEPTEMBER 8th, 1927.

The PRESIDENT in the Chair.

Mr. D. S. Palmer, of Kingston-on-Thames, was elected a member.

The President exhibited *Malacosoma castrensis* bred from Sussex larvae. Most of the larvae he had failed to pupate. Those bred belonged to a dark, well-marked form. He showed also a very variegated, purplish form of *Hadena pisi*, and in contrast a female of very uniform brown coloration ; very pale and very dark examples of *Acronicta psi*, including one with very decided dark striation of the hindwings ; and the larvae of *Ptychopoda inornata*, from Limpsfield, and of *Mamestra nana* (*dentina*).

Mr. O. R. Goodman exhibited ab. *arete* of *Aphantopus hyperantus*, taken during the Field Meeting, at Blackheath, near Guildford.

Mr. Ashby exhibited a male of the remarkable Chilian lamellicorn beetle, *Chiasognathus granti*, from Valdivia. The mandibles are developed to a length equal to, or exceeding, that of the entire body. These organs, which are of unequal length, have the tips curved, so that they cross when closed ; and the inner margins are armed with numerous small, sharp spines. The head, coming between these "horns" and the broad, triangular thorax, appears to be much smaller than it is. The legs are long and slender, the first pair longer and stouter than the others and armed with spines. Another noticeable feature is the spreading tuft of fine hairs that terminates the basal joint of the antenna. As in the case of our *Lucanus cervus*, the female is without the exaggerated development of the mandibles —hers are short and stout—and the antennae lack the hair-tufts ; the legs, also, are shorter.

Mr. Hawkins exhibited numerous larvae, both living and preserved, including those of *Orgyia gonostigma*, *Eupithecia trisignata*

and *Cosymbia orbicularia* among the latter, and *Cochlidion avellana* (*limacodes*) and *Ectropis extersaria* (*luridata*) among living forms. He showed, also, " double " flowers of the sweet-pea.

Mr. Hugh Main exhibited the larva of a dipteron, *Vermilio* sp., which makes pits in the sand to capture ants and wandering insects; also a *Lampromyia* sp. (Diptera) bred from a larva, which made pit-traps similar to those of *Vermilio*.

SEPTEMBER 22nd, 1927.

The President in the Chair

Mr. Barnett exhibited a long series of varied captured examples of *Spilosoma menthastri*, from Crohamhurst.

Dr. G. V. Bull exhibited three specimens of *Brenthis euphrosyne*, taken in August, presumably 2nd brood; pink and green coloured larvae of *Cidaria* (*Euphyia*) *corylata*, larvae of *Acronicta rumicis*, a green larva of *Biston betularia*, etc.

Dr. E. A. Cockayne exhibited the following Lepidoptera from the Moray coast. *Agrotis tritici*, a series with ground colour varying from dark red-brown to black; *Agrotis cursoria*, a variable series including ab. *caerulea* and ab. *brunnea*; *Agrotis nigricans*, a black form; *Agrotis vestigialis*, *A. praecox*, and *A. lucernea*; *Noctua depuncta*, *N. xanthographa* (melanic), and *N. umbrosa*; *Leucania pallens* ab. *rufa*, and *L. conigera*; *Triphaena subsequa* (*orbona*), *T. pronuba*, buff, light and darker red, greyish, dark brown and mottled forms; *Miana literosa*; *Apamea secalis* ab. *secalina*, with straw coloured, light brown, and light and dark red-brown ground, ab. *oculea* with straw coloured and red-brown ground, ab. *nigra*, also an aberration with white reniform and a white splash running from the reniform to the second line; *Xanthia fulvago* ab. *flavescens*; *Enargia* (*Cosmia*) *paleacea*.

Mr. Robert Adkin exhibited specimens of *Carpocapsa pomonella*, bred in July last, from larvae taken in his garden at Eastbourne in the previous autumn: and read the following note:—

If we take up a book on economic entomology, we are likely to find statements with regard to this species similar to the following: " The method of infestation is for the moths to come out about the time of the opening of the apple-blossoms, and when the petals have fallen and the embryo fruit is beginning to form, the females lay their eggs," etc.; or " The moths emerge from the caterpillar

cocoons at the fall of the blossom, and fly from fruit to fruit, laying one egg on each." These quotations, taken from what are generally regarded as Standard British works on the subject, seem to imply that the fall of the apple blossom and the emergence of the moth take place at the same time. This, in my experience is very far from the fact. The apple blossoms somewhere about the end of April to the middle of May. I have reared *C. pomonella* many times, and the dates of emergence have invariably been between the 10th and 24th of July; that is, from six to eight weeks after the apple blossom has fallen, and at a time when the apples are not only fully formed but have attained considerable growth. Again, we are told that the egg is laid in the eye of the apple; also that the larvae feed only on the seeds. Both these statements seem to be open to doubt, for there appears to be good reason for believing that the moth will lay either on the fruit or elsewhere, even on the branches; and as to feeding only on the seeds, numbers of infested apples that I have opened suggest that seeds and flesh are eaten indiscriminately. The fact is, our knowledge of the details of the life-history of even so common a pest as the codlin moth is very incomplete, and tends to confirm what Dr. Morris told us at the recent meeting of the British Association, viz., that the great need of economic entomology is an accurate knowledge of the life-histories of the pests that are to be dealt with.

Mr. Colthrup exhibited long and varied series of *Bryophila perla* and of *B. muralis* (*glandifera*) with some examples of the Cambridge race, *impar*. Among the *B. muralis* were two very white specimens ♂ and ♀, for which he proposed the varietal name of *albida*. The series was a selection from 20 years' collecting.

Mr. Step exhibited a young plant of Alder (*Alnus glutinosa*) with the roots freed from soil and in water, to show their investment by *Mycorrhiza* and the presence of nodules inhabited by nitrifying bacteria (*Bacillus radicicola*). He explained that though most of our forest trees are known to have mycorrhiza on their roots, the only other of our non-leguminous woody plants to possess bacteria-nodules is the Sweet Gale or Bog-myrtle (*Myrica gale*). In both cases the nodules are modified lateral roots.

Mr. Coulson exhibited a specimen of *Philonthus fimetarius* that had an additional tarsus on the left fore-leg.

Mr. Adkin read the following report.

British Association.—Report of the Society's Delegate to the Conference of Corresponding Societies.

The 1927 Meeting of the British Association for the Advancement of Science was held in Leeds, from August 31st to September 7th; the Conference of Corresponding Societies being fixed for the afternoons of September 1st and 6th. I attended the Conference as delegate on both occasions and beg to report as follows:—

At the opening session the President of the Conference, Sir Francis Ogilvie, gave an address dealing largely with Regional Surveys, but approached his subject from a somewhat different angle from that of his predecessors in the chair, who it will be remembered, dealt largely with the agricultural side; while on the present occasion wild-life held the chief place. The Local Society he urged should undertake such work; they should deal with some well defined area, not necessarily a large one; a river basin; sometimes, even a single field if thoroughly worked might be a useful one. Plotting on a large-scale map was a good method of keeping the records, and he instanced a case where a well arranged map, hung in an elementary school, had been of considerable assistance in getting the attention of the scholars, first to local matters with which they were more or less familiar, thus rendering them more susceptible to their general studies. Often such records are the work of one man who, having read or shown them to his society, retains them in his own possession: he dies and they are lost: or it may be that he hands them to the Secretary, who possibly having no proper means for their preservation, they meet with a similar fate.

He appreciated the difficulty of keeping permanent records, whether in the form of reports or of maps, as Local Societies seldom had the funds necessary to cope with the present high cost of printing; the manuscripts, however, might be deposited in some local institution, or some other adequate means taken for their preservation.

It was reported:—

(*a*) That the Circular sent some five years ago to the whole of the Corresponding Societies, some hundred and odd in number, calling their attention to the necessity for sending delegates to the Conference, had been acted upon by only some thirty or forty of such Societies, and that the others would therefore automatically cease to be regarded as Corresponding Societies of the Association.

(*b*) That the Association's application to have cinematograph-

films of scientific value imported free of duty met with no favourable response.

(*c*) That the present position of the question of the remission of Income Tax on societies' invested funds was that the two test cases had been before the Commissioners, whose decision was adverse to the societies and that they were now being taken to the High Court.

It was suggested that the agenda of the Conference might be circulated to delegates in advance, so that they might have an opportunity of consulting their respective societies, and receiving their instructions on the various points raised, before attending the meetings. It was pointed out that there were several difficulties in the way of such an arrangement; the matter would, however, receive the careful attention of the authorities, and, if possible the suggestion would be complied with.

Sir George Fordham in a long and eloquent address, founded largely on a series of suggestions made at a meeting of the Berkhamstead Citizen Association in connection with the Herts Natural History Society, at a Conference held in July 5th, 1927, introduced the question of the protection of wild-flowers; and after considerable discussion he proposed resolutions to the following effect:

(*a*) That the Home Office be approached with a view to ascertaining what bye-laws referring to the protection of wild-flowers were at present in existence, and what, if any, prosecutions had taken place under them. This was carried and will therefore go to the Committee of Recommendations for their approval or otherwise.

(*b*) That a list of wild-flowers needing protection, with descriptions that would render them easily recognisable, be prepared and circulated to Local Societies, Schools, etc. This was hotly debated, and on being put to the vote was lost by an overwhelming majority.

A further resolution:—That it is desirable that education and other authorities be approached with a view to calling their attention to the damage that is continually, though often thoughtlessly, being done to wild-flowers in general,—was carried.

The second session was occupied chiefly by two papers on Nature Reserves. The first by Mr. T. Sheppard, of Hull, dealt with those of Yorkshire, which included Spurn Point, Hornsea Mere and Flamborough Head; while Professor Oliver, a member of the

Committee of the National Trust, referred to those of Norfolk, viz., Scolt Head, Blakeney Point and Cley Marshes. Both authors referred to the success which had attended these reserves, many species of birds which had forsaken them, or had become very scarce before they were taken over, had, since they had been properly looked after, returned to or improved their status in them; they also referred to the assistance rendered by liberal-minded land-owners in many parts of both counties in assisting in the preservation of the local faunas and floras.

Professor Oliver said with regard to Cley Marshes, there were certain matters in connection with their acquisition that made it difficult for the National Trust to take them over; a Norfolk Trust was therefore constituted to acquire and manage them, and he thought the time was not far distant when it might be desirable that properly constituted County Trusts might be set up to assist the National Trust in the management of such Nature Reserves, in which the Local Societies might take part. Such Reserves could not, however, be left to themselves—they needed careful attention and reliable watchers if they were to be of any real value, and their proper management must necessarily entail a certain amount of expenditure.

As to the general proceedings of the Association, little need be said here. The more important papers read have been so widely reported in the Press that most of you will already be familar with their contents. The "Advancement of Science," that I have the pleasure to present to you with this report, will enable you to peruse the whole of the Presidents' Addresses in detail; and I hope later on to be able to supply you with the "Report," where, no doubt, abstracts of the papers read before the various sections will be found. But there is just one paper that was read before Section D., the only one bearing directly upon entomology, to which I wish to call your attention now. I refer to the paper by Dr. J. W. Munro on "The Needs of Economic Entomology." Unfortunately, it was the last paper to be read to the Section, and the time-table had so far been exceeded that he had barely a quarter of his alloted time in which to deliver it. However, this did not prevent him stressing one point, namely, to use his own words, "In the solving of many insect problems progress depends on a fuller knowledge of insect morphology and physiology." It is a lamentable fact that there are points in the life-histories of many of our worst insect pests of which we are profoundly ignorant, and it is possible that, if such matters were

fully understood, much simpler and less costly means than those now in vogue might be found for combating some of our insect enemies. The unravelling of the obscure habits of some of these creatures is a most fascinating subject; it is one in which we all can help in one way or another; and I trust that it is not too much to hope that some of our younger members, who have their lives before them, may be willing to lend a hand. If in doubt as to where to make a beginning, I have not the slightest doubt that any of our economic entomologists will be only too glad to set them on the road.

It is proposed to hold next year's Meeting of the Association in Glasgow under the presidency of Sir William Bragg.—R. Adkin.

OCTOBER 13th, 1927.

The President in the Chair.

Mr. Grosvenor exhibited a series of a *Zygaena*, bred from two ♀s sent to him from near Barcelona by Mr. Main, as a second brood. Out of some 70 larvae obtained, 41 emerged as a 2nd brood, 18 were hibernating normally, 4 were killed and preserved, and 4 died in the pupal stage. This was most unusual, as normally not more than about 1% of the larvae can be induced to feed up for a second brood. The larvae were very close to those of *Z. trifolii* in habits and in their appearance, but the imagines were a mixture of *trifolii*, *stoechadis* and *lonicerae*. Those which were hibernating now fed only for about a month. One changed its skin, and after feeding for 2 weeks changed its skin again, and then went into hibernation. Of this second brood he obtained three pairings, of which some commenced to hibernate, while others are continuing to feed, preparing for a third brood.

Mr. Newman exhibited a drawer of *Colias croceus* (*edusa*) typifying a very large number bred from a spring-caught f. *helice*, in June last. Dr. Cockayne pointed out that the proportion of typical individuals to those showing variation was Mendelian; and that f. *helice* was the Mendelian Dominant.

Mr. Henderson exhibited an example of the coleopteron, *Silpha subrotundata*, Steph., from the Isle of Man, in which the antennae were shortened, the normally three-jointed club becoming a small conical joint. The maxillary palpi were also shortened.

Mr. Cheeseman exhibited his captures at the Ranmore Common

Field Meeting on Sept. 3rd, including *Polyommatus* (*Agriades*) *thetis*, which was common in its usual haunts.

Mr. Bunnett exhibited a bred example of *Cucullia gnaphalii*, and the curious cocoons and pupae of *Sarrothripus revayana* and of *Hylophila bicolorana*.

Mr. Stanley Blenkarn exhibited a large example of the common snake (*Tropidonotus natrix*) from the Isle of Wight.

Mr. Tonge exhibited a short series of *Nygmia phaeorrhoea*, from Eastbourne, of an unusual form with black spots.

Mr. E. J. Bedford gave a lecture on "Nature Photography," exhibiting a large number of lantern slides, coloured from nature by himself.

OCTOBER 27th, 1927.

THE ANNUAL EXHIBITION.

There was no formal business, and as last year the exhibits were placed on tables. Although the evening was exceptionally wet and stormy, the attendance was a record, nearly 250 members and friends being present, of whom some 50 brought exhibits.

Mr. Robert Adkin exhibited representative series of a number of mongrel broods, obtained by crossing *Diacrisia mendica* with its race *rustica*, namely:—

1. *Rustica* ♂ (King's Co.) × *mendica* ♀ (Suffolk), emerged 1926. The males were in colour more or less intermediate between the two races; their chief feature being a broad, pale streak along the costa and a pale line from the base to the middle of the wing.

2. A second generation of the above, emerged 1927. The males showed a strong tendency to segregate out into light and dark forms, about one-third being as light as the King's County male, one-third as dark as the males of the Suffolk *mendica*, and the remaining third about intermediate between the two. The proportion of sexes was almost exactly one male to two females.

3. A re-cross between a mongrel ♂ (King's Co. ♂ × Suffolk ♀) × *rustica* ♀ (King's Co. ♂ × Cork ♀), emerged 1927. The males showed practically equal proportions of as light as *rustica* and intermediate, none being so dark as typical *mendica*. The females showed a tendency towards black fringes in several of the specimens, probably derived from the original Suffolk stock.

4. A re-cross between *rustica* ♂ (Cork) × mongrel ♀ (Cork ♂,

Suffolk ♀), emerged 1927. Of the males, about one-third were quite as light as the parent *rustica*, and two-thirds intermediate; the latter were again divisable into light and dark intermediates in equal proportions. The females were chiefly of the lightly-spotted Cork form.

5. A re-cross between *rustica* ♂ (King's Co. ♂ × Cork ♀) × mongrel ♀ (Cork ♂ × Suffolk ♀), emerged 1927. The males were about half of them as light as *rustica*, the other half rather light-intermediate. The females call for no remark.

None of the broods were complete, disease having caused numerous deaths among the larvae, but in no case did less than one hundred imagines emerge.

Mr. Adkin also exhibited specimens of *Agriades thetis* (*bellargus*), viz., typical male; "grey" male; "black" male; and typical female, together with enlarged photographs of the wing scales. The brilliant colour of the male *bellargus* wing is probably derived from the refraction of light by numerous minute striae on the scale surface, not from blue pigment. The photograph showed that in the "grey" form the edges of the scales are curled up, thus interfering with the refraction of the light and giving the wing its grey appearance. In the "black" form, the photograph showed the scales to be in shape as in the normal male wing, its dark colour presumably being due to melanic pigment; the female scales were shown to be of quite a different shape from those of any of the males.

Mr. H. W. Andrews exhibited a collection of Diptera he had taken in the North Kent District.

Mr. B. W. Adkin exhibited long varied series of *Callimorpha quadripunctaria* (*hera*) and of *C. dominula*, most of them bred.

Mr. T. L. Barnett exhibited 75 *Ectropis* (*Tephrosia*) *crepuscularia*, taken in South Croydon in May-June, 1927. One example was almost white with light grey markings, and another very dark grey, similar to ab. *delamerensis*.

Mr. Percy M. Bright exhibited two long series: 1, of *Brenthis euphrosyne* showing many extreme aberrations; 2, of *Melanargia galathea*, including a wholly black aberration and a wholly white one.

Mr. A. A. W. Buckstone exhibited two cases, containing a number of teratological examples of various species of Lepidoptera.

Mrs. and Miss Brooke exhibited Swiss wild-flowers of various species from the Upper Rhine Valley and its neighbouring moun-

tains. These were dried in sand in 1908 and 1909, and kept their forms and colours until accidentally exposed to damp conditions, when the colours of many disappeared and the firmness of their shapes subsided.

Dr. G. V. Bull exhibited several aberrations of *Abraxas grossulasiata*, bred from wild larvae taken in East Herts and Regent's Park.

Mr. Stanley Blenkarn exhibited three drawers of his collection of Coleoptera.

Dr. E. A. Cockayne exhibited two cases containing preserved larvae, showing variable forms of each species.

Mr. H. L. Dolton exhibited 12 specimens of the rare and local Coleopteron *Phymatodes* (*Callidium*) *lividus* including 3 specimens which the late W. E. Butler, F.E.S., exhibited at the Society's Rooms on March 10th, 1906. These were afterwards presented to the Society's collection.

Mr. H. M. Edelsten exhibited :—

1. Various rush and reed stems and photographs to show the early stages of some of the British Fen moths.

2. *Dianthoecia luteago* and subsp. *barrettii* arranged to show the difference between the two.

3. Series of the British species of *Chilidae*, *Chilo phragmitellus*, *Schoenobius forficellus*, *S. mucronellus*, *S. gigantellus*, the recent addition to the British list, *S. dodatellus*, and the Crambid *Calamotropha paludella*.

Mr. L. C. Bushby exhibited living specimens of the Giant Scarites (*Scarites buparius=gigas*), from Algeria; Spotted Ground Beetle (*Anthia sexmaculata*), Algeria; Giant Millipedes (*Scolopendra* sp.), Portuguese East Africa; Praying Mantis (*M. religiosa*), Portuguese East Africa, and from Algeria; Crested Mantis (*Empusa egina*), South France; Fat-tailed Scorpion (*Androctonus* sp.), Algeria; Locusts (*Anacridium aegyptium*), South France; and a Bird-eating Spider (*Mygale*), probably West Indian.

Mr. L. E. Dunster exhibited aberrations, of *Epinephele jurtina*, upper and underside; of *Plebeius aegon*, from Eynsford, varying in ground colour of underside and in spotting; of *Rumicia phlaeas*, with L. forewing approaching ab. *schmidtii*, Chipstead; of *Plebeius medon* (*astrarche*), with cream underside, and hindwings nearly obsolete in spotting, Chipstead; 4 ♀ *Aphantopus hyperantus* ab. *arete*; 4 ♀ yellow forms of *Pieris rapae*, 1 of spring brood, 3 of summer brood.

Mr. Hy. J. Turner, on behalf of Mr. William Fassnidge, exhibited a twig of a willow containing the living larva of *Synanthedon flaviventris*, Stdgr., found near Southampton; and communicated the following note from him. "When I found it, the dead portion containing the larva was hanging, but still attached. It broke off in my pocket. Another exactly similar mine on the same bush broke as I tried to cut below it. Note the green leaves on the living wood and the withered or dead leaves on the dead portion. The height of the mine from the ground was about five feet, but this is very little to go by, for the height is very variable." He adds: "So far, I have turned up quite a dozen larvae of *flaviventris*, and only one larva of the longicorn, *Saperda populnea*. I have found a mine already pecked out by a bird."

Miss M. E. Fountaine and Signor C. Neimy exhibited series of eight species of the genus *Hypolimnas*, from Africa, the Philippines and the Fiji islands: including *H. anomala*, *H. alimena* (from N. Queensland), *H. misippus*, *H. anthedon*, *H. dinarcha*, *H. wahlbergi*, *H. bolina* (from India and Burma, as well as from N. Queensland and the before mentioned Islands), *H. salmacis*.

Mr. T. H. L. Grosvenor exhibited short series of various species of the genus *Zygaena*, arranged to show how the typical forms, and also in some cases aberrational forms, tend to form groups with very little visible difference between the various species. Also series of the same species showing the wide range of variation, both aberrational and racial, which renders these forms very distinct from the typical. It appears that we have here a very plain case of evolution. There is a tendency in this group to form these races, which by isolation will doubtless, in course of time, become distinct species.

Purpuralis Group.—In this group, the variation, both racial and aberrational, is limited, the confluent character of the species giving little assistance in this direction. Colour varieties occur, such as black or yellow forms, but cannot be shown owing to lack of material.

Trifolii Group.—In this group, the variation, both aberrational and racial, is excessive, the spotted character of the typical forms allowing reduction and enhancement of the spots, in addition to the variation in colour. Black and yellow forms recorded.

Achilleae Group.—This group, which is a connecting link between the 5- and 6-spotted forms, shows a considerable racial and aberrational variation in the confluence and reduction of spots, also in colour. Black and yellow forms have been recorded.

Carniolica Group.—In this group, variation is more excessive than in the foregoing. The crescent spot, outlining of spots with white, and presence or absence of red belt, add three more factors for the possibility of variation. Colour variation as before, but with the addition that nearly white forms occur. Adequate material to show this excessive variation is difficult to obtain, as the majority of the species and races live in countries, such as Asia Minor and Russian Turkestan, difficult of access to entomologists from Western Europe.

Mr. Grosvenor also exhibited a series of *Zygaena lonicerae* (?), of the 2nd brood, bred August-September, 1927, *ab ovo*, from females taken at Blances, nr. Barcelona, by Mr. Hugh Main, F.E.S., in June, 1927.

The following are the figures for this most abnormal race :—

Larvae living (72), ex two females; the large majority died en route.

Imagines bred :—Males 19, Females 22	Total 41
Larvae hibernating normally	18
Larvae killed and preserved (2 full-fed, 2 hibernating)	4
2 imagines (males, emerged deformed)	2
4 died as pupae	4
3 died as larvae	3
	72

Percentage of Second Brood 68·3%.

Mr. F. T. Grant and Mr. Douglas Watson exhibited short series of *Nonagria dissoluta* and var. *arundineta*, and of *Senta maritima* and var. *wismariensis*, from North Kent Marshes.

Mr. C. N. Hawkins exhibited a series of varieties of *Amorpha populi* from Upper Tooting; with a number of preserved larvae of lepidoptera.

Capt. K. F. M. Murray exhibited a gynandromorph of each of the two species, *Ectropis* (*Tephrosia*) *punctulata* and *Hydrilla palustris* ♂.

Mr. H. Moore exhibited several species of polymorphic butterflies, and some large and conspicuous Orthoptera.

Mr. J. Forsyth Johnstone exhibited *Melitaea athalia* var. *nigra-thalia*; *Polyommatus thetis* (*bellargus*), ♂, all four wings striated, one ♂ and two ♀ ab. *obsoleta*, ♂ with a black spot in centre of each forewing (upperside), ♀ with red patch on left forewing; *Euchloë cardamines*, orange replaced by red; *Coenonympha pamphilus*, black spot in centre of right hindwing; two ab. *obsoleta* of *P. coridon*: *Epinephele tithonus*, specimens with extra spots below the

apical and one with four spots on hindwings ; *Agrotis exclamationis*, with the spots united.

Mr. D. E. Kimmins exhibited photographs of insects.

Mr. R. M. Long exhibited the following aberrations of Lepidoptera :—*Papilio machaon*, var., with black markings suffused ; bred from Wicken larvae, found in 1922. *Pieris napi*, ♂, with female markings on right side ; Mitcham, May, 1927. *Brenthis euphrosyne*, heavily marked with black ; Box Hill, May, 1925. *Polyommatus icarus*, blue ♀ and 5 underside vars. 3 *Spilosoma menthastri*, pale forms. *Agrotis corticea*, melanic var. ; S. Croydon, 1924. 7 *Erannis* (*Hybernia*) *marginaria*, dark forms from the Croydon district. *Biston* (*Pachys*) *betularia*, intermediate forms from the Croydon district. 4 *Zygaena filipendulae*, ranging from red to yellow.

Mr. W. J. Lucas exhibited coloured drawings of insects and plants :—*Grylloblatta campodeiformis*, Walk., ♀ (Orthoptera) ; *Isopteryx torrentium*, Pictet (Plecoptera) ; *Mecostethus grossus*, Linn., ♂ and ♀ (Orthoptera) ; Naiad of *Aeschna juncea*, Linn. (Paraneuroptera) ; Naiad of *Leucorrhinia dubia*, Linn. (Paraneuroptera) ; Naiad of *Libellula quadrimaculata*, Linn. (Paraneuroptera) ; *Botrychium lunaria*, Sw. (Moonwort) ; *Spiranthes aestivalis*, Rich. (Summer Lady's Tresses).

Mr. H. A. Leeds exhibited series of British butterflies showing the range of variation, all captured in 1927, including :—*Euchloë cardamines*, ♀ upperside, extraordinary large discoidals. *Pieris rapae*, ♀ upperside, creamy yellow. *P. napi*, ♀ upperside, blackish, well defined neuration. *Aphantopus hyperantus*, 2 *caeca*, and a pale ♀ underside. *Epinephele jurtina*, a series showing whitish patches and streaks ; whitish, straw and bright tawny grounds, and several with extra spotting. *Epinephele tithonus*, dark ♂s ; ♀ upperside with two very large additional ocellated spots on forewings, and a ♀ underside with extremely large apical spots and extra spots beneath 1 on left forewing and 2 on right forewings. *Polyommatus thetis*, ♂ undersides, paler ground, and ab. *atrescens* ; ♀ upperside, *nigrescens-antico-semiceronus*. *Coenonympha pamphilus*, a remarkable right forewing, showing partial duplication of the brown costal marking, the ordinary darker costa well above this. *Rumicia phlaeas*, *ignita-subradiata*, *juncta* approaching *nigro-apicata*, *intermedia*. *Plebeius medon*, ♂ underside with chalky-white ground, discoidals present, and 2 spots on left hindwing, otherwise basal submedian and border black spots absent. A number of named aberrations of *Plebeius argus*, *Polyommatus icarus* and *P. coridon*.

Mr. Hugh Main exhibited living insects, scorpions and spiders, mainly from the S. of France.

Mr. C. H. Williams exhibited long series of *Abraxas grossulariata* and of *Polyommatus coridon*.

Mr. C. G. M. de Worms exhibited both sexes of the *impar* form of *Metachrostis* (*Bryophila*) *muralis (glandifera)*; and a cream-coloured aberration of *Cosmotriche potatoria*, lent by H. F. Gammon, Esq.

Mr. S. R. Ashby exhibited his collection of British Hemiptera.

Mr. H. Worsley-Wood exhibited (1) a selection of larvae of British Lepidoptera; (2) a collection of the same preserved and mounted on food-plants and hand-coloured, from the collection of A. E. Hodge; (3) Larvae of British Sawflies; (4) *Ortholitha chenopodiata* (*limitata*) with white marginal border.

Mr. Leonard T. Ford exhibited a series of *Peronea literana*, from the Isle of Wight.

Mr. O. R. Goodman and Mr. A de B. Goodman exhibited a large collection of the butterflies collected by them at St. Martin Vesubie, Digne and St. Baume, in S. France, during June and July, 1927.

Mr. C. G. Priest exhibited his captures of Lepidoptera during the year, including a very pink tinted form of *Amorpha populi*.

Mr. Percy Richards exhibited a large number of aberrations of *Aglais urticae* and of *Epinephele jurtina* (*janira*).

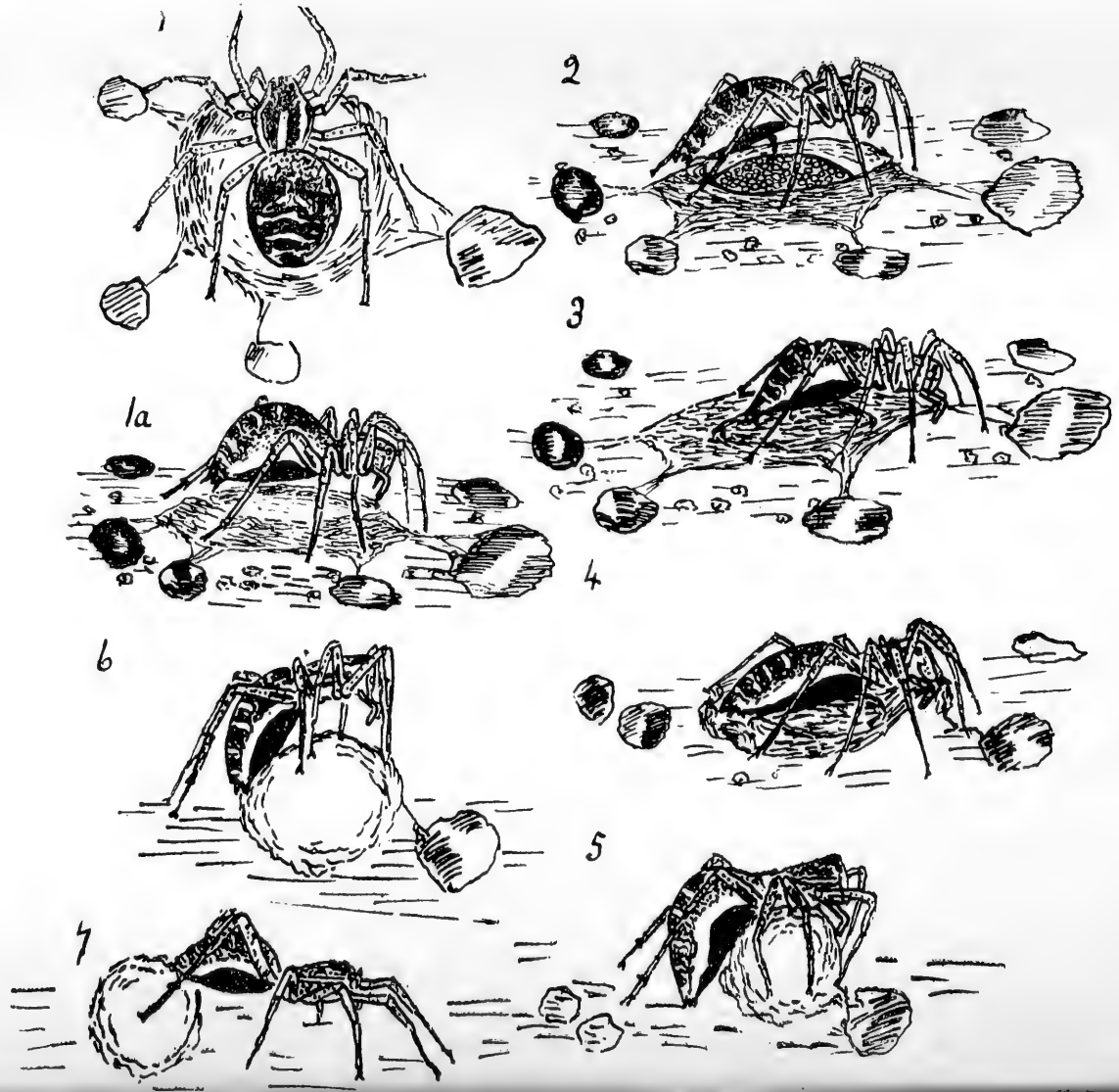
Dr. E. Scott exhibited a drawer containing various species of the genus *Erebia*, which he had obtained at Gavarnie, Pyrenees, in July, 1927.

Mr. G. Talbot, on behalf of J. J. Joicey, Esq., examples of the species of butterflies collected in the Great Atlas Mountains of Morocco, and of the species obtained in a trip to the Republic of Andorra, in the Eastern Pyrenees.

The Rev. J. E. Tarbat exhibited three examples of the July form of *Polygonia c-album*, form *hutchinsoni*; and three including a banded one, of the September (second brood) form.

Dr. H. B. Williams exhibited a series of *Lobophora halterata*, from Oxshott district, 1927, showing considerable variation, particularly in the females; short series of *Notodonta ziczac*, *N. dromedarius*, and of *Taeniocampa gothica* from the Aberdeen district, with southern forms for comparison.

Mr. F. W. McDonald exhibited a number of butterflies from Milne Bay, the extreme S.E. corner of New Guinea; a case of insects of different orders from South America, and a large number of Fossils.



Del. A. de B. Goodman.

Mr. L. W. Newman exhibited :—1. Series of *Colias croceus*, bred from the form *helice*, captured in June, 1927. The ♀ laid about 280 ova. The following specimens were bred : ♂s 112, ♀s 49, *helice* 47 ; total 208 specimens. 49 died in larval state, 18 died in pupa, leaving about 5 which were lost.

2. Long series of *Abraxas grossulariata*, including abs. *varleyata*, *exquisita*, *lacticolor*, *iochalcea*, *crocea*, *nigrocretacea*, *pulchra*, etc.

3. Long series of *Cosmotriche potatoria*, very varied, from Sussex with ♀ ♀ of ♂ ♂ colour.

4. Long series of *Callimorpha dominula* of considerable variation, including specimens with all usual white spots very deep orange.

5. Long series of *Polygonia c-album* var. *hutchinsoni*, etc.

6. Long and very varied series of *Polyommatus thetis* with abs. *obsoleta*, *striata*, etc.

7. Series of *Aphantopus hyperantus* with abs. *caeca*.

8. And of *Melitaea athalia* with melanic and extreme pale forms.

9. A pair of fine melanic *Brenthis euphrosyne* ; and other species.

Mr. S. G. Castle-Russell exhibited Lepidoptera captured or bred during the season by himself, including :—*Papilio machaon*, a black male with the usual markings absent, except faint blue spots on hindwings ; bred from a wild larva found by the exhibitor, July 25th, 1926, Norfolk, emerged May 8th, 1927. *Pieris napi*, a short series of unusually heavily marked females, including a gynandromorphic specimen : left wings male, right wings partly female ; all bred from Co. Fermanagh parents. *Aglais urticae*, a series of aberrational forms from Basingstoke larvae, including one with completely black hindwings except for faint blue streaks. *Pararge megera*, a male aberration, Basingstoke. *Hipparchia semele*, exceptionally dark male upperside, and a light-bordered female. *Polyommatus* (*Agriades*) *coridon*, females with yellow spots, one with left wings typical and right wings *semi-syngrapha*. *Plebeius aegon* (*argus*), gynandromorphic specimen, predominantly female in colour, but with male blue colouring on both upper and undersides.

Mr. A. de B. Goodman a living specimen of *Lycosa narbonensis*, the S. France hunting-spider, with drawings illustrating its life-history (plt. VIII.), and communicated the following notes.

THE BLACK-BELLIED TARANTULA SPIDER (LYCOSA NARBONENSIS.)

The rough sketches were made during the oviposition by a female taken at La Sainte Baume, S. France, and are intended to shew the various positions assumed during the process. Whether the

oviposition takes place naturally within the spider's pit, or not, was not ascertained. The specimen under observation was confined in a circular jar partly filled with earth, and no pit was made.

Figs. 1 and 1a.—Dorsal (1): lateral (1a), views of process when first observed. A circular silken pad, 1″ to 1½″ in diameter, was attached by silken threads from its perimeter to surrounding small objects, e.g., pieces of earth, etc. There was a large concavity in the centre of the pad, which the spider was making by laying on silk at the outer edge, by means of a three pronged protuberance at the tip of the abdomen. The silk was applied by a tapping movement of the abdomen, and the spider moved one way around and then the other with its legs on the extreme outer edge of the pad, thus completely covering the concavity with its body.

Fig. 2.—Lateral view shewing mass of eggs filling the cavity. These were discharged *en masse* in a bright yellow yolk, in which they were just discernible as whitish specks. The egg-mass seemed to come from below the black portion of the abdomen beneath and a certain amount of yolk adhered to it. The body of the female shrunk to half its size after oviposition.

Fig. 3.—Lateral view shewing the covering in of the egg-mass by further additions of silk. The spider drew the silken walls of the cavity towards the centre, smoothing it and adding more silk by the gentle tapping movement of the abdomen as before. The silken pad thus finally had a convex upper surface covering the egg-mass lying in the centre of the pad.

Fig. 4.—Lateral view shewing detachment of the pad from its various anchorages. The spider seized the edges of the pad in its jaws and tore away the silken anchorage threads from their attachments.

Fig. 5.—Lateral view of egg-mass detached and gathered up beneath the spider. Note that the abdomen is *not* attached to the egg-mass.

Fig. 6.—Lateral view of spider attaching its abdomen to the egg-mass.

Fig. 7.—Spider with egg-mass free and attached only to the abdomen by silken threads. Note that the egg-mass is not completely spherical but flattened at opposite poles.

It might be stated that Fabre describes his observation of the silken pad, but makes no mention of how the egg mass is formed.

Several authorities have expressed doubt as regards Fabre's description that the mother-spider holds the egg-sac to the sun

rays; this however in the main is true, for on Aug. 13th, 1927, and on subsequent occasions, female spiders have been observed resting head downwards at the mouth of the pits with the egg-masses exposed to the sunshine on the edge of the pit, between the two hindmost legs. It should be noted however that the egg balls were certainly not *held* to the sun by the hindmost legs. The photograph given by Fabre is undoubtedly incorrect and was probably obtained by the use of a dead specimen.

On Sept. 27th, 1927, an egg-mass was opened. The eggs were yellow, soft and separate; all trace of the yellow yolk previously observed had disappeared; 311 eggs were counted and 11 young spiders emerged. The eggs are approximately ·07″ in diameter.

The egg-shell is sloughed off towards the abdomen.

The young spiders have a globular yellow abdomen with faint segmental lines, and the head and legs are ivory white. The jaws are completely developed. Later, the young spiders became yellow in colour with darker markings corresponding to those of the adult.

NOVEMBER 10th, 1927.

The PRESIDENT in the Chair.

Mr. T. R. Eagles, F.E.S., of Enfield; Capt. F. S. Smith, of Middlebourne, Farnham; Mr. W. T. Davies, of Bexley Heath; Mr. W. H. Walker of Potter's Bar; and Mr. A. N. Witting, of Catford, were elected members.

The President exhibited a long series of *Celaena haworthii*, males and females, from E. Aberdeenshire, taken this season on heather, and not on scabious as usually recorded. He showed also living larvae of *Ptychopoda rusticata*, *P. biselata* (*bisetata*), and *Triphaena subsequa* (*orbona*), all reared from ova.

Mr. Turner, on behalf of Mr. Wm. Fassnidge, exhibited a specimen of *Myelois cirrigerella*, a Phycid first taken in this country by Mr. Edward Meyrick at Marlborough in 1874, and never since recorded. The present exhibit was taken at Winchester, and was in excellent condition. The species is distributed over Central Europe, but only occurs in any locality quite sporadically. Nothing is known of its life-history.

Capt. Crocker spoke of the habit of *Synanthedon andrenaeformis* to hop from one spot to another, a habit begun soon after emergence from the pupa, but he had never observed it at flowers. It was

remarked how few species of "Clearwing" were ever observed at rest.

Mr. A. de B. Goodman exhibited a fine example of the ab. *honoratii* of *Zerynthia* (*Thais*) *rumina*, a form with considerable extension of the beautiful, rich rose-coloured patches, which occurs but rarely among the race *medesicaste* of the South of France.

He showed also four species of the neuropterous genus *Ascalaphus* and read the following notes :—

A. longicornis, L., an orange and bronze insect, which is fairly well distributed throughout the S. of France : I have met with it at St. Martin Vesubie, La Sainte Baume and in the Cevennes, in June and July.

A. ictericus, Cph., a very rare, bronze-tinted species, native of Algeria. It was found singly, in May and June, at Hamman Righa and Teniet-el-Had.

A. libelluloides, a yellow and black species, common locally throughout South France in June and July. I have met with it at St. Martin Vesubie, Digne, and Mont Aigoual, Cevennes.

A. ottomanus. In July, 1921, I sent several examples of *Ascalaphus* from St. Martin Vesubie, to the late Dr. C. L. Withycombe. These he identified as *A. ottomanus*, and expressed surprise at their occurrence in S. France, as their previously known range was from Dalmatia to the Black Sea. A few years later St. Martin was visited in July by Mr. H. Main, who told me he had seen *Ascalaphus* in great numbers. These, I have no doubt, were the same species, for this year, in late June, I found *A. ottomanus* very abundant in the valley of the Madone des Tenêtres, St. Martin Vesubie, while only one or two specimens of *A. longicornis* and of *A. libelluloides* were seen. I have compared these St. Martin Vesubie specimens with *A. ottomanus* from Asia Minor in the B.M. Collections, and undoubtedly these specimens are correctly identified.

NOVEMBER 24th, 1927.

Mr. H. W. Andrews, F.E.S., Vice-President in the Chair.

Messrs. J. O. T. Howard, B.A., of St. John's Wood ; Rev. E. E. Tottenham, of Richmond ; H. R. Hewer, of S. Kensington ; H. E. Skelton, of Upper Tooting ; and A. W. McKenny-Hughes, of the Innes Horticultural Institution, Merton, were elected members.

Mr. Lucas, in illustration of his paper, exhibited specimens of

the four British species of snake-flies (*Rhaphidia*), with a series of drawings of their structural details.

On behalf of Mr. Hammond, Mr. Lucas exhibited an example of the rare dragonfly, *Somatochlora metallica*, taken along the Byfleet Canal; hitherto believed to be almost confined to the north of Scotland.

Mr. B. W. Adkin exhibited two specimens of *Cosmotriche potatoria*, which emerged in October, 1927. They were part of a large brood, of which four fed up and pupated; the remainder hibernating as larvae in the usual manner. The brood was obtained from a female bred in July from a wild larva, and they had been reared entirely out of doors. He remarked that this was his first experience of a second emergence of this species; and he would be interested to learn of any similar instances.

Mr. W. J. Lucas, B.A., read a paper, "Notes on the British Snake-flies (*Rhaphidia*)." (See page 34.)

DECEMBER 8th, 1927.

The PRESIDENT in the Chair.

Mr. Barnett exhibited a long series of *Phigalia pedaria*, males, taken on street lamps near Crohamhurst, showing considerable variation.

Mr. Turner exhibited two specimens of the very large Lamellicorn beetle, *Goliathus giganteus*, from the Cameroons.

JANUARY 12th, 1928.

The PRESIDENT in the Chair.

Mr. O. E. Janson, 13, Fairfax Road, Hornsey, was elected a member.

Mr. Sperring exhibited a specimen of *Brenthis euphrosyne*, taken in Galway; the second record of the occurrence of the species in Ireland. The previous record was made by Mr. Sabine, from Co. Clare.

Dr. H. B. Williams exhibited a number of abnormal cocoons of *Saturnia pavonia*, made in captivity by larvae bred from the egg. Such abnormality is exhibited when parasitation has taken place; but in this instance no such reason was possible. The cocoons

were respectively, without the usual exit; two exits, one at each end, and one pupa; one cocoon with double exit and two pupae; two pupae in one cocoon with no exit, each larva apparently closed the exit made by the other: cocoons of unusual colouring; etc.

Mr. Thos. Greer exhibited the following Lepidoptera from Co. Tyrone and N. Ireland:—*Pieris napi*, a series of ♂s, showing gradual increase of discal markings on forewings; ♂ with dot in posterior wings. *Pieris rapae*, ♀s yellowish, banded, and ab. *nigropuncta*. *Euchloë cardamines*, ♂s with marginal dots strongly emphasised, especially on posterior wings; ♀ with dark costa. *Epinephele jurtina*, a series (July, 1927) showing extended fulvous colour on forewings of ♂s: ♀s with fulvous bands on hindwings; and a series of form *addenda* ♂ and ♀. *Polyommatus icarus*, series of undersides, illustrating variation in spotting and range of colour; ♀s with two shades of blue on base of posterior wings underside. *Lycaenopsis* (*Celastrina*) *argiolus*, ♀, an almost spotless example. A number of teratological specimens including *E. cardamines*, *M. aurinia*, *C. pamphilus*, *P. icarus*, *N. baja*, *H. crinanensis* and *Z. lonicerae*. Also Lepidoptera from Lough Neagh district. *Cosmotriche potatoria* and examples from Eastbourne, Sussex, for comparison. *Acronicta menyanthidis*, a large pale form; and *A. rumicis*, a dark form. *Helotropha leucostigma* and var. *fibrosa*, reddish form. *Agrotis agathina*, varying from light to dark. *Celaena haworthii*, a lowland marsh form, and a moorland one for comparison. *Dianthoecia conspersa*, Co. Tyrone; and *D. caesia* from West Donegal. *Zygaena lonicerae*, *Z. filipendulae*, and an intermediate form, six-spotted with broad margins to hindwings.

Mr. Robert Adkin read a paper entitled "Notes on the Genus Hyponomeuta with special reference to *H. cognatellus*, Hb., *H. padellus*, L., and *H. malinellus*, Zell." (page 48). In illustration he exhibited long series of imagines, together with examples of their pupal cocoons.

JANUARY 26th, 1928.

ANNUAL MEETING.

The PRESIDENT in the Chair.

The Reports of the Council and Treasurer with the Balance Sheet were read and adopted (see pages xiv-xx); and the President, Dr.

E. A. Cockayne, read the Annual Address (see page 55). Votes of Thanks were passed to the Officers, congratulating the Society on the year's work. The following is a list of those declared elected as Officers and Council for the ensuing twelve months:—

President, E. A. Cockayne, M.A., M.D., F.R.C.P., F.E.S. *Vice-Presidents*, H. W. Andrews, F.E.S., T. H. L. Grosvenor, F.E.S. *Treasurer*, A. E. Tonge, F.E.S. *Librarian*, E. E. Syms, F.E.S. *Curator*, S. R. Ashby, F.E.S. *Hon. Editor of Proceedings*, H. J. Turner, F.E.S. *Hon. Secretaries*, Stanley Edwards, F.L.S., etc. (Corresponding), H. J. Turner, F.E.S. *Hon. Lanternist*, J. H. Adkin. *Council*, J. H. Adkin, F. B. Carr, A. W. Dods, A. de B. Goodman, F.E.S., O. R. Goodman, F.E.S., F.Z.S., C. N. Hawkins, F.E.S., W. Rait-Smith, F.E.S., F.Z.S., C. Sperring, and W. H. T. Tams, F.E.S.

Ordinary Meeting.

The President, Dr. E. A. Cockayne, M.A., M.D., F.R.C.P., F.E.S., in the Chair.

Mr. Jarvis exhibited an example of the phytophagous coleopteron, *Timarcha violaceo-niger*, with a bifid tarsus. The beetle was taken May 22nd, 1915, at Royston, by the late Mr. E. A. Butler, and differs from normal type, in that the second joint on the left medial leg is dilated at its base, to about 3 times its normal width. The base is curved upwards towards the centre and to its angles are appended 2 complete 4-jointed tarsi (with claws); the first tarsus being nearly normal and the second developed to about half normal size. In all other respects the beetle appears to tally with type, in fact, the dilated joint is of normal length, and the two tarsi are pubescent on the underside (as usual).

Mr. Tonge exhibited a very varied bred series of *Peronea hastiana*, bred from larvae obtained at Deal.

Mr. White exhibited an apple, on the rind of which was a batch of ova, supposed from their shape and closely ranged position, to be those of *Himera* (*Colotois*) *pennaria*.

Correction.— [The following paragraph arrived too late for substitution for that printed on page 74.]

Mr. Bristowe said that British spiders did not make "devices" in the ordinary way, but *Epeira adianta* makes a white platform in the centre of its web and *Cyclosa conica* does occasionally construct a small "stabilimentum." He called attention to the remarkable convergence of evolution in the families *Uloboridae* and *Epeiridae*; both make orb-webs and "devices" are found in some species of each. He stated that Pompilid wasps usually capture one large spider, whilst Sphegids often have 20 or 30 small ones. The thorny bodies of some spiders found abroad do not prevent their being victims of wasps. He had observed a Brazilian Theridiid, which put a crumpled leaf in its web and in which it lived. He asked whether those spiders which construct "stabilimenta" eat their webs, according to the usual practice of Epeirids every night. He had much pleasure in seconding the vote of thanks.

INDEX.

NEUROPTERA.

ORTHOPTERA.

PARANEUROPTERA.

PHANEROGAMS.

THE SOUTH LONDON
Entomological & Natural History Society

(Established 1872)

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1901 ARMSTRONG, Capt. R. R., B.A., B.C. (Cantab), F.R.C.S., F.R.C.P., 3*a*, Newstead Road, Lee, S.E.12. *e, l.*

1895 ASHBY, S. R., F.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c, l.*

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1911 BLAIR, K. G., B.SC., F.E.S., "Claremont," 120, Sunningfields Road, Hendon, N.W. 4. *n, c.*

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1926 BLISS, A., "Musgrove," Brighton Road, Purley.

1925 BLYTH, S. F. P., "Cleveland," Chislehurst, Kent. *l.*

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1909 BOWMAN, R. T., "Rockbourne," Keswick Road, Orpington, Kent. *l.*

1909 BRIGHT, P. M., F.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l.*

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1928 COMMON, A. F., "Tessa," St. James Avenue, Thorpe Bay.

1907 COOTE, F. D., F.E.S., 32, Wickham Avenue, Cheam, Surrey. *l, b.*

1919 COPPEARD, H., 26, King's Avenue, Greenford, Middlesex. *l.*

1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W. 3. *l.*

1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E. 18. *l, c.*

Year of Election.

1922 Couchman, L. E., c/o Mrs. A. Couchman, May Cottage, Brooklane, Bromley, Kent. *l.*

1909 Coulson, F. J., 17, Birdhurst Road, Colliers Wood, Merton, S.W. 19. *l.*

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1911 Coxhead, G. W., 45, Leicester Road, Wanstead, E. 11. (*Life Member.*) *c.*

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1918 Craufurd, Clifford, "Dennys," Bishops Stortford. *l.*

1920 Crocker, Capt. W., Constitutional Club, E. Bexley Heath. *l.*

1898 Crow, E. J., 70, Hepworth Road, Streatham High Road, S.W. 16. *l.*

1928 Curwen, Capt. B. S., 9, Lebanon Pk., Twickenham. *l.*

1927 Danby, G. C., 33, Huron Road, Tooting Common, S.W.17.

1925 Dannatt, W., F.Z.S., "St. Lawrence," Gaibal Road, Burnt Ash, S.E. 12. *l.*

1900 Day, F. H., F.E.S., 26, Currock Road, Carlisle. *l, c.*

1889 Dennis, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*

1918 Dixey, F. A., M.A., M.D., F.R.S., F.E.S., Wadham College, Oxford. *Hon. Member.*

1901 Dods, A. W., *Council*, 88, Alkham Road, Stamford Hill, N. 16. *l.*

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1920 Farmer, J. B., 31, Crowhurst Road, Brixton, S.W. 9. *l.*

Year of Election.

1918 Farquhar, L., "Littlecote," Pield Heath Avenue, Hillingdon, Middlesex. *l.*

1924 Fassnidge, Wm., M.A., F.E.S., 47, Tennyson Road, Portswood, Southampton. *l, n, trich, he.*

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1920 Ford, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*

1915 Foster, T. B., "Lenore," 1, Morland Avenue, Addiscombe, Croydon. *l.*

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1919 Frisby, G. E., F.E.S., 29, Darnley Road, Gravesend. *hym.*

1912 Frohawk, F. W., M.B.O.U., F.E.S., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*

1914 Fryer, J. C. F., F.E.S., M.A., "Chadsholme," Milton Road, Harpenden, Herts. *l, ec. ent.*

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1927 Gibbins, F. J. F.I.A.A., F.I.A.S., 51, Weldon Crescent, Harrow, Middlesex. *l.*

1928 Gilles, W. S., F.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*

1920 Goodman, A. de B., F.E.S., *Council*, "Normanby," Darkes Lane, Potters' Bar, Middlesex. *l.*

1926 Gordon, D. J., B.A., F.E.S., Craigellachie House, Strathpeffer, N.B. *col., lep.*

1924 Grant, F. T., 37, Old Road West, Gravesend. *l.*

1925 Graves, P. P., F.E.S., 5, Hereford Square, S.W.7. *l.*

1923 Gray, C. J. V., BM/BRWX., London, W.C.1. *l.*

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1918 GREEN, E. E., F.E.S., "Ways End," Camberley, Surrey. *hem.*

1924 GREER, T., J.P., Curglasson, Stewartstown, Co. Tyrone. *l.*

1926 GREY, Olive, Mrs., F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*

1911 GROSVENOR, T. H. L., *Council*, Springvale, Linkfield Lane, Redhill. *l.*

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1891 HAMM, A. H., F.E.S., 22, Southfields Road, Oxford. *l.*

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1926 HARMSWORTH, H. A. B., F.E.S., 3, Marlborough Gate, Hyde Park, W.2. *l.*

1926 HARRIS, A. G. J., B.A., 21, Nevern Place, S.W.5.

1924 HARWOOD, P., F.E.S., Westminster Bank, 92, Wimborne Road, Winton, Bournemouth. *l.*

1927 HAWGOOD, D. A., 89, Leigham Vale, Tulse Hill, S.W.2. *l.*

1924 HAWKINS, C. N., F.E.S., *Council*, 23, Dalebury Road. Upper Tooting, S.W.17. *l.*

1929 HAWLEY, Lt.-Col. W. G. B., 13, Colville Road, W.11.

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1923 HAYWARD, Capt. K. J., F.E.S., Villa Ana, F.C.S.F., Argentine. *l.*

1920 HEMMING, Capt. A. F., F.Z.S., F.E.S., 29, West Cromwell Road, S.W. 7. *l.*

1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *col.*

1927 HEWER, H. R., M.SC., D.I.C., Royal College of Science, S. Kensington, S.W. 7.

1927 HEWITT, A. C., 83, Tavistock Avenue, Walthamstow, E.17.

1920 HODGSON, S. B., 3, Bassett Road, N. Kensington, W.10.

1927 HOWARD, J. O. T., B.A., 78, St. John's Wood Court, N.W.8.

1927 HUGHES, A. W. McKenny, 22, Stanford Road, Kensington, W. 8. *ec. ent.*

1929 HUGHES, A. W., 14, Cliff Road, Wallasey, Cheshire.

1929 HUGHES, Miss W. P. K., M.SC., "Australia House," Strand, W.C.2.

1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.

1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*

1923 JACOBS, S. N. A., Ditchling, Hayes Lane, Bromley. *l.*

YEAR OF ELECTION.

1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l.*

1924 JAMES, R., F.E.S., 14, Golden Lane, E.C.1.

1927 JANSON, O. J., F.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent.*

1925 JARVIS, C., 12, Claylands Road, Clapham, S.W.8. *c.*

1922 JOBLING, Boris, "Neva,' Whitechurch Gardens, Edgware, Middlesex. *med. ent.*

1923 JOHNSTONE, J. F., F.E.S., "Ruxley Lodge," Claygate, Surrey. *l.*

1918 JOHNSTONE, D. C., F.E.S., 26, Granville Park, Lewishan, S.E *l.*

1920 JOICEY, J. J., F.L.S., F.E.S., F.R.G.S., etc., "The Hill," Witley, Surrey. *l.*

1898 KAYE, W. J., F.E.S., "Caracas," Ditton Hill, Surbiton, Surrey. *l, S. American l.*

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1914 LEEDS, H. A., 2, Pendcroft Road, Knebworth, Herts. *l.*

1919 LEMAN, G. C., F.E.S., "Wynyard," 52, West Hill, Putney Heath, S.W. 15. *c.*

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1920 LINDEMAN, F., c/o Rio de Janeiro Tramway Light and Power Co., Caixa Postal 571, Rio de Janeiro, Brazil. *l.*

1926 LONG, R. M., Witley, 3, Cedars Road, Beddington, Surrey. *l.*

1924 LOWTHER, A. W. G., "The Old Quarry," Ashtead, Surrey. *ent.*

1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *Brit. o., odonata, n, m, b.*

1929 LYALL, Miss Edith May, 57, Mortlake Road, Kew Gardens, Surrey.

1921 LYLE, G. T., F.E.S., "Briarfield," Stump Cross, Shibden, Halifax. *h.*

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1926 MACDONALD, F. W., 82, Trinity Street, Leytonstone, E.11. *l.*

1892 MAIN, H., B.SC., F.E.S., F.Z.S., "Almondale," 55, Buckingham Road, S. Woodford, E. 18. *l, nat. phot., col.*

YEAR OF ELECTION.

1889 MANSBRIDGE, W., F.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc.*

1922 MASSEE, A. M., F.E.S., East Malling Research Station, Kent. *l.*

1885 MERA, A. W., 5, Park Villas, Loughton, Essex. *l.*

1881 MILES, W. H., F.E.S., "Grosvenor House," Calcutta. Post Box 126. *mi, b.*

1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E.16. *l, h, d, e l, e h, e d, mi.*

1928 DE MORNEY. C. A. G., 21, Nevern Place, S.W.5.

1920 MORRISON, G. D., F.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marichall, Aberdeen. *ec. ent.*

1925 MOUNSEY, D., "Kirkstone," 5, Harewood Road, S. Croydon. *Ent, Ornith.*

1927 MURRAY, Capt. K. F. M., 62, Park Street, Grosvener Square, W.1. *l.*

1923 MUTCH, J. P., "Mayfield House," Church Road, Bexley Heath. *l.*

1923 NASH, T. A. M., 16, Queen's Road, Richmond, Surrey. *l.*

1923 NASH, W. G., F.R.C.S., "Clavering House," de Pary's Avenue, Bedford. *l.*

1906 NEWMAN, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*

1926 NEWMAN, L. H., Salisbury Road, Bexley, Kent. *l.*

1926 NIXON, G. E., 315B, Norwood Road, Herne Hill, S.E.24. *h, l.*

1911 PAGE, H. E., F.E.S., "Bertrose," 17, Gellatly Road, New Cross, S.E. 14. *l.*

1927 PALMER, D. S., "North Lodge," Esher.

1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W. 1. *l.*

1928 PERKINS, J. F., 19, Courtfield Gardens, W.C.5. *h.*

1925 PORTSMOUTH, J., 15, Victoria Street, Westminster, S.W.1. *l.*

1925 PORTSMOUTH, G. B., 15, Victoria Street, Westminster, S.W.1. *l.*

1912 POULTON, PROF. E. B., D.SC., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.E.S., "Wykeham House," Oxford. (*Hon. Member.*)

1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane.

1897 PREST, E. E. B., 8 and 9, Chiswell Street, E.C. 1. *l.*

1924 PRIEST, C. G., 30, Princes Place, Notting Hill, W.11. *l.*

Year of Election.

1904 Priske, R. A. R., f.e.s., 136, Coldershaw Road W. Ealing, W. 5. *l, m.*

1919 Quilter, H. J., "Fir Cottage," Kiln Road, Prestwood, Great Missenden. *l, c, d, mi.*

1922 Rait-Smith, W., f.z.s., f.e.s., *Council*, "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*

1925 Ralfs, Miss E. M., f.e.s., "Montford," Kings Langley, Herts.

1922 Rattray, Col. R. H., 68, Dry Hill Park Road, Tonbridge, Kent. *l.*

1902 Rayward, A. L., f.e.s., 15, Vicarage Drive, Eastbourne. *l.*

1887 Rice, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. 4. *orn.*

1927 Richards, Percy R., "Wynford," Upton Road, Bexley Heath. *l.*

1920 Richardson, A. W., f.e.s., 28, Avenue Road, Southall, Middlesex. *l.*

1908 Riley, Capt. N. D., f.e.s., f.z.s., 5, Brook Gardens, Beverley Road, Barnes, S.W.13. *l.*

1910 Robertson, G. S., m.d., "Bronllys," 72, Thurlow Park Road, Dulwich, S.E. 21. *l.*

1922 Robertson, W. J., m.r.c.s., l.r.c.p., f.z.s., 69, Bedford Road, S.W. 4. *l.*

1911 Robinson, Lady Maud, f.e.s., "Worksop Manor," Notts. *l, n.*

1920 Rothschild, The Right Hon. Lord, d.sc., f.r.s., f.l.s., f.z.s., f.e.s., Tring, Herts. *l, orn.* (*Life Member.*)

1887 Routledge, G. B., f.e.s., "Tarn Lodge," Heads Nook, Carlisle. *l, c.*

1890 Rowntree, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*

1915 Russell, S. G. C., f.e.s., "Brockenhurst," Reading Road, Fleet, Hants. *l.*

1908 StAubyn, Capt. J. S., f.e.s., "Sayescourt Hotel," 2, Inverness Terrace, Bayswater, W. 2.

1925 Sancean, E., "The Yew," Firtree Road, Banstead. *b.*

1914 Schmassmann, W., f.e.s., "Beulah Lodge," London Road, Enfield, N. *l.*

1910 Scorer, A. G., "Hillcrest," Chilworth, Guildford. *l.*

1927 Scott, E., m.b., "Hayesbank," Ashford, Kent. *l.*

1923 Sevastopulo, D. G., f.e.s., c/o Ralli Bros., Calcutta. *l.*

Year of Election.

1910 Sheldon, W. G., F.Z.S., F.E.S., "West Watch," Limpsfield, Surrey. *l.*

1898 Sich, Alf., F.E.S., "Grayingham," Farncombe Road, Worthing. *l.*

1925 Simmons, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*

1920 Simms, H. M., B.SC., F.E.S., "The Farlands," Stourbridge.

1927 Skelton, Hy. E., 12, Mandrake Road, Upper Tooting, S.W. 17.

1921 Smart, Major, H. D., R.A.M.C., M.D., D.SC., F.E.S., 172, High Road, Solway Hill, Woodford Green. *l.*

1922 Seth-Smith, D. W., Curator's House, Zoological Gardens, Regents Park, N.W.8. *l.*

1927 Smith, Capt. F. S., F.E.S., "Sunnyside," Middlebourne, Farnham. *l.*

1928 Smith, Mrs. Maud Stanley, "Sunnyside," Middlebourne, Farnham. *l.*

1882 South, R., F.E.S., 4, Mapesbury Court, Shoot-up-Hill, Brondesbury, N.W.2. *l, c.*

1926 Sparrow, R. W., "Wildwood," Regents Park Road, Finchley, N.3.

1908 Sperring, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*

1920 Stafford, A. E., *Council*, 98, Cowley Road, Mortlake, S.W. 14. *l.*

1872 Step, E., F.L.S., 158, Dora Road, Wimbledon Park, S.W. 19. *b, m, cr*; *Insects, all Orders.*

1928 Stocken, H. E. W., Orchard Cottage, W. Byfleet, Surrey.

1923 Stolzle, G. A. W., "Southcote," South Street, nr. Whitstable, Kent. *l.*

1924 Storey, W. H., 63, Lincolns Inn Fields, W.C.2. *ent.*

1911 Stowell, E. A. C., B.A., Eggars Grammar School, Alton, Hants.

1929 Stubbs, G. C., 41, St. Mary's Street, Ely, Cambs.

1916 Syms, E. E., F.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *l.*

1920 Talbot, G., F.E.S., "The Hill Museum," Witley. *l.*

1922 Tams, W. H. T., F.E.S., 5, Dairy Lane, Hurlingham, S.W. 6. *l.*

1894 Tarbat, Rev. J. E., M.A., Colbourne Rectory, I. of Wight. *l, ool.*

YEAR OF ELECTION.

1913 TATCHELL, L., F.E.S., Swanage, Dorset. *l.*

1925 TAYLOR, J. S., Dept. Agriculture, Div. Ent., Pretoria, Union of S.A. *l.*

1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.

1926 TOMLINSON, Florence B., "The Anchorage," Lodge Road, Croydon. *l.*

1902 TONGE, A. E., F.E.S., *Hon. Treasurer*, "Aincroft," Grammar School Hill, Reigate. *l.*

1927 TOTTENHAM, Rev. C. E., "Keswick," Tyrone Road, Thorpe Bay, Essex. *c.*

1887 TURNER, H. J., F.E.S., F.R.H.S., *Hon. Editor*, "Latemar," West Drive, Cheam, Surrey. *l, c, n, he, b.*

1921 VERNON, J. A., "Lynmouth," Reigate, Surrey. *l.*

1923 VREDENBERG, G., 38, Ashworth Mansions, Maida Vale, W.9. *l.*

1889 WAINWRIGHT, C. J., F.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*

1927 WAINWRIGHT, Chas., 8, Kingsdown Avenue, W. Ealing, W.13.

1929 WAINWRIGHT, J. Chas., 8, Kingsdown Avenue, W. Ealing, W.

1929 WAINWRIGHT, John, 8, Kingsdown Avenue, W. Ealing, W.

1911 WAKELY, L. D., 11, Crescent Road, Wimbledon, S.W.20. *l.*

1880 WALKER, Comm. J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*

1927 WALKER, W. H., "Ranworth," Potters Bar. *l.*

1925 WARD, J. Davis, F.E.S., "Limehurst," Grange-over-Sands. *l.*

1920 WATSON, D., "Proctors," Southfleet, Kent. *l.*

1928 WATTS, W. J., 3, Rayward Road, Elmer's End, Beckenham. *l.*

1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l.*

1911 WELLS, H. O., "Inchiquin," Lynwood Avenue, Epsom. *l.*

1911 WHEELER, The Rev. G., M.A., F.Z.S., F.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*

1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.

1927 WHITTING, A. N., 6, Woolstone Road, Catford, S.E. 6.

1920 WIGHTMAN, A. J., F.E.S., Broomfield, Pulborough, Sussex. *l.*

1914 WILLIAMS, B. S., "St. Genny's," 15, Kingcroft Road, Harpenden. *l, c, hem.*

1912 WILLIAMS, C. B., M.A., F.E.S., Research Institute, Amani, Tanga, and 20, Slatey Road, Birkenhead. *l, ec. ent.*

1925. WILLIAMS, H. B., LL.D., F.E.S., "Little dene," Claremont Lane, Esher, Surrey. *l.*

YEAR OF ELECTION.

1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*

1926 WOOTTON, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*

1927 DEWORMS, C. G. M., F.E.S., M.B.O.U., Milton Pk., Egham, Surrey. *l, orn.*

1921 WORSLEY-WOOD, H., F.E.S., 37, De Freville Avenue, Cambridge. *l.*

1920 YOUNG, G. W., F.R.M.S., 20, Grange Road, Barnes, S.W. 13.

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

REPORT OF THE COUNCIL, Jan., 1929.

THE Council, in presenting the fifty-seventh Annual Report, is gratified to be able to record steady progress in the condition of the Society and a satisfactory year's work.

The Membership continues steadily to increase and has now reached the record number 265, the new admissions having more than made up the losses. There are at the moment, ordinary members 259, honorary members 2, and life members 4. There have been 2 deaths, Mr. W. G. Dawson at the ripe age of 91, and Miss E. Chapman aged 83.

4 members have resigned and 6 have been taken off for non-payment of their subscription.

Again there has been an increase in the Attendance at the meetings, the average for the 23 meetings being 42.

It was pointed out to the Council that the Bye-Laws were somewhat out of date, and as a new issue was necessary, your Council considered the present a good opportunity to thoroughly revise them and to incorporate the various alterations and additions, which had been made since the last edition, 1891. A small committee was appointed consisting of Messrs. O. R. Goodman, C. N. Hawkins and C. Sperring, who were empowered to draw up a series of revised Bye-Laws and to submit them to the Council. This was done, and early in the new year it is hoped that they will be ready for submission to a special meeting for confirmation and subsequent issue. Your Council regret that Mr. Sperring has found that his business engagements do not permit of his remaining on the Council for his final years of office, and thank him for his services.

The Annual Exhibition was held on October 25th, and was a great success. The arrangements for tables, chairs and refreshment were again very kindly undertaken by Mr. O. R. Goodman, who unfortunately was taken ill and had to hand over matters to his son Mr. A. de B. Goodman, who saw that everything was carried through successfully. The thanks of the Society are due to these two gentlemen for their efforts.

Your Council regrets that the response to the appeal for support to the Refreshment Fund is in no way adequate for the expenses entailed in this necessary adjunct to the success of the evening, and points out that the funds of the Society are insufficient to bear this increasing item of expenditure.

Papers have been read before the Society by Messrs. R. Adkin (2), W. S. Bristowe, O. R. Goodman, T. H. L. Grosvenor, H. Main (2), T. A. M. Nash (submitted by the President), W. H. T. Tams and Dr. Dixey.

Owing to the difficulty of getting promises for Papers so long before they could be read, your Council early in the year decided to issue two programmes of fixtures, one covering the summer period and the other the winter session. This has been carried out.

Field Meetings were arranged at Ranmore, Chilworth, Tring, Westerham, Netley Heath, Peaslake, Lea-on-Sea (abandoned) and Bookham. It was found impossible to arrange a Fungus Foray with any promise of success owing to the dry spell of weather in the autumn. All these meetings were successful and the attendance at most of them good.

The lantern was in use on seven occasions under the kind supervision of Mr. J. H. Adkin as Honorary Lanternist.

Mr. R. Adkin was asked to represent the Society from June 6th, to 9th, at the Annual Congress of the South Eastern Union of Scientific Societies to which the the Society is affiliated, and also at the meeting of representatives of affiiliated societies to the British Association at Glasgow, September 5th to 12th.

The volume of "Proceedings" for the year 1927 was published somewhat later in the year than usual. It consists of xx+125 pages with 8 plates.

The Hon. Curator reports as follows.—

"Through the kindness of Colonel F. A. Labouchere the Society has been presented with the handsome mahogany Cabinets and Collections of Palaearctic and British Lepidoptera formed by the late Mr. J. J. Lister, F.R.S., in two 40 drawer and three 20 drawer Cabinets.

"Lord Rothschild has very kindly offered to take charge until arrangements can be made to bring them to the Society's Meeting rooms. They are at present in his private museum at Tring. We are very greatly indebted to these two gentlemen for the trouble they have taken to secure this collection for the Society, and our best thanks are due to them.

"It is hoped that the collection will soon be available for reference."

"Mr. R. Adkin has presented various species of British Lepidoptera to the Society's collections, Mr. C. Jarvis four species of British Coleoptera, and the Rev. C. E. Tottenham forty-nine species of Coleoptera which were desiderata."

The Hon. Librarian reports as follows :—

" That the books have been well used both at our meetings for reference and for home study.

" The usual entomological journals have been bound, and a start made with the binding of the long series of the ' Trans. Ent. Socy.' presented by Dr. Fremlin.

" The most important additions are Stainton's ' Natural History of the Tineina,' 13 vols., presented by Dr. G. S. Robertson, and the whole of the parts published on Diptera of the ' Faune de France,' purchased."

Your Council on behalf of the Society desires to thank the numerous donors and others who have rendered assistance in many ways during the year.

The following is a List of the Additions to the Library.

Books.—Spiders of Connecticut: Stainton's Nat. Hist. of the Tineina 13 vols. (Dr. G. S. Robertson): Bibliotica Andina: The Mutillid Wasps of America: The Fish of the Phillipines: Diptera of the Fauna of France (purchased): Asteroidea of the N. Pacific.

Proceedings, Transactions, Reports of Societies, etc.—Bolletino R. Scuola d'Agricoltura, Portici, Italy, 1927; Report of the U.S. National Museum; Proceedings of the American Entomological Society: The London Naturalist; Proc. Perthshire Soc. for Nat. Science; Bull. Société ent. de France; Trans. Entomological Society of London (Dr. Fremlin); Annales Société ent. de France; Revista Ent. Soc. Argentina 1926-7; Trans. Wisconsin Academy of Science; Trans. Leicester Literary and Philosophical Soc.; Proc. Isle of Wight Soc.; Proc. Bournemouth Nat. Science Society; Annual Rep. Smithsonian Institute.

Periodicals and Magazines.—Entomologist's Record: Entomologische Mitteilungen: Entomologist: Entomological News: Natural History (America): Phillipine Jr. of Science: Canadian Entomologist; Essex Naturalist: The Vasculum: Revu Russe: Entomologiska Tidskrift: Entomologists' Monthly Magazine (purchased).

Separates.—Address to the Entomological Society of London 1927(8): 36 items from the United States National Museum: *Argyresthia conjugella*: 8 items from Upsala University, Sweden: Evolution of Animals (Horniman's Museum): British Coccidae (E. E. Green): 12 items from the Field Museum of N. H. Chicago: 1 item from M. Janet: Report and Journal of the Footpaths Preservation Soc.: 9 items from Prof. Strand of Latvia.

TREASURER'S REPORT, 1928.

I have to record another satisfactory year showing an increase in the assets over liabilities amounting to £12 16s. 5d. as compared with 1927.

I cannot however point to as large an increase in our membership as we had then, for the total subscription income £129 2s. 5d. is down by £11 2s. 6d. and the arrears shown on the last balance sheet which I estimated should produce £10 fell short of that sum by 22/6d.

Dividends on our investments produced £29 12s. 6d. as before and we drew £2 0s. 4d. in interest on our deposit account at the bank.

Entrance fees are £2 2s. 6d. less than in 1927 and brought in the meagre total of £1 12s. 6d. only, but the amount received from the sales of our Proceedings is I am glad to say well up, standing at £6 18s. 6d. as compared with £4 19s. 4d. in 1927 and since I closed my accounts I hear that a further sum of £3 6s. 0d. is still to come in, which is very satisfactory.

These items with 13/10d. for books sold make up a total income of £170 0s. 2d. against £181 10s. 8d. for 1927.

To turn to the expenses side of the accounts, our regular standing charges are a little less than last year £57 15s. 5d. compared with £62 9s. 0d. while binding and purchase of books is a trifle higher at £4 12s. 0d. Subscriptions to Societies is the same at £1 15s. 6d., and sundries, postages, etc., £3 9s. 0d.

Printing the Proceedings cost £97 14s. 9d. which is substantially less than in 1927 but on the other hand catering and hire of chairs and tables for the Annual Exhibition cost £23 3d. 9d. against £16 16s. 0d.

These items make up a total expenditure of £188 0s. 5d. or £18 0s. 3d. more than our standing income.

Once again our very good friends have come to the rescue and with donations to the Publication Fund, including half tone blocks, amounting to £19 12s. 2d. and to the Tea fund £13 4s. 6d., have turned this debit balance into one on the credit side as already stated.

[*Continued on p.* xx.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1928.

REVENUE ACCOUNT.

Expenditure.	£	s.	d.	*Income.*	£	s.	d.
To Rent of Rooms	50	0	0	By Subscriptions :—			
,, Insurance	1	6	6	Current	97	15	0
,, Attendance	2	10	0	Arrears	8	17	6
,, Secretaries' and Treasurer's expenses	3	18	11	In advance	22	10	0
,, Catering and hire of tables, etc. ..	23	3	9		129	2	6
	80	19	2	,, Dividends :—			
Subscriptions.				On 5% War Stock	6	10	0
South-Eastern Union of S. Societies	15	0		,, 3½% Conv. Stock	8	2	6
Commons and Footpaths Preservation Society	10	6			14	12	6
	1	5	6	Deposit interest	2	0	4
Vote to				,, Donations :—			
Publication Fund	60	0	0	Tea fund	13	4	6
Library Fund	5	0	0	Balance brought from 1927	82	13	1
	65	0	0				
Balance carried forward	94	8	3				
	£241	12	11		£241	12	11

LIBRARY FUND.

	£	s.	d.		£	s.	d.
To Binding Books	1	11	0	By Balance brought forward	1	5	8
,, Books Purchased	3	1	0	,, Books sold		13	10
,, Sub. to Ent. Mo. Mag.		15	0	,, Vote from General Fund	5	0	0
,, Postages and Stationery		9	0				
,, Balance carried forward	1	3	6				
	£6	19	6		£6	19	6

PUBLICATION FUND.

	£ s. d.		£ s. d.
To Printing Proceedings	84 14 1	By Balance brought from 1927	3 18 0
,, Half-tone Blocks	13 0 8	,, Donations (including half-tone blocks)	19 12 2
	97 14 9	,, Chapman Memorial Fund	15 0 0
,, Postage	2 5 0	,, Vote from General Fund	60 0 0
,, Balance carried down	5 8 11	,, Sales of Proceedings	6 18 6
	£105 8 8		£105 8 8

ENTRANCE FEES AND LIFE-MEMBERSHIP SUBSCRIPTIONS ACCOUNT.

	£ s. d.		£ s. d.
To Balance carried forward	7 9 0	By balance brought forward from 1927	5 16 6
		,, Entrance fees	1 12 6
	£7 9 0		£7 9 0

BALANCE SHEET.

Liabilities.	£ s. d.		*Assets.*		£ s. d.
To Balance, being excess of assets over liabilities ..	783 9 9	By Balances—			
			General Fund	94 8 3	
			Publication Fund	5 8 11	
			Library Fund	1 3 6	
			Suspense a/c	7 9 0	
		,, Investments at cost			108 9 8
			£130 5% War Bonds		
			£430 5% War Stock		
			£290 3½% Conversion Stock		667 0 1
		,, Subscriptions unpaid :—			
			Good	9 0 0	
			Doubtful or bad	20 0 0	
				say	8 0 0
	£783 9 9				£783 9 9

Audited and found correct, this 21*st January*, 1929. F. B. CARR, T. W. HALL, } *Auditors.*

I think that the thanks of the Society are due to all the members who have contributed to the funds mentioned, and I should like to express my personal thanks to Mr. T. W. Hall, and Mr. F. B. Carr for auditing my figures and vouching for their correctness.

A Statement of Accounts and the Balance Sheet for 1928, duly signed and approved by these gentlemen, is attached.

South-East France.

By O. R. Goodman, F.Z.S., F.E.S.—*Read March 8th*, 1928.

There is in the life of every English collector a time when the paucity of the native fauna and the lugubriousness of the climate almost forces him to seek more prolific and happy hunting grounds, and his thoughts naturally turn to warmer and more salubrious climes not too far afield. His first thoughts are usually of Switzerland which has decided advantages, but even in that favoured spot the sun does not always shine, and this may cause him many disappointments climatically, and therefore, if I may advise, let him turn his thoughts to the shores of the Mediterranean Riviera and the Alpes Maritimes, where he is practically certain to get weeks on end of sunshine and warmth, and a most prolific fauna of all orders in the most delightful of surroundings. Each village and town from Marseilles to the Italian frontier is the centre of alluring localities, from early Spring to late Autumn, and all this within about twenty-four hours of London.

It was the memory of delightful hours spent during previous years in these districts that induced Major Liles and myself to leave London on June 4th last year (1927). We had the pleasure of the company of Mr. Hugh Dixon, F.L.S., a noted botanist, who supplied a much needed want.

Our first objective was a locality in the "Mountains of the Moors" called the Val d'Argens, which can be approached from the main line at the villages of Le Muy and Les Arcs, at which latter place we stopped.

The "Mountains of the Moors" skirt the sea from Hyéres to St. Raphael, but at no part rise more than two thousand feet above sea level. The views disclosed from their heights, both of the coast and the islands, are beyond compare, and the old villages, sometimes with a ruined castle overhanging them, present the most charming pictures. The River Argens flows down the valley on the north of the mountains into the Gulf of Frejus, but in doing so it, apparently, for no obvious reason, cuts through a portion of the mountains, forming a gorge about five miles long with precipitous sides leaving just room enough for a narrow path on the north bank; this path is little frequented and has only been known as a collecting locality for a few years. Nearly all the spring Rivieran butterflies occur in the gorge where the flora is very diverse. In April both

species of *Zerynthia* (*Thais*), *Z. rumina* subsp. *medesicaste* and *Z. hypermnestra* (*polyxena*) are abundant, as not only does *Aristolochia rotunda*, one of the foodplants of *medesicaste* occur there, but also that much finer species *A. clematitis* is most abundant amongst the undergrowth and attains the height sometimes of over two feet. The larvae of *polyxena*, however, require a careful search. The most attractive plant to the insects is the *Berberis*, whose yellow flowers cover the branches and are frequented by at least three Theclids, *Strymon spini*, *S. ilicis* and *S. w-album*. The last, a rare species on the Continent, simply swarms in the early summer. Woe betide the rash collector who tries to take them settled, as the concealed thorns, over half-inch long, will play havoc with his net. Let him instead shake the bush and net some of the crowd that are disturbed. Another very thorny plant that comes as a climber is the *Smilax*, whose thorns, though fewer, are much more formidable.

This valley is one of the localities of the rare *Laeosopis roboris*, and the grassy patches are studded with *Potentilla*, whose orange flowers attract that very local skipper *Hesperia sidae*, which flits over the flowers in its tantalising manner. These grassy glades are also the home of *Scolitantides orion*, which, in South France, is of the beautiful *ornata* variety and occurs in May.

The path wanders closely following the winding bank of the river through rough farms and meadows with row after row of mulberry trees, of which more anon. We were reclining under an enormous cherry tree and quenching our thirst with the luscious fruit, when an example of that magnificent butterfly *Charaxes jasius* flitted by, but our scramble for nets disturbed him and away he soared over the trees. We had the pleasure of getting a long view of that rare bird, the Bee-eater, whose brilliant blue and green plumage is most striking in a bird as big as a thrush.

The south slopes of the " Mountains of the Moors " skirt the sea and are clothed with areas of aromatic plants, such as rosemary, thyme, etc., and in the pine woods one frequently comes across lovely mimosa trees, whose delicate foliage and sulphur-coloured flowers scent the air for yards around.

The village of Grimaud is one of the charming hamlets and is shaded by a number of nettle trees, which in the Spring are frequented by many ragged specimens of the hibernated *Libythea celtis* butterflies busily laying eggs on the bare branches amongst the buds. A visit to this village in May introduced us to the very interesting industry of silkworm breeding, and a few words thereon will not perhaps be out of place.

In the South of France the outskirts of most villages are planted with mulberry trees, skirting each road for about a mile in every direction, mostly with the two species *Morus alba* and *Morus multicaulis* the more favoured foodplants. As one approaches in Spring one finds that the trees furthest from the village are denuded of

leaves and convey the idea that they are dead ; this is occasioned by the peasants commencing plucking the leaves at a distance from their homes and gradually coming nearer as the demand increases. At this time of year the whole population is engaged in this industry, all the available rooms, bedrooms, sitting rooms, and lofts, are cleared of furniture and a staging erected in the centre running from floor to ceiling, with cross slats at intervals. To each row of slats is hooked a linen tray upon which the larvae are reared during all their instars. The species cultivated here is *Bombyx mori*, and consists of three varieties, 1st, of a plain putty colour, 2nd, striped with brown on each segment, and 3rd, having false ocellated spots on the second segment as in *Eumorpha elpenor* ; all forms have a horn. The " worms," as they are called, are shaded from the light and are kept in sizes and moved to various trays as they grow. They are fed four times a day with fresh leaves, and cease feeding at the change of skin between each instar. The eggs hatch in May and the larvae pupate in thirty-eight days. When the larvae are full fed they become restless and are then taken to another house where similar stages are erected, but the slats are covered with small frames containing carefully prepared heather sprays cut about 9" long. The peasants sprinkle Mugwort (*Artemisia vulgaris*) amongst this, as it is said to be very attractive to the full fed larvae when pupating.

The cocoons are sold to merchants who come and buy them for transport to Lyons, the great silk manufacturing city, where they are killed by being put into a heated oven. The rough silk outer covering is removed and the silk wound from the cocoons, which are floated in water. Each cocoon winds off between five hundred to one thousand yards of raw product. Silk is sold by weight, but the finished article is very heavily weighted by being charged with a compound of lead in the finishing process.

After a very hot day (June 7th) at the old Roman seaport of Frejus, where we visited the ancient amphitheatre, which is in very good preservation, and made a round of the ramparts, harbour (now inland) and the aqueduct, we took the train to the little seaport of Agay, on the east of St. Raphael, situated at the foot of the Mountains of the Esterel. These mountains, although about the same altitude as those of the Moors, are in great contrast. The rocks are of a brilliant red coloration and of volcanic origin, whereas the Mts. of the Moors are of a greyer tint. The brilliant red in contrast with the deep cobalt blue of the Mediterranean and the sky-blue above makes this portion of the coast one of the most beautiful spots on the Riviera.

Agay is a small village in a little bay at the mouth of one of the few streams draining these dry mountains, and is a charming centre for exploring this picturesque district. There are several fine hotels, and we selected one on the edge of the cliff with walks down

to the beach (Reserve d'Agay Hotel), and found it most comfortable. We had fixed on this spot as a likely locality for the "Pasha of many tails" as he is called, *Charaxes jasius*, and on the morrow set out for its haunts, walking inland by the sides of the stream which is nicely clothed with thickets. Butterflies swarmed in the glades, especially numbers of the great brown and white *Satyrus circe*, settling on the trunks of the fir trees on which it is very inconspicuous. *Brenthis daphne* sat in such numbers on the brambles that twenty or thirty were visible at a time, and in the shade *Lycaenopsis argiolus* was common, and the *Theclidae* abundant. *Limenitis rivularis* (*camilla*) occasionally glided past just as *L. sibilla* does at home. The very dark form of *Melanargia galathea* var. *procida* was just emerging, and two specimens of *Hesperia sidae* were taken, but worn at this late date. The continental form of the Lulworth skipper (*Thymelicus acteon*) had just emerged. After crossing some vineyards we came upon a knoll with rough ground covered with bushes of strawberry tree, *Arbutus unedo*; the food-plant of *Charaxes*. There were several specimens of *C. jasius* sailing from plant to plant, but in spite of its size, 5" across the wings, we were entirely unsuccessful in taking it, to our bitter disappointment. We lunched at the foresters hut called "La Gratadis" and returned in the cool of the evening.

The Esterel seems a particularly fine locality for the cicadas: one species occurs in such numbers and the males create such a din, that when walking through the pine copses it is impossible to hear oneself speak. In these copses some numbers of *Palpares libelluloides* were flapping about like disabled dragonflies, but the larvae and pupae were absent, or at least, invisible. The allied species from other parts of the world appear to rest on the tree trunks and are wonderfully protected by their coloration.

And now for the Alps . . . . After passing a night in that delightful city Nice, with its white villas situated in lovely gardens amidst rose covered pergolas, balustraded terraces covered with climbing exotic plants of all the colours of the rainbow, we took the very overcrowded motor and journeyed up the Valley of the Var, half dry at this period, as far as Vesubie, and thence we entered the narrow branch Valley of Lantosque. The gorges through which we passed compared favourably with the most noted valleys of Switzerland or the Pyrenees; the mountains, and cliffs, and precipices, are as sheer as those of the Devil's Gorge at Andermatt, or that of St. George at Quillan.

The road has to be tunnelled and blasted out of the rocky sides and it is so narrow that the valley is entirely closed by iron gates and rails with batteries set in the rocks, as this is one of the valleys leading over the Italian Frontier.

All the old villages are built perched high on rocks above the road, for protection in the olden times against the raids of the Saracens.

There is a tramway running the whole distance to the Alpine village of St. Martin Vesubie, but the awful landslip of the previous year had rendered this track unusable. The slip was caused by a portion of the mountain side of a loose gravel conglomerate becoming water logged and sliding down into the valley, overwhelming half the village of Roquebilliére together with the road and tramway. Many people lost their lives, and the houses were smashed and swept away.

A few miles beyond Roquebilliére the Alpine village of St. Martin Vesubie is reached. This village formerly called St. Martin Lantosque, which was the previous name of the valley, appears in the early entomological books as the locality for nearly every mountain and Mediterranean species, the lists of Milliére being quite voluminous. The more modern work of Bromilow, "Butterflies of the Riviera," is more accurate and fuller of information.

The village is situated at an altitude of 3333 feet above sea level directly North of Nice at a distance of thirty six miles. Its position is at the confluence of two valleys, Val de Boreon and Val de Fenestre, which form the top ends of the main valley of the Vesubie, the water of which furnishes the water supply of the towns from Nice to Menton. There are in the vicinity thermal springs of sodium, sulphur, and magnesium natures, efficacious in the treatment of bronchitis, rheumatism, and eczema, the best known being situated at Berthemont-les-Bains.

The village of St. Martin is entirely shut in by the mountains of the Alpes Maritimes, which form the natural frontier between France and Italy, although the actual line is considerably on the French side of the watershed. The situation is entirely Alpine, the higher mountains being snow-covered during the whole year. Whilst traversing the valley from the sea it is very striking to pass from semi-tropical surroundings to the high Alps with the consequent change of vegetation, from the palm and olive groves of the coast upwards through the chestnut and pine zones to the bare Alps, and renders the scenery very varied and of divergent character.

The centre of the village contains a large square shadily planted with plane and lime trees, near the terminus of the tramway. Grouped around the square are the larger hotels, whilst the narrow streets wind up the steep gradients of the hill through the typical old buildings which almost meet over-head. It is a paradise for the artist and the photographer. The Church is finished by a golden cupola of Saracenic design, showing the influence of that race in the history of this, and in fact, all the Rivieran littoral.

The most pretty view of the town is from the bridge over the river on the Nice road.

The Hotel Victoria, at which we stayed, was situated on the outskirts of the town and opened out on to a terrace, upon which we had all our meals, and on to a rose-garden from which delightful views

were obtained of the whole of the Boreon valley, and over the flowery uncut fields to the village some half-mile away. The pillars of the terrace were covered with honeysuckle and climbing roses, which at night were frequented by *Sphinx convolvuli*, several specimens of which were taken after dinner; and the garden was frequented by many fireflies which flashed intermittently through the trees.

Our first excursion was up the Boreon Valley, along which runs a carriage road, first through fields bordering the side of the rushing stream, and afterwards over rocky ground into the larch and pine-covered slopes of the upper valley, which, as we proceeded, became narrower and narrower. One proceeds about two and a half miles upwards before the frontier is crossed into Italy by a rough bridge to the left bank of the stream. Examples of the mountain ash or rowan are studded on the banks, and the berries at this time were assuming their red colour. Shortly after crossing the frontier we mounted a hill covered with meadows, ablaze with alpine flowers, such as the globe flower (*Trollius*), aconite, columbine, buttercups, spearwort, *Dianthus*, *Umbelliferae*, and many others, and emerged upon a knoll where a view of the Boreon Cascade can be obtained. There is a good stream of water which descends 115 feet, practically sheer. The road here passes the Boreon Hotel, which cannot be used at present as it is occupied by the Italian Gendarmeri, who are now making themselves as unpleasant as possible to the French near the frontier. Italy evidently desires to recover the province as far as the Var River, which was the frontier until ceded to the French in 1860. The path proceeded to the village of Cerise, or in Italian, Cirregia, with its many cherry trees, and thence by various passes to Italy. Amongst the insects seen and taken were some numbers of a large form of *Parnassius apollo* with *Erebia ceto* and *E. stygne* (*pirene*).

To the west of St. Martin rises a perpendicular crag, one thousand feet above the town, but on the bank of the river. It is surmounted by a little village perched most picturesquely on the summit. This is a nice afternoon's walk. The main road crossed the river by the upper bridge near the wood mill and wound high above the river through fields and rocky slopes by great lacets up the slope of the crag. The prettier way, however, is from the lower village by a narrow mule bridge and thence by a zig-zag path through pretty villas and overhanging banks in which numbers of *Myrmelion*-pits were dotted about. The larvae, as is well known, use these pits to trap their victims, seizing them in their strong nipper-like jaws and sucking out the life juices. They were found in all stages of development. The full fed larva spins a silken cocoon in the dust, and thus coated with dust it resembles a small ball of earth. After a period of pupation the familiar delicate-winged imago emerges. We found the ant-lion pits commonly in the dust under a sloping rock at St. Martin Vesubie.

The path opens on the previously mentioned road at the foot of the lacets where the slopes are studded here and there with that exquisite scarlet *Lilium pomponium*, which is one of the peculiar plants of Vesubie. These cliffs and slopes are the most prolific locality for that beautiful *Papilio alexanor*, but its flight renders its capture very difficult unless visiting its food-plant, *Sesile montana*, or sucking the flowers of a purple species of thistle.

The village of Venancon is interesting for the tiny chapel built on a block of limestone rock and containing 15th century frescos; it is also more interesting as containing the only café in the neighbourhood.

During the first week of our stay the weather was broken by several storms of short duration, but it improved as time went on. One perfect morning we decided to try a little mountaineering, so starting early with guide and steeds we commenced the ascent of Le Balme de la Frema, a mountain of about 8000 feet altitude to the north. Even at that early hour the sun was very hot in the valley but was mitigated by the mountain breeze as we proceeded. The early part of the climb is up a very rocky fissure, the path eventually emerging on the Col de St. Martin, leading over to St. Sauveur in the valley of the Tinée. From the rocks rising about the path hung feather pendants of sprays of the exquisite flowers of *Saxifraga lantoscana*, one of the most delicate of the genus. The summit of the pass is wide and open with mossy turf, where a rest was welcomed, after which the path skirted along the mountain at a considerable altitude, through fir woods for a mile or so, and thence, branching upwards, we emerged upon the rolling Alps, the slopes of which are covered, in the month of July, with the star like flowers of the edelweiss in quantity, and the Alpine anemone, the vivid blue of *Gentiana acaulis* and other smaller species. The paths over these Alps are deep cut into the soil by the streams from the melted snow. The rocky summit was reached about two o'clock and the view from thence compensated for the very considerable fatigue of the ascent. After lunch collecting was commenced and the objects of the excursion were found in abundance and perfect condition. The first was that striking mountain fritillary, *Melitaea cynthia*, the males of which are black with white markings, the females somewhat resembling *aurinia*. They were taken flitting about in the grass gulley running up between the two mountain tops, and settling on the leaves of *Gentiana lutea*. The other object was that high mountain butterfly *Oenis aëllo*, which frequented the stony summit of the Balme de la Frema, and were flying very commonly and in lovely condition. The insect is much like *Satyrus semele*, "the Grayling," both in habits and coloration. The genus, which is chiefly arctic, is considered one of the earliest existants of archaic form. The other species was *Euchloë belia*, very typical, but flying very fast

like *Synchloë callidice*. The view from this summit is one of extreme beauty, with the range of snow clad peaks of the Alpes Maritimes stretching along the entire horizon in a setting of the exquisite blue of a perfect southern sky studded with feathery clouds, and the green of the Alps and the valleys below clothed in the dark green of the pine forests. The descent was far more tiring than the ascent, and we arrived at our Hotel thoroughly fatigued.

The last excursion to be made was to the Pilgrim Chapel of Madone de Fenestre at the head of the valley to the N.E. and situated 6200 feet above the sea, which necessitated a continual climb for three miles, at times very rough. How an old peasant pilgrim woman we met could walk bare-foot for this distance over the steep and stony path is incomprehensible.

The valley branches from the Vesubie Valley in a N.E. direction and one mounts along an open pasturage for about one and a half miles to a place where a landslide has blocked the valley, thus forming a small lake which is surrounded by broken trees and other debris.

The pastures are alive with insect life and it is most interesting to watch the Ascalaphids of several species hawking with outspread wings over the grass and swooping on some less speedy insect and seizing it to bear away to a twig to consume at leisure.

Ascalaphus.—The genus *Ascalaphus* was well represented at St. Martin Vesubie. By far the commonest species was *A. ottomanus* which flew in hundreds in the Valley of the Madone de Fenestre. This species it will be remembered, was reported by us from this locality in 1921 ; its previous known range then being Dalmatia to the Black Sea. The late Dr. C. L. Withycombe exhibited some of our 1921 specimens at this Society, but unfortunately, owing to some misunderstanding, these were described in the 1921 "Proceedings" as coming from Digne.

The other species noted were *A. libelluloides* (*coccajus*), which is apparently nearly related to *A. ottomanus*, and *A. longicornis*.

Ascalaphus ottomanus.—The forewings are slaty blue with brownish dusky markings. Hindwings pale slaty blue with brownish dusky markings towards the tips and the *black basal area is rounded*. The antennae straight and knobbed.

Ascalaphus libelluloides (*coccajus*).—The forewings brownish with yellow, or more rarely, white basal areas. Hindwings yellow, or more rarely, white with brownish markings towards the tips. The black basal area pointed, being roughly triangular. The antennae straight and knobbed.

Ascalaphus longicornis. —Smaller than the preceding species. The forewings rich golden with black dusting basally. Hindwings golden with the black basal area rounded, and with black crescent-shaped markings at the tips. This feature has been noted by us on several occasions, and we should be glad to know if this is a constant

character of the species. All specimens, as far as we can recollect, have had this character.

Of the life-history of this genus little apparently is known. Mr. Main once induced a female to lay eggs on a blade of grass, but the young larvae on hatching refused to feed. Professor Poulton exhibited the living larvae of some African species at the Entomological Society; they are carnivorous, flat, bug-like creatures with strong nippers, thus resembling the larvae of *Myrmeleon formicarius*. They are said to live on tree trunks exhibiting marked protective resemblance. The larvae exhibited by Professor Poulton resembled lichen patches. These specimens, we believe, are now in Mr. Main's charge, so perhaps we may hope to hear further details from him at a later date.

As we left the outskirts of the village we saw several specimens of *Polygonia egea* closely allied to our *P. c-album* butterfly. Mr. Simmonds, of Nottingham, whom we met at St. Martin has since bred through a series from eggs obtained here, and has found that the result produced specimens of both the typical *egea* and a lighter form analogous to the var. *hutchinsoni* in *Polygonia c. album*.

The upper end of the valley is a jumble of rocks amongst the fir woods with Alpine knolls ablaze with flowers of all colours, the yellow *Trollius* or globe flower being very conspicuous, and the woods dotted with bunches of the large orange tiger-lily.

At the frontier a large and very fierce green lizard was secured under a rock and was duly dubbed "Mussolini."

The upper gradients are severe and the Chapel is placed amongst wild and bare mountains covered with snow. This is the spot from which hunters start after chamois, which can sometimes be observed from the Hotel. The name Fenestre is due to a hole through one of the mountains, visible from the path, which is the window referred to in the name.

After our visit to Vesubie was finished we travelled by the Sud Railway for the whole day at a snail's pace up the valley of the Var, past Touët de Beuil, above the road, and Entrevaux with a 17th century Castle with ramparts and drawbridge complete, arriving at Digne at last. Digne is too well known as the Entomologists' Paradise to require description. The following are a few notes on specimens obtained there.

The larvae of *Melitaea didyma* feeds on white dead-nettle, and, they are very like those of *M. athalia*. The pupa of *M. didyma* was suspended on a lavender twig. It is white with yellow and black markings, and hangs head downwards.

A large yellow and black dragonfly, species (?), was taken in the Valley of the Eaux Chaudes, Digne, flying over a layer of mud at the side of the stream; from time to time it would fly up and down vertically, plunging its abdomen into the mud, the body during these vertical movements upwards being curved towards

the thorax. These evolutions enabled its capture, and the specimen is now in the possession of Major C. E. Liles. It is thought that perhaps the specimen was ovipositing, but a careful search in the mud revealed no eggs.

A specimen of a large Cicada, *Cicadetta atra*, with body shiny reddish brown was found frequenting oaks in the Dourbs Valley, Digne. These insects usually lie flat along horizontal twigs.

A small black scorpion, *Scorpio europaeus*, was found not uncommonly under stones round about Digne.

A large species of spurge grew commonly in the valleys at Digne and numbers of *Deilephila euphorbiae* larvae were found feeding upon it; sometimes as many as 7 or 8 larvae on one plant.

After a pleasant week there we motored through that very interesting portion of Provence given over to the cultivation of almonds, peaches, etc., which are grown on a high plateaux of yellow sand. We arrived about mid-day, after a steep ascent, at the Hotellerie de la Sainte Baume, situated about twenty miles due west from Marseilles.

The chain of Ste. Baume attains a height of 2800 feet, or a little more, and the formation is somewhat curious. The southern flank is practically precipitous so that the Hotelliére can only be approached from the west or north. It is situated upon a ledge or terrace extending the whole length of the mountain at a height of about two thousand feet, which is called the Plan d'Aups. The slope between this plain and the mountain is entirely covered with a very fine and extensive forest pierced with drives in many parts. The foliage is very thick, and in these glades and on the edges of the wood great numbers of butterflies abound. *Dryas paphia*, *Argynnis cydippe*, and *Satyrus circe*, being the most common, whilst on the edges quantities of *Polyommatus dolus* ♂ and ♀ with its var. *vittata* flitted over the lavender, and in the rougher ground *Polyommatus coridon* var. *constanti* was not uncommon.

There were great fields of lavender bushes planted on the plain, delighting the eye and scenting the air, amongst which *Gonepteryx cleopatra* swarmed.

The northern edge of the plain consisted of a curious flat rocky formation which was fissured in every direction and could only be crossed safely by one of two paths. All this part of the plateaux was clothed in shrubs and undergrowth, and was the haunt of many of the rarer species. *Argynnis hecate* was going over, but solitary specimens of *Laeosopis roboris*, *Strymon quercûs* and *Satyrus briseis* were taken. This edge was bounded by a sheer precipice of about two hundred or three hundred feet, giving a wonderful view to the north of the Valley of Ste. Zacharie and the ruined castle of old Nans.

The Hotellerie, apparently an old Monastery, is towards the eastern end of the plain with a steep path through the wood to the sacred

grotto in the precipice above. The Grotto is a few hundred feet above the Hotel and two hundred feet under the summit. The front is built up to form a natural rock chapel in which the Pilgrims' services are held. Upon the summit of the mountain exactly over the Chapel is another, from which point the whole of the country as far as Marseilles with the blue Mediterranean in the back ground can be seen. It may be of interest to recount the Legend attached to this point. . . . .

Mary Magdalen after the Crucifixion, together with her sister Martha, and Lazarus, and other Christians, were so persecuted by the Jews that they were forced to flee the Holy Land and were compelled to launch in a crazy little ungovernable craft. However, through God's goodness they were guided through endless trials and perils until they were driven on the Rivieran shore near Marseilles, from whence they were transported by angels to the mountain of Ste. Baume, where Mary took up her residence in the Grotto, and lived in penitence and privation, during which time she was transported by angels seven times a day to the height above where the upper Chapel of St. Pillon is erected. Her death took place at Ste. Zacharie, thirty-three years after her landing.

As an Hotel, the Hotellerie has little to recommend it. Everything was slipshod, and the meals the worst we have ever had in France. This we bore for a week, but fish on Friday, and little enough of that, broke the camel's back, and we retreated with all the haste we could on Saturday for Marseilles.

However, as a collecting ground, and beauty spot, it has few equals, and the many opportunities of entrancing studies of life-histories compensated for the other drawbacks.

At Ste. Baume another species of Cicada was met with, *Tibicina haematodes*, frequenting the pine forests. It is much smaller than the preceding species. *Lycosa narbonensis*, the black bellied Tarantula, was common on the Ste. Baume plateau. Our observations on the ovi-position have been reported at this Society at a previous meeting. On one occasion we found a small dead lizard in a burrow, but whether this was actually killed by the tarantula which occupied this particular pit, we are unable to say.

Facts and Fallacies about Spiders.

By W. S. Bristowe, B.A., F.Z.S.—*Read March 22nd*, 1928.

I am used to being looked upon as an oddity by my friends for collecting spiders, though why an interest in spiders should be regarded as something rather degrading when no similar stigma attaches to Lepidopterists I cannot see. The green butterfly-net has perhaps accustomed people to Lepidopterists, whilst I, except when armed with a sweeping net or beating tray, look a fairly normal being, I believe, acting in a strange way—clawing up grass with my nails, peering for hidden treasure under bushes or wrestling with stones on hillsides. Last summer I was endeavouring to trace the range of a spider, *Pholcus phalangioides*, which is found in houses along the south coast only. To do this I sought excuses to enter garages, hotels or other buildings and then walked from room to room staring at the ceiling. Perhaps there is some excuse for people who look at me doubtfully and discuss me in whispers after all. In the Louvre in Paris I once nearly got into serious trouble. When I was standing admiring a picture I suddenly became aware of a small spider hanging by a thread from my hat. I whipped out a tube of spirit and almost instantaneously was beset by two gesticulating custodians, who apparently thought I was going to throw vitriol over one of the art treasures.

" Some books are lies frae end to end," says Burns.

I won't go so far as to say that this statement could be applied to books on spiders, but many of the observations of early writers are tempered with considerable imagination, and it is an undoubted fact that many common beliefs about spiders are quite untrue.

Fallacies about spiders are very frequent both in books and in people's minds. These fallacies may be classified as follows :

Those due to (1) ignorance, (2) imagination, (3) generalisations.

I propose to give you a few examples of each kind.

1. Ignorance.

In the introduction to his valuable book entitled " The Spiders of Dorset," the late Rev. O. P. Cambridge, says that a friend told him he knew of four kinds only—the Red Spider; the Harvest Spider; the Garden Spider; and the House Spider. This answer shows a very common misconception, not only as to the number of species, but also as to what is really a spider. There are more

than 550 kinds in this country alone, whilst the Red Spider and the Harvest Spider are not spiders at all, the former being a Mite, the latter a Phalangid.

A very common misconception is that a spider is an insect, but as you all know, the spider belongs to the class Arachnida and can be distinguished from insects by a number of characters. The spider for instance, has 8 legs, two parts to its body, no antennae, simple eyes and undergoes no metamorphosis.

That spiders have jaws and poison sacs is certainly a fact, but that they will deliberately bite man is a common fallacy. All spiders will open their jaws if there is no means of escape, but even then very few British species could pierce the human skin. It is still doubtful to what extent the bites of tropical spiders are poisonous to man, but that the effects in many cases have been exaggerated, and that the bites of scorpions or other creatures have often been attributed to the spider, is certain.

From time to time friends who have lived in Eastern countries give me exciting accounts of battles staged between spiders and scorpions. It appears that in most cases, however, the spiders referred to are not true spiders at all, but belong to the order Solifugae. These Arachnids are very spider-like but may be distinguished by their segmented abdomens and chelate jaws.

2. Imagination.

We all know the kind of stories told by fishermen, and the fallacies coming under this heading might be called, "Fishermen's Tales." They are, alas, only too numerous in spider literature.

Legends from tropical countries of "man-eating" spiders must be referred to various forms of land crabs and, as a rule, to the giant Hermit Crab, *Birgus latro*, which lives in coconut trees. The capture of birds by some tropical spiders must be looked upon as a rare occurrence, but a whole sub-family are popularly known as "Bird-Eating Spiders." These spiders are mainly nocturnal in habits and their snares seldom consist of more than irregular strands of silk at the entrance to the burrows in which they live, so their opportunities for capturing birds must be rare—perhaps their nocturnal wanderings sometimes bring them in contact with sleeping birds.

An English spider, *Dolomedes fimbriatus*, is known as the Raft Spider because it is said, it fastens leaves together to form a raft on which to float down streams. This spider is certainly always found near water; it is quite at home on the surface and can dive beneath the surface, but from my experience of it I can state that it does not build rafts. There are records of this spider and also its foreign relations diving beneath the surface to capture prey, and in some cases fish. Whether this is another "Fisherman's tale" I am unable to say.

Many writers on insects, and spiders also, have credited them with a high proportion of intelligence, but critical examination always shows, unfortunately, that their actions are governed mainly by instinct. What marvellous instinct different spiders inherit to enable them to build their various types of snare, their trap-doors on hinges and their parachutes!

At one time it was believed that spiders could effect marvellous cures as medicine, and one prescription at the beginning of the 19th century was, "swallowing a spider gently bruised and wrapped up in a raisin, or spread upon bread and butter." I hardly like to assert that the belief in this prescription was unfounded, as I feel sure a dose of this sort three times a day would effect rapid cures with some people even to-day!

3. Generalisations.

Literature on spiders contains a great amount of misleading information regarding the habits of spiders, observations on one species or perhaps one family being applied to spiders as a whole. My observations on the courting habits of spiders have shown me me that every species has its own little peculiarities. Some males court by means of dances, or a better description would be displays; some by telegraphic signs along the threads of the web; others by what is sometimes known as "cave-man" methods in spite of their inferior size. Some males will only approach if the female is already eating an insect, for instance *Meta segmentata*, whilst *Pisaura mirabilis* presents the female with a fly as a wedding offering. That females always eat the males is a very common fallacy, based perhaps partly on the behaviour of the common Garden Spider, *Epeira diademata*, where the courtship would appear to be fraught with considerable danger. The fact is that once the female spider has recognized the male he is comparatively safe, but it is up to him to arouse her sexual instincts to a pitch at which they dominate her preying instinct. After copulation has taken place her preying instinct is of course once more dominant, so wise is the male who beats a hasty retreat. Similarly towards the end of the mating season his danger increases. The supposition that the male is always killed is based largely on the sudden disappearance of the males. In actual fact, though many may perish at the hands of the female, many others die a natural death as once they reach maturity the lives of the males are in most families relatively short.

Certain instances are sometimes cited of species in which the sexes live together in apparent harmony for considerable periods. One of these is *Meta segmentata*. In September, 1926 I kept, a number of these pairs under observation. I marked 10 males and found that after 4 days only one was in the same web. Thus even in this apparently monogamous community the males are unfaithful

to their wives! After copulation has taken place the male leaves the female's web and goes in search of another. If another male is in possession a fierce battle ensues which results in one or other of them being driven away.

Very few investigations have been carried out on the spider's prey and sense of taste, and as this is an example of a generalisation and fallacious assumption that spiders will eat anything small enough for them to overpower, I propose to deal with this at some length.

Spiders eat flies, they devour one another and sometimes in the tropics capture birds—such are the facts of which most people are aware, but even the knowledge of experts does not extend very far beyond this. From books one usually gets the impression that spiders will eat any living creature which they can overpower, and that apart from this little or no discrimination is used.

Spider collectors in an endeavour to find some useful purpose fulfilled by spiders, have sometimes asserted that they destroy enormous quantities of harmful insects, but their assertions have never been backed by statistics to show that useful forms do not meet a similar fate. From time to time spiders have been included by zealous entomologists in lists of the enemies of some particular insect pest, but there is no published information to support this contention that any spider shows specialization as regards its prey.

The habits of different kinds of spiders will affect the nature of their prey considerably. First of all, dividing spiders roughly into two groups, web-builders and hunting spiders, it is clear that if we show spiders to have powers of discrimination, the hunting forms will have more opportunity of exercising their taste of preference than web-builders, which can only select from amongst those insects which become entangled in their snares. Secondly the habitat will play a large part in deciding what selection of insects each species of spider is likely to have. Thus the web of an Epeirid spider built amongst flowers will entangle flying insects whilst a spider which lives in banks or under stones, such as *Dysdera*, *Segestria* and *Drassodes*, will be in contact mainly with crawling insects such as beetles, earwigs and woodlice.

I propose first dealing with the size and then the nature of the prey of spiders.

Size of Prey.

I have already referred to Bird- and Fish-catching spiders. There are records of spiders found devouring snakes, but it is probable that they were not responsible for their deaths. On lizards I have myself fed some of the large South American Mygales.

The size of prey taken by an individual spider varies at different ages and with different degrees of hunger. It may also be laid down as a general rule that web-builders will attack relatively larger

creatures than hunting spiders, which have no silken threads to assist them in entangling their prey. This general rule has many exceptions as some of the web-builders are arrant cowards and some of the hunters will attack insects considerably larger than themselves. The size of an insect is gauged by means of sight in the family *Attidae*, *Lycosidae* and *Pisauridae*, and by touch and sight in other hunting spiders; web-builders judge both the size and also to some extent the nature of an entangled insect by their sense of touch.

Attention, so far as I know, has never been called to the fact that the webs of Epeirid spiders are within broad limits designed to catch insects up to a particular size only. The Garden Spider, *Epeira diademata*, builds a strong symmetrical sticky web. It is capable of retaining large insects for a long enough period to allow the owner to reach them and swathe them in sheets of silk to prevent their breaking free. I have seen adult individuals catch wasps, honey-bees, and even bumble-bees. The Lesser Garden Spider, *Meta segmentata*, does not build either such a strong or such a sticky web relatively and the relative size of prey is not so great. Insects are sometimes refused on account of their size by adult* individuals. The spiders belonging to the genus *Tetragnatha* are long-legged and thin-bodied spiders which live for the most part near water where a somewhat flimsy snare is constructed. Here flies, especially Nematocera, are abundant and these form the staple diet of the genus. I have seen both *Tetragnatha* and *Meta* drop an inch or so from their webs to catch a passing insect, and the Rev. O. P. Cambridge recorded a similar observation in "The Spiders of Dorset." *Epeira umbratica* is a large spider which makes a large orb web composed of threads, which are probably stronger and stickier than those of any other British Epeirid. The value of this is found when we come to study the habits of the spider; it is a nocturnal species and the threads are capable of retaining, in spite of their struggles, a good proportion of the insects which once come in contact with it. The insects which are caught will vary according to the situation of the web and also the time of year. One evening in March, 1921, I counted 187 nematocerous flies (mainly Chironomids) in a single web situated in a garden at Cobham. Mr. O. W. Richards has very kindly shown me quite a number of prey records he has made for this species, and these bear out my view that the food of this species consists mainly of small insects. His list includes a number of beetles, a few bugs and a few hymenopterous insects, but with the exception of aphids which were abundant on certain occasions, the majority of these records include such entries as:

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* I should like to stress the word "adult" as immature spiders may not capture such big insects relatively as the adult forms.

" Prey mostly gnats 9/5/24, 29/4/24, 8/5/23.
Mostly gnats and aphids 22/6/23.
Bibio marci very abundant 16/5/24.
abundant 9/5/24, 21/5/23, 18/4/26.
fair 13/5/24.
Chironomids and Sciarae 18/4/26.
Mainly Chironomids 15/10/25.

The nature of the prey will naturally vary with the locality and the season.

An interesting point is that the young of *Epeira umbratica* are sun-lovers and on sunny days they bask in the sun and run with rapidity after any insect which touches the web.

The House Spiders (family *Agelenidae*, genus *Tegenaria*) do not appear to be frightened on the score of size. Their sheet webs are not sticky but entangle the feet and impede the escape of insects which have fallen on to it, whilst the fleet-footed owner is carrying on a running battle and inflicting rapid bites at its adversary. I have seen a *Tegenaria parietina* overcome a sleepy Queen Wasp, and recently, whilst looking through the diary of the late F. M. Campbell, I noticed an entry to the effect that he had seen *T. derhamii* kill and eat a cockroach.

The genera *Amaurobius* and *Dictyna* both belong to the family *Dictynidae*. The former are fairly large spiders and the latter small; both build irregular sticky webs and will attack insects larger than themselves. The normal diet of *Amaurobius*, judging by the remains, appears to consist largely of beetles and woodlice, but *Amaurobius similis* killed a bumble-bee and also the formidable larva of *Ocypus olens* which I threw into its web. The webs of *Amaurobius* are in walls, banks and tree trunks. *Dictyna* webs are to be found in rush, gorse, heather and other flower heads and here a wider range of insects are captured. Taking the size of these spiders into account relatively large insects are captured such as Bluebottles (*Calliphora*) and Syrphids (*Volucella*, etc.).

In contrast to *Dictyna*, spiders of the family *Linyphiidae* capture for the most part only small insects. This family contains the minute shiny black-bodied spiders and also the somewhat larger forms belonging to the genus *Linyphia* and allied genera. They build sheet webs on the underside of which they run about, and they bite insects, which fall on to it through the web. In spite of there being a web between them and any intruders, they will commonly allow those which approach themselves in size to escape. Small flies appear to be the main diet of *Linyphia* and the allied genera, whilst I have often found Collembola being eaten by the small black forms which live mainly at the roots of herbage.

Of all the web-builders those which belong to the genus *Theridion* fill me with the greatest admiration. They are round-bodied forms with thin legs and diminutive jaws which spin snares of irregular

threads crossing one another at all angles. They will attack and overpower intruders, often many times their own size and weight, in spite of their delicate appearance. *Theridion tepidariorum* is a common species in greenhouses. No insect is too large for it to tackle, and I once watched a long battle between one of them and a relatively enormous adult *Tegenaria atrica*, which I had placed in its web. The mode of procedure is always the same—viscous threads are thrown with the hind legs over the legs of the prospective prey and then each leg in turn is rendered powerless by a bite before the *Theridion* approaches to finish it off. *T. pictum*, which is a small species commonly to be found on Holly, Gorse and other shrubs, is no less intrepid and I have found them in the act of devouring such relatively formidable insects as Soldier Beetles (*Telephorus*), Bluebottles (*Calliphora*), Syrphids, May-flies and Queen Ants. The webs of different individuals of this species are commonly connected, and the struggles of a large insect will often attract the attention of several neighbours. Sometimes two individuals will throw viscous strands over the same insect at the same time and then struggle in apparently bloodless battles* for possession. On one occasion a third individual decamped with the booty whilst the contestants were occupied in sparring with one another.

A third common representative of the genus *Theridion* is *T. lineatum*. This species does not build so large a web as those of the preceding ones, yet I have often found it in possession of such relatively large insects as Bluebottles. I have also found it devouring a Carabid beetle (*Harpalus*), a Syrphid fly (*Eristalis*) and a large *Anthomyiid* fly. The webs are often built amongst grass, brambles and low herbage. Sometimes they are built just beneath flower heads such as that of Ragwort and various Umbelliferous plants. The spider's attention is immediately drawn to any insect which touches a thread and viscous threads with very little delay are thrown over its legs or wings. I have watched several lengthy battles with Bluebottles (*Calliphora*) all of which resulted in victory, in some cases after nearly an hour's hard work.

Now let us come to the spiders which do not catch their prey by means of snares. These have to meet their prey on level terms, so that the capture of bulky or formidable insects is a more precarious affair, and taken as a whole the size of their prey is relatively smaller than that of the web-building types. Though there must be exceptions it may be stated that the main diet of the *Attidae* and *Lycosidae* consists of relatively small insects. I have seen a *Salticus scenicus* stalk and catch a house-fly and *Marpessa muscosa* devouring a bluebottle (*Calliphora*), but these instances do not affect the general rule. The most enterprising hunters are certain members of the Crab Spider families, which in most cases lie in wait for unsuspecting insects, and when an opportunity occurs

* Probably because they are of the same size and very evenly matched.

bury their fangs in some vital spot such as the back of the insect's neck. Common examples in this country are *Xysticus cristatus* and *Misumena vatia*. I have found the former devouring ants, and seen one almost carried away on the back of a relatively enormous blue-bottle, whilst it is a not uncommon occurrence to find the latter sitting in a flower sucking the juices of a luckless honey-bee. *Thomisus onustus* is another British Thomisid which will capture bees when an opportunity occurs; in Spain I once stalked a butterfly (*Colias croceus*) sitting on some heather only to find that a pink variety of this species had forestalled me. *Heteropoda venatoria*, a large crab-spider of the family *Heteropodidae*, which is frequently imported into this country with bananas from warmer climates, is said to devour cockroaches, and an interesting case of its audacity has recently been brought to my attention by Dr. R. S. Taylor, whose notes on an observation he has made on this species in British Somaliland have kindly been handed to me by Dr. Hugh Scott of Cambridge. Dr. Taylor found an immature male *Heteropoda* in possession (if we may describe it thus) of a large grasshopper. The body of the spider was 30mm., while that of the grasshopper, which has been indentified by Dr. Uvarov as *Thisoecetrus littoralis*, Rambur, ♀, was 34mm. from front of head to end of abdomen, or 41mm. from front of head to end of tegmina and wings.

Dr. Taylor writes as follows: "When I first saw this pair they were on the floor of my office with the grasshopper apparently in a normal resting position and close to its side the spider with all its legs thrown back. At first I thought the grasshopper happened to be resting close to a dead spider, but as I approached to look more closely the hopper sprang a distance of about ten inches carrying the spider with it, and then sprang twice more about the same distance each time. The spider now altered his tactics and ran about six inches up the wall, but while a glass cover was being fetched dropped to the floor and again threw his legs back.

"I am wondering if the spider was afraid of having some of its legs kicked off and apparently preferred the risk of having its jaws torn out."

The strength of the grasshopper and the obstinacy of the spider which refused to be shaken off even by three jumps in quick succession of close on ten inches, are of considerable interest. The attitude of the spider with its legs thrown back is a common one amongst crab-spiders after the capture of an insect. They rely very largely on their legs to capture prey and, once captured, this wise instinct to throw back their legs out of danger from bites and stings of their adversaries has been evolved.

Mr. G. L. R. Hancock has recently sent me a fine crab-spider from Uganda. The body of the spider measures ·75 inchs., and he tells me that he found it devouring a large Praying Mantis which measured quite 3 ins. in length. This is remarkably interesting,

as not only is the Mantis a very formidable opponent, but also the mode of capturing its prey is very similar in this group of insects to that of the crab-spiders themselves. Both lie in wait with powerful arms outstretched ready to seize in fatal embrace any unwary insect which approaches. The spider is *Platythomisus insignis*, Poc., and the Mantis has kindly been identified by Dr. Uvarov as *Polyspilota aeruginosa*, Goeze.

Drassodes lapidosus is one of our commonest spiders under stones and yet very little is known about its habits. It is one of the fiercest of spiders, and will attack other spiders as big as or bigger than itself. The manner in which it attacks its prey is, I believe, unrecorded. Small insects it simply seizes in its jaws, but larger insects are treated in a different way. The *Drassodes* inflicts a rapid bite and then curling its body round and keeping it as far as possible away, either runs rapidly around its adversary trailing a thick band of silk, or in some cases over and under it, thereby entangling the insect securely. The *Drassodes* then stands aside and waits for the poison of its bite to take effect. Presently it taps the insect and if it is still vigorous another rapid bite is inflicted followed by a further pause; when it is judged to be no longer dangerous it plunges its jaws into it and commences its meal. I have seen *Drassodes* overpower such formidable spiders, of the same size as itself, as *Tarantula barbipes*, *Coelotes terrestris* and *Amaurobius similis*.

Nature of Prey.

When we come to consider the nature of the prey of different spiders we immediately come up against serious difficulties. How can we decide whether a particular insect is rejected as being unsuitable by the spider's sense of sight, touch, smell or taste? In all families except the *Attidae* and *Lycosidae*, sight is used only to a very small extent. With web-building forms the sense of touch is of great importance, and some creatures which become entangled in the web are rejected without the owner of the web ever having left its retreat. By touching an insect a spider can gain a very good idea of its nature, but by rejecting it at this stage it will leave us uncertain as to whether it was distasteful to the tactile or olfactory senses. The Epeirids and Theridiids usually wrap web around their prey before biting it, so that here is something on which we may base conclusions as to the sense involved in the event of rejection.

Spiders are confirmed cannibals, as is well known, and stories are told of mature individuals being reared on no other food than their brothers and sisters. I have, I believe, found two British spiders which refuse to catch even small spiders, namely *Thomisus onustus* and *Misumena vatia*. Both these spiders live in flowers and are therefore accustomed to flying insects. *Drassodes lapidosus* is a

fierce spider which lives under stones and feeds on creeping insects. This spider does not like flapping insects like moths and butterflies. It would appear as though these spiders have become accustomed within fairly wide limits to a particular kind of prey. Spiders of the family *Mimetidae* are pirates which are said to feed exclusively on other spiders, and a N. American species *Mimetus interfector* is said to enter the webs of *Theridion tepidariorum* to destroy the owner. In this country the family is represented by three unobtrusive small spiders. Last autumn at Cobham I was lucky enough to find the rarest of the three, *Ero tuberculata*, sitting in the web of a *Theridion pictum* and devouring the owner! Gerhardt records that he has found spiders of the genus *Ero* devouring other spiders in Germany also, so it appears to be a characteristic of the family, though to what extent they restrict their attention to spiders is not definitely known. Gravely (*Rec. Ind. Mus.* Vol. XXII. Pt. IV. p. 419) records his observations on an Attid spider, *Zinus* sp., which enters the webs and destroys Pholcids of the genus *Smeringopus*. He tells me he has found an allied species devouring the web-building Pisaurid, *Euprosthenops ellioti*.

Generally speaking, spiders are thirsty creatures and in captivity deaths from lack of moisture must be far more frequent than from hunger. The requirements of different species varies enormously and some such as *Steatoda bipunctata* and *Tegenaria* will live for many months in sealed tubes, whilst others such as *Argyroneta*, *Micromatta* and certain species of Lycosid will die if kept under similar circumstances within a relatively few hours' confinement.

From the few experiments I have carried out on the sense of taste in relation to vegetable diet, it appears that though spiders will sometimes suck fruit, juices, etc., for short periods for the sake of the moisture contained therein, they will not on the whole tolerate such a diet. The intensity of their dislike varies considerably in different species, and in fact throughout all experiments on taste generalisations are dangerous.

A blackberry pip flipped in to the web of an *Epeira diadematа* resulted in one case in rejection and in another to its being sucked for several minutes. *Theridion pictum* refused a fleshy piece of raspberry while *Linyphia triangularis* sucked it for a time. Plum was refused by *Epeira diadematа*. Tiny pellets of cotton wool soaked in beer and other forms of alcoholic drink were refused by *Meta segmentata*, *Zilla X-notata*, *Theridion pictum* and *Linyphia triangularis*, and it is probable that all spiders are teetotallers. Pellets of quinine, tea, milk and sugar solution offered to the same species in similar fashion were rejected, while white coffee though rejected by *Theridion lineatum* and *Amaurobius similis* was sucked for a considerable time (half an hour or more) by *Zilla X-notata* on three occasions. *Epeira diadematа* and *Meta segmentata* both sucked pellets soaked in camphor solution for short periods and then showed discomfiture.

It was stated by Simon that *Atypus* feeds mainly on Earthworms, but recently this has been denied by Berland who says that they rely entirely on insects which traverse the aerial portions of the tube. That they *will* eat earthworms I have proved by experiment, and have found that *Epeira diadematа* will do so also. No doubt the staple food of *Atypus* does consist of insects and their remains testify to this.* Enock found the remains of various bees, *Andrena* and *Nomada*, the Tiger Beetle, *Cicindela*, and various Muscid flies. Later in the year he found the remains of Earwigs and Woodlice. He does not infer that the spider showed any preference or that the Woodlice and Earwigs were rejected in times of plenty, but, from my observations on other spiders it seems quite likely that such does take place. Woodlice are not very popular and it would appear as though spiders neither like their smell nor their taste. When woodlice are present under bark or stones spiders are usually absent. Their remains are to be found in the nests of *Dysdera*, *Segestria* and *Amaurobius*. On one occasion I placed a woodlouse in the web of an *Amaurobius similis*, but after touching it the spider retreated, so it appears likely that they are only taken by *Amaurobius* in times of scarcity. *Linyphia triangularis*, *Theridion sisyphium* and *T. pictum* refused woodlice. The usual procedure in the case of the *Theridion* is to touch the woodlouse, bind it up if it struggles, bite and then retire. Renewed struggles result in the spider repeating these actions, but it cannot be persuaded to eat it. In some cases the woodlouse was cut out of the web by the *Theridion*. *Epeira cucurbitina* will eat woodlice without hesitation.

Many spiders will refuse to attack Hymenopterous insects, including ants and forms without stings such as Ichneumons, Braconids and Chalcids. The case of ants is difficult and somewhat conflicting, so perhaps the reception given to different kinds varies. The two families which appear to eat them most readily are the Theridiids and Thomisids. I have seen the webs of a Brazilian spider, *Latrodectus geometricus*, filled with the empty corpses of the Saüva ant. I also saw a Thomisid and a Theridiid (*Lithyphantes*) eating ants in Brazil. In England I have seen *Xysticus cristatus*, *Theridion sisyphium* and *T. pictum* eating ants. The last named species will sometimes only make half-hearted attempts to capture the ants which are placed in its web. Various Linyphiids (*Linyphia triangularis*, *L. pusilla*) and Epeirids (*Epeira diadematа*, *Meta segmentata*) refused ants after running out to investigate them. *Epeira cucurbitina* bit a *Lasius niger* and then ran about frantically wiping its chelicerae on the edge of leaves. A similar incident was observed by Mrs. Collings of Sark many years ago, but in her case the spider was *Tegenaria atrica*. Presumably formic acid from the ant is responsible for this.

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* "Trans. Ent. Soc." 1885.

Ladybirds fall victims to some spiders, whilst others will refuse to attack them. A *Scotophoeus blackwallii*, which I had had in captivity for several days, refused a ladybird but accepted a small moth immediately. Ladybirds give out an odour which is in all probability repellent to some spiders and not to others. I have found *Epeira diadematа* and *Theridion pictum* eating ladybirds. Opilionids (harvest spiders) also give out a secretion when attacked, the smell of which in some species is clearly discernible. Some spiders will eat them whilst others will not. In Brazil I found that a *Gonyleptes*, which emitted a strong smell, was refused by a Diplurid and a Lycosid spider. In this country I have often seen Opilionids refused both by web-building and by hunting spiders. I have found *Xysticus cristatus* eating a young harvest spider and *Epeira cucurbitina* accepted rather unwillingly two species, one a very young *Linobunum*, the other an immature *Oligolphus*. An *Amaurobius similis* was amongst the spiders which sampled and refused an Opilionid.

Greenfly are not popular insects so far as spiders are concerned. *Theridion pictum* for instance, will leave them alone after half completing the "wrapping" process, but so long as it continues to struggle the spider will respond to its instinct and return again and again until eventually in some cases it ends in devouring it. On some occasions I have seen this spider eat a greenfly without any delay, and this presumably occurs when the spider is hungry. Miss A. B. Sargent tells us* that she fed her captive *Agelena naevia* on Aphids: "At first these spiders were all fed on aphides which they relished, but as they grew larger and were offered other things aphides were refused. Flies were eagerly caught, but ants were never touched. This would indicate that they have some kind of discrimination."

I am collecting data bearing on this subject of the prey and the sense of taste in spiders. From what I have said you will see that the subject is not quite as straightforward as might at first appear to be the case. The sense of taste is bound up with the sense of smell, and in fact their sense of smell is very akin to taste, as I have shown elsewhere.† From the information at present at my disposal I believe that spiders do possess a sense of taste whereby they can discriminate to a certain extent and even show preference for particular prey. Too marked likes and dislikes would be fatal and in fact might be a factor in natural selection. Major Hingston collected spiders of the genus *Sitticus* at 22,000 ft. on Mt. Everest, and apparently these have to subsist on whatever insects are blown up the mountain side by the upward air currents which prevail there. It is obvious that they could not pick and choose, but must take whatever is brought to them.

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* Nat. Sci. Phil. 1900, p. 395.

† Proc. Zoo. Soc. Pt. 2, 1926, p. 332.

Notes on the Life-History of Cydia (Carpocapsa) pomonella, L.

By Robert Adkin, F.E.S.—*Read November 8th*, 1928.

Although *Cydia pomonella* has been known as a destroyer of apples for at least a couple of centuries, and during that time has received the attention of fruit-growers and entomologists alike, it is very doubtful whether, even now, we know all the details of its life-history. Quite a considerable amount of literature has been devoted to it; some of it sound enough, but a good deal of it more in the nature of fairy-tales, woven around one of the most beautiful but baffling of little moths.

In 1747 Benjamin Wilkes commenced the publication of his work "The English Moths and Butterflies" and on plate 9 he depicts the larva, pupa and imago, also an apple showing the mine made by the larva. The artists of that period often paid more attention to pictorial effect than to the exact details of the insects they desired to depict, and in this instance the plate is embellished with a large spray of apple blossom and a very fine, ripe, rosy apple, the insects themselves taking a subsidiary position. But for all that the maggoty apple is a fair representation of an average *pomonella*-infested fruit; it shows the mine as one usually finds it, and gives the idea that the artist had really copied it from one that he had before him. His letterpress describing the larval habits is very brief, and as he says, not founded on his own observations.

The first volume of the "Entomological Magazine" was published in 1833 and in it are several articles by "Rusticus of Godalming" on "Blight." In one of these (page 144) he purports to give a complete life-history of *pomonella*. He asserts that the moth lays its eggs in the eyes of the fruit "one only in each, by introducing its long ovipositor between the leaves of the calyx, which form a tent above it that effectually shields it from the inclemency of the weather, or any other casualty." He then goes on to describe how the little larva eats its way into the apple, avoiding the core, and then when half way through the fruit, makes another tunnel through which it passes the frass and obtains a supply of air. When full-fed, he says, the apple falls and the larva comes out of it and crawls to the trunk of the tree. He then continues, "In this situation he remains

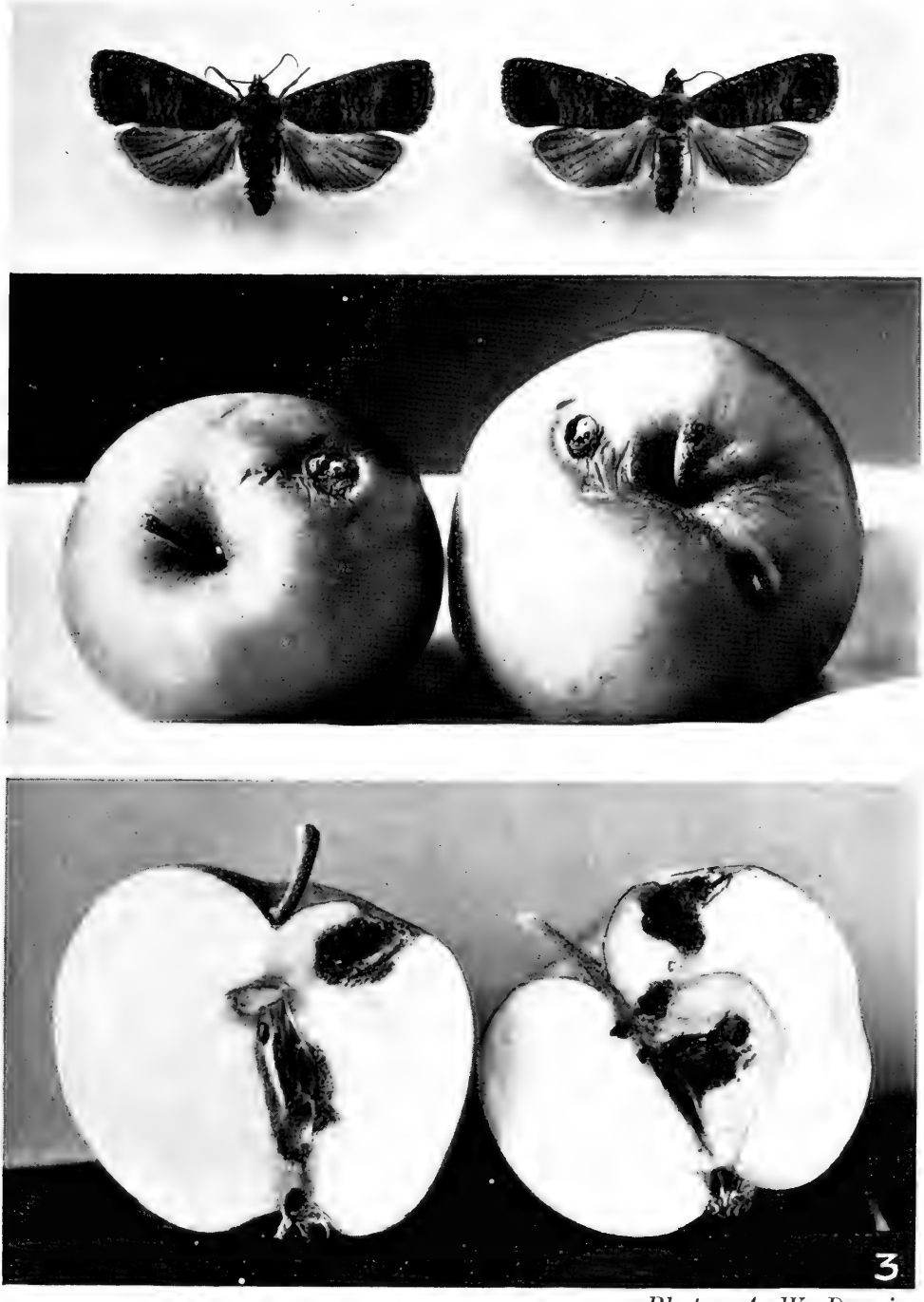

Photo: A. W. Dennis.

1. *Cydia (Carpocapsa) pononella* × 2.
2. *Apples showing "Cap."*
3. *Apples showing mines made by larvæ.*

without stirring for a day or two, as if to rest himself after the uncommon fatigue of a two yards march ; he then gnaws away the bark a little in order to get further in out of the way of observation ; and having made a smooth chamber big enough for his wants, he spins a beautiful little milk-white silken case, in which, after a few weeks, he becomes a chrysalis, and in this state remains throughout the winter."

This, like all the articles by "Rusticus," is charmingly written, yet when closely investigated it is only too apparent that a good deal of it is pure imagination. For all that it seems to have formed the foundation for much that was subsequently written, and even so serious a writer as S. J. Wilkinson refers to it as "the interesting account of its habits to be found in the Letters of Rusticus." Unfortunately, many of our economic writers also, seem to have founded the life-histories with which they favour us, largely on such writings, or on life-histories worked out in countries where the species occurs in conditions very different from those pertaining in Britain. Thus we read, "The method of infestation is for the moth to come out about the time of the opening of the apple-blossoms, and when the petals have fallen and the embryo fruit is beginning to form, the females lay their eggs,"[1] and so forth. Also, "the moths appear about the end of May, and the eggs are deposited singly upon apples just after the petals of the blossoms have fallen.—After creeping over the young apple for some little time, the larva, it will be noticed, in most cases enters the apple at the blossom end or calyx cavity, and commences to tunnel its way to the core.—In about seven days it reaches the core, and there commences to feed upon the pips or seeds and upon the surrounding pulp.—The pips and pulp around the core having already been eaten, it commences to tunnel its way, usually towards the opposite or stalk end, to the surface."[2] Or again, "The moths emerge from the caterpillar cocoons at the fall of the blossoms and fly from fruit to fruit, laying one egg on each. The minute grub crawls over the apple till it arrives at the 'eye' when it feeds a little time here and then enters the fruit, reaching the core and ejecting its excrement (frass) through the opening, the appearance of which shows the attack. Later on the grub burrows to the side of the fruit, forms another opening at which more frass appears."[3] Barrett says nothing about the egg-laying, but he tells us that the larva eats "a hole right through the fruit in order to feed on the pips ; if the seeds of one apple are insufficient attacking another."[4]

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[1] Ormerod. "Handbook of Insects injurious to Orchard and Bush Fruits." 1898.

[2] Collinge. "A Manual of Injurious Insects." 1912.

[3] P. J. Fryer. "Insect Pests and Fungus Diseases of Fruit and Hops." 1920.

[4] Barrett. "The Lepidoptera of the British Islands." Vol. XI. p. 155. 1907.

Although these accounts vary somewhat in wording, their general purport seems to be that the blossoming of the apple and the egg-laying of the moth synchronise fairly closely; that the egg is laid either in the eye of the fruitlet, or that the larva on hatching seeks the eye, and entering by it, burrows to the pips and feeds on them. Now, whatever may be the case in countries where three or even four generations are produced in the course of a year, I am convinced that the life-history of the species, in Britain, is very different from the foregoing.

For several years past I have been keeping an eye on this species in the hope of obtaining a more or less complete account of its life-history, and although I am not at all certain that I have been successful, certain points have come to my notice, so much at variance with those that I have quoted, that I think it well to put them on record.

From the view point of one who endeavours to grow a limited quantity of good class fruit, it is perhaps fortunate that the species has never been very abundant in my garden, where my observations have chiefly been made; but not a year has passed without some wormy apples being found, while in some years, as in the present, they have been only too common. One advantage that I have had is that the trees are all of comparatively small size, pyramids, espaliers, or cordons, thus admitting of the fruit being kept under closer observation while on the tree, than if it were growing on large orchard standards.

I have already shown that it is impossible that the moth can lay its eggs in the blossom.[5] In this connection Prof. Theobald, who by reason of his position has unique opportunities of studying this species in nature, informs me that the female usually lays her eggs on the fruits when they are about the size of a walnut, occasionally on the strigs (fruit-stalks), very seldom on the leaves. He further says, " there is no doubt, however, that the larvae enter via the eye and one can see them feeding just inside the cup."

My own observations have been chiefly upon the ripening fruits and the full-fed larvae. About the middle of August the infected apples begin to fall. If one collects, possibly, a dozen fruits that have fallen during the night and splits them open, it will, in all probability, be found that there is a remarkable likeness in the position and general appearance of larval burrows, but they have no tenants. The fruits usually fall during the night and it would appear that the larvae at once leave them and seek shelter in the bark of the tree or other secluded spot. I have, from time to time, opened some hundreds of the fallen fruits but in only one or two cases have I found them to contain larvae. But if at this period, *i.e.*, the middle of August, one searches the fruits that are still on the tree, it is probable that some will be found that show a mark on

[5] " Proc." 1927, p. 96.

the skin, in appearance not unlike the "cap" made by some of the clear-wings in the bark of the trees in which they feed, but larger in size and somewhat irregular in outline. It is generally placed on the side of the fruit at about one-third of the distance from the stalk towards the eye. If such fruits are put away in a suitable receptacle[6] one is pretty sure to rear *pomonella* from them, for they almost invariably each contain a larva, and of course, when the larva leaves the fruit it bursts a hole through this "cap"; the "cap" being really a dried portion of the skin of the fruit.

A careful examination of a large number of these infested apples leads me to the conclusion that it is at the spot where this "cap" shows that the larva has entered. Just beneath the "cap" is a chamber that strongly suggests that the young larva on entering the fruit, feeds immediately under the skin thus hollowing out a shallow space, wider than the main gallery that leads from it towards the centre of the fruit. This main gallery leads to and generally partially or completely surrounds the core and the seeds are sometimes entirely, but more often partially, eaten, but I have found no evidence to support Barrett's assertion that the larva feeds only on the seeds.

But to this general rule there are exceptions. In apples growing upwards from the branch, that is with the eye uppermost, both entrance and exit appear to have been through the eye, and even in cases where the entrance appears to have been made in the usual way, at the side of the fruit, I have found traces that suggest that the young larva may have fed for a short time in the eye before entering at the side of the fruit, but in such cases I have been quite unable to find any trace of a gallery leading from the eye to the main burrow in the fruit, thus suggesting that the young larva, after feeding for a time in the eye, has crawled over the fruit until it has found a suitable spot to penetrate it at the side. Further, on one occasion I had a crop of rather tough-skinned pears that was badly infected and in every case that I examined both entrance and exit was through the eye.

The conclusion that I come to is, that in normal circumstances the young larva enters the fruit at the side, but that it is able to adapt itself to the position in which the fruit is placed or to the quality of its rind, and further, that it feeds upon both the flesh and the seeds of the fruit indiscriminately.

The larva, when full-fed, leaves the fruit and crawls to some spot, usually the stem of the tree, if it affords the necessary accommodation, and in chinks of the bark or under moss, it spins a tough cocoon, in which, as is now well known, it passes the winter and does not turn to a pupa until the following spring.

Considerable doubt has been expressed as to whether *pomonella* is

[6] I have found a large size glass-topped cardboard box filled with pieces of bark and moss to answer the purpose well, but it must be kept out of doors.

ever double-brooded in Britain ; indeed, many of our leading lepidopterists appear to regard it as an essentially single-brooded species in this country. There is, however, abundant evidence that in favourable seasons a very considerable second brood may be produced ; the following is a case in point.

For some years past the Apple Sawfly (*Hoplocampa testudinea*) had been only too plentiful in my garden, and on July 16th of the present year I made a search of some of the apple trees in order to remove any infested fruit. I found no workings of sawfly larvae,[7] but I collected five apples, the appearance of which suggested that they contained mature larvae, possibly of the Tortrix, although the time was too early for these to be full-fed in the ordinary course of things. However, between the 19th and 24th of August four *pomonella* were reared from them, and it was evident that I had not found all the infected fruit, for later on in the season, *i.e.*, the end of September, I found more fruit that contained *pomonella* larvae.

Theobald tells us that he has twice noted undoubted second broods.[8]

The perfect insect is not very often met with in the open, but occasionally it is to be seen on the walls and windows of fruit stores. In such cases the individuals seen must surely be the result of a second brood. In the ordinary course of things, store apples are not gathered until quite the middle of September or later, whereas the first brood larvae have all left the fruit from the middle to the end of August, but those of the second brood are not mature until at least the middle of September and may sometimes be found in the fruit even as late as the beginning of October ; there is therefore abundant evidence that a second brood is not of very rare occurrence ; indeed it is to be expected whenever there is a really warm summer.

The production of a second brood of moths must necessitate considerable modifications in the larval habits ; the larval life within the fruit must be shortened by some three to four weeks, and on the larva leaving the fruit, instead of lying for some five or six months before changing to a pupa, must assume the pupal stage almost immediately.

The entry of the second brood larva into the fruit appears to be, as I take it to be in the case of the normal brood larva, at the side, and usually in a similar position, *i.e.*, at about one third of the distance from the stalk to the eye, but the mark that it leaves on the skin is somewhat different. In the case of the first brood the "cap" is usually of a greyish colour, but in that of the second

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[7] Larvae of the Gooseberry Sawfly (*Nematus ribesii*) and the Slug-worm of the pear (*Eriocampa limacina*), which also had been prevalent, have this year disappeared.

[8] S. E. Agricultural College. "Report on Economic Zoology," 1911, pp. 14-16.

brood it is more of a rusty hue and is generally surrounded by a discoloured ring. This difference in colour, I conclude, is to be accounted for by the more advanced state of the fruit. These second brood larvae as already mentioned, are not full-fed until the latter half of September. They then leave the fruit and having spun their cocoons remain in them until the spring before changing to pupae, the imagines from the two broods of larvae appearing together in the following June or July.

Scent-glands of the Pierinae.

(Summary of the Lecture.)

By Dr. F. A. Dixey, M.A., F.R.S., etc., Hon. Member.—*Read November 22nd*, 1928.

It is well known that the male of *Pieris napi* has a strong scent of lemon verbena. This scent is confined to the upper surface of the wings, where alone the specialised "plume-scales" are found. There is therefore a strong presumption that these scales are concerned in the distribution of the scent, though probably not in its production. They occur in very many members of the Pierine subfamily, and also in certain Satyrines and Nymphalines. The normal plume-scale consists of a flattened lamina, connected proximally by means of a slender footstalk with a disc which articulates with a socket in the wing-membrane. Distally the lamina is furnished with a fringe of delicate processes known collectively as the fimbriae. Lantern slides were shown of the plume-scales of several Pierine forms, in all of which the above features were visible, with modifications according to the species.

The character of the scent varies both in quality and intensity. In very few instances is it as strong as in *P. napi*. Individual variations occur, as in *P. rapae*; where some individuals are almost scentless, while others emit a distinct odour of sweetbriar. In *P. brassicae* the plume-scales are numerous and large, but the scent, which resembles that of orris-root, is uniformly faint. But however variable in intensity, the quality is always the same for the same species. From the fact that these specialised scales occur only in the males, it seems natural to infer that the scent they convey acts as a sexual attraction. In this connection it is interesting to remark that their scent is in most cases, perhaps in every case, agreeable to the human perception.

In our Common Whites, and many other Pierines, scent-scales of this kind are scattered generally over the surface of the wing, mixed up with the ordinary scales. By means of preparations thrown on the screen, it was shown that they are developed in the furrows between the ridges of the folded wing as seen in the pupa before exclusion. In the adult wing, when denuded of scales, the sockets of the two kinds of scales are seen in alternate rows.

Some Pierine groups, for example the mimetic neotropical genus *Dismorphia*, possess patches of scent-scales of a sort differing from the "plumules" already noticed. These have a short footstalk but no disc or fimbriae; and are closely packed together instead of being generally distributed among scales of the ordinary character. The patches thus formed are arranged in pairs, one on the lower surface of the forewing and the other on the upper surface of the hindwing, in such a manner that in the usual position of rest the two exactly cover each other; this no doubt having the effect of economising the odour. Examples of these scent-areas in *Dismorphia*, and of their constituent scales, were shown in actual specimens and in drawings thrown on the screen.

Scent-patches of a somewhat different character occur in other Pierine genera, such as *Terias* and *Catopsilia*. In these the patches are furnished with numerous fine tracheae, the function of which may be to supply air to the specialised cells from which the scent-scales are developed. But the absence of tracheae from the patches in *Dismorphia* is not easy to explain.

Many Papilios are provided with specialised scales which are no doubt concerned in the production of scent; and also with bunches of hair which presumably serve as scent distributors; drawings of some of these were shown.

Finally, illustrations were given of the fact that the scent-scales are developed from underlying cells in which probably the scents are elaborated. In the case of the adult plume-scales, an aperture can often be seen in the disc, marking the way by which the protoplasm of the cell was originally in continuity with the interior of the scale. This continuity gradually ceases in the course of growth; and by the time that the adult condition of the scale is reached, the formative cell has almost or entirely disappeared.

On the White-Spotted forms of Dryas Paphia and some other Species.

By Robert Adkin, F.E.S.—*Read December 13th*, 1928.

During the years of the late seventies and the early eighties of the last century white-spotted forms of *Dryas paphia* were met with in sufficiently large numbers to attract attention.

In 1882 Jenner Weir figured a specimen in the " Entomologist " ; said he had taken four of them in the New Forest and added, "I feel quite unable to suggest any explanation of this singular aberration." [1]

In 1886 Weir exhibited seven specimens of *D. paphia* and one of *Brenthis euphrosyne* at a meeting of this Society and drew attention to the white spots on the wings, and suggested that, " Possibly the pupa had something on it which prevented the rays of light from colouring the insect ; in nearly all cases the spots are symmetrical." [2]

In the discussion, which followed, South said that in 1881 and 1882 he took some specimens of this insect (*D. paphia*) with the white spots, and it occurred to him at the time that the spots were probably caused by the sun's rays passing through a globule of water and falling on the pupa ;" but Carrington pointed out that this would leave a line instead of a distinct spot. At a subsequent meeting South said that, after making some experiment, he did not think the sun's rays passing through a drop of water could have anything to do with the white spotted varieties adverted to.[3]

In 1893 Frohawk figured a specimen of *D. paphia* having two white patches on each of the fore-wings and an indication of one on each of the hindwings, and suggested the possibility of the white spots being a reversion to some transitional stage in the development of the species from an ancestral form.[4]

At a meeting of this Society held on February 13th, 1896, South read a paper entitled " Some Remarks on the Genus Argynnis with particular reference to a certain phase of aberration observed in some species of the genus." [5]

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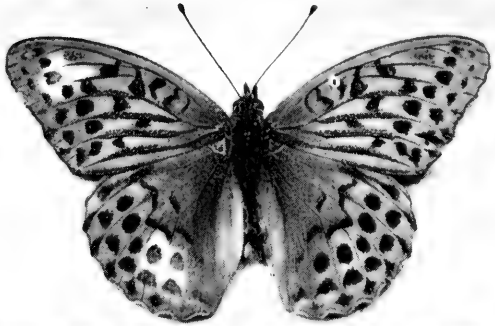
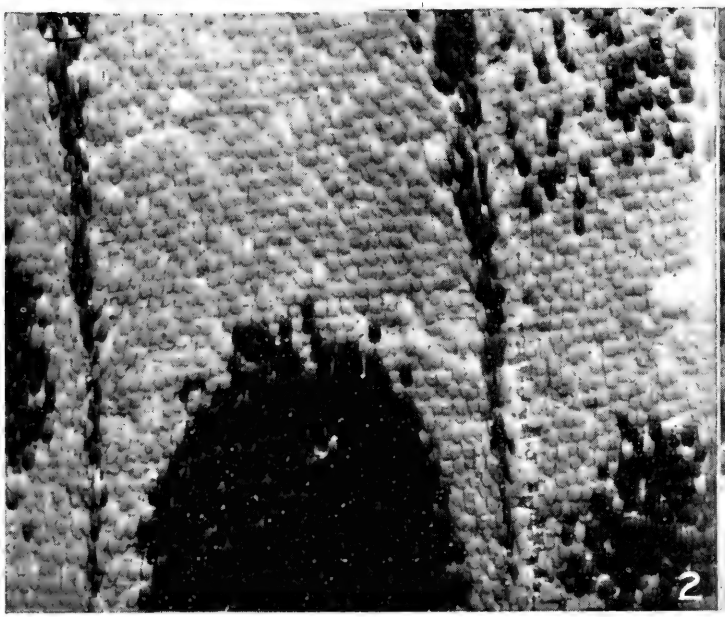
[1] " Entom." 1882, pl. 1, fig. 3, p. 50.
[2] " Proc." 1886, p. 55.
[3] " Proc." 1886, p. 55, 1927, p. 78.
[4] " Entom." 1893, p. 97.
[5] " Proc." 1896, p. 76.





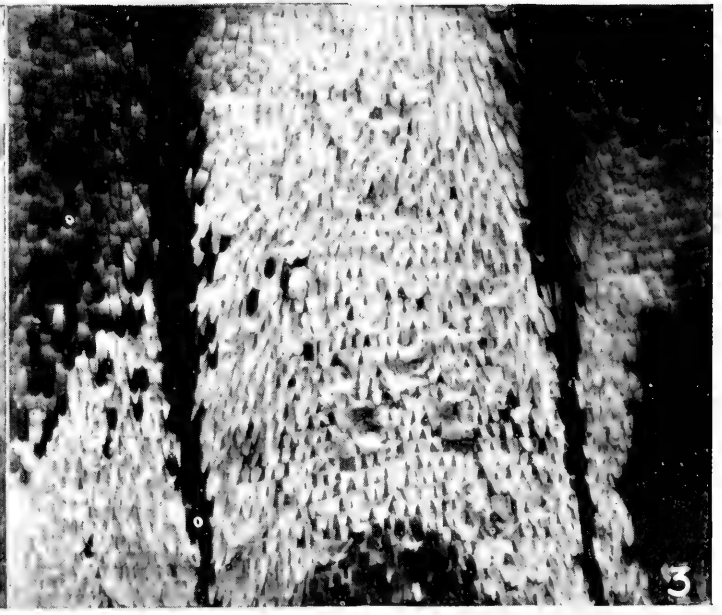


Photo: A. W. Dennis.

1. *Dryas paphia, showing white spots.*
2. *Normal Scales × 20.* 3. *Distorted White Scales × 20.*

Having given a general review of the group and after pointing out that in a species not far removed from *paphia* the female normally has white-spotted wings, he proceeded to elaborate Frohawk's reversion theory, and concluded with the following sentence, "Although I do not insist on the pale patches being ancestral characters, I am inclined to consider that such a conclusion is not altogether unsupported by the facts to which I have briefly adverted."

From the report of the discussion which followed,[6] it is to be gathered that Frohawk said that he had examined these white patches microscopically and found that the scales were present but that they were without pigment. Tutt then said that "this statement practically gave away the whole theory propounded by South." Then, having reviewed the whole situation, he concluded, "Taking into account the known factors of the histolysis of the pupal tissues, he considered that anything that would cause a local weakening of the tissue would produce a result similar to that exhibited. This actual weakness of tissue might occur in the larval period, when it would naturally be carried through the pupal stage, or it might originate in the pupal stage, whilst the possible factors that might cause local weakness in the larva or pupa are manifold. He further pointed out that a well-known lepidopterist had observed that when dust particles or other foreign matter interfered with the pupa when it was in a very soft stage, *i.e.*, during the first hour or two following the change from the larval to the pupal condition, the result always ended in crippling the imago, or in the failure of the complete scale development in the neighbourhood of the injury or irritation."

So the matter rested until Cockayne's Classic paper of 1921 on "Structural Abnormalities in Lepidoptera"[7]—where under the sub-heading "Local Scale Defects" (p. 51) we read "I have examined a very large number of specimens showing patches of white or pale colour, often described as bleached specimens, and almost without exception have found the scales on these patches thin, transparent or nearly transparent, and curled at the edges or rolled up completely. The condition very often affects corresponding areas on both wings of the same side, or on all four wings. As in the case of malformations, which appear alike in both wings of one side, or in all the wings, this affords strong evidence that local injury may be the cause." And further (p. 53) "In *Dryas paphia* it is not very unusual to find a white spot on all four wings, or on both the wings of one side, in which the scales of the ground colour are always defective, and sometimes those of the black spots also. The positions are nearly always the same, in the forewing between nervures 5 and 6, near the apex, and in the

[6] "Proc." 1896, p. 31.
[7] "The London Naturalist." 1921, pp. 10-68.

hindwing between nervures 4 and 5. These positions would coincide in the pupal condition. Local pressure is the probable cause, but it is hard to understand what the pressure can be which acts so uniformly on such a definite area."

I have given these events in chronological order because I think it best shows the way in which the train of thought has developed. The first suggestions appear to have been little more than random guesses with practically no evidence to support them, but as the question came to be more closely examined definite facts have emerged which, as Tutt shrewdly observed, appear to have resolved the question into a " purely physiological one."

Recent discoveries may perhaps take us a step further. Last year, Prof. Dr. Richard Goldschmidt published a book on Physiological Genetics.[8] It is printed in German and therefore perhaps not so easily available to some of us as it otherwise might be, but fortunately in a review of it by J. S. Huxley,[9] lengthy extracts are given in English of which the following is one : —

" Goldschmidt and his pupils have been able to show that the wing-pigmentation of Lepidoptera is brought about by a curious interrelation of developmental processes. The scale rudiments develop at different rates, so that before any pigment exists in the wing, the future pigmentation can be read off as a structural shadow-pattern. The various pigments appear to be produced in the body at different times, and to be shot out into the wings when ready. In the wings they can only be deposited in the scales which are at a certain stage of their development: they pass over the rest. Thus the relative rates of scale differentiation and of pigment production both contribute to the actual pattern."

The simple meaning of this appears to me to be that so long as the scale development and the pigment flow synchronise the normal wing pattern will be produced ; but that if at the critical time some untoward circumstance should occur to throw the scale development and the pigment flow out of time with each other, or that has interfered with the normal scale development in such a way that it is not ready at the right moment, the scales affected by that occurrence will be left without pigment. Cockayne has already shown that the scales of the pale patches are thin, more or less transparent and curled at the edges or rolled up completely, showing that they are scales that have not received their supply of pigment. I have examined a number of the pale patches and find that this invariably is so.

To return to the various suggestions that have been made. Jenner Weir's prevention of the rays of light ; South's sun's rays passing through a drop of water; and Frohawk's reversion theory have already been refuted, or may be dismissed as having no evidence to

[8] " Physiologische Theorie der Vererbung."
[9] " Nature," Vol. CXX, p. 109.

support them. Tutt's suggestion of dust particles, etc., falling on the freshly formed pupa does not appear to me to be a likely cause, for I think it probable that the injury would be to the wing membrane rather than to the scales, for although the formation of the latter commences early in the pupal period it is doubtful whether it would have commenced at the time mentioned. There is, however, the possibility that the "dust particles or other foreign matter" might become embedded in the pupal skin and thus exert a continuous pressure on some defined area and possibly thus close the scales on that particular area against the pigment flow when it takes place. But even so it would hardly be likely to always, or even frequently, affect the particular part of the wing where the white patches most frequently occur.

There remains to be considered Cockayne's suggestion that "local pressure is the probable cause." This suggestion was not made without direct evidence to support it, for he quotes, among others, a case where Chapman produced a "bleached patch" on the red band of the wing of a *Pyrameis atalanta* by accidentally pressing the pupa between the cover and the lip of a jar.[10] Chapman does not say at what period in the pupal stage this accident happened, but as he says that the indentation made by the pressure remained after the pressure was removed, its effect was no doubt felt on the tissues of the insect until emergence. I think we may therefore accept as a fact that when local pressure is exerted on the pupa at the time when the pigment is being shot into the scales, or when its effect continues until that time, it will produce a white (or pale) patch on the wing of the imago.

To assign a cause for these white patches usually falling on approximately the same position on the wing, is perhaps not such an easy matter, but I think a reference to the life-history of the species may possibly offer a suggestion. When the larva of *paphia* has completed its feeding on the violets, it wanders in search of some position where it may secure itself for pupation. Such information as I have of the sort of position that it would seek in nature is limited; but I have a record of a pupa being found attached to the stem of an oak tree, and of a number of larvae hung up, waiting the change to pupae, high up in a blackthorn bush.[11] In confinement the gauze covering of the cage seems to offer an attraction, but even with that present, I have known a larva attach itself to a leaf, not of the food-plant but to a more substantial leaf that had been introduced. The shape of the pupa, in common with that of most of the Argynnids, is peculiar, in that the wing cases are a prominent feature; the pupa is suspended by the cremastral hooks and hangs free from any further support. Now suppose that a violent wind stirs the branches of a bush on which the pupa is suspended, what is

[10] "Entom." 1894, p. 23.

[11] Observations made by Mr. A. L. Rayward.

more likely than that the pupa might be dashed against a neighbouring branch, or possibly crushed between two branches, and that the wing cases, being the most prominent part, might receive the full force of the blow. In the first case one wing or the pair of wings on the one side would be affected, according to whether the force was sufficient to penetrate to the inner wing as it lay beneath the upper wing in the pupa; in the latter case both forewings or both pairs of wings would be similarly affected. I do not think this is a very wild hypothesis, at any rate it may be one worthy of experimental examination.

The Argynnids are not the only group in which these white patches are found; many of the Satyrids are equally liable to them. But in their case the areas are generally larger and often more irregular in shape, and one, two, three or all the wings may be affected. This difference in the patches of the two groups may probably be accounted for in the difference of their pupal habits. *Epinephele jurtina* (*janira*) is a species that is often affected. Its larva is a grass-feeder and attaches itself to a stem or blade of its foodplant for pupation. In such a position falling debris or other circumstance may easily cause the pupa to receive pressure and a larger wing area would be affected than in the case of a pupa suspended in a bush, and thus cause the relative difference in the area affected. Indeed, when the diverse shapes of the pupae of the two species and the difference of their pupal habitats are considered, we should expect to frequently find a larger and less well defined whitened area in *jurtina* than in *paphia*.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 24th, 1929.

By E. A. Cockayne, D.M., F.E.S., F.R.C.P.

LADIES and GENTLEMEN. The reports of the Council and Hon. Treasurer show that the Society is increasing steadily in prosperity. There has been an addition to our membership, though not so great an addition as I hoped for when I made my appeal last year; the ordinary members now numbering 260, and a good average attendance at the meetings has been maintained. The Annual Exhibition was a great success, though the attendance fell just short of the record reached last year. The high standard of exhibits was fully maintained, but the Council has noted with regret a decrease in the number of small exhibits and would remind members that to be interesting an exhibit need not necessarily be large. Light refreshments, which add so much to the comfort of members and their guests, were provided once more, but the voluntary contributions towards their cost fell far short of the total required. This has entailed a heavy drain on income badly needed for other purposes, such as the upkeep and extension of the library, and it may become necessary to give up the provision of refreshments altogether, unless the fund receives a greater measure of support next year.

The acquisition of the Lister Collection, which we owe to the generosity of Colonel Labouchere, is the out-standing event of the year. The rearrangement of the whole of the Society's collections of Lepidoptera, which it necessitates, will throw a heavy burden on the Hon. Curator and it will be some time before it is available for reference.

The redrafting and amendment of the Rules, a work which was

long overdue, has made considerable demands on the time of the special sub-committee and of the Council as a whole. The revised Rules are to be submitted to you shortly and, if agreed to, will, I hope, appear in the next volume of the Proceedings.

Three members have died during the year.

Emily Chapman, who died in December last at the age of 83, was the elder of the two sisters of the late Dr. T. A. Chapman, F.R.S. She used to accompany him on most of his continental journeys and, while he studied entomology, she interested herself in the flora of the various countries. She took great pleasure in bringing home seeds and roots to plant in the garden and with the skill of the born naturalist often brought delicate wild plants to maturity where others failed. Long ago she used to attend our field meetings on the Surrey hills, and in her later years of retirement always retained her interest in the welfare of the Society.

W. G. Dawson, who joined the Society as a life member in 1888, died last year at the age of 91. He was formerly a regular attendant at our meetings and a contributor to our Proceedings. His interest was centred in the Indo-Malayan Rhopalocera, and his collection from this region, to which he added specimens captured by himself in Burma in his eighty-first year, has been presented to the Plumstead Museum.

Oliver Richardson Goodman was a Vice-President Elect and would in the normal course of events have occupied the Chair. He was a regular attendant at the meetings and keenly interested in the prosperity of the Society. Much of the success of the Annual Exhibitions of recent years is due to his sagacity in seeing where improvements could be effected and to his energy in carrying them out. His chief interest was in the Palaearctic Rhopalocera, and he visited localities far from the beaten track to find many new or little known species and local races. It was his custom to give us an account each year of his journey illustrated by lantern slides of the districts visited and by rare and local species obtained there. Those evenings will not readily be forgotten by the members fortunate enough to have enjoyed them. We had looked forward to a continuance of his manifold activities for many years to come and deeply deplore his death at the early age of fifty-one.

Variation and Nomenclature.

I am devoting the remainder of my address to some observations on variation and nomenclature. I have noticed with concern a

greater and greater separation between entomologists who are systematists and those who are interested primarily in genetics, and yet in reality each class is complementary to the other and their interests are identical. One of the reasons for this breach is that most of the papers on the genetics of insects are published in the journals dealing with heredity, which are inaccessible to some systematists and seldom read by others. I feel convinced however that as time passes there will be a closer co-operation between them, and that systematists will lay before the experimentalists puzzling problems for them to solve, and will find that by their solution nomenclature will be brought more into line with scientific truth. Every year more skilled biologists are taking up posts in the tropics, and it is in the tropics that the scope for work of this kind is greatest. For example, were experimental breeding possible in the case of some of the South American butterflies such as those of the genus *Heliconius* and *Agrias*, some, now regarded as groups of allied species, would in all probability prove to be forms of one species, differing in a number of well-defined genes, like those shown by Fryer to exist in *Acalla comariana*, Zell. Until these butterflies have been bred extensively the worker in a museum at home can merely name the various forms without understanding their nature.

However divergent our views on variation and nomenclature may be, we all admit that many, perhaps the majority, of named varieties or aberrations, as it is the custom to call them now-a-days, are mutations, some conspicuous others inconspicuous, but all alike in that they are hereditary. As to the nature of the very rare aberrations opinion is more divided. It is probable that some are rare recessives and that others are due to a chance combination of two independent genes. As an example of the former I will cite *Callimorpha dominula*, ab. *bimacula*, which, though it has been bred in some numbers, has so far as I am aware only been captured once in a wild state, and as an example of the latter *Hyloicus pinastri*, ab. *albicolor*, a double recessive combining in one insect ab. *albicans*, and ab. *unicolor*, which has only been taken once in the British Isles. *Abraxas grossulariata* has two recessive aberrations, *lacticolor* and *varleyata*, and when the same insect is homozygous for both genes ab. *exquisita* results, a moth unlike either in its appearance. *Exquisita* has, I believe, never been captured, though there is no reason why it should not be taken in a wild state; but if a single specimen had been caught and no-one had crossed *lacticolor* and *varleyata* it would have been looked upon as a remarkable sport and

its hereditary nature might never have been suspected. Most likely many of our unique or very rare aberrations are in their origin comparable with *albicolor* and *exquisita*, and, if a figure is given, I think that naming them is not merely unobjectionable but advantageous. Further examples of the same kind will then be recorded under a definite name in the indexes of our periodicals, and not appear as unidentifiable aberrations.

Other aberrations are due to multiple genes all producing similar effects so that the greater the number of genes present in one insect the greater the intensification of the pattern. The *intermedia*, *radiata*, *zatima*, *deschangei* group of aberrations of *Spilosoma lubricipeda* is of this kind. The well-known race *rustica* of *S. mendica* is very similar, there being a dominant gene for white modified by others, so that a complete range of intermediates between the dominant white and recessive brown male exists. Most systematists call *rustica* a race, because where it occurs the typical brown form is almost unknown, as in Ireland for example, and elsewhere the whiter forms are absent. They look with different eyes on the the radiated forms of *lubricipeda*, because, though it is common in Heligoland, the type is found with it and it also occurs in varying proportions along the East coast of England. The distinction is really quite artificial, and these instances show that in the absence of breeding experiments there is no safe criterion by which to distinguish a group of aberrations from a race. *Pararge aegeria* and *egerides* probably differ in two genes for orange and perhaps a third for pattern, and yet Verity would like to exalt *aegeria*, the group of fulvous forms, to the rank of a sub-species. Thus we have the same phenomenon given a series of aberrational names in one case, a racial name in another, and, if not actually given a subspecific name in a third, at least looked upon as worthy of one.

This is not my conception of the constitution of a race or subspecies, but before stating my views I must make some preliminary observations on heredity. Many inheritable variations arise as a result of external conditions, as I shall show in a later part of my address, but for the most part they do not seem to be of such a kind as to make the insect more capable of living under the conditions that brought them about. There is no convincing proof that changes in their surroundings can bring about in living organisms adaptations that enable them to survive the changes and that can be handed on to their descendants, as the Neo-Lamarckians contend, and even if such adaptations do occur their mode of inheritance is unknown.

Meantime geneticists are accumulating more and more proof that all the characters they investigate, whether great or small, are inherited according to the Mendelian Law and finding that the apparent exceptions are more or less complicated examples of its operation. Until definite evidence to the contrary is adduced I shall continue to believe that all transmissible variations are inherited in this way, and on this belief, base my views of the constitution of races and sub-species.

Though one member of a species is chosen as the type, a typical form cannot really exist, for no two individuals are exactly alike in appearance and still less so genetically. Nevertheless, large numbers of a species in a given place may be sufficiently alike to be regarded as typical. But in the locality from which the type originally came there will be in most cases a number of aberrational forms each differing from it in possessing or lacking some gene, the presence or absence of which makes a more or less distinct difference in its appearance. The fact that one of these aberrational forms is absent from one locality and very abundant or even universal in another is insufficient ground on which to separate the latter as a race still less as a sub-species. *Amphidasis betularia* may be all typical in Scotland, all ab. *carbonaria* in Yorkshire, and a mixture of these two forms with ab. *insularia* on the North Downs, but I should not look upon those from Yorkshire and Surrey as local races.

I regard a true race as one *possessing a number* of *genes*, each modifying its appearance to a greater or lesser extent, not present in the typical form, and *lacking other genes*, which are present in the typical form. The fewer in number these genes are, the more frequently will specimens inseparable in appearance from the type occur, and the less justification will there be for the giving of a racial name. The adoption of such a conception will always make it impossible to draw up a hard and fast definition of a race. Even with a complete knowledge of genetical constitution, which will probably never be attained and may be impossible of attainment, definition would still be a matter of the greatest difficulty.

The difference between a race and a sub-species is also merely one of degree. In a sub-species there are still more genes present that are lacking in the type and still more lacking that are present in the type, until their number may be so great that it becomes almost or quite impossible to find an individual of the sub-species with a facies resembling that of the type. And just as the line between a race

and a sub-species is indefinable, so higher in the scale it is equally impossible to draw a sharp distinction between a sub-species and a species.

There is however another factor that adds greatly to the complexity of a problem already difficult enough. It has long been recognised that plants of the same species may differ very greatly in their manner of growth when growing in different soils or under different climatic conditions. Variation of this kind is so great in some of the New Zealand plants such as the whip-cord Veronicas, that few would have suspected the form of a species like *V. cupressoides* growing in a dry environment to be the same as the form in a damp one, had it not been proved experimentally. The same kind of mistake arose in connection with the wet and dry season phases of some tropical butterflies. In *Precis* for example the colour and pattern may be altered in a most remarkable manner by climatic influences, but we need not go so far afield as Africa to observe the effects of temperature and moisture, for Weismann has shown how susceptible are *Heodes phlaeas* and *Araschnia levana* to external influences. Nor is climate the only factor. The prevailing hue of their surroundings has a marked effect on the colour scheme of some insects, particularly on those with incomplete metamorphosis. In the Lepidoptera I know of no experimental proof of a direct response of this kind, but the close correspondence of colour in some species with that of the various soils on which they are found suggests that it may occur in them too.

Arrow has shown that size in the males of certain beetles such as *Helicopris hamifer* and *Enema pan* is correlated with wonderful variation in the size and structure of the horns. Further evidence is needed, but if, as seems likely, abundance and good quality of food causes increased size it must also cause the structural phases that accompany it.

The remarkable observations on locusts by Uvarov seem to show the action of another environmental factor. He believes that pairs of what have up to now been regarded as distinct species are really the swarming and solitary phases of single species, and gives as instances of such pairs, *Locusta migratoria* and *danica*, *L. pardalina* and *solitaria*, *Schistocerca gregaria* and *flaviventris*, *Melanoplus spretus* and *mexicanus atlantis*, and *Dociostaurus maroccanus* and *degeneratus*. Here the swarming phase is produced by an increase in the density of the locust population in a given area regardless of the climatic or other causes giving rise to it.

No student of the Lepidoptera can plead that he is ignorant of these facts, and yet racial and sub-specific names are given freely to forms differing far less than the wet and dry season phases of many butterflies. However unlike their environment may be in temperature, humidity, or elevation, from that in the locality inhabited by the typical form, no attempt is made in the great majority of cases to test by experiment whether a so-called race or sub-species is stable when removed to other surroundings. In many cases I suspect they would prove to be mere phases differing little or not at all in their hereditary qualities, and in support of it I will quote an experiment carried out by Harrison. *Pieris napi vulgaris*, when bred out of doors in England from Italian eggs, retained only one of the characters that distinguish Italian from British specimens. All the others were climatic in origin.

Admittedly there are hereditary characters that only appear under some external stimulus such as heat, cold, or moisture and in the absence of this special stimulus remain latent, so that one can conceive of a local race reverting to the type, when bred where the type occurs, though the typical form could not assume the facies of the local race, when bred where the local race is met with. But even if all variation due to external causes were the result of biphasic genes and not to a general response of the somatic tissues, actual cases like the hypothetical one just mentioned would probably be too rare to be of practical importance, and so forms that show instability under changed conditions must for the most part be regarded as phases and not races.

Verity has defined a race as 'a group of individuals having developed in the same surroundings and exhibiting certain local features simply due to their influence,' and elsewhere he has indicated that he does not believe these features to be hereditary. Few will agree with him, but if he were right in this assumption I should say that not one of his named races is a true race, but that all are phases. They may be worthy of names, but it should be clearly indicated that their distinguishing features are due to climate or some other external cause. Races and sub-species that have not undergone the test of breeding true in an altered environment have small claim to scientific recognition as such. I am not speaking now of sub-species of so high a grade that some might prefer to call them species, but of the numberless local forms, particularly of those of the European Rhopalocera, upon which names are being bestowed so liberally.

There is a wide field open to entomologists who are anxious to elucidate the nature of local forms and not merely to collect and name them. Harrison has shown us one way of doing so. So-called races and sub-species should be bred out of doors in the habitat of the type, or if this is impossible under conditions differing widely from those of their native place. If they prove stable, either they differ from the typical form in a multiplicity of transmissible characters and their right to the title is established, or they are simple mutants and fall under the heading of aberrations.

Pictet has used another method in his study of the geographical races in the National Park of Switzerland. He has noted the exact range of certain forms and observed for several years the state of affairs in the zone where they overlap. Dealing with the following pairs—*Erebia nerine*, Esp., and ab. *reichlini*, H.S., *Coenonympha satyrion*, Esp. and ab. *darwiniana*, Stdgr., *Brenthis amathusia*, Esp., and ab. *nigrofasciata*, Fav. and *Erebia gorge*, Esp., and ab. *triopes*, Spuler.—he finds that in the case of each pair both members are found alone in certain areas and where they overlap they occur together without any intermediate forms, the proportion being seven to one in the case of the first three pairs and one to seven in the case of the fourth. His conclusions are that the first member of each pair is dominant to the second in the case of the first three pairs and recessive in the case of the fourth, and that where both occur interbreeding accounts for a proportion of three to one and fresh immigration raises it to seven to one. I doubt the validity of his explanation of the proportions, but the evidence certainly points to a Mendelian relationship between the members of each pair, and, if so, the cases are comparable with that of *Amphidasis betularia* and ab. *carbonaria* in the United Kingdom, and the second member of each pair is not a race or sub-species but an aberration. Seitz regards *reichlini* as a sub-species, but agrees with Pictet in looking on the others as aberrations. Verity adopts a most elaborate subdivision of *arcania* into two exerges, *arcania* and *gardetta*, each comprising a number of races, and places *satyrion* (*philea*, Hb.) and *darwiniana* into exerge *gardetta*. From this I gather that he considers this pair to be phases, a conclusion diametrically opposed to that of Pictet. I do not know what view he takes of the other forms. Doubtless, reference to other authors would lead to the discovery of further divergences of opinion, but this will suffice to show the need for more experimental work.

Hemming is attacking the problem from another stand-point.

He is examining the genitalia of races and sub-species of European butterflies and finding that in some cases these are so different as to indicate specific rank. Once separable by means of the genitalia other differences, small but constant, become manifest. Unfortunately the genitalia are indistinguishable in the different species of some genera, so that their similarity in doubtful cases cannot be regarded as a proof of specific identity. Here a study of the early stages may provide convincing evidence that they form a group of species rather than races of a single species. There are other obscure groups of forms on which more light may be thrown by a knowledge of the whole life-history than in any other way.

It is only by a combination of one or more of these methods with carefully devised breeding experiments that a real knowledge of the status of many geographical forms can be attained.

Verity in one of his papers claims that he has analysed thoroughly the races of most of the European butterflies. What he has done is to draw up a valuable list of forms that still await analysis, and had he omitted some and given a fuller description to others his list would have been of much greater use. In giving names to many of these forms to prevent them from being forgotten or overlooked, he is not altogether wrong ; it is the system of nomenclature that is at fault. We require some non-committal term to use as I have used 'form' in this address, and a name for what I have called phases or a recognition of the term phase in a technical sense. The recent wide use of sub-species is degrading it unduly, and to avoid this geographical forms should be roughly divided into two categories and the term sub-species should be restricted to the well differentiated forms, and either the term race or some Latin equivalent should be adopted for the less clearly defined forms or the place of origin coupled with the scientific name should be regarded as an adequate means of referring to them. As our knowledge grows it should be made possible to discard the non-committal term altogether or to replace it by aberration, race, sub-species, or phase, and so indicate its real nature. Both the original naming of a form and the later defining of its status would need notification. The present rigid system presupposes a knowledge we do not yet possess.

Intensive study leading to a vast number of new names will inevitably extend from the European to the tropical Lepidoptera and from the Lepidoptera to other Orders. It is of vital importance that before this takes place the nomenclature of all forms below the higher grades of sub-species shall be placed on a sounder basis.

Let me return to the consideration of aberrations. Many workers are interested solely in races and sub-species and do not deign to notice even the major aberrations. They appear to be unaware that the main differences between racial or sub-specific and typical forms are due to genes producing small effects in comparison with the effect produced by a single gene responsible for a major aberration. This attitude leads them to attach as much importance to phases, perhaps due to variability within the gene, as to the gene itself.

The systematist should feel dissatisfied until he has before him an analysis of the races and sub-species he is dealing with and learnt wherein their real differences lie, which of them are attributable to the immediate effects of their surroundings, phases, and which are due to the presence or absence of particular genes or to differences in the proportions of those genes. Such knowledge can only be acquired gradually by the combined efforts of the field naturalist, the geneticist, and the museum worker, but it ought to be the ideal ever present in the mind of the systematist.

The fascinating subject of parallel variation has a bearing on this matter. It must be due to the presence of similar or identical genes in the species with parallel forms, and such genes must be older than the species themselves, if identical, or, if similar, due to the physiological relationship antedating the origin of the species. Parallel variation has been studied with greater care in *Drosophila* than in any other genus and a marvellous parallelism in the genes has been found in the different species. According to Spencer, for example, there are at least four sex-linked mutants and three linked autosomal mutants in *D. hydei* similar to the sex-linked and autosomal mutants in *melanogaster*; and Lancefield and Metz have discovered a similar parallelism between some of the mutants in *D. willistoni* and *melanogaster*. If we are to believe the work on the location of the genes, these parallel mutants are due to genes carried by corresponding chromosomes and moreover situated in the same parts of the corresponding chromosomes. This is not an isolated case; the same conclusion has been reached in the case of other genera of plants and animals. Who can doubt that it is equally true of the Lepidoptera? The recessive black forms and yellow forms, known to occur in most of the Zygaenids, and probably common to all, afford a good example of the kind. The white female forms of the genus *Colias*, behaving as sex-limited dominants afford another. Mutants due to such a gene may appear even in members of different genera, and I will take as a probable example the one

that causes melanism in *Selenia bilunaria* and *S. tetralunaria*, *Ennomos angularia* and *E. autumnaria*, *Gonoptera bidentata*, *Pseudopanthera* (*Venilia*) *macularia*, and *Epione advenaria*, a gene that is recessive in those species in which its behaviour has been investigated. Even in widely separated genera astonishing similarities of colour and pattern may be seen not as aberrations but in the typical form, and these too may be due to the possession of identical genes inherited from a remote common ancestor, genes that have been lost or hidden by more recently acquired dominant ones in the intervening genera or species. Biological facts of such significance must be discussed and referred to by scientists of different nations and the only easy way in which this can be done is by the use of names.

In the report of the British National Committee on Entomological Nomenclature it is proposed to give official recognition to sub-species, and, since races are now ranked with sub-species, to races also, but no reference is made to aberrations, and presumably these are to have no official status. Surely those aberrations, which are mutations, should receive equal recognition and be protected in the same way by the Laws of Nomenclature. I have little doubt that the good sense of the majority of Entomologists will ensure them the same protection as heretofore, and the law of priority will be followed, but it is a retrograde step that our arbiters of nomenclature propose to take unless they intend to undertake the gigantic task of giving the same name to all parallel variations. This would be the ideal method of dealing with the problem. All the black mutations in *Zygaena* would then have the same name, and all the white forms of female in *Colias* and so on. This, however, does not appear to be their intention. On the contrary they propose to render invalid a name given to one member of a genus, if it has been used already for another member of the same genus. They may thus prevent the use of one name for forms owing their appearance to identical or corresponding genes, or groups of genes or for forms owing their similar appearance to similarity in their environment.

It is to be hoped that these suggestions will not be ratified and that those aberrations, which are mutations, will receive due recognition. Their importance has been impressed upon us still more strongly by some recent additions to our knowledge of the manner in which they may be brought about. As this knowledge appears to throw some light on the origin of races and sub-species it seems to be a fitting moment to call your attention to it.

You are all familiar with the work of Harrison on industrial

melanism. Chemical substances such as lead and manganese in his hands have effected changes in the germ-plasm like those occurring uncontrolled near the big cities of this country, the continent of Europe, and America. These melanic mutants have proved stable and their peculiarities are inherited under any environmental conditions. Harrison's work has not yet been repeated with success by others, but has been subjected to a good deal of criticism, though I see no reason to doubt either the soundness of his methods or the results achieved by them.

Nevertheless the production of mutations in *Drosophila* by radium and X-rays is far more impressive. Objections like those raised against the work of Harrison cannot be raised in their case and already the experiments have been repeated independently by others. The mutations obtained by Muller were not produced occasionally after years of patient labour like Harrison's melanic moths, but were obtained with bewildering rapidity. Muller says that almost every other sperm cell capable of taking part in the production of a fertile fly contained an ' individually detectable ' mutation in some chromosome or other. In other words almost half the progeny of an irradiated parent showed an easily recognisable mutation, no attempt being made to count the minor ones, and the rate of mutation among the offspring of irradiated parents was 15000 per cent. greater than among the controls. The mutations that appeared after X-ray treatment were like those that occur from time to time in the course of ordinary breeding experiments, recessive for the most part and often sex-linked. Most of the known mutations reappeared and only a few were previously unknown.

Both X-rays and radium in large doses cause sterility and the highest rate of mutation was found to occur with a dosage just short of a sterilising one. The results obtained in the first instance by Muller have been confirmed by the experiments of others, and Hanson and Heys have got similar results by using radium or the gamma rays of radium alone.

Muller has also shown that an increase in the temperature at which cultures of *Drosophila* are kept increases the rate of mutation, though to a much less extent than X-rays or radium.

Mutations can thus be produced by either chemical or physical agencies, and the more powerful they are the greater the rate of mutation. There appears to be nothing specific in the agencies employed and their action is merely that of giving to the cells a shock just short of fatal.

Mavor says that "the introduction of a violent agent like X-rays into the delicate mechanism of hereditary material is not to be compared with any natural process and can hardly be expected to have a greater influence on the hereditary tendencies than the work of a train wrecker would have on the destination of a train." His comment is unfair. Though physical violence comparable with that exerted by a strong dose of X-rays can seldom if ever occur under natural conditions, nor can as heavy doses of poisonous metallic salts as Harrison used be encountered often in the vicinity of industrial centres, less violent chemical and physical agents must often be at work and lead to the appearance of an occasional mutation. In this connection the temperature experiment of Müller is most important for it shows that climatic conditions may be a direct cause of the appearance of new inheritable characters. The facts of geographical variation have long pointed to this conclusion, but the experimental proof is most welcome. Previous temperature experiments have merely produced remarkable variations such as those so well known in the Vanessids and Argynnids. These were not inherited, though the germ cells were to some extent affected as the experiments of Standfuss with *V. urticae* and of Fischer with *Arctia caia* showed. These effects were only produced by a severe shock, just short of fatal; heat, cold and centrifugalisation gave identical results. In this they resemble the recent experiments on the production of mutations, but differ from them in that mutations are produced by much less drastic means, the more violent agents simply increasing the rate of production. They differ also in that they are not fully transmissible like true mutations. They seem more akin to the temperature phases, the wet and dry season forms, of tropical butterflies, but we might learn more about their nature if more than one generation of their offspring could be bred under normal conditions.

Recent research has let in a ray of light to illumine the darkness, which has hitherto enveloped the process of evolution, and has shown that this is not wholly caused by changes taking place within the organism and independent of its environment, but is at any rate in part due to the conditions in which the organism is living. I use the expression ray of light advisedly, because none of the mutations seem to be specially adapted to the conditions that bring them forth and many are such as to make the organism less able to survive under any conditions. It may be that they play only a subsidiary part in normal evolution, or it may be that experiments on other

species will give rise to a much larger proportion of mutations that may by selection prove useful and to fewer harmful ones: I fear the former surmise is the true one, but if the latter proves to be correct the discovery is indeed epoch making. Given isolation by sea, mountain, or desert we should have a clue at last to the way in which a species, so separated, forms first two races, then two subspecies, and finally two species by the action of differences in the chemical and physical agents, food, soil, temperature, humidity, and sunlight, met with in the two areas.

Even if this discovery has not revealed the secret of the origin of those variations that in the past have supplied the material for natural selection to work upon, may they not provide us in the future with the material for artificial selection offering us a wide choice of mutations to preserve or reject as we will? This may sound visionary, but if in a brief space of time we have produced almost all the known mutations of *Drosophila*, why should we not equally well produce almost all the known mutations of *Abraxas grossulariata* or *Arctia caia* or many hitherto unknown mutations of animals and plants, the possibilities of which have been less thoroughly explored, but which may prove of the greatest service to mankind?

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On the termination of my second year as your President I wish to thank you for the honour you have done me and for the kindness

and courtesy you have always shown to me. I also take this opportunity of acknowledging the debt of gratitude I owe to the Officers and Council. No one who has not held my position can realise to the full to what extent the President is dependent on their loyal co-operation and how much this costs them in time and trouble.

In choosing as my successor Mr. Andrews, a dipterist, you have accorded recognition to a representative of an Order comparatively neglected, but of great importance to mankind, and in so doing I feel sure you are furthering the best interests of the Society. I am confident that under his able guidance The South London Entomological and Natural History Society will advance from strength to strength and I join with you in welcoming him and wishing him a happy and prosperous tenure of the Office.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 9th, 1928.

The President, Dr. E. A. Cockayne, A.M., F.E.S., F.R.C.P., in the Chair.

Mr. C. D. Anderson, of Ealing, was elected a member.

Mr. Hugh Main gave a demonstration of the apparatus and methods used by him in Nature Photography; and subsequently exhibited a series of slides to illustrate his "Nature Notes with a Camera."

FEBRUARY 23rd, 1928.

Mr. H. W. Andrews, F.E.S., Vice-President, in the Chair.

The evening was devoted to the exhibition of lantern slides by Messrs. R. Adkin, T. J. Coulson, A. W. Dennis, G. E. Frisby, A. de B. Goodman, H. Main, C. W. Sperring, and A. E. Tonge.

Mr. Tonge showed a series of slides of ova of Lepidoptera in profile.

Mr. Dennis, studies of wild and uncommon plants.

Mr. Main, portions of the life-histories of Coleoptera and spiders.

Mr. Frisby, the nests of local British birds, including Terns, Gulls, Warblers, Oyster-catcher, Dunlin, Sandpiper, Redshank, etc.

Mr. Robert Adkin's contribution included:—

1. The cremasters of *Aglais urticae* and *Vanessa io*, mounted to show the hooks by which the pupae attach themselves to the silken pads prepared by the larvae. The preparations from which these slides, and the five following were taken, were very skilfully made by Mr. A. L. Rayward.

2. A foreleg of *Pieris brassicae* with its pair of claws, a pad and two brushes, as representing the Papilionids; of *Pyrameis atalanta*, brush-like and useless for alighting or walking, as representing the

Nymphalids; and of *Polyommatus coridon* with its single claw, as representing the Lycaenids.

3. The anal comb of *Augiades sylvanus*. The larvae of many Hesperiids construct tubes of their food-plants in which they live, and the comb is used as a means of keeping the tube clear of excrement. On a pellet being passed it is held by the anus until the comb comes into action, when it is ejected clear of the tube.

4. A larva of *Biston betularia* which, he said, the following narrative would show to be a very remarkable case of "protective resemblance." A friend and his wife, with another young couple, were spending a brief caravan holiday in the New Forest. One evening, with a view to a little mild sport among the small birds on the following day, this young friend cut what he believed to be a very symmetrically forked twig of hawthorn, in order to make a small catapult, and placed the twig in the dickey of the motor car used for towing the caravan. On taking up the twig on the following morning, it was found that one of the limbs of the fork had disappeared, or perhaps it would be more correct to say had shifted its position and was pointing downwards instead of upwards. It was then found, on closer inspection, that what had appeared to be one limb of the fork was in reality a caterpillar.

MARCH 8th, 1928.

The PRESIDENT in the Chair.

The death was announced of one of the oldest members of the Society, Mr. W. G. Dawson (1888) at the age of 91.

Mr. Grosvenor exhibited larvae of a Zygaenid, probably a race of *Z. lonicerae*, reared from ova deposited by females obtained by Mr. Hugh Main at Blanes, near Barcelona, Spain, in June, 1927. Many of the ova hatched in transit, but the remainder produced a remarkable brood, in that about 75% of them produced imagines in the autumn. The exhibit included :—

Larvae from the wild-taken imagines, the remainder having emerged as a second brood. These larvae behaved in a normal fashion, feeding for a few weeks, before going into hibernation.

An abnormal larva, one of the foregoing batch, went into hibernation in a normal fashion on or about July 31st, 1927. After being in hibernation for a few weeks, it suddenly changed its skin ;

and on September 17th, started feeding and continued to do so until October 3rd, when it again changed its skin and went into hibernation. He called attention to the large size of the larva.

Larvae obtained from a pairing of the autumn brood. They fed for a short period, and then went into hibernation.

Larvae belonging to the autumn brood which, instead of hibernating normally, went on feeding with every indication of producing a 3rd brood. In November they ceased feeding and went into hibernation. These were larger in size than the last.

An abnormal larva belonging to the same brood, which ceased feeding in November, but did not change into hibernating skin. It remained bright green and continued to wander around the cage, but refused to feed. Gradually it became very thin and unhealthy, with every appearance of dying; but in the middle of February it commenced to feed *without changing skin*, and slowly gained stamina, until to-day (March 8th, 1928) it is a healthy larva nearly half grown. It had not changed its skin since last November, but now appeared to be about to do so.

Mr. Hy. J. Turner exhibited nine species of Hawk-moths (*Sphingidae*) sent to him by our fellow member Mr. Sneyd Taylor, from Barberton, S. Africa. They were taken at flowers and at light. There were *Herse convolvuli*, *Hippotion celerio*, *Basiothia schenki*, *B. media*, *Odontosida magnifica*, *Cephonodes hylas*, *Nephele accentifera*, *Macroglossum trochiloides*, and *Leucostrophus hirundo*.

Pieris rapae was reported as having been seen during the first week in March.

Mr. O. R. Goodman read a paper entitled, "South-east France," and illustrated it with lantern slides of the scenery. (See page 1).

MARCH 22nd, 1928.

The PRESIDENT in the Chair.

Mr. C. N. Hawkins exhibited living larvae of *Ptychopoda dimidiata*, from ova laid in July last and hatched in August. They had fed slowly practically the whole winter, except during very severe weather, and were now nearly full fed.

Mr. Dennis exhibited stereoscopic slides of the filmy ferns *Hymenophyllum tunbridgense* and *H. unilaterale*, pointing out that the two species are readily identified in fruit, the former having the

two valves of the involucre nearly circular in outline and strongly toothed at the margin, those of the latter being ovate and without teeth. The divisions of the fronds in *tunbridgense* lie flat, *unilaterale*, having them strongly decurved.

Mr. W. S. Bristowe, B.A., F.Z.S., read a paper, "Facts and Fallacies about Spiders." (See page 12).

APRIL 12th, 1928.

The PRESIDENT in the Chair.

The President exhibited bred series of *Nonagria cannae* and *N. typhae*, including examples of the dark ab. *fraterna* form. He also shewed larvae of *Oporinia autumnata* and of *Omphaloscelis lunosa*.

Mr. C. N. Hawkins exhibited a short series of *Acidalia* (*Ptychopoda*) *rusticata*, bred from eggs laid by a ♀ taken in July, 1927, in North Kent; and of *Taeniocampa populeti*, bred from larvae taken at our last Field Meeting at Byfleet. One ♂ of *A. rusticata* has the ante-marginal cloud absent from all wings. Also larvae of *Mormo* (*Mania*) *maura* and of *Naenia typica* from Wandsworth. It was pointed out that the larva of *M. maura* might be distinguished by the red spots above the spiracles. The *P. rusticata* larvae, which the President had from the same source, fed all the winter, except in the severest weather, but had not yet pupated. A discussion took place as to the food-plant of this species in nature.

Mr. Bliss exhibited an aberration of *Limenitis sibilla*, with only a few very small remnants of the wide white band usually crossing all four wings; it was taken in the New Forest in 1918.

Mr. Tonge exhibited a wild-laid egg of *Polyploca flavicornis*, situated in the angle between two small twigs of birch.

Mrs. Olive Grey exhibited the larva of a Carabid beetle from Morocco, and two cast skins. It was taken in February.

Mr. Hy. J. Turner exhibited ♂ and ♀ specimens of the S. African Saturniid, *Bolocera* (*Ludia*) *smilax*. A female had been bred from a larva, and the males were attracted to her in some numbers.

The President referred to *Oporinia autumnata* as having pale green larvae, which feed later than those of *O. filigrammaria* which are dark brown. The latter feed on heather, the former on birch and alder. *O. autumnata* is wide-spread in both north and south, whilst *O. filigrammaria* occurs only in the north.

APRIL 26th, 1928.

The PRESIDENT in the Chair.

Dr. Cockayne exhibited the larva of *Leucania turca*; and it was remarked how much it resembled an Agrotid larva.

Mr. Turner exhibited a small box showing the imagines, larval cases, mines of the larvae, and hibernating cases of the larvae of *Coleophora hemerobiella*, the food-plant of which was hawthorn leaves.

Mr. T. H. L. Grosvenor exhibited larvae of the following Zygaenids :—

5 spotted forms :—of *Z. lonicerae* (England), *Z. transalpina* (St. Martin Vesubie) and *Z. stoechadis*; and of ? species (Digne; St. Martin Vesubie and Blanes).

6 spotted forms :—of *Z. stoechadis*, ? species (Digne), *Z. filipendulae* (England) and *Z. scabiosae* (Digne). Also parents of most of the foregoing.

Oberthur named a race apparently of *stoechadis* from the South of France (Ste. Baume, Hyéres, etc.,) which he called *anceps*, stating that this regularly has 5 and 6 spotted forms; but breeding from what was apparently this race has produced very distinct larvae, so that it would seem that there are two species here. *Transalpina*, which flies with them, is easily distinguished, especially in the larval state, in which note the black dorsal line, a characteristic of this species. The 5 spot of St. Martin Vesubie are almost black with a very bright sub-dorsal line. Those from Digne are pale green with small black spots, and with dorsal and sub-dorsal lines; these very much resemble the 6-spotted larvae from Ste. Baume, but the latter have larger black spots.

The larvae of *Z. scabiosae* are worthy of note on account of their small size, they hibernate when about 2 mm., whereas most of the others that I have bred are about 4 mm. when hibernating.

Mr. Newman exhibited a living specimen of *Callophrys rubi*, just taken; and gave notes on this year's experience so far. He had found larvae of *Lasiocampa quercus* commoner than usual, of *Eutricha quercifolia* widely spread, of *Cosmotriche potatoria* commonly; but *Arctia villica* had been very rare for years. Of the species of which he had been endeavouring to hibernate the larvae, *Geometra papilionaria* had wholly succumbed, of *Melitaea athalia* but very few remained, *Brenthis euphrosyne* was an utter failure, of *B. selene* a very fair number had gone through, but *Argynnis aglaia* was

another utter failure. Out of a very large number of *A. cydippe*, there was no trace of a larva. *Ourapteryx sambucaria*, *Angerona prunaria* and *Phalaena syringaria* had all done fairly well. *Lycaenopsis argiolus*, *Pieris rapae*, *P. napi*, and *Gonepteryx rhamni* imagines were flying, but the last was not so common as usual; and *Aglais urticae* was much less in number. He had seen two *Polygonia c-album* near Oxford. As to his Zygaenids, the larvae had all succumbed.

Mr. Grosvenor remarked that it had been one of the best years for hibernating Zygaenids in his experience. Quite 90% of his larvae had come through, and in one case 196 were feeding out of 198 pre-winter larvae.

Dr. Bull exhibited a wild laid ovum of *Polyploca flavicornis*, on a birch twig at the base of a bud; and reported seeing *Pyrameis cardui* in Sussex that day.

A discussion took place as to the feeding of butterflies after hibernation. *Vanessa io* and *Polygonia c-album*, thrived on sallow catkins, *Gonepteryx rhamni* sucked bluebells and primroses, *Aglais urticae* dandelions. If fed on sugar in captivity all these invariably died prematurely, but never when fed on their natural food.

The President remarked that individuals of *G. rhamni* had their own individual taste; one would seek primroses, another the bugle, and so on. Mr. Step had noticed another to visit only the flowers of bilberry.

Mr. Main said that *P. napi* would exist for weeks on sugar; it was however not a species which hibernated as an imago.

MAY 5th, 1928.

FIELD MEETING—RANMORE.

Conductor—HY. J. TURNER, F.E.S.

This meeting, the first of the season, was a very successful one as regards numbers; nearly thirty members and friends were present.

The Lepidoptera and Coleoptera of this neighbourhood are pretty well known and were not reported. Mr. G. Nixon reported the following bees:—*Halictus subfasciatus*, Nyl.=*freygessneri*, Alfk., "not a very common species"; *Andrena nigroaenea*, Kirb.; *Nomada goodiana*, Kirby; *N. alternata*, Kirby (*marshamella*, Kirby); *N. ruficornis*, L. (*flava*, Kirb.); *Psithyrus vestalis*, Fourc., and *Bombus hortorum*, L., var. *ruderatus*, Fb. Mr. D. E. Kimmins reported the

following insects:—Neuroptera: *Hemerobius stigma*, Steph., *H. nitidulus*, Fb., and *H. micans*, Oliv. Diptera: *Bibio venosus*, Mg., and *Bombylius major*, L. Orthoptera: *Tetrix subulatum*, L. It was observed generally everything was backward for the date.

MAY 10th, 1928.

Mr. H. W. Andrews, F.E.S., Vice-President in the Chair.

Several members made remarks on the season.

Mr. Tonge had found the larvae of *Hipparchus* (*Geometra*) *papilionaria* more common than ever before.

Mr. Adkin had seen a *Pyrameis cardui* on May 8th at Eastbourne, whereas it was rarely seen before the end of the month.

Mr. Grosvenor said it was already too late for larvae of *Zygaena trifolii*. On May 5th, at Ranmore, he had found 7 pupae, 4 of which had been attacked by enemies. The pupae were very rare this year. He stated that the early broods of this species pupated on blades of grass which subsequently drop to the ground, where the pupa lies flat, while the later brood pupates on stones or other objects.

MAY 19th, 1928.

Field Meeting—St. Martha's, Chilworth.

Conductor—Hy. J. Turner, F.E.S.

This was a locality new to the Society necessitating a somewhat longer journey. A few members and friends were pressnt. The morning was dull and little but larvae beating could be carried on. Soon after midday a thunderstorm began and a deluge of rain put an end to all activity. All those present, however, were impressed with the possibilities of the district for future investigation.

MAY 24th 1928.

Mr. H. W. Andrews, F.E.S., Vice-President in the Chair.

Mr. C. N. Hawkins exhibited living larvae of *Strymon w-album*, *Amathes circellaris* and *Chesias spartiata*, Hbst.=*legatella*, Schiff.,

taken on the occasion of the Field Meeting at Chilworth, May 19th.

Mr. Eagles exhibited living larvae of *Boarmia abietaria*, Schiff.= *ribeata*, Clerck, beaten from yew at Ranmore during the Field Meeting, May 5th; also larvae of *Bryophila* (*Metachrostis*) *perla*.

Mr. H. Moore exhibited a short series of the Nymphalid *Dione vanillae* sub-sp. *insularis*, Maynard, and contributed the following note:—"In the "Entomologist" for September, 1926, there was a very useful paper by Captain N. D. Riley on the species of *Colaenis* and *Dione*. Familiar as we may be with *Dione vanillae*, Linn., in some form or another, it is only when such revisional work is published that we are able to sort out our specimens and understand the obvious differences in appearance; and I may add, find out what we have not got. In my case, while I have handled a fair number of N. American specimens (which henceforth are known as sub-species *incarnata*) the other races have not come my way in any abundance; and the only example of the race *insularis*, as we know it, was a solitary specimen from Jamaica. However, of late, a friend has been asking his missionary friends to send him home butterflies from their respective stations, and from Cleuthera Island (one of the Bahamas) he received a box in which amongst others, were 200-250 specimens of *D. vanillae* sub-sp. *insularis*. But they had been captured by the juvenile members of his coloured flock, and were in much the same condition as those taken some time ago by ourselves, before we were old enough to own a net. These I exhibit are some of the best."

A Potential Orchard Pest.—Mr. Robert Adkin exhibited specimens of the Tineid moth, *Argyresthia conjugella*. He said that the natural food of its larva was the Mountain Ash (*Pyrus aucuparia*) in the fruits of which it burrowed. In some parts of the world, however, it had, during the past thirty years, become rather a serious orchard pest. Reports had been received from places so far apart as Sweden, Japan and the United States of America, that the apple crop had from time to time been badly damaged by the larvae boring into the fruit; and isolated cases had recently been reported from several other countries, including Britain. From careful observation it appeared that so long as an adequate supply of Mountain Ash fruits were available the larvae were content to feed in them, but when the moth became very abundant and the supply of its natural food ran short, it laid eggs on the apples. It was to be feared that, having acquired the habit of feeding in apples, it

would probably continue to do so, and so became a pest in this country, as it already had in some others, notably Sweden, where in some years the apple crop had been completely ruined by it.

Mr. Grosvenor exhibited series of *Zygaena carniolica*, from many localities, and pointed out the various subspecies or closely allied species. The larvae were said to be very like those of *Z. trifolii*.

Mr. K. G. Blair exhibited, on behalf of Mrs. O. Grey, a specimen of *Cryptamorpha desjardinsi*, Guér., found alive among Bananas in London. Described originally from Mauritius, it is widely distributed among the islands of the warmer parts of the world, being represented in the Brit. Mus. collection by specimens from the Sandwich Is., New Caledonia, Fiji, New Zealand, Mauritius, the Seychelles, St. Helena, Madeira and the West Indies. It has been recorded as an introduction in southern Europe, and has been many times described, *e.g.*, *Telepharius fasciatus*, Redt. (Fiji), *Dendrophagus suturalis*, White (N.Z.), *Cryptamorpha musae*, Woll. (Madeira).

Mr. H. W. Andrews exhibited six out of the seven British species of the genus *Xylota* (*Syrphidae*), Diptera, of which five occur in his neighbourhood of West Kent. The larvae are found in rotten wood.

Mr. Hy. J. Turner exhibited the curious larvae of *Xylophasia monoglypha* which he had found feeding at the roots of dock and dandelion, in his new garden at Cheam.

Dr. G. V. Bull exhibited *Pieris napi* with deficient scaling, May, 1928; *Dasychira pudibunda*, a very small example, bred April; an asymmetrically marked *Plusia gamma* bred September, 1926; an unusually black larva of *Abraxas grossulariata*, and a larva of *Miselia oxyacanthae*. He pointed out how great was the resemblance of the latter to the lichen on the bark of a tree. He also reported having seen *Rumicia phlaeas* and *Brenthis euphrosyne* flying on May 6th, and *Hamearis lucina* on May 19th.

Mr. S. R. Ashby exhibited a series of *Xestobium rufo-villosum*, DeG., from Rye, Sussex, May, 1928; also *Polydrusus micans*, F., and *Saprinus virescens*, Pk., taken at Ranmore on May 5th, 1928.

JUNE 2nd, 1928.

FIELD MEEEING—TRING.

Conductor—O. R. GOODMAN, F.Z.S., F.E.S.

Only about half-a-dozen members attended and no report was sent in.

JUNE 14th, 1928.

The PRESIDENT in the Chair.

Mr. C. N. Hawkins exhibited seven examples of *Pygaera* (*Clostera*) *curtula*, L., all bred from a batch of eggs found on aspen at Byfleet, on May 28th, 1927. Three ♂ ♂, of the summer form, emerged on July 23rd, 24th and 26th, 1927; the remainder, 2 ♂ ♂, and 2 ♀ ♀, passed the autumn and winter as pupae and emerged on March 5th (two) and 29th, and April 9th, 1928; these four are of the spring form. All were treated alike in breeding, so far as the varying lengths of the pupal periods permitted. There were shewn also, two forms of the ♂ pupa, one of which was much paler and apparently of thinner texture than the other. This did *not* depend on the time of emergence of the imago. All the other pupae were of the dark form.

Dr. Fremlin exhibited an unusual form of *Dysstroma truncata* (*russata*), bred from a larva taken at Berkhamstead. It was considerably blacker than usual, with a well marked red band. A second exhibit was an example of *Epirrhoë alternata* (*sociata*), from Ryarsh in Kent, in which the central white band was much contracted and narrow, the outer area was wider and dark, while the inner basal band was deep black and broken.

Mr. Jarvis exhibited examples of several species of British Longicorn beetles and a number of species of the same section from Brazil for comparison.

Mr. Hy. J. Turner exhibited the following species of Lepidoptera taken by Mr. J. Sneyd-Taylor, B.Sc., in the Transvaal, S. Africa.

Ludia (*Bolocera*) *smilax*.—A Saturnian of which the female was bred from a larva found on the "pepper tree" (*Schinus molle*), and the males assembled. (*Ent. Record*, XL. 77).

Patula (*Crishna*) *macrops*, subsp. *walkeri*.—A large Noctuid with a distribution over most of Africa and the Indo-Malay region, and often taken far out at sea. The males possess an enormous tuft of yellow hairs on the tibiae of the front legs.

Hippotion eson.—A common S. African Sphingid.

Sphingomorpha chlorea, subsp. *monteironis*.—A noctuid which as an imago does much damage to the tree-fruit of S. Africa.

Tascia finalis.—A Syntomid-like Zygaenine.

Thyretes caffra.—A very common Amatid (Syntomid) found throughout Cape Colony.

Amphicallia tigris.—A brilliant yellow and black Arctiid, belonging

to the *Callimorphinae* section. The genus has representatives all along the East African area.

Various members reported *Pyrameis cardui* from Tring, Essex, Eastbourne, S. Devon, Brighton, etc.; and *Colias croceus* at Box Hill on the occasion of the Field meeting in May.

The President reported that, in spite of the inclement weather in Perthshire, he had found *Anarta melanopa* and *A. cordigera* exactly at their usual time of appearance, the latter being the scarcer. *A. melanopa*, as a rule, is found quite 2000 ft. above the locale of *A. cordigera*, but both occurred together on the lower ground; only once had he found the latter species at the higher level. On one occasion he found the three *Anarta* species on the same ground. He asked what was the food-plant " in nature " of *A. melanopa*. It was stated to be crowberry, but this had never been verified. *A. cordigera* is the more active in the sunshine, and will not oviposit unless in brilliant sunlight, whilst *A. melanopa* is more or less active at all times. He stated that the occurrence of *A. cordigera* in any number was influenced by the custom of firing the heather, which was done annually in strips. Bearberry recovers slowly.

JUNE 23rd, 1928.

FIELD MEETING—WESTERHAM.

Conductor—F. B. CARR.

This locality has been frequently visited by the Society before, and no report was forthcoming.

JUNE 28th 1928.

The PRESIDENT in the Chair.

Mr. Buckstone exhibited larvae and pupae of *Ruralis betulae* from Witley; and said that he had found the larvae to be cannibals. It was remarked that if occasionally sprayed they would not attack each other.

Mr. Tonge exhibited a specimen of the timber saw-fly, *Sirex gigas*, from Reigate, and stated that it appeared to have become more common in recent years.

Mr. Blair remarked that he had seen the ♀ oviposit, and subsequently contributed the following note:—

Oviposition of Sirex gigas, L.—On June 9th, when with Mr. E. E. Green in his garden at Camberley, we came upon a ♀ *Sirex gigas* with her ovipositor deeply embedded in a larch log. We stopped to watch operations and soon the ovipositor was withdrawn. The insect then wandered off, walking rather jerkily over the log, the ovipositor held in its sheath beneath the body, its tip dragging along the bark behind her. As she went her antennae were in constant action tapping the bark in front of her. About six inches from the spot where we first found her, having apparently discovered another position to her liking, the body was raised as high as possible on her legs, the ovipositor slipped from its sheath and the point inserted in the bark beneath the middle of her body, *i.e.*, some distance, about an inch, away from the spot last explored by her antennae. The ovipositor was then perpendicular to the bark and to the general axis of her body, though this was now somewhat arched, while its sheath remained in its original position. Gradually the ovipositor was driven farther into the log, a slight side-to-side motion of the body being perceptible, until finally it was buried almost to its full length. Though we watched carefully we saw no sign of the passage of any egg down the ovipositor, but after a few seconds it was seen to be being slowly withdrawn, the withdrawal being considerably more rapid than the entry. From first point of insertion to complete withdrawal occupied 10 minutes. The insect then moved off again, but once more the ovipositor was slipped from its sheath and driven for its full length into the wood, in this case the operation taking a little longer, 12 minutes until complete withdrawal. Again no egg was observed to pass, but *S. gigas* is well known to make several such borings without ovipositing. Again the insect moved off, the ovipositor dragging along behind her. The terminal spike of the body is not brought into play at all, either when walking over the surface or during the thrusting in of the ovipositor; neither does the ovipositor sheath appear to afford any support during this operation. This time she wandered further without finding a suitable spot, then suddenly flew away.

Dr. G. V. Bull exhibited *Vanessa io*, ab. *cyanosticta*, with blue spots on the hindwings; *Rumicia phlaeas*, with the greater part of the R. forewing only of almost white coloration; and *Pseudopanthera macularia*, in which the marking was very abnormal. He also showed living larvae of *Polyploca ridens*, *Ectropis consonaria*, and *Boarmia rhomboidaria* (*gemmaria*).

It was remarked that *R. phlaeas* was notably scarce this year, so far.

Mr. Palmer exhibited a specimen of *Melanargia galathea*, with yellowish ground colour, from Swanage; an intermediate to ab. *flava*.

Mr. Dennis exhibited an example of *Plutella cruciferarum* with its cocoon. In comment, Dr. Cockayne remarked that he had found the species on a desert island in Russian Lapland on the Murman coast, where probably the larva had fed on a species of *Draba* or Cress.

Remarks were made as to the occurrence this year of several migratory species of lepidoptera in number. It was suggested that the prevalence of the North wind* may have been an aid to such migration, as it is well known that insects fly against the wind.

JULY 7th, 1928.

FIELD MEETING—HORSLEY.

Conductor—K. G. BLAIR, B.Sc., F.E.S.

The route taken was by the footpath along the railway to West Horsley place, across the Guildford-Leatherhead Road by the Church, up the Sheepleas to Netley Heath, and back by Chalky Lane to the "Duke of Wellington," where an excellent tea was served at 6 o'clock. Thirteen members took part.

Among the Lepidoptera noted were *Epinephele tithonus*, *Hepialus hectus*, *Toxocampa pastinum*, *Plagodis dolabraria*, *Boarmia repandata*, *Comibaena pustulata*, *Asthena testaceata* (*sylvata*), etc., with larvae of the following:—*Gonepteryx rhamni*, *Drepana lacertinaria*, *D. falcataria*, *D. binaria*, *Notodonta ziczac*, *N. chaonia*, *Sarrothripus revayana*, *Pygaera curtula*, *P. pigra*, *Polyploca flavicornis*, *P. ridens*, *Demas coryli*, *Gonodonta libatrix*, *Biston strataria* and *B. betularia*, *Ennomos erosaria*, and *Acasis viretata*. The Lepidopterists, however, did not have it all their own way; among Coleoptera worth noting were the following:—*Lucanus cervus*, *Cryptocephalus labiatus*, *Strangalia armata*, *Leptura melanura*, *Cistela hiperus*, and *Bytiscus populi*, while some burnt pines produced *Salpingus reyi* (*ater*) in numbers, *Catops fumatus* and *Corticaria elongata* and *C. fenestralis*. Of

* According to my notes the wind (Eastbourne) during later part of May and until June 8th was as much east as north.—R.A.

Orthoptera *Ectobius lapponica*, *Leptophyes punctatissima*, *Omocestus viridulus* and *Tetrix bipunctatum* put in an appearance. A small ichneumon, *Lissonota errabunda* was noticed flying in numbers up and down certain oak-trunks, apparently males awaiting the emergence of the females. Morley does not mention any host for this species. At a previous meeting of the Society mention was made of some of the old pine trunks on Netley Heath being riddled with *Sirex* burrows. Search was made for these trunks, but though certain trunks were found riddled with burrows of which the makers could not be ascertained, they certainly were not *Sirex*.

JULY 12th, 1928.

The PRESIDENT in the Chair.

Mrs. Maud Stanley-Smith was elected a member.

The President exhibited a hymenopterous parasite bred from a larva of *Synanthedon scoliaeformis*. He also showed the three species of *Anarta* taken at Rannoch in May, 1928, on the same ground: *A. cordigera*, *A. melanopa* and *A. myrtilli* (see p. 62).

Mr. Dennis exhibited photographs of the pupae of *Euchloë cardamines*, and stated that, in his experience, the larva did not, as a rule, pupate, as so repeatedly stated, on a stem of the foodplant, but upon surrounding objects. The general experience was the same.

Mr. H. Moore exhibited the Lycaenid, *Zizina labradus* (*phoebe*), one of the commonest wayside butterflies of New Zealand.

Mr. Farmer exhibited a living specimen of *Synanthedon myopaeformis*, a species which was emerging from a hawthorn bush in his garden in some numbers. The imagines came out on the side upon which the sun shone and dried their wings very quickly.

Mr. Anderson exhibited an example of *Daphnis nerii*, taken in the Isle of Wight at light, after midnight, on September 7th, 1926; and an aberration of *Aglais urticae* taken at Sutton Courtney, in which the band of the hindwing above was represented by six very dull and obsolescent orange spots, and on the underside there was a uniform dark ground without any indication of a band.

Mr. Eagles exhibited living larvae of *Ennomos quercinaria* (*angularia*) and *E. erosaria* from Horsley, and of *Eumorpha elpenor*, from Waltham.

Mr. Andrews reported that he had been some weeks on the coast of Cornwall, where he found *Colias croceus* and *Pyrameis cardui* very common. The weather was generally very dull, and the wind strong. His captures of Diptera were disappointing.

JULY 21st, 1928.

FIELD MEETING—PEASLAKE.

Conductors—Dr. G. S. ROBERTSON and F. B. CARR.

An excursion was made to the Hurtwood, Peaslake. 'Bus was taken from Dorking North Station to "The Rookery," beyond Westcott, where the party got out, the route being through Friday Street, where the lake was nearly empty owing to re-stocking with trout and getting rid of the "coarser" fish. A fine patch of *Mimulus luteus* was in flower at the upper end. Shortly before reaching Friday Street three *Cidaria picata*, a couple of *Asthena sylvata*, and a very dark form of *Boarmia repandata* were taken, also several larvae of *Eupithecia pulchellata* in the flowers of the foxgloves. On leaving Friday Street we took a westerly course through the woods to Abinger and Holmbury St. Mary, thence on to the Hurtwood near Peaslake, where *Limenitis sibilla* were seen in fair numbers but were rather badly worn. No *Eupithecia pusillata* larvae were beaten from the spruce needles, although they were common on the same date last year, full-fed. The aspens produced *Cerura bifida*, *Psilura palpina*, and *Pheosia tremula* (*dictaea*) larvae. Seven members and friends remained for tea at the Hurtwood Inn in Peaslake Village.

JULY 26th 1928.

Mr. H. W. ANDREWS, VICE-PRESIDENT, in the Chair.

Mr. Anderson exhibited four aberrations of *Zygaena filipendulae*, bred from Caterham pupae :—

1. L. forewing, all the spots run together, leaving only a small streak of the ground colour near the base. The R. side normal.
2. L. hindwing with a slight salmon suffusion.
3. The sixth spots very small and ill-developed.
4. All the wings salmon colour.

Mr. Grosvenor discussed the Zygaenids he had bred from ova laid by females taken at Ste. Baume. He was greatly puzzled as to the species. The examples bred varied by many gradations from specimens absolutely 5-spotted to others equally 6-spotted. He suggested that it might be a race of *Z. filipendulae* which produced 5-spotted forms.

The Chairman remarked on the advantages of breeding on a large scale and from many localities. Incidentally, he mentioned that he had seen *Z. filipendulae* in his garden at Eltham.

Mr. K. G. Blair exhibited a specimen of the Dipteron, *Bombylius minor*, from Shanklin, I. of Wight, bred from the cells of a bee *Colletes daviesana*, upon which it was a parasite.

Reports were made as to the occurrence, even commonly, of *Limenitis sibilla* in several localities in Surrey, as well as generally in parts of Sussex. *Asthena blomeri* had been in profusion in its well-known locality near Chalfont Road.

AUGUST 9th, 1928.

The PRESIDENT in the Chair.

Mr. Barnett exhibited a long series of *Boarmia consortaria*= *punctinalis* taken on trunks of trees near S. Croydon. These included several of the well-characterised melanic form. Other members reported the melanic form from near Wellington College, Tilgate, Byfleet, Maidstone and Oxshott. The form at the last mentioned locality was noted as getting gradually darker of late years. The President remarked that it was a Mendelian dominant.

Mr. Step exhibited an example of *Manduca* (*Acherontia*) *styx*, brought to him from Calcutta where it had come in to light.

Mr. K. G. Blair exhibited, on behalf of Mrs. Brooks, the eggs of the lace-wing fly, remarkable as being placed on long thread-like stalks, which waved in the air.

Mr. Robert Adkin exhibited larvae of *Chloridea* (*Heliothis*) *peltigera*, taken by Mr. A. L. Rayward on the Crumbles at Eastbourne, within the last few days. He said that this larva had occurred in considerable abundance all along the coast from Dungeness to Eastbourne, in suitable places wherever the Stinking Groundsel (*Senecio viscosus*) grew, but had not there been found on any other plant. Along the banks of the Cuckmere River, however, where this Groundsel did not grow, it had been taken on Rest-harrow (*Ononis arvensis*).

Several members had met with the larvae of *C.* (*H.*) *peltigera*, and it was remarked the colour of the larva was very variable. Some were quite pale green compared with the dark green larvae exhibited. It was also noted that they could not be induced to feed on any substitute plant other than that they were taken from. Mr. Step recorded having found a larva feeding on a banana. The President said that at Deal he found the larvae on *Convolvulus soldanella*, and these were of a beautiful delicate pink. If kept in close confinement they were inclined to be cannibals.

Mr. Adkin also communicated the following note :—

Moth in Human Ear.—Mr. Robert Adkin said that the following incident seemed to be so remarkable that he thought it worth putting on record. An invalid who was sleeping was awakened at about 2 a.m. by a loud buzzing sound, which became so intolerable that a nurse who was in attendance was summoned and told by the patient that a fly had entered her ear while she slept. The nurse, although somewhat sceptical, poured a quantity of oil into the ear, and the buzzing gradually died down and ultimately ceased. The doctor on calling on the following morning made a critical examination, and said that he could see what appeared to be the leg of some insect, and some dark object which he thought might be wax. On syringing the ear with hot water and antiseptic, three attempts removed nothing, but at the fourth a dark object was driven out which proved to be, not wax, but a moth. The moth was naturally in a very stained and battered condition, but a careful examination left little doubt that it was a specimen of *Nomophila noctuella*, a species which has been exceedingly abundant on the South Coast recently and which has come into houses to light in considerable numbers.

Mr. Dennis exhibited photographs of the specialised hairs of the newly hatched larvae of *Euchloë cardamines*. These hairs are tubular, and exude at the tip a globule of moisture, which is very resistant to evaporation. Similar hairs occur in all stages of the larva. No suggestion has apparently been made as to their use or purpose.

Mr. C. N. Hawkins exhibited the larvae of *Sesia* (*Macroglossum*) *stellatarum*, found at Wimbledon, feeding on the yellow bedstraw, *Galium verum*.

It was reported that *Metachrostis* (*Bryophila*) *perla* was much more common than usual this year at Blackheath. *Rumicia phlaeas* was said to be very scarce this season ; those seen being very dark.

AUGUST 23rd, 1928.

The PRESIDENT in the Chair.

Mr. H. Moore exhibited both sexes of the remarkable American *Argynnis diana*, a classical example of the most highly developed Sexual Dimorphism. The males have the upper surface of both wings deep black-brown, with a broad marginal border of fulvous, interrupted on the forewings by rays of the dark colour along the nervures, separating dark spots. The females are of a rich bluish-black, with three rows of almost parallel large bluish spots, the outer ones being almost white. The species is confined to the Appalachian Region of N. America; and is the largest and most magnificent of the American Argynnids.

The President exhibited *Cleora* (*Boarmia*) *repandata* bred from Rannoch larvae, the small, local, Scotch race; and larvae of *Agrotis ripae* from the sand dunes near Deal, feeding on *Convolvulus soldanella*.

Mr. Eagles exhibited living larvae, of *Stauropus fagi*, beaten from hornbeam at Epping, and now feeding on beech; young larvae of *Euphyia* (*Cidaria*) *silaceata*, feeding on Enchanter's Nightshade, of *Cilix glaucata* on hawthorn; and ova of *Ennomos erosaria*.

Mr. O. R. Goodman stated that the *helice* form of *Colias croceus* was very abundant in Algeria in the early summer of 1927.

Mr. Hy. J. Turner exhibited the three recognised species of *Manduca*=*Acherontia*, *M. lachesis*, *M. atropos* and *M. styx*; and pointed out that *M. lachesis* was the large robust species with very darkly marked hindwings, while the other two were alike in having hindwings without any dark marking on the basal half. The first two species might be readily separated by the undersides of the abdomen, which in *M. styx* was almost or quite devoid of mesial spots, while in *M. atropos* these were always well developed into stripes. The distribution of *M. lachesis* was, "China, N. and S. India and Ceylon, eastwards to the Southern Moluccas (Ceram, Amboina)"; that of *M. styx* was "Indo-Malay sub-region as far north as Japan, eastward to Ceram," and that of *M. atropos*, "the whole of the Aethiopian Region, the Palaearctic Region as far north as the Shetland and Lofoden Islands; eastward to Transcaucasia and North Persia, westwards to the Azores." There seems to be little aberrational or racial variation in the species. In *M. styx* the specimens from the Malay Peninsula, the Archipelago, China and

Japan have the russet colouring of the forewings absent or obsolescent, and have been named sub.-sp. *crathis* by Rothschild.

He also exhibited specimens of the Micro-lepidopteron *Gelechia malvella*, together with the larvae feeding on the seeds of the Hollyhock, *Althaea rosea*, a plant belonging to the order *Malvaceae*. For many years he had expected to find the larvae, but not until the present season was he successful and that in his own garden. In his recent new edition, Meyrick had erected a new genus, *Platyedra*, for half a dozen species, the larvae of which all feed on seeds of *Malvaceae*. We have one other species of this small genus in this country, *viz.*, *P. vilella*, the larvae of which feed on the common mallow, *Malva sylvestris*. Two examples of *P. vilella* were exhibited. The most conspicuous member of this restricted genus is the well known pest of the cotton plant, *P. gossypiella*. It may be remembered that the cotton plant is one of the *Malvaceae* (Mallows). There is a good distinguishing character between these two obscurely marked species in that *P. vilella* has a black dot towards the base of the inner margin of the forewing. Meyrick says that the half a dozen species of the genus all occur around the Mediterranean region; he also says both the British species are local. There is a very beautiful figure of the larva of *P. malvella* in the famous work of Fischer von Röslerstamm, 1838?.

In Mr. Turner's box was an example of the Tortrix, *Laspeyresia* (*Stigmonota*) *pallifrontana*, a rare and very local species attached to the wild *Astragalus glycyphyllos* (the milk vetch), on the seed-pods of which the larvae fed. He had never met with the species wild and would be pleased of any information as to the locality of the food-plant. He knew of one where the larva had been met with near Guildford, and another where the insect was not to be found. The species was not included in the *Entomologist* List; it is a more or less recent addition to the British fauna. C. G. Barrett says, *Lep. Brit. Is.*, XI., "It was discovered as an inhabitant of this country in the year 1887 by Mr. Wm. Warren, among specimens captured by Mr. Wm. Thompson, of Stony Stratford, Bucks. Since then it has been found in Sussex by Mr. W. H. B. Fletcher; in Surrey by Mr. H. J. Turner; in Herefordshire by Mr. Hutchinson; and in Cambs. by Mr. Warren."

SEPTEMBER 13th, 1928.

The PRESIDENT in the Chair.

Mr. Mera exhibited a cabinet drawer with species of *Dianthoecia* (British), and pointed out the North Cornwall form of *D. nana* (*conspersa*) with orange spots, some of the dark forms quite comparable with the Shetland form known as *ochraea*; a banded specimen of *D. carpophaga*, generally considered very rare; a series of the white forms from Sussex, known as *pallida*, *ochraea-pallida* and *fusca-pallida*.

Mr. Witting exhibited an example of *Polyommatus coridon* with a very dark underside, which was of the form *semi-obsoleta*, from the Isle of Wight.

Dr. Bull exhibited bred melanic examples of *Boarmia roboraria* from East Sussex, which were quite comparable with the Essex form; and an example of homoeosis in *Semiothisa notata*, in which a portion of the forewing pattern was reproduced on the L. hindwing, which was small.

The President remarked that the former had been reported from both Herts and Surrey, and that some species were more prone to homoeosis than others. It had been more frequently observed in *Arctic caja*, *Coenonympha pamphilus* and *Semiothisa notata*.

Mr. Hy. J. Turner exhibited series of *D. carpophaga* from various British localities, and said that the prior name of this species was *lepida* of Esper, that of the genus was now said to be *Harmodia*.

Mr. B. D. Molesworth, a visitor, exhibited a specimen of *Catocala electa* taken at Hoddesdon, settled on a window in early morning, September 15th, 1927. The species has only twice before been taken in England, and this was by Vine, at sugar in the neighbourhood of Brighton, September 24th, 1875 ("Ent." VIII. 282), and by Bankes at Corfe Castle on September 22th, 1892 ("Ent." XXVI. 86).

Mr. MacKenny-Hughes reported that he had been experimenting with the larvae of *Selenia bilunaria* under an excess of the ultra-violet rays, and had found the rays utterly fatal to development and life.

Mr. Robert Adkin exhibited a short series of *Simaethis pariana*. He said that in 1926 he received the specimens exhibited from his friend Mr. Huggins, who had obtained them near Faversham. He had regarded it as a rather good species, for although the larva was

known to feed on both apple and hawthorn, it was not often that one met with it. He had, however, just heard from Prof. Theobald that in certain districts in Kent it had been causing very considerable damage in the apple orchards, over a hundred acres of trees being "browned" by hordes of the larvae. The damage was caused, not so much to the present crop of fruit, but by the larvae webbing over and devouring the leaves, thus impoverishing the tree, and so reducing its fruiting capabilities for the following year.

Mr. Adkin also exhibited "Cherry Galls" on oak leaves, with which he said a small oak bush growing in one of the woods near Eastbourne was practically covered. He referred to the very interesting account of the maker of this gall, *Dryophanta scutellaris*, and its connection with that of the "Purple Velvet-Bud Gall," *Spathegaster taschenbergi*, given in Alder and Straton's "Alternating Generations," pp. 60-64, and in Connold's "British Oak Galls."

Mr. A. Bliss exhibited the living larvae of *Pheosia tremula* (*dictaea*); *Pygaera curtula*, light brown in colour; *Gonodontis bidentata*, the very dark and light forms; and *Calocalpe* (*Eucosmia*) *undulata*.

Mr. Palmer reported *Colias croceus* as very common around Shoreham, Sussex, where the *helice* form was also observed. Reports were made of its occurrence in many parts of the S. of England, but it appeared to be particularly common along the eastern portion of the south coast.

The President exhibited a bred series of *Nonagria geminipuncta* from E. Sussex, including five specimens of the black form ab. *fusca*, Tutt. Eighty in all were bred.

These black forms, it was pointed out, represent about 6% of the population of the locality.

SEPTEMBER 27th, 1928.

The PRESIDENT in the Chair.

Mr. E. Step exhibited two examples of the Indian water-bug (*Belostoma indica*), received from his son in Calcutta, where they had been attracted indoors by light. He called attention to the fact that one specimen had the left elytron crossed over the right, reversing the normal folding of these organs. On behalf of Mr. Turner, Mr. Step exhibited the young stage of the tinder bracket fungus, *Fomes fomentarius*, found at Effingham on a dead blackthorn stem.

Mr. Farmer recorded the fact that *Polyommatus icarus* at Seaford and Banstead, and *Colias croceus* (*edusa*) at Seaford, were exceedingly abundant on the third day after the very severe gale of August 14th, whereas he had seen neither species before. Both var. *helice* and *Colias hyale* were seen. He also showed larvae, of *Hadena oleracea* on Chenopodium, *Biston* (*Amphidasis*) *betularia* on michaelmas daisy, and a very red-chocolate coloured larva of *Euplexia lucipara*.

Mr. Grosvenor exhibited *Zygaenidae* in illustration of his paper.

Dr. Bull exhibited living larvae of *Callimorpha dominula*, from a damp locality near Winchester, feeding on the water avens (*Geum rivale*). It was remarked that for the wintering period they should be kept in a roomy cage with plenty of dead sycamore leaves.

Mr. A. Bliss exhibited a scorpion found among grape-fruit from New York; also larvae of *Plagodis dolabraria* and *Acronicta leporina*, the yellow form.

Mr. Barnett exhibited an extreme example of fasciation of the flower stem in the ragwort (*Senecio jacobaea*); two forms of *Ematurga atomaria*, the heather and the grass form, including an aberration in which one of the transverse lines was not present; and a series of *Ptychopoda rusticata*.

Dr. Cockayne exhibited ab. *conjuncta* of *Zygaena filipendulae*, also a preserved larva; a *Z. trifolii* with confluent markings, and a *Z. meliloti*, with a preserved larva.

Mr. T. H. L. Grosvenor read a short paper "The five and six-spotted Zygaenas: A Comparison." (See subsequent report of Ann. Exhibition, p. 82).

A short discussion took place.

OCTOBER 11th, 1928.

The President in the Chair.

Mr. B. D. H. Kettlewell and Mr. J. A. Thompson, of Caius College, Cambridge, and Mr. Clifford Wells, of Crowthorne, were elected members.

The President exhibited a living larva of *Heliothis scutosa* from Austria: its food in nature was a species of *Artemisia*, on the flowers and seeds of which it fed. In the absence of this it had eaten some *Chenopodium* slightly.

Mr. B. W. Adkin exhibited specimens of *Epinephele tithonus*, from

the Lizard, Cornwall, 1928, with others from Dartmoor and S.E. England for comparison. The specimens from the Lizard were dull, with the black spot on forewings small and the white dots therein inclined to become obsolete. There was one pale variety. The Dartmoor specimens were bright coloured with the black spot large and the white dots therein pronounced; extra black spots, some with a white dot, showing on both fore and hindwings. Those from S.E. England were the typical form. He also exhibited an almost black variety of *Argynnis cydippe* (*adippe*), captured by himself in Windsor Forest on June 14th, 1928, with a mass of beautiful green silvering beneath.

Mr. Buckstone exhibited a large cocoon found on a hawthorn bush. It was considered to be that of *Dicranura vinula*.

Mr. K. G. Blair exhibited a living Cassidid beetle, *Metriona bicolor*, F., found in a box of apples from Virginia. This beetle exhibits a striking change of colour when living. At times it will be of a uniform strongly metallic golden colour (in America a popular name for it is the 'gold bug'), at others the thorax will appear greenish-golden, the elytra purplish red, with a bluish or purple opalescence. In both cases the explanate margins of both thorax and elytra remain almost colourless and transparent. The latter colour appears to be assumed when the beetle is active, walking about or attempting to fly, and the golden colour when at rest or sluggish. The change takes place within a few minutes, the dorsal area first assuming the golden hue, which then spreads to the lateral areas, leaving for a while the basal half of the 7th interval red, finally this too becomes golden uniformly with the rest.

This change of colour has long been known, being referred to by T. W. Harris, "Insects of Massachusetts," 1841. This author states that it lives upon the leaves of "morning glory; sweet potato and bittersweet."

After death, the brilliancy usually disappears completely, the whole insect becoming a dirty yellow colour.

Mr. Tonge exhibited imagines of the 2nd brood of *Cidaria* (*Orthonama*) *lignata* (*vittata*). The larvae came from Wicken Fen and fed on the yellow bedstraw, *Galium verum*. The imagines were very small. It was remarked that the second brood in Scotland also were very small.

Mr. Step exhibited the humble-bee (*Bombus terrestris*), with its attendant mites. When observing the insect visitors to the flower-heads of Devil's-bit, on Wimbledon Common, the rusty appearance

of the bee had attracted attention, and a closer inspection showed that it was due to the sides and lower parts being crowded with the mites. On putting the bee into the cyanide bottle, the mites dropped off at once, and about a hundred of them were shaken out on a gummed card, as exhibited. They are a species of *Gamasus*, closely allied to, if not the same as, that found on the beetles, *Geotrupes stercorarius*, *Aphodius* and some of the Necrophori.

The idea long prevalent was that the mites were parasites upon the insects; and so recently as 1876, Van Beneden, in his *Animal Parasites*, says of those found upon Bees: "Bees . . . . have a mortal enemy, an acarus, which attaches itself to them, not in order to gain some advantage from them, but to cause their death. It is not so much a parasite as an assassin, and we may be excused from describing it."

The truth is that the mites are messmates, in the case of the beetles acting as scavengers, and on the bees probably subsisting upon the abundant pollen which clings to the ventral hairs.

The President exhibited preserved larvae of *Cabera pusaria* and *C. exanthemata*, and read the following note:—

"My exhibit consists of a series of eleven preserved larvae of *Cabera pusaria* and the same number of *C. exanthemata*, to illustrate my notes on the chief differences between the larvae of these two species. The only unusual larva is the *exanthemata* with a very thick lateral stripe on the thoracic somites on the right side and a thin one on the left side.

"I. Larvae with green ground colour; distribution of red on dorsum.

(1) In *pusaria* there is a strong tendency for the red markings on the dorsum to form a continuous line on the thoracic somites even in the larvae with little red on them.

"In *exanthemata* this area is unmarked with red in lightly marked specimens.

"In heavily marked *pusaria* there is a broad deep red thoracic blotch, whereas in *exanthemata* this area tends to remain light coloured, and in the darkest examples is only suffused or speckled with pink or red.

"(2) In the most lightly marked *exanthemata* the only red markings are on the middle somites; in *pusaria* on the anterior or on the anterior and posterior somites.

"II. Distribution of lateral red markings.

(3) In all except the most lightly marked larvae of *exanthemata*

the spiracular line is formed of pink, purplish, or red blotches on all the somites, and there may be a suffusion of a lighter shade of one of these colours between the blotches and upwards towards the subdorsal line.

"In *pusaria* there is no dark spiracular line in the majority, and even in those most heavily marked it is only indicated faintly on the thoracic and last three abdominal somites.

"III. Shape of the red dorsal markings on the abdominal somites.

(4) *Pusaria*. At the anterior end of each somite there is a small red central dot, or a larger one with a small one on each side of it. At the posterior end of each somite there is a red central dot which has a tendency to spread laterally and forwards, but with little tendency to form a continuous subdorsal line. The red mark in such insects is a rectangle with its short axis in the long axis of the larva or it is roughly triangular. There may be another dot on each side of this red mark, which is never fused with it.

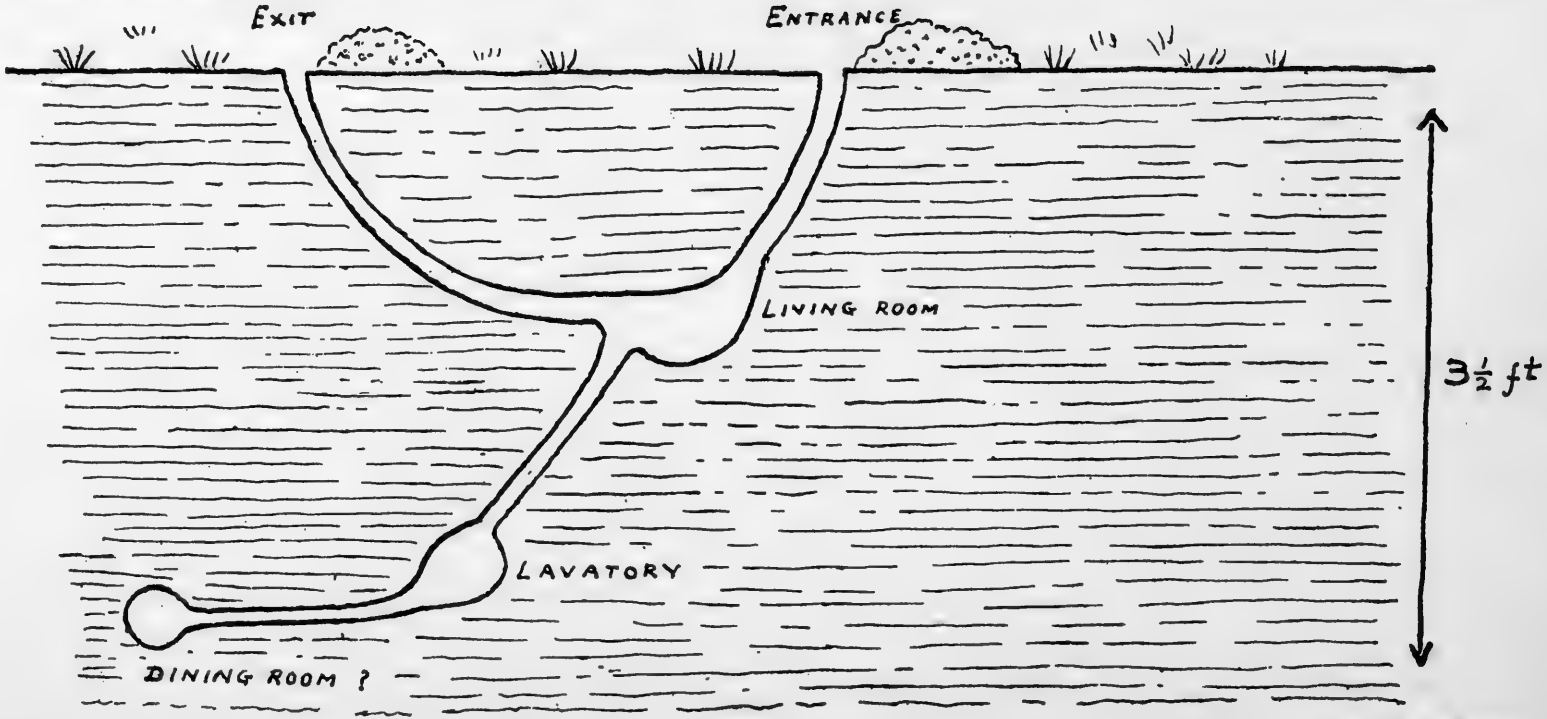
"*Exanthemata*. At the anterior end of the somite there is a red dot in the centre with a smaller dot on each side. These three dots are never united, and even in the pinkest larvae the space between them remains a lighter colour than the rest of the ground colour. In some of the brown larvae the space between shows up as two white specks. On the posterior end of the somite the red or purple marks are usually two subdorsal cones with the apices pointing forwards. There may be a very thin central line, and continuous subdorsal lines may run from the apices of the series of cones.

"IV. Larvae with brown ground colour.

(5) In *pusaria* the ground colour may be red-brown, grey-brown or chocolate, but the colour is uniform all over. There are two conspicuous white dots on the anterior end and two on the posterior end of all or nearly all the somites. These sometimes occur also on the most heavily marked larvae with a green ground colour, and in these it can be seen that the dots lie just outside the lateral dorsal dots and not as in *exanthemata* between the central and lateral dots.

"In *exanthemata* the spiracular line and dorsal markings are darker than the rest, so that there are lighter brown areas on the dorsum shaped rather like a tulip with a short stalk directed towards the posterior end of the larva.

"There is a central row of white dots on the ventral surface of *pusaria*, and none in *exanthemata* ; but I am not sure how constant this is.



Del. T. A. M. Nash.

TUNNEL OF BRACHYTRYPEX MEMBRANACEUS.

" V. Ground colour.

(6) In *exanthemata* there is a form with a white ground colour, which does not, so far as I know, occur in *pusaria*.

" VI. Food-plant.

(7) I believe that all larvae on birch are *pusaria* and all on sallow are *exanthemata*. (On alder and aspen both species are found.) No doubt there are occasional exceptions to this general statement."

The President then read a short paper from our fellow member Mr. T. A. M. Nash, who is now in Tanganyika Territory.

Notes on the Habits of Brachytrypex membranaceus. Kikorie, Kondoa Iraugi District, Tanganyika Territory.—On March 28th, 1928, when walking along a native path early in the morning, my attention was attracted by a very penetrating stridulation that sounded in the distance like bagpipes. Investigation showed the cause of the noise to be *Brachytrypex membranaceus*, a cricket of very large size, which was sitting outside a small tunnel which opened on one face of a small heap of earth; the insect was stridulating violently, the tegmina being raised above the abdomen at an angle of about 30°; the left tegmen is kept under the right during the process of stridulation. A tremendous volume of sound is produced by the file of one tegmen vibrating against the scraper of the other; each tegmen bears one file and one scraper, as is typical of the *Gryllidae*. It was observed that while stridulating, the labium moves backwards and forwards, as if keeping time to the rising and falling of the notes, and ceasing to move on the cessation of the noise.

Often, previously, piles of earth had been noticed near the path, but they had been dismissed as the work of a small species of mole, from their unusually large size. Examination of the tunnels, from the earth heaps outside, proved very difficult, owing to the crumbling nature of the soil. Only one home was successfully investigated, so that the following observations are based upon one excavation only; however, in all other cases where investigation was attempted, there was no indication that the habits differed from those described.

Each cricket constructs two tunnels which open on the surface, each is under the lee of one of the two earth heaps thrown up; these mounds are relatively huge, when the small size of the worker is taken into consideration. The mouth of the tunnel, near which the cricket stridulates, can only be described as the front door; from this a passage leads down to a neatly hollowed-out cavity which acts as a living room. From this one passage runs up

obliquely to a point nearly a yard away from the "front door," opening to the surface, at the foot of the second mound of earth, but on the side of it remote from the "front door." This would appear to serve as an emergency exit, for while digging near the entrance hole, the cricket was observed, only just in time, to be escaping by this hole. The position of the back door on the far side of a relatively huge heap of earth, would render the occupant's escape almost certain to meet with success, as the small rodent, or whatever preys upon this insect, besides being probably engrossed in its excavations, could not see over the top of the far mound.

From the living room another passage branches off, but this time in an almost vertical direction downwards. This also opens into a small chamber, which was filled with mouldy excreta, and seemed to serve the purpose of a lavatory. From this room a horizontal tunnel ran off for a couple of feet, and opened into the last chamber, which contained a few blades of grass chopped into small lengths. Without knowing more about the feeding habits of this insect, it would be unsafe to state what this last chamber is used for; possibly it serves the purpose of a dining room. Should grass form a major part of this insect's food, then it is possible to conceive that it takes a small supply down to this chamber, and eats it during the day time.

The insect is nocturnal in its habits, and is usually only seen early in the morning, after rain, when it appears to be fond of stridulating. Often, however, the dead bodies of *Brachytrypex membranaceus*, are found in the path, having apparently met with some disaster during the night, when they left their homes in search of food.

A curious point was, that in no case were both male and female found in the same home. They appear to copulate outside their burrows, during the night, and afterwards, each to return to his or her own home. Sometimes a male would be excavated from its home, and sometimes a female, but never male and female from the same burrow. The living room was about $1\frac{1}{2}$ ft. down, and the lowest room about $3\frac{1}{2}$ feet.

In conclusion, it would be advisable to say, that not nearly enough burrows were excavated, to enable one to say that what has just been described, is always the case; however, it certainly was the case in one perfect excavation, and appeared to be the case in several others. It is an extremely difficult matter investigating the burrows of insects that go so deep in a loose, sandy soil. There is also much

trouble in finding two isolated earth-heaps, so as to ensure that one is working in the same house all the time, as often one will see seven or eight mounds, all close together.

I am indebted to the British Museum for the identification of this insect. (Plate III.)

OCTOBER, 25th 1928.

ANNUAL EXHIBITION.

As usual now, there was no formal business, and exhibits were placed on tables. A large number of members and their friends were present, and another very successful annual feature of the Society was recorded.

Mr. B. W. Adkin exhibited a large number of series of *Cosmotriche* (*Odonestis*) *potatoria*, from various localities in Britain.

Mr. Robert Adkin exhibited the following British Lepidoptera :— *Acidalia* (*Sterrha*) *laevigata*, the new British Geometer (See "Entom." 1927, p. 222), bred September, 1928, by Prof. J. W. Heslop Harrison ; *Heliothis peltigera*, bred September, 1928, from wild-taken Eastbourne larvae.

And on behalf of Mr. R. Armstrong Adkin, a rare and local form of British Land Mollusc, *Helix aspersa* var. *exalbida*, taken near Eastbourne in 1928.

Mr. H. W. Andrews exhibited the British species of *Bombyliidae* (Diptera).

Mr. S. R. Ashby exhibited his collection of British *Telephoridae* and *Longicornia* (Coleoptera).

Mr. E. J. Bedford exhibited a specimen of *Colias palaeno*, L., captured by Master H. S. Fuller in a valley of the Downs near Lewes, in July, 1923, during his first season's collecting. It was caught on Sunday by means of a straw hat.

Mr. K. G. Blair, on behalf of Mr. F. Laing exhibited a Gall on Heath (*Erica tetralix*) produced by an Eriophyid mite ; a newly described white fly (*Aleyrodes*) on Rhododendron, and Dimorphs of a Japanese Aphid on Maple.

Mr. Bowman exhibited a specimen of a large Saturniid moth picked up alive in Blackwall Lane, London, E.

Miss Winifred M. A. Brooke exhibited drawings of the eggs of various insects, and of their progressive stages in hatching.

Mr. A. W. Buckstone exhibited the following hybrids of British Lepidoptera:—(1) *Pygaera curtula* ♂ × *P. pigra* ♀. (2) *Nyssia zonaria* ♂ × *Apocheima hispidaria* ♀. (3) *Nyssia zonaria* ♂ × *Lycia hirtaria* ♀. (4) *Lycia hirtaria* ♂ × *Nyssia zonaria* ♀, and (5) *Ennomos autumnaria* ♂ × *E. quercinaria* ♀.

Dr. G. V. Bull exhibited two xanthic aberrations of *Brenthis euphrosyne*, and two others heavily marked, all from E. Sussex in 1928; with a short series of *Ortholitha mucronata* (*palumbaria*) from Rannoch, 1927-8.

Mr. Bushby exhibited the following living specimens:—the West African land-crab (*Cardisoma armatum*), which frequents the shores of streams and burrows in the sand. The bright colouring of the young forms does not survive in the adults, which are of a uniform yellowish-grey. They are omnivorous.

The fat-tailed Scorpion (*Androctonus* sp.); a native of the Algerian and Tunisian regions of Africa.

The green-mottled mantis (*Blepharis mendica*); found on scrubby growths in desert regions of Algeria. It is said to feed on a small cricket. An immature form.

The bird-eating spider (*Grammostola longimanus*). This species is a native of Brazil. It is able to inject poison through its fangs into its victims. The body-hairs are finely barbed and can penetrate deeply into the flesh of one's fingers, causing swelling and stiffness which lasts for several weeks. The supposition that active adult birds are caught remains to be proved. It is possible that nestling birds are sought out and eaten.

Larvae of *Antherea eucalypti* (*Saturniidae*), of New South Wales; a relation of the Tussore Silk Moth (*Antherea mylitta*), of India. The hard egg-shaped cocoon, also, was exhibited.

The black-bellied Tarantula (*Lycosa narbonnensis*). This, and some allied species, occur in stony regions in South France, Spain, Algeria, etc. They live in self-dug burrows. The eggs are contained in a silken sac carried by the female who, during September, brings it to the mouth of the burrow and holds it up to the warmth of the sun to aid the hatching. On emerging the large family of youngsters climb to the mother's back and remain there for several months, as seen in this specimen.

Dr. E. A. Cockayne exhibited preserved larvae of *Heliothis peltigera*.

Mr. B. H. Crabtree exhibited remarkable aberrations of *Arctia caja*, chiefly from Lancashire, Yorkshire and Cheshire.

Mr. H. L. Dolton exhibited a series of *Chrysoclista linneella*, taken at Reading, where it has been very plentiful this year; and an aberration of *Rumicia phlaeas* in which the right forewing is mostly white.

Mr. F. W. McDonald exhibited a large number of Molluscs and a case of corals.

Mr. H. M. Edelsten exhibited series of *Chrysophanus dispar* subsp. *rutilus*; also subsp. *batavus*. The former were from Capt. Purefoy's Irish Colony and the latter from the colony in Wood Walton Fen. The exhibit was on behalf of the Committee for the Protection of British Lepidoptera.

Mr. Stanley Edwards exhibited a large number of Exotic Coleoptera.

Mr. Fidgeon exhibited the heads of two Wild Boars.

Mr. L. T. Ford exhibited two species of Tortrix showing similar range of variation: *Peronea contaminana* and *P. caudana*.

Mr. Thomas Greer exhibited the following Lepidoptera from Northern Ireland, counties Tyrone, Derry, etc.

Pieris napi.—A series of the spring brood with undersides; summer brood, three specimens with diaphanous hindwings.

Euchlöe cardamines.—A series of named aberrations, ab. *dispila*, ab. *radiata*, ab. *williamsi*, and ab. *ochraea*.

Melitaea aurinia.—A bred series; Co. Tyrone, 1928.

Epinephele jurtina.—A series of upper and undersides and ab. *addenda*: Co. Tyrone.

Coenonympha tiphon.—From Lough Neagh district, June, 1928. In this locality the species is being rapidly exterminated through the drainage of its haunts on the bogs.

Coenonympha pamphilus.—Series of undersides showing the range of variation. Co. Tyrone.

Aglais urticae.—A specimen with inner margins suffused with black scales: Co. Derry, August, 1928.

Polyommatus icarus.—A series from a restricted locality among the hills of Co. Tyrone at 700 feet, including a ♂ with red spots on margins of hindwings above; ♀s with red marginal lunules band-like; ♀s with red lunules almost absent; ♀s all blue; *undersides* a number of ab. *icarinus*; *postico-obsoleta*, one near *obsoleta*; heavily spotted forms, one ab. *excessa*; a streaked form, etc., Co. Tyrone, July, 1928. A short series from the coast of Co. Derry, July, 1928, for comparison.

Aporophyla nigra.—Coast of Co. Derry, September, 1928.

Plusia pulchrina and *Plusia interrogationis*.—A short series of each from Co. Tyrone.

Entephria flavicinctata.—Co. Antrim, where the imago is very conspicuous when resting on a red Triassic sandstone; August, 1928.

Perizoma blandiata.—Coast of Co. Antrim, June, 1928.

Mrs. Olive Grey exhibited two Trapdoor Spider nests from Jamaica, and the "Blue Ant" (*Diamma bicolor*), from Australia.

Mr. Grosvenor exhibited long series of 5- and 6-spotted Burnets (*Zygaena*) in three sets.

1. A race of *Z. filipendulae* (*stoechadis*) from the South of France, producing regularly 5- and 6-spotted forms.

2. Local races of *filipendulae* (*stoechadis*), *lonicerae*, *angelicae*, *carniolica* and *transalpina*, showing a greater divergence of form among aberrations of a given species, than between species and species.

3. A race of the genus, species unknown, bred from imagines taken by Mr. Hugh Main at Blanes near Barcelona, Spain.

This exhibit was accompanied by very full notes of the details concerning each race or colony.

Mr. C. N. Hawkins exhibited a case of preserved larvae of British Lepidoptera.

Dr. Lionel Higgins exhibited a number of butterflies collected by himself in Styria; several species being from the original localities where the species were first discovered.

Mr. F. W. J. Jackson exhibited *Colias croceus*, taken in 1928, with three of the form *helice*, and a gynandromorph, R. fore-wing ♀, L. forewing and R. hindwing ♂, L. hindwing mixed in marking.

Mr. Chas. Jarvis exhibited European and Exotic Coleoptera. *Prionidae*, *Cerambycidae* and *Lamiidae*).

Mr. B. D. H. Kettlewell exhibited the following migratory species from South Devon. *Leucania vitellina*, (2) 1926-1928. *Leucania unipuncta*, (2) 1926-1928. *Heliothis armigera*, (4) 1926, (3) 1928, (1). *Laphygma exigua*, a long series, 1926. *C. croceus* var. *helice*, series, 1928. *Heliothis peltigera*, 1926, and a series of *Bryophila muralis* var *impar* from Cambridge.

A bred series of *Dianthoecia luteago* subsp. *barrettii* from four different places on the Devon and Cornish coasts showing local variations.

A brood of *Coscinia cribrum* showing how 3 imagines emerged in April, 1928, while larvae of the same brood remain as if in aestivation

throughout the summer and were exhibited as larvae (half grown) along with the imagines already bred.

Mr. Kimmins exhibited series of British "snake-flies," *Rhaphidia*.

Col. F. A. Labouchere exhibited examples of *Chrysophanus dispar* and the subsp. *rutilus* and subsp. *batavus*.

Mr. H. A. Leeds exhibited a large number of British Lepidoptera all captured wild in 1928. The specimens included *Colias croceus*, examples showing gradation in the number of spots; *Aphantopus hyperantus* ab. *arete*, one with a pale patch crossed by a black streak; *Adopaea flava* ab. *obscura*; *Plebeius argus* (*aegon*), variously bordered, pale areas on wings, absence of blue, smoky underside, and specimens of multiple aberration; *Coenonympha pamphilus*, veined and streaked; *P. medon* ab. *obsoleta*; *Polyommatus icarus*, many multiple aberrations including one with border lunules of f.w. extensive, pale golden; *P. coridon*, also many multiple aberrations.

Mr. R. M. Long exhibited aberrations of *Smerinthus ocellata*, *Mimas tiliae*, *Cosmotriche potatoria*, *Abraxas grossulariata* from wild larvae, *Rumicia phlaeas*, *Aglais urticae*, *Dryas paphia* and *Erannis* (*Hybernia*) *marginaria*.

Mr. W. J. Lucas exhibited drawings of the following naiads of eight British Paraneuroptera (Dragonflies), with details:—*Gomphus vulgatissimus*, Linn., *Cordulegaster annulatus*, Latr., *Brachytron pratense*, Müll., *Anax imperator*, Leach, *Aeschna grandis*, Linn., *Calopteryx splendens*, Harris, *Lestes sponsa*, Hans., *Erythromma naias*, Hans.

Mr. H. Moore exhibited several nests of exotic bees and wasps.

Mr. F. H. Murphy exhibited the nest of a Reed Warbler.

Mr. R. M. Prideaux exhibited a few recent captures of *Colias croceus*, including var. *helice*, from West Kent.

Mr. C. G. Priest exhibited a varied bred series of *Mimas tiliae*, a series of varied *Coenonympha pamphilus*, and a specimen of *C. croceus* taken September 17th at Dorking.

Mr. Percy Richards exhibited a large number of aberrations of British Rhopalocera including—*Aphantopus hyperantus*; ab. *caeca*, Blean Wd., 1928, and 1 ab. *lanceolata*; *Aglais urticae* ab. *polaris*; *Argynnis aglaia*, *Dryas paphia* ab. *valezina*, the spots emphasised and forming a band on the hindwing, and the silver streak uninterrupted; *Pyrameis cardui*, bred in 1928; *Melitaea athalia*, *Colias croceus*, an unusually large ♂, 2 lemon coloured ♂s and 1 ♀, 2 ab. *pallida*; *Epinephele jurtina*, *E. tithonus*, *Polyommatus icarus*, dwarf ♂s, a blue suffused ♀, and varied underside ♂s;

Plebeius argus (*aegon*), *Lycaenopsis argiolus*, *Hamearis lucina*, *Adopaea flava* (*linea*), *A. lineola*, with nearly black hind-wings; and *Polyommatus thetis*.

He also showed a case containing about 180 preserved larvae, painted in many instances, the colours being matched with living specimens.

A case containing 65 specimens of *Rumicia phlaeas*, from Bexley Heath, 1928, including many aberrations, several with pear-shaped spots; and forms approaching *eleus*; and an asymmetrical specimen possibly a gynandromorph.

A case containing 38 specimens of *Coenonympha pamphilus* from Bexley Heath and Eynsford comprising very dark bordered forms; others chocolate, very light, and one with 1 pure white forewing; and other interesting forms.

Mr. J. E. H. Roberts exhibited 12 species of living naiads of British dragonflies, and a series of the same preserved.

Lord Rothschild exhibited 3 drawers containing an almost complete collection of Australian *Cossidae* including many preserved larvae.

Mr. and Mrs. Castle-Russell exhibited some remarkable aberrations of the following species taken or bred by the exhibitors during the season 1928:—*Rumicia* (*Heodes*) *phlaeas*, *Polyommatus* (*Agriades*) *coridon*, *P. thetis* (*bellargus*), *Polyommatus icarus*, *Pieris napi*, *Brenthis euphrosyne*, *B. selene*, *Melitaea cinxia*, *M. athalia*, *Pararge megera*, *Epinephele jurtina*, *E. tithonus*, *Aphantopus hyperantus*, *Coenonympha pamphilus*; and a cabinet drawer containing aberrations of *Aphantopus hyperantus* from the exhibitors' collection.

Miss F. Tomlinson exhibited needlework representations of Lepidoptera and other insects.

Mr. A. E. Tonge exhibited obsolete forms of *Polyommatus coridon* ♂ from East Kent, and *Laphygma exigua* and *Heliothis peltigera* from Reigate.

Mr. Hy. J. Turner exhibited 2 cases containing life-histories of some twenty species of British *Coleophora* (Micro-lep.).

Mr. Clifford Wells exhibited gynandrous *Plebeius argus* (*aegon*), and aberrations of *Colias croceus* and *Brenthis selene*.

Mr. A Granville White exhibited a large number of *Colias croceus*, with form *helice*; and living larvae from ova laid by the *helice*. He also shewed four volumes of hand-coloured plates by Rösel von Rosenhof, 1746-1760.

Mr. C. H. Williams exhibited a collection of aberrations of *Polyommatus coridon* and *Abraxas grossulariata*.

Dr. H. B. Williams, exhibited four *Heliothis peltigera*, bred from Eastbourne, September, 1928, and a preserved larva; ♀ ♀ of the Sussex race of *Cosmotriche* (*Odonestis*) *potatoria*, with an Esher ♀ for comparison; a melanic race of *Boarmia roboraria*, from N.E. Surrey, with New Forest ♀ for comparison; *Dianthoecia caesia*, from the Isle of Man, 1928, and a form of *Gnophos obscurata*, also from the Isle of Man, 1928, of similar coloration, with examples from Oxshott, Folkestone, and Lewes for comparison; *Coenonympha pamphilus*, ab., from Eastbourne, August, 1928, and a ♀ of *Pararge megera*, with central area suffused, from the same place; a series of *Xanthia fulvago*, bred from Glasgow District, 1928, showing considerable variation and including two ab. *flavescens*.

Mr. H. Worsley-Wood exhibited a series of *Bryophila muralis*, race *impar*, Warren, taken at Cambridge, 1928; *Cepphis* (*Epione*) *advenaria* with dark median band, referable to ab. *fasciata*.

Mr. Hugh Main exhibited a large number of living insects, scorpions, etc.

NOVEMBER 8th, 1928.

The President in the Chair.

Mr. Hugh Main exhibited a modified form of his sub-terrarium to accommodate small underground larvae. It consisted of a straight-sided tumbler with two sheets of glass cut to fit inside, kept apart by a small piece of wood at the base, with the space between them filled with earth, or sawdust. The two outer spaces could contain a small amount of earth to allow of moisture being applied when necessary.

Mr. Turner exhibited two extremely small examples of butterflies: one, *Polyommatus icarus* from *icarinus*, measuring only 20mm., (normal 29-38mm.); the other a female *Plebeius aegon* (*argus*) measuring 18½mm. (normal 27-33mm.). They were both captured in Macedonia, near Salonika.

Dr. Bull exhibited second-brood examples of the following species: *Brenthis selene*, August 8th, 1928, S.E. Kent; *Polyommatus icarus*, October 1st, 1928, S. E. Kent; *Calothysanis amata*(*ria*), August 23rd, 1928, Sandhurst; *Leucania comma*, October 24th, 1928,

Sandhurst; *Agrotis exclamationis*, October 16th, 1928, Sandhurst, and *A. segetum*, October 24th, 1928, Sandhurst. Perhaps some were late examples of extended emergences.

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

Mr. Hugh Main showed a series of slides dealing with the parasitic hymenopteron, *Methoca ichneumonoïdes*, which infested the larva of the tiger-beetle, *Cicindela*; and details of another case of parasitism, that of the *Anthophora* and *Andrena* bees upon the larva of the oil-beetle.

Mr. E. Step exhibited slides of Mycetozoa, Reptilia and Batrachia: the last class including a portrait of a toad (*Bufo vulgaris*) that had been attacked by dipterous larvae—probably those of *Lucilia bufonivora*—which had eaten away the skin closing the nasal openings, so that immersion in water would probably cause the death of the toad.

Mr. Robert Adkin showed slides of the eggs of *Brenthis euphrosyne* and *Pyrameis cardui*, wild laid, *in situ*; also of *Cydia* (*Carpocapsa*) *pomonella* and of apples which had been mined by that species, in illustration of a paper entitled "Notes on the Life-History of *Cydia* (*Carpocapsa*) *pomonella*, L.," which he communicated. (See page 24.)

NOVEMBER 22nd, 1928.

The President in the Chair.

Mr. T. F. Perkins, 19, Courtfield Gardens, W.; Mr. H. W. Stocken, of Orchard Cottage, W. Byfleet; Mr. F. W. J. Jackson, of the Pines, Ashtead, and Mrs. S. G. Castle-Russell, of "Brockenhurst," Reading Rd., Fleet, were elected members.

The President exhibited the living larva of *Noctua flammatra* from ova obtained from Italy. It was said the colour of the larva was green, but these while young were black and white with a thin dorsal line, becoming brown when full grown.

Mr. Newman exhibited ova of *Laphygma exigua*, from a female taken in S. Devon.

Mr. R. Adkin exhibited examples of the wet and dry season forms of the S. African *Precis octavia*, taken within 3 days of one another. It was reported that both forms occurred in Kenya Colony indis-

criminately. The suggestion was made that certain areas remained under more or less wet conditions throughout the year, while adjacent areas might be quite dry in the dry season.

Mr. Percy Richards exhibited a *Pyrameis atalanta* taken at rest, possibly hibernating, in his sitting-room at Bexley.

Dr. F. A. Dixey, M.A. F.R.S., gave an interesting lecture on "Scent-glands in the *Pierinae*," and showed many lantern-slides in illustration. (Summary p. 30.)

In the discussion which ensued, the President remarked on the beauty of the special structures under the microscope; and said that, although both sexes have scents in some cases, it was mostly confined to the females. Dr. Dixey said that in some species there were two scents, one agreeable and the other disagreeable. They might be either sexual or protective. Attraction was a necessity. It was noted that brushes, hairs and special filaments were often present and applied to the scent glands for the purpose of disseminating the scent. Mr. Newman said that the ova of *Euchloris vernaria* were scented.

DECEMBER 13th, 1928.

The President in the Chair.

Mr. W. F. Gilles, F.E.S., F.I.C., of Braintree, was elected a member.

Mr. H. Worsley-Wood exhibited two aberrations of *Pieris napi*, with primrose yellow wings due to deficiency or weak pigment in the upper layer of scales in all four wings. The upper scales were much twisted, some even hair-like. They were caught in Dumbartonshire. Also, an example of ab. *pallida* of *Colias croceus*, bred from an Eastbourne larva, with brownish grey hindwings and no black border. The black pigment is here altered to brown, and the scales in both layers are slightly turned upward.

Mr. Hugh Main exhibited a large number of bred *Pieris napi*, part of the proceeds of various crossings with the alpine form *bryoniae*, effected by the late Mr. Harrison and himself some twenty years ago; and including a number of very interesting forms.

Mr. Newman exhibited bred series of *P. napi*, from Ireland. There were twenty seven of his pupae which were bright yellow in colour.

Mr. B. W. Adkin exhibited a *P. napi* with white underside of the hindwing, and another with the upper spot on the forewing much reduced in size; also some yellowish Scotch forms, some rich yellow Irish ones, and some very dark Irish forms.

Dr. Bull exhibited a ♂ *Pieris brassicae*, unusually small, from Herts; another from Rannoch, unusually large; ♀ *P. rapae* with the two spots on the forewing almost joined by black scales, and another ♀ with very small spots; ♂ *P. napi* with transparent forewings and the underside pattern of hindwings on the upperside, and a ♀ very heavily marked.

Mr. Buckstone exhibited ♀ *P. napi*, yellow forms, banded forms and one with ground colour greenish, a ♂ with two discal spots on the forewing, and several of both sexes with much emphasised markings. All were bred from Surrey ova. *P. brassicae*, ♀ with the spots on the underside of the forewings united, and a ♂ with a small spot on the disc of the forewings. *P. rapae* ♀, with a black spot on the disc of each hindwing.

Mr. H. Moore exhibited examples of exotic *Pieridae*, including the curious *Pseudopontia paradoxa* which had not always been considered a Pierid by systematists.

Mr. Hy. J. Turner exhibited a large number of species of Indo-Malayan *Pieridae*.

Mr. Jacobs exhibited a beating tray formed by adapting an umbrella, with an adjustment of the handle to facilitate the holding.

Mr. R. Adkin exhibited a large number of lantern slides to illustrate his paper "On the White-spotted Forms of *Dryas paphia* and some other species." (See page 32).

JANUARY 10th, 1929.

The PRESIDENT in the Chair.

The decease of Mr. O. R. Goodman, a Vice-President elect, was announced.

Miss W. P. Hughes, of Australia House, W.C.; Miss E. M. Lyall, of Mortlake Road, Kew; Mr. J. D. Harman, of Hither Green Lane, Lewisham; Mr. A. F. Common, of St. James Avenue, Thorp Bay; and Mr. A. W. Hughes, of Cliff Road, Wallasey, were elected members.

Mr. W. H. T. Tams exhibited a number of Lepidoptera taken by him during his visit to the United States last summer.

Mr. Tams then read an account of his experiences while attending the meeting of the International Entomological Congress at Ithaca, U.S.A., in August last.

JANUARY 24th, 1929.

ANNUAL MEETING.

Dr. E. A. COCKAYNE, A.M., F.E.S., F.R.C.P., PRESIDENT, in the Chair.

The Meeting was devoted to the business of receiving and adopting the Reports of the Council, Treasurer and Librarian for the past year, the announcement of the results of the election of the Officers and Council for the ensuing year, and the reading of the Annual Address by the retiring President (page 37).

The following is a list of the members elected to serve as Officers and Council for the Session 1929-30:—*President:* H. W. Andrews, F.E.S. *Vice-president*, E. A. Cockayne, D.M., A.M., F.R.C.P., F.E.S. *Treasurer*, A. E. Tonge, F.E.S. *Librarian*, E. E. Syms, F.E.S. *Curator*, S. R. Ashby, F.E.S. *Hon. Editor of Proceedings*, Hy. J. Turner, F.E.S. *Hon. Secretaries*, Stanley Edwards, F.L.S., F.Z.S., F.E.S., and Hy. J. Turner, F.E.S. *Hon. Lanternist*, J. H. Adkin. *Council*, J. H. Adkin, L. C. Bushby, F.E.S., F. B. Carr, A. W. Dods, A. de B. Goodman, F.E.S., T. H. L. Grosvenor, F.E.S., C. N. Hawkins, F.E.S., Col. F. Labouchere, F.E.S., and W. Rait-Smith, F.E.S., F.Z.S.

Votes of thanks were accorded to the President, Treasurer, Secretaries, and other officers.

ORDINARY MEETING.

Mr. H. W. ANDREWS, F.E.S., PRESIDENT, in the Chair.

Mr. C. N. Hawkins exhibited:—1. *Colias hyale*, ♂, Bembridge, I.W., September 18th, 1928. An unusual form with the black on the outer marginal area of the forewings extended and completely divided into an outer and an inner portion by a band of the ground colour.

2. *Colias croceus* ♀ var. *helice*, Sandown, I.W., September 23rd, 1928. With discoidal spots on hindwings lemon white instead of orange.

3. *Acidalia* (*Ptychopoda*) *aversata*, ♂, Upper Tooting, July 30th, 1922. Asymmetrical.

4. *Abraxas grossulariata*, ♂, Upper Tooting. Bred July 12th, 1928, from a small black larva found on Plum. It had a plentiful supply of food, but fed very slowly and pupated when less than half the normal size. The specimen is in perfect condition and the scales are well formed, but there seems to be an absence of pigment. $1\frac{1}{8}$ inch in expanse.

5. *Polyommatus icarus* ♀, Sandown, I.W., September 22nd, 1928. Very small. $\frac{7}{8}$ inch in expanse.

6. *Mesoleuca* (*Melanthia*) *bicolorata*, ♂. Upper Tooting, July 12th, 1923. Very small. $\frac{3}{4}$ inch in expanse.

7. *Naenia typica*, ♀ ♀. Freshwater, I.W. Discoidal and reniform spots on forewings joined.

Mr. R. Adkin, the Society's delegate to the Conference of Corresponding Societies of the British Association reported that illness had prevented him reaching Glasgow, and that he had therefore been unable to attend the Meetings of the Conference. He had, however, made arrangements that would enable him to present to the Society the full "Report" of the Association as soon as published, and this, he had no doubt would be found to contain an account of the more important business Transacted by the Conference.

Corrections:—p. 64, line 17 from bottom for "place" read "Place."

line 7 from bottom delete *B. betularia.*

line 3 from bottom for *hiperus* read *luperus.*

for *Bytiscus* read *Byctiscus.*

In "Proceedings" 1927-8, p. 76, line 21 should read "*S. bilunaria* similar to Harrison's."

INDEX.

NEUROPTERA.

ORTHOPTERA.

BYE-LAWS

OF THE

South London Entomological & Natural History Society

(As amended at a Special Meeting held on May 23rd, 1929.)

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1. *Name.*

The Society shall be called THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

2. *Object.*

The Society shall have for its object the advancement and diffusion of Biological Science by means of meetings at the Society's Rooms and in the Field, discussions, papers, exhibitions, the publication of Proceedings, and the formation of typical collections and of a library for the use of the Members.

3. *Constitution.*

The Society shall consist of Honorary, Life, Country and Ordinary Members.

4. *Management.*

(*a*) The property of the Society shall be vested in two Trustees who shall be elected or removed from time to time by the Society as a majority of the Members present at a Special Meeting shall think fit.

(*b*) The affairs of the Society shall be conducted by a Council consisting of the Officers of the Society (see Bye-law 5) and ten Ordinary Members of Council. Seven of the Council shall form a quorum.

(*c*) All members of the Council shall be elected annually at the Annual Meeting and shall be eligible for re-election except that no member shall hold the Office of President or of Vice-President for two years consecutively; and the five senior Ordinary Members of Council shall not for twelve months be eligible for re-election as Ordinary Members of Council.

(*d*) Seniority is to be reckoned by length of continuous service as Ordinary Member of Council; among those equal in such seniority, those having made the least number of attendances shall resign; and among those with an equal number of attendances seniority in age shall finally decide.

(*e*) The Council at its first meeting after election shall appoint Library and Publication Committees and shall have power to make and from time to time alter such regulations as they shall find necessary for the management of the Library and for the guidance of the Publication Committee.

(*f*) All notices of motions and questions by Members of the Society relating to the management of the Society shall, except at the Annual Meeting, be in writing and signed by the Member or Members concerned and shall be posted up in the Meeting Room where every Member can see them during the Meeting previous to the one at which they are to be discussed or asked. A signed copy of any such notice shall be furnished to the Council before the same is posted up in the Meeting Room.

5. *Officers.*

The Officers of the Society shall consist of a President,* two Vice-Presidents, a Treasurer, two Secretaries, an Editor of Proceedings, a Curator and a Librarian.

6. *Removal or Resignation of Officers or Ordinary Members of Council.*

(*a*) For any cause which shall appear sufficient to a two-thirds majority thereof the Council shall have power to suspend any Officer of the Society or Ordinary Member of Council from the exercise of his office or duties or to remove him and declare his office or seat on the Council vacant.

(*b*) The Council shall from time to time fill up any vacancy amongst the Officers of the Society or Ordinary Members of Council that may arise during their year of office or that may have been occasioned by insufficient, ineffectual or invalid nominations at the Annual Meeting. For the purpose of Bye-law 4 (*c*) the service of a Member of the Council while filling any such vacancy shall be counted as service in the office or position as Ordinary Member of Council to which he was last elected at an Annual Meeting and the service of a Member not already on the Council, while filling any such vacancy, shall not be be counted.

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*For definition of Chairman see Bye-Law 13 (*b*).

7. *Assistants.*

The Council shall have power to appoint from time to time at their discretion one or more of the Members of the Society (whether Members of the Council or not and whether holding any other office or not) to act as assistant or assistants to the Treasurer, Librarian, Editor of Proceedings, Curator, or either or both of the Secretaries. Any assistant so appointed shall, unless he resign such appointment, hold office during the pleasure of the Council and in the event of the absence, suspension or removal of his Principal may be directed by the Council to act in the latter's place, but no assistant as such shall be entitled to act or vote in the Council.

8. *Honorary Members.*

The Council shall have power from time to time to nominate leading naturalists or persons who have rendered special services to the Society to be Honorary Members of the Society, but the number of such Honorary Members shall not exceed ten at any one time. Such Honorary Members shall be entitled to exercise all the rights and privileges of, and shall be subject to the same Bye-laws and Regulations as, Ordinary Members except that they shall be exempt from the payment of fees and subscriptions.

9. *Life, Country and Ordinary Members.*

(*a*) Every candidate for admission to the Society shall be proposed in writing by one Member (to whom he shall be known personally) and seconded by at least one other Member, and the nomination form with the name and address of the Candidate, together with the names of his Proposer and Seconder or Seconders, and a statement as to the class of membership desired, shall be submitted to the Council for consideration. If in order, the nomination shall be read out by the Secretary at the first Ordinary Meeting of the Society after it has been considered by the Council and shall again be read out at the following Ordinary Meeting, when, unless a ballot shall be demanded by any Member, such candidate shall be declared duly elected. If a ballot is demanded it shall be taken forthwith, when, if four-fifths of the Members present vote for the election of the Candidate, he shall be declared duly elected.

(*b*) Candidates residing outside a radius of thirty miles from the Society's Rooms may be elected as Country Members and any Ordinary Member of the Society going to reside beyond such radius, may, if he so desires, and subject to the consent of the Council, become a Country Member, but any Country Member coming to reside within such radius shall become an Ordinary Member automatically.

(*c*) Any Country or Ordinary Member, having duly complied with the Bye-Laws of the Society, may at any time with

the consent of the Council and upon payment of the Composition for Life Membership, become a Life Member without re-election.

10. *Entrance Fees, Subscriptions and Donations.*

(*a*) The Entrance Fee of an Ordinary Member shall be 2s. 6d. and the Annual Subscription 12s. 6d. The Entrance Fee of a Country Member shall be 2s. 6d. and the Annual Subscription 7s. 6d. The Composition for Life Membership in lieu of the Entrance Fee and future Annual Subscriptions shall be Eight Guineas. Every Life, Country and Ordinary Member shall, before he is entitled to exercise any of the rights or privileges of Membership (1) pay to the Treasurer the Composition for Life Membership or the Entrance Fee and one year's subscription (whichever is applicable), and, in default of such payment within six months his election shall be void, (2) sign the Obligation Book and be presented to the President or Chairman.

(*b*) Any Country or Ordinary Member elected after September 29th in any year shall, on payment of his Entrance Fee and one year's subscription, be deemed to have paid up to the end of the year next following.

(*c*) All subscriptions shall be payable yearly and shall become due at the first Meeting in each calendar year and any Country or Ordinary Member not having intimated his resignation to the Corresponding Secretary or to the Treasurer on or before the date of that Meeting shall be liable for the subscription appropriate to his Membership.

(*d*) The Council may remit wholly or in part a subscription due from any Member, should some special circumstances appear to them to warrant such action.

(*e*) Entrance Fees and compositions for Life Membership shall not be treated as part of the ordinary income of the Society but shall be applied to the Library Fund or to the purchase of cabinets and the improvement of the collections, or for other objects for the permanent benefit of the Society, as the Council shall from time to time think fit. Until so applied such Entrance Fees and compositions for Life Membership shall either be temporarily carried to a suspense account or be invested in the names of the Trustees; but in the latter case the income shall be available for the general purposes of the Society.

(*f*) Donations or bequests of money, stocks, shares, or securities for money shall, subject to any directions given by the donor or testator in each case, be dealt with in the manner

provided in the last preceding paragraph as to Entrance Fees and compositions for Life Membership.

11. *Rights of Members.*

Subject to the provisions contained in Bye-laws 10 (*a*), 12 (*b*), 12 (*c*), and 12 (*d*), Members shall:

(*a*) Have a right to be present, to join in the discussions, and to vote at all Meetings of the Society; to propose candidates for election; and at any Ordinary Meeting, Conversazione, Annual Exhibition, or Field Meeting to introduce visitors whose names shall before the close of the Meeting be entered by the introducing Member in a book kept for that purpose, or, in the case of Field Meetings, be given to the Leader before the end of the Meeting.

(*b*) Be entitled to have access to the Collections, and to the use of the Library (subject to the Regulations thereof), and those who have paid or compounded for the Annual subscription for any year and all Honorary Members shall be entitled to receive gratis *one* copy of the Proceedings published for that year, provided such copy is claimed within two years of the date of publication thereof or the consent of the Council is obtained.

(*c*) Be eligible to hold any office in the Society, or to serve as Ordinary Members of Council.

12. *Resignation, Removal or Suspension of Members.*

(*a*) Any Member, having paid all sums due to the Society, shall be at liberty to withdraw therefrom by giving notice in writing to either the Corresponding Secretary or the Treasurer.

(*b*) No member shall enjoy any of the rights or privileges of membership if his subscription be twelve months in arrear; and should the subscription of any member be two years in arrear, the council shall, unless they see good reason to the contrary, and after one months written warning sent by Registered Post to him at his last known place of abode erase his name from the list of Members, and thereupon such Member shall cease to be a Member of the Society, but the Council may, nevertheless, at any time reinstate such a Member upon such terms (if any) as they shall think fit. Any name so erased or reinstated shall be posted on the notice board, as having been so dealt with, at the next Ordinary Meeting of the Society.

(*c*) The Society shall have power to expel any Member by carrying—as hereinafter mentioned—a motion to that

effect at a Special Meeting called for that purpose in accordance with By-law 23. At such meeting voting shall be by ballot and the motion for expulsion shall be deemed "carried" if not less than two thirds of the total number of Members present and entitled to vote, vote in favour thereof; otherwise the motion shall be deemed "not carried."

(*d*) The Society shall also have power at any Meeting by a similar vote to suspend any Member who shall refuse to obey the ruling of the President or Chairman or shall otherwise render himself obnoxious to the Meeting. A Member so suspended shall not exercise nor be entitled to enjoy any of the rights and privileges of Membership during the continuance of the Meeting at which he is suspended.

13. *President and Vice-Presidents.*

(*a*) The duty of the President shall be to preside at the Meetings of the Society and of the Council, to regulate all the discussions and proceedings thereat, to deliver an address at the Annual Meeting, and to execute or see to the execution of the Bye-laws and Regulations of the Society, and at every Meeting the President or, in his absence, anyone for the time being occupying his place shall have a casting vote independently of his personal vote as a Member.

(*b*) In the absence of the President one of the Vice-Presidents or, if neither of them be present, such Member of the Council as the majority of the Council present shall appoint, or if no Member of the Council be present such Member of the Society as the majority of the Members present shall appoint, shall preside and shall for the time being have the title of Chairman and the authority and privileges of the President.

14. *Treasurer.*

The Treasurer shall :—

(*a*) Demand and receive all monies owing to the Society, disburse all monies due from the Society, and receive donations and bequests made to the Society.

(*b*) Give proper signed receipts for all monies received by him on behalf of the Society or the Society's Trustees, and keep properly completed counterfoils of all such receipts.

(*c*) If the subscription of any Member be six months in arrear notify such Member thereof and draw his attention to Bye-law 12(*b*).

(*d*) Report to the Council from time to time the name of any Member who is 12 months or two years (as the case may be) in arrear with his subscription.

(*e*) Keep the Society's cash and all proper books of accounts together with the relative vouchers. These accounts duly vouched shall be audited annually by two Auditors, one to be elected by and from the Council at its last Meeting before Christmas and one by and from the general body of Members at the last Ordinary Meeting before Christmas. The Auditors shall present their reports at the Annual Meeting and the Treasurer's audited accounts shall be printed with the Annual Report. Should the Treasurer at any time resign his office, or be suspended or removed therefrom, or should he die, the accounts shall thereupon be audited by Auditors to be appointed by the Council.

(*f*) Generally act under the direction of the Council in all matters connected with the finances of the Society.

15. *Secretaries.*

The Secretaries shall :—

(*a*) Conduct and produce to the Council all correspondence in any way connected with the Society at the next Council Meeting after the correspondence shall have been received or have taken place.

(*b*) Prepare agenda including any motions to be submitted for the consideration of the Council or of the Society.

(*c*) Take minutes of the Proceedings at all Meetings of the Council in books kept for that purpose.

(*d*) Keep a register, which they shall from time to time correct as occasion arises, of the names and addresses of all Members of the Society.

(*e*) Within one week after the election of any new Member give him notice of his election together with a copy of the Bye-laws of the Society, and call his attention to Bye-law 10(*a*), and shall see that he signs the Obligation Book.

(*f*) Keep a record of the attendances of Members at all Meetings of the Council.

(*g*) Send by post to all Members of the Council notice of Council Meetings not less than four days before such meetings are due to be held.

(*h*) Send by post to every Member entitled for the time being to receive them—to his last known address—a copy of the Proceedings of the Society as soon as published in any

year, and in addition, to every such Member recorded in the Society's register as residing in the British Isles, a copy of each of the lists referred to in Bye-laws 22 (*d*) and 22 (*f*), a copy of any announcement of the Society's Meetings and notice of their Annual Exhibition, Annual and Special Meetings, etc., as laid down in these Bye-laws or any future modification thereof.

(*i*) Generally act under the direction of the Council in all matters connected with the Society.

16. *Editor of Proceedings.*

The Editor of Proceedings shall :—

(*a*) Take minutes of the Proceedings at all Meetings of the Society in books kept for that purpose.

(*b*) Announce and record all additions to the Library.

(*c*) Take charge of all Reports of Field Meetings.

(*d*) Take charge of all papers read or announced before the Society and accepted for publication in the Society's Proceedings until they shall have been published.

(*e*) Edit the Proceedings and Abstracts of Proceedings.

(*f*) Generally act under the direction of the Publication Committee, subject to the authority of the Council.

17. *Librarian.*

The Librarian shall take charge of the books and manuscripts of the Society, keep a catalogue of the same with the names of the donors, and see that the regulations of the Council respecting the circulation of the books are strictly carried out (See Appendix).

All books belonging to the Society shall circulate among the Members, subject to such regulations as the Council may from time to time deem necessary, a copy of which regulations shall be affixed by the Librarian to each book before it is circulated.

18. *Curator.*

The Curator shall have charge of the various collections of the Society and shall be responsible for the proper keeping thereof and shall make and keep a list of the contents, such list to be corrected from time to time as occasion arises.

19. *Attendance Recorder.*

The Council shall appoint an Attendance Recorder whose duties shall be to take charge of the Attendance Book during Meetings at the Society's Rooms, and to see that each Member present signs his

name therein and records that of any Visitor introduced by him. The Attendance Recorder as such shall not be a Member of the Council and shall return the books in his charge to the Librarian after each Meeting.

20. *Meetings.*

Meetings of the Council shall be held at the discretion of the Council but not less often than four times in every year. The order of business at such meetings shall be at the discretion of the Council.

Meetings of the Society shall be Ordinary, Annual, or Special Meetings, and such Field Meetings, Conversaziones and Annual Exhibitions as the Council may from time to time arrange.

21. *Ordinary Meetings.*

(*a*) Ordinary Meetings shall be held on the evenings of the second and fourth Thursdays in each month (except the fourth Thursday in December and any evening on which a Conversazione or Annual Exhibition is held), or on such other day as the Council may from time to time direct. The Chair shall be taken at 7.0 p.m. or at such other time as the Council may direct. The order of business shall be as follows :—

(1) The Minutes of the last previous Meeting shall be read and, when confirmed, signed by the President or Chairman.

(2) Announcements.

(3) Candidates for admission to the Society proposed or elected and new Members come up for presentation to the President or Chairman, signing of the Obligation Book and admission.

(4) Exhibitions, communications, and discussions relating thereto.

(5) Papers read or announced, and discussed.

(6) General business transacted.

(*b*) All papers read or announced at any Meeting and accepted for publication in the Society's Proceedings shall become the property of the Society, unless otherwise stipulated before the reading or announcement thereof.

22. *The Annual Meeting and Election of Council.*

(*a*) The Annual Meeting shall be held on the fourth Thursday in January at 7.0 p.m.

(*b*) At this Meeting Members may, without the notice required by Bye-law 4 (*e*), bring forward any motion or ask any questions relating to the management of the Society.

(*c*) At this Meeting the order of business shall be as follows :—

(1) The Minutes of the previous Annual Meeting shall be read and, when confirmed, signed by the President or Chairman.

(2) The Treasurer's report and the audited accounts and balance sheet shall be read.

(3) The Report of the Council shall be read.

(4) The Annual Elections shall be held.

(5) Other business.

(6) President's address.

(7) Retirement of President and Introduction of new President.

(*d*) The Council for the time being shall annually prepare a list containing the names of such Members as they shall recommend to fill the offices of President, Vice-Presidents, Treasurer, Secretaries, Editor of Proceedings, Curator, and Librarian ; and of such other Members as they shall recommend to be Ordinary Members of Council for the year ensuing. The list to be submitted to the next Annual Meeting, subject to revision by the Council, if necessary, shall be read out at the last Ordinary Meeting held in November and shall then be posted up in the Meeting Room and posted up again at every Meeting of the Society until the election is held. A copy of the approved list, together with notice of the next Annual Meeting and a copy of paragraphs (*f*) and (*g*) of this Bye-law shall be transmitted before December 6th by the Secretaries to every Member recorded in the Society's register as resident in the British Isles, at his last known place of abode.

(*e*) If, in any year, owing to the death, incapacity, refusal to act, resignation, or removal under the provisions of Bye-law 12, of any Member occurring or being for the first time notified to the Council after the date of the sending out of the notices of the Annual Meeting, there shall be an insufficiency of effectual recommendations in the list prepared by the Council of Members to fill the said Offices or to serve as Ordinary Members of Council for the ensuing year, the Council may, at the Annual Meeting, recommend some other Member or Members (whether

already included in the Council's list or not) to fill any vacancy or vacancies so caused. If any such recommendation be made the business of such Annual Meeting shall proceed as though such recommendation had been included in the Council's list as sent to Members instead of that actually contained therein.

(*f*) If any six or more Members shall desire to propose any other eligible candidate or candidates for election to any of the said Offices or as one or more of the Ordinary Members of Council, such six or more Members shall, before December 20th, give notice thereof in writing (signed by such Members and stating the name of every such candidate and the Office or position as Ordinary Member of Council for which he is nominated) to one of the Secretaries, who shall, two clear days at least before the first meeting in January send a list of the name or names so proposed and of the Office or Offices or Position concerned to every member, recorded in the Society's Register as resident in the British Isles, at his last known place of abode.

(*g*) When in any year no such notice has been so given to either of the Secretaries with regard to any particular Office or concerning the Ordinary Members of Council, the President or Chairman shall at the Annual Meeting declare the Council's nominee or nominees to that Office or as Ordinary Members of Council, as the case may be, appointed for the ensuing year.

(*h*) If any such notice be so given the election shall take place at the Annual Meeting and the voting shall be by ballot. Two scrutineers shall be appointed, one by and from the Council, and the other by and from the general body of Members present, to superintend the ballot and to report the results to the Meeting; the Secretaries, assisted by the Treasurer, shall have previously prepared a list of those Members entitled to vote, and each Member before voting in the ballot shall give his name to the scrutineers to be marked off on the said list.

(*i*) Any balloting paper containing votes for a greater number of names proposed for any Office or seats on the Council than the number to be elected shall be wholly void and be rejected by the scrutineers.

(*j*) If at an Annual Meeting any election which ought then to take place be not held or completed such election shall be adjourned and, if necessary, re-adjourned from time to time to the next convenient day or days. Notice of every

such adjourned or re-adjourned election shall be sent to Members to whom notice of the Annual Meeting was sent, in like manner as is provided for notices of Special Meetings.

23. *Special Meetings.*

(*a*) Special Meetings may be called by the Council at any time they may deem necessary by sending at least seven clear days' notice in writing to every Member recorded in the Society's register as resident in the British Isles at his last known place of abode. The Council shall also call in the same way a Special Meeting upon four weeks notice in writing being given to them signed by not less than six Members desiring such Meeting accompanied by a statement of its object [see also Bye-law 4 (*e*)].

(*b*) The object of a Special Meeting shall be stated specifically in the notice and no other business shall be taken at such Meeting.

(*c*) No vote shall be taken at a Special Meeting unless twenty or more Members entitled to vote are present.

(*d*) Bye-law 22 (*h*) with the exception of the first seventeen words shall apply to Special Meetings, provided that for the purposes of such Meetings [other than Special Meetings under Bye-law 12 (*e*)] voting may be by show of hands.

24. *Proceedings.*

(*a*) The Proceedings shall consist of such papers communicated to the Meetings of the Society as the Council shall direct to be published therein.

(*b*) The Abstracts of Proceedings shall consist of notices of the Papers read or announced and of the Exhibitions made at the Meetings of the Society, reports of Field Meetings, and other matters of interest.

(*c*) The Proceedings and the Abstracts of Proceedings shall be bound up together and published yearly (subject however to the discretion of the Council) at such prices per volume as the Council shall from time to time direct, but nothing herein contained shall be deemed to prevent the Council from authorising from time to time at their discretion the exchange of the Society's publications or any one or more of them, for any publication or publications of any other Society, Institution or Body whatsoever having the same or similar objects, without having regard to the price or prices at which such latter publication or publications has, or have been, or shall be, issued or sold.

25. The Society shall not and may not make any dividend, gift, division, or bonus, in money into or between any of its Members.

26. *Interpretation.*

(*a*) In the interpretation of these Bye-laws any reference to a Member or Members shall be deemed to apply to both sexes, and these Bye-laws and any addition or amendment thereto shall throughout be construed accordingly.

(*b*) If any question or dispute arise as to the correct interpretation of these Bye-laws or of any part or parts thereof or of any addition or amendment thereto, the Council may from time to time give a ruling or rulings thereon which shall be deemed for all purposes to state the true interpretation and meaning thereof.

27. *Alteration of Bye-laws.*

No alteration or addition shall be made in or to these Bye-laws except at a Special Meeting called for the purpose, at which Meeting the Council shall have the power, subject to Bye-law 23, to give such directions as they think necessary for regulating the discussion and the manner of procedure thereat. In the event of any alteration or addition being made, a copy of the altered, amplified, or additional bye-law or bye-laws shall be issued with the next published volume of Proceedings.

APPENDIX.

EXISTING LIBRARY REGULATIONS.

1.—Books may be borrowed at all Meetings of the Society.

2.—No Member shall be allowed to borrow more than three volumes at a time, or to keep them longer than one month.

3.—Any Member retaining a volume or volumes beyond the specified time shall pay a fine of Twopence per fortnight for each volume so detained.

4.—Members damaging, losing, or destroying any book belonging to the Society shall either provide a new copy, or pay such sum as the Council shall think fit.

[illegible] 1888-9 (1 Vol.),

1890-91 (1 Vol.), 1892-3 (1 Vol.),

[illegible] 1896, 1897, 1898, 1899, 1900, 1901,

[illegible] 1904, 1905, 1906, 1907, 1908, 1909,

[illegible] 1911, 1912, 1913, 1914, 1915, 1916, 1917,

[illegible] 1919, 1920, 1921, 1922, 1923, 1924, 1925,

1926 and 1927,

[illegible] in print, and may be had on application to the Librarian.

[illegible] price 1/6; 1887, price 2/6; 1888-9 and
1890-91, price 3/6 each; 1892-3, price 5/-;
[illegible] price [illegible]; 1895, price 2/-; 1896, price 2/6;
1897, Part 1, price 2/-; Part 2, price 2/-;
1898, Part 1, price 1/-; Part 2, price 2/-;
1899, price 2/6; 1900, price 2/6; 1901, price 2/-;
[illegible] price 2/6; 1903, price 2/-; 1904, price 2/-;
[illegible] price 2/6; 1906, price 2/6; 1907, price 2/6;
[illegible] price 2/6; 1909, price 5/-; 1910, price 4/6;
1911, price 4/6; 1912, price 4/-; 1913, price 4/-;
[illegible] price 3/-; 1915, price 5/-; 1916, price 3/6;
[illegible] price 3/6; 1918, price 4/-; 1919, price 5/-;
[illegible] price 5/-; 1921, price 5/-; 1922, price 10/6;
[illegible] price 10/6; 1924, price 12/6; 1925, price 12/6;
1926, price 15/-; and 1927, price 12/6.

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THE SOUTH LONDON
Entomological & Natural History Society

(Established 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E. 1.

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THE SOUTH LONDON

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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 Seven to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invites the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting Specimens.

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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 ; *ec. ent.*, Economic Entomology ; *e*, signifies Exotic forms ; *trich*, Trichoptera.

YEAR OF ELECTION.

1886 ADKIN, B. W., F.E.S., "Trenoweth," Hope Park, Bromley, Kent. *l*, *orn.*

1922 ADKIN, J. H., *Hon. Lanternist*, *Council*, Lamorran, Oak Lane, Sevenoaks. *l.*

1882 ADKIN, R., F.E.S., "Hodeslea," Meads, Eastbourne. *l*, *ec. ent.*

1901 ADKIN, R. A., "Hodeslea," Meads, Eastbourne. *m.*

1928 ANDERSON, C. D., 22, Mount Park Road, Ealing, W.5.

1907 ANDREWS, H. W., F.E.S., *Vice-President*, "Woodside," 6, Footscray Road, Eltham, S.E. 9. *d.*

1901 ARMSTRONG, Capt. R. R., B.A., B.C. (Cantab), F.R.C.S., F.R.C.P., 3*a*, Newstead Road, Lee, S.E.12. *e*, *l.*

1895 ASHBY, S. R., F.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c*, *l.*

1896 BARNETT, T. L., "The Lodge," Crohamhurst Place, Upper Selsdon Road, S. Croydon. *l.*

1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, S.E. 15. *l.*

1930 BAXTER, G. L., 50, Wroughton Road, Clapham Common, S.W. 11.

1927 BEDWELL, E. C., F.E.S., 54, Brighton Rd., Coulsdon, Surrey. *c.*

1929 BELL, J. K., Marden Lodge, Caterham Valley, Surrey.

1924 BIRD, Miss F. E., "Red Cottage," Cromwell Avenue, Billericay, Essex. *orn.*

1911 BLAIR, K. G., B.SC., F.E.S., *Council*, "Claremont," 120, SunningfieldsRoad, Hendon, N.W. 4. *n*, *c.*

1898 BLISS, Capt., M. F., M.C., M.R.C.S., L.R.C.P., F.E.S., Butlin's Hill, Braunton, near Rugby. *l.*

1926 BLISS, A., "Musgrove," Brighton Road, Purley.

1925 BLYTH, S. F. P., "Cleveland," Chislehurst, Kent. *l.*

YEAR OF ELECTION.

1923 BOUCK, Baron J. A., F.E.S., "Springfield," S. Godstone, Surrey. *l.*

1909 BOWMAN, R. T., "Rockbourne," Keswick Road, Orpington, Kent. *l.*

1909 BRIGHT, P. M., F.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l.*

1927 BROCKLESBY, S. H., "Long Lodge," Merton Park, S.W.19. *l.*

1923 BROCKLEHURST, W. S., "Grove House," Bedford. *l.*

1924 BROOKE, Mrs. M. L., 48, Anerley Park, S.E.20. *l.*

1909 BUCKSTONE, A. A. W., 5, Haynt Walk, Merton Park, S.W. 20. *l.*

1927 BULL, G. V., B.A., M.B., F.E.S., "White Gables," Sandhurst, Kent. *l.*

1915 BUNNETT, E. J., M.A., 72, Colfe Road, Forest Hill, S.E. 23. *m.*

1922 BUSHBY, L. C., F.E.S., *Council*, 11, Park Grove, Bromley, Kent. *l.*

1922 CANDLER, H., "Broad Eaves," Ashtead, Surrey. *l, orn, b.*

1886 CARPENTER, J. H., "Redcot," Belmont Road, Leatherhead, Surrey. *l.*

1899 CARR, Rev. F. M. B., M.A., L.TH., The Vicarage, Alvanley, Nr. Helsby, Cheshire. *l, n.*

1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.

1922 CHEESEMAN, C. J., 100, Dallinger Road, S.E. 12. *l.*

1879 CLODE, W. (*Life Member.*)

1915 COCKAYNE, E. A., M.A., M.D., F.R.C.P., F.E.S., *Council*, 116, Westbourne Terrace, W. 2. *l.*

1930 COLBY, F. E. A., F.R.C.S., Hook Farm, Billingshurst, Sussex.

1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E. 22. *l, ool, orn.*

1928 COMMON, A. F., "Tessa," St. James Avenue, Thorpe Bay.

1907 COOTE, F. D., F.E.S., 32, Wickham Avenue, Cheam, Surrey. *l, b.*

1919 COPPEARD, H., 26, King's Avenue, Greenford, Middlesex. *l.*

1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W. 3. *l.*

1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E. 18. *l, c.*

1922 COUCHMAN, L. E., c/o Mrs. A. Couchman, May Cottage, Brooklane, Bromley, Kent. *l.*

1909 COULSON, F. J., 17, Birdhurst Road, Colliers Wood, Merton, S.W. 19. *l.*

YEAR OF ELECTION.

1918 COURT, T. H., F.R.G.S., "Oak Leigh," Market Rasen, Lincolnshire. *l.*

1925 COX, R. Douglas, 12, Blakemore Road, Streatham, S.W. 16.

1911 COXHEAD, G. W., 45, Leicester Road, Wanstead, E. 11. (*Life Member.*) *c.*

1899 CRABTREE, B. H., F.E.S., "Holly Bank," Alderley Edge, Cheshire. *l.*

1918 CRAUFURD, Clifford, "Dennys," Bishops Stortford. *l.*

1920 CROCKER, Capt. W., Constitutional Club, E. Bexley Heath. *l.*

1898 CROW, E. J., 70, Hepworth Road, Streatham High Road, S.W. 16. *l.*

1928 CURWEN, Capt. B. S., *Council*, 9, Lebanon Pk., Twickenham. *l.*

1927 DANBY, G. C., 33, Huron Road, Tooting Common, S.W.17.

1925 DANNATT, W., "St. Lawrence," Gaibal Road, Burnt Ash, S.E. 12. *l.*

1900 DAY, F. H., F.E.S., 26, Currock Road, Carlisle. *l, c.*

1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*

1918 DIXEY, F. A., M.A., M.D., F.R.S., F.E.S., Wadham College, Oxford. *Hon. Member.*

1901 DODS, A. W., 88, Alkham Road, Stamford Hill, N. 16. *l.*

1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*

1930 DUDBRIDGE, B. J., 13, Church Lane, Merton Park, S.W. 19.

1912 DUNSTER, L. E., 44, St. John's Wood Terrace, N.W.3. *l.*

1927 EAGLES, T. R., F.E.S., 32, Abbey Road, Enfield, Middlesex. *l.*

1928 EARLE, Edw., 16, Addison Gardens, W.14.

1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Secretary*, 15, St. Germans Place, Blackheath, S.E. 3. *l, el.*

1923 ELLIS, H. Willoughby, F.E.S., F.Z.S., M.B.O.U., "Speldhurst Close," Sevenoaks, Kent. *c, orn.*

1926 ENNIS, P. F., "Hillside," 22, Conway Road, Wimbledon, S.W.20.

1920 FARMER, J. B., 31, Crowhurst Road, Brixton, S.W. 9. *l.*

1918 FARQUHAR, L., "Littlecote," Pield Heath Avenue, Hillingdon, Middlesex. *l.*

Year of Election.

1924 Fassnidge, Wm., M.A., F.E.S., 47, Tennyson Road, Portswood, Southampton. *l, n, trich, he.*

1887 Fletcher, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex. (*Life Member.*) *l.*

1926 Fletcher, P. Bainbrigge, B.SC., 65, Compton Road, Wimbledon, S.W.19. *c.*

1889 Ford, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*

1920 Ford, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*

1915 Foster, T. B., "Lenore," 1, Morland Avenue, Addiscombe, Croydon. *l.*

1907 Fountaine, Miss M. E., F.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*

1921 Frampton, Rev. E. E., M.A., Halstead Rectory, Sevenoaks, Kent. *l.*

1886 Fremlin, Major H. S., M.R.C.S., L.R.C.P., F.E.S., Government Lymph Laboratories, The Hyde, N.W.9. *l.*

1919 Frisby, G. E., F.E.S., 29, Darnley Road, Gravesend. *hym.*

1912 Frohawk, F. W., M.B.O.U., F.E.S., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*

1914 Fryer, J. C. F., F.E.S., M.A., "Chadsholme," Milton Road, Harpenden, Herts. *l, ec. ent.*

1911 Gahan, C. J., D.SC., M.A., F.E.S., "The Mount," Aylsham, Norfolk. *c.*

1920 Gauntlett, H. L., M.R.C.S., L.R.C.P., F.E.S., 37, Howard Lane, Putney, S.W.15. *l.*

1927 Gibbins, F. J. F.I.A.A., F.I.A.S., 51, Weldon Crescent, Harrow, Middlesex. *l.*

1928 Gilles, W. S., F.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*

1929 Glegg, D. L., "Vermala," 9, Westleigh Avenue, Putney, S.W.15. *l.*

1920 Goodman, A. de B., F.E.S., "Normanby," Darkes Lane, Potters' Bar, Middlesex. *l.*

1926 Gordon, D. J., B.A., F.E.S., Craigellachie House, Strathpeffer, N.B. *col., lep.*

1924 Grant, F. T., 37, Old Road West, Gravesend. *l.*

1925 Graves, P. P., F.E.S., 5, Hereford Square, S.W.7. *l.*

1923 Gray, C. J. V., BM/BRWX., London, W.C.1. *l.*

1918 Green, E. E., F.E.S., F.Z.S., "Ways End," Camberley, Surrey. *hem.*

YEAR OF ELECTION.

1924 GREER, T., J.P., "Milton," Sandholes, Dungannon, Co. Tyrone. *l.*

1926 GREY, Olive, Mrs., F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*

1911 GROSVENOR, T. H. L., *Council*, Springvale, Linkfield Lane, Redhill. *l.*

1884 HALL, T. W., F.E.S., 61, West Smithfield, E.C. 1. *l.*

1926 HALTON, H. C. S., Essex Museum, West Ham, E.

1891 HAMM, A. H., A.L.S., F.E.S., 22, Southfields Road, Oxford. *l.*

1903 HARE, E. J., F.E.S., 4, New Square, Lincoln's Inn, W.C. 2. *l.*

1926 HARMSWORTH, H. A. B., F.E.S., 3, Marlborough Gate, Hyde Park, W.2. *l.*

1926 HARRIS, A. G. J., B.A., 21, Nevern Place, S.W.5.

1924 HARWOOD, P., F.E.S., Westminster Bank, 92, Wimborne Road, Winton, Bournemouth. *l.*

1927 HAWGOOD, D. A., 89, Leigham Vale, Tulse Hill, S.W.2. *l.*

1924 HAWKINS, C. N., F.E.S., *President*, 23, Dalebury Road, Upper Tooting, S.W.17. *l.*

1929 HAWLEY, Lt.-Col. W. G. B., 13, Colville Road, W.11.

1913 HAYNES, E. B., 82a, Lexham Gardens, W. 8. *l.*

1923 HAYWARD, Capt. K. J., F.E.S., F.R.G.S., Estancia Santa Rosa, Patquia, Prov., La Rioja, F.C.C.N.A., Argentine. *l. orn.*

1920 HEMMING, Capt. A. F., F.Z.S., F.E.S., 29, West Cromwell Road, S.W. 7. *l.*

1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *col.*

1927 HEWER, H. R., M.SC., D.I.C., Royal College of Science, S. Kensington, S.W. 7.

1927 HEWITT, A. C., 83, Tavistock Avenue, Walthamstow, E.17.

1920 HODGSON, S. B., 21, Boxwell Road, Berkhamsted, Herts.

1927 HOWARD, J. O. T., B.A., 78, St. John's Wood Court, N.W.8.

1927 HUGHES, A. W. McKenny, 22, Stanford Road, Kensington, W. 8. *ec. ent.*

1929 HUGHES, A. W., 14, Cliff Road, Wallasey, Cheshire.

1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.

1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*

1923 JACOBS, S. N. A., *Council*, Ditchling, Hayes Lane, Bromley. *l.*

1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l.*

1924 JAMES, R., F.E.S., 14, Golden Lane, E.C.1.

YEAR OF ELECTION.

1927 JANSON, O. J., F.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent.*

1925 JARVIS, C., *Council*, 12, Claylands Road, Clapham, S.W.8. *c.*

1923 JOHNSTONE, J. F., F.E.S., "Ruxley Lodge," Claygate, Surrey. *l.*

1918 JOHNSTONE, D. C., F.E.S., 26, Granville Park, Lewisham, S.E *l.*

1920 JOICEY, J. J., F.L.S., F.E.S., F.R.G.S., etc., "The Hill," Witley, Surrey. *l.*

1898 KAYE, W. J., F.E.S., "Caracas," Ditton Hill, Surbiton, Surrey. *l, S. American l.*

1910 KIDNER, A. R., "The Oaks," Station Road, Sidcup, Kent. *l.*

1925 KIMMINS, D. E., 16, Montrave Road, Penge, S.E. 20. *l.*

1925 LABOUCHERE, Lt-Col., F. A., *Vice-President*, 15, Draycott Avenue, S.W.3.

1924 LANGHAM, Sir Chas., Bart., F.E.S., Tempo Manor, Co. Fermanagh. *l.*

1927 LAWSON, H. B., F.E.S., "Brookhill," Horsell, Woking. *l.*

1922 LEECHMAN, C. B., 'Caral,' Brighton Road, S. Croydon. *l.*

1914 LEEDS, H. A., 2, Pendcroft Road, Knebworth, Herts. *l.*

1919 LEMAN, G. C., F.E.S., "Wynyard," 52, West Hill, Putney Heath, S.W. 15. *c.*

1922 LILES, Major C. E., 6, Hyde Park Mansions, N.W. 1. *l.*

1926 LONG, R. M., Witley, 3, Cedars Road, Beddington, Surrey. *l.*

1924 LOWTHER, A. W. G., "The Old Quarry," Ashtead, Surrey. *ent.*

1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *Brit. o., Odonata, n, m, b.*

1929 LYALL, Miss Edith May, 57, Mortlake Road, Kew Gardens, Surrey.

1921 LYLE, G. T., F.E.S., "Briarfield," Stump Cross, Shibden, Halifax. *h.*

1925 MACCALLUM, C., 1, Aston Road, Ealing, W.5. *l.*

1926 MACDONALD, F. W., 82, Trinity Street, Leytonstone, E.11. *l.*

1892 MAIN, H., B.SC., F.E.S., F.Z.S., "Almondale," 55, Buckingham Road, S. Woodford, E. 18. *l, nat. phot., col.*

1889 MANSBRIDGE, W., F.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc.*

1922 MASSEE, A. M., F.E.S., East Malling Research Station, Kent. *l.*

Year of Election.

1885 Mera, A. W., 5, Park Villas, Loughton, Essex. *l.*

1881 Miles, W. H., F.E.S., "Grosvenor House," Calcutta. Post Box 126. *mi, b.*

1889 Moore, H., F.E.S., 12, Lower Road, Rotherhithe, S.E.16. *l, h, d, e l, e h, e d, mi.*

1928 de Morney, C. A. G., Flat 5, 60, Hogarth Road, Earls Court, S.W.5.

1920 Morison, G. D., F.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marichall, Aberdeen. *ec. ent.*

1925 Mounsey, D., "Kirkstone," 5, Harewood Road, S. Croydon. *Ent, Ornith.*

1927 Murray, Capt. K. F. M., 62, Park Street, Grosvener Square, W.1. *l.*

1929 Nash, J. A., 93, Blackheath Hill, Greenwich, S.E. 10.

1923 Nash, T. A. M., 16, Queen's Road, Richmond, Surrey. *l.*

1923 Nash, W. G., F.R.C.S., "Clavering House," de Pary's Avenue, Bedford. *l.*

1906 Newman, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*

1926 Newman, L. H., Salisbury Road, Bexley, Kent. *l.*

1926 Nixon, G. E., 315B, Norwood Road, Herne Hill, S.E.24. *h, l.*

1911 Page, H. E., F.E.S., "Bertrose," 17, Gellatly Road, New Cross, S.E. 14. *l.*

1927 Palmer, D. S., "North Lodge," Esher.

1929 Parkes, W. R., St. Thomas's House, Lambeth Palace Road, S.E.1.

1908 Pennington, F., Oxford Mansions, Oxford Circus, W. 1. *l.*

1928 Perkins, J. F., 19, Courtfield Gardens, S.W.5. *h.*

1925 Portsmouth, J., 15, Victoria Street, Westminster, S.W.1. *l.*

1925 Portsmouth, G. B., 15, Victoria Street, Westminster, S.W.1. *l.*

1912 Poulton, Prof. E. B., D.SC., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.E.S., "Wykeham House," Oxford. (*Hon. Member.*)

1927 Pratt, W. B., 10, Lion Gate Gardens, Richmond Lane.

1897 Prest, E. E. B., 8 and 9, Chiswell Street, E.C. 1. *l.*

1924 Priest, C. G., 30, Princes Place, Notting Hill, W.11. *l.*

1904 Priske, R. A. R., F.E.S., 136, Coldershaw Road, W. Ealing, W. 5. *l, m.*

Year of Election.

1919 Quilter, H. J., "Fir Cottage," Kiln Road, Prestwood, Great Missenden. *l, c, d, mi.*

1922 Rait-Smith, W., F.Z.S., F.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*

1925 Ralfs, Miss E. M., F.E.S., "Montpelier House," 60, Clarendon Road, Holland Park, W.11.

1922 Rattray, Col. R. H., 68, Dry Hill Park Road, Tonbridge, Kent. *l.*

1902 Rayward, A. L., F.E.S., 15, Vicarage Drive, Eastbourne. *l.*

1887 Rice, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. 4. *orn.*

1927 Richards, Percy R., "Wynford," Upton Road, Bexley Heath. *l.*

1920 Richardson, A. W., F.E.S., 28, Avenue Road, Southall, Middlesex. *l.*

1908 Riley, Capt. N. D., F.E.S., F.Z.S., 5, Brook Gardens, Beverley Road, Barnes, S.W.13. *l.*

1910 Robertson, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*

1922 Robertson, W. J., M.R.C.S., L.R.C.P., F.Z.S., 69, Bedford Road, S.W. 4. *l.*

1911 Robinson, Lady Maud, F.E.S., "Worksop Manor," Notts. *l, n.*

1920 Rothschild, The Right Hon. Lord, D.Sc., F.R.S., F.L.S., F.Z.S., F.E.S., Tring, Herts. *l, orn.* (*Life Member.*)

1887 Routledge, G. B., F.E.S., "Tarn Lodge," Heads Nook, Carlisle. *l, c.*

1890 Rowntree, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*

1915 Russell, S. G. C., F.E.S., "Brockenhurst," Reading Road, Fleet, Hants. *l.*

1908 St. Aubyn, Capt. J. A., F.E.S., 14, Purley Knoll, Purley.

1925 Sancean, E., "The Yew," Firtree Road, Banstead. *b.*

1914 Schmassmann, W., F.E.S., "Beulah Lodge," London Road, Enfield, N. *l.*

1910 Scorer, A. G., "Hillcrest," Chilworth, Guildford. *l.*

1927 Scott, E., M.B., "Hayesbank," Ashford, Kent. *l.*

1923 Sevastopulo, D. G., F.E.S., c/o Ralli Bros., Calcutta. *l.*

1910 Sheldon, W. G., F.Z.S., F.E.S., "West Watch," Oxted, Surrey. *l.*

Year of Election.

1898 Sich, Alf., f.e.s., "Grayingham," Farncombe Road, Worthing. *l.*

1925 Simmons, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*

1927 Skelton, Hy. E., 12, Mandrake Road, Upper Tooting, S.W. 17.

1921 Smart, Major, H. D., r.a.m.c., m.d., d.sc., f.e.s., 172, High Road, Solway Hill, Woodford Green. *l.*

1927 Smith, Capt. F. S., f.e.s., "Sunnyside," Middlebourne, Farnham. *l.*

1928 Smith, Mrs. Maud Stanley, "Sunnyside," Middlebourne, Farnham. *l.*

1882 South, R., f.e.s., 4, Mapesbury Court, Shoot-up-Hill, Brondesbury, N.W.2. *l, c.*

1908 Sperring, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*

1920 Stafford, A. E., *Council*, 98, Cowley Road, Mortlake, S.W. 14. *l.*

1872 Step, E., f.l.s., *Council*, 158, Dora Road, Wimbledon Park, S.W. 19. *b, m, cr*; *Insects, all Orders.*

1928 Stocken, H. E. W., Orchard Cottage, W. Byfleet, Surrey.

1923 Stolzle, G. A. W., "Southcote," South Street, nr. Whitstable, Kent. *l.*

1924 Storey, W. H., 63, Lincolns Inn Fields, W.C.2. *ent.*

1929 Stubbs, G. C., 41, St. Mary's Street, Ely, Cambs.

1916 Syms, E. E., f.e.s., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *l.*

1920 Talbot, G., f.e.s., "The Hill Museum," Witley. *l.*

1922 Tams, W. H. T., f.e.s., 5, Dairy Lane, Hurlingham, S.W. 6. *l.*

1894 Tarbat, Rev. J. E., m.a., Colbourne Rectory, I. of Wight. *l, ool.*

1913 Tatchell, L., f.e.s., Swanage, Dorset. *l.*

1925 Taylor, J. S., Dept. Agriculture, Div. Ent., Pretoria, Union of S.A. *l.*

1929 Tetley, J., "White Cottage," Silverlea Gardens, Horley.

1926 Tomlinson, Florence B., "The Anchorage," Lodge Road, Croydon. *l.*

YEAR OF ELECTION.

1902 TONGE, A. E., F.E.S., *Hon. Treasurer*, "Aincroft," Grammar School Hill, Reigate. *l.*

1927 TOTTENHAM, Rev. C. E., "Keswick," 18, Tyrone Road, Thorpe Bay, Essex. *c.*

1887 TURNER, H. J., F.E.S., F.R.H.S., *Hon. Editor*, "Latemar," West Drive, Cheam, Surrey. *l, c, n, he, b.*

1921 VERNON, J. A., "Firlands," Ascot, Berks. *l.*

1923 VREDENBERG, G., 38, Ashworth Mansions, Maida Vale, W.9. *l.*

1889 WAINWRIGHT, C. J., F.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*

1927 WAINWRIGHT, Chas., 8, Kingsdown Avenue, W. Ealing, W.13.

1929 WAINWRIGHT, J. Chas., 8, Kingsdown Avenue, W. Ealing, W.

1929 WAINWRIGHT, John, 8, Kingsdown Avenue, W. Ealing, W.

1911 WAKELY, L. D., 11, Crescent Road, Wimbledon, S.W.20. *l.*

1930 WAKELEY, S., 8, Woodland Hill, Upper Norwood, S.E.19.

1880 WALKER, Comm. J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*

1927 WALKER, W. H., "Ranworth," Potters Bar. *l.*

1925 WARD, J. Davis, F.E.S., "Limehurst," Grange-over-Sands. *l.*

1920 WATSON, D., "Proctors," Southfleet, Kent. *l.*

1928 WATTS, W. J., 3, Rayward Road, Elmer's End, Beckenham. *l.*

1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l.*

1911 WELLS, H. O., "Inchiquin," Lynwood Avenue, Epsom. *l.*

1911 WHEELER, The Rev. G., M.A., F.Z.S., F.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*

1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.

1920 WIGHTMAN, A. J., F.E.S., Broomfield, Pulborough, Sussex. *l.*

1930 WILKINS, C., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W.19.

1914 WILLIAMS, B. S., "St. Genny's," 15, Kingcroft Road, Harpenden. *l, c, hem.*

1912 WILLIAMS, C. B., M.A., F.E.S., 29, Queen's Crescent, Edinburgh. *l, ec. ent.*

1925. WILLIAMS, H. B., LL.D., F.E.S., "Little dene," Claremont Lane, Esher, Surrey. *l.*

1927 WITTING, A. N., 6, Woolstone Road, Catford, S.E. 6.

1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*

Year of Election.

1926 Wootton, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*

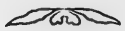
1927 deWorms, C. G. M., F.E.S., M.B.O.U., Milton Pk., Egham, Surrey. *l, orn.*

1930 Worsfold, L. B., 12, Robin Hood Road, Brentwood, Essex.

1921 Worsley-Wood, H., F.E.S., 37, De Freville Avenue, Cambridge. *l.*

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

REPORT OF THE COUNCIL, Jan., 1930.



The Council in presenting the fifty-eighth Annual Report is pleased to be able to state that the condition of the Society remains satisfactory.

The Membership is 245 made up as follows, Full Members 208, Country 31, Life 4, Hon. 2. The number is somewhat smaller than in the two previous years; this is partly accounted for by the Council removing from the list, in accordance with the revised Bye-Laws, a number of names of those who had allowed their subscriptions to fall in arrear.

There have been 8 resignations, which is above the average.

There has been only one death, Mr. G. W. Young, F.G.S. He had been a Member since 1920, and some years ago gave a lecture before the Society, "On the Geological Antiquity of Insects."

The revised Bye-Laws which had occupied the Council for many sittings were completed in May, and at a Special General Meeting, held on May 25th last were considered and passed; a copy of them was issued with the Annual volume of the Proceedings for the year 1928-29. The Society's thanks are due to the Bye-Laws Committee, and particularly to Mr. C. N. Hawkins, for the trouble he has taken in the revision.

The Annual Exhibition was held on October 24th, and in spite of inclement weather was a success, 211 Members and friends being present. Mr. A. de B. Goodman and the other members of the special Committee kindly made the necessary arrangements, and there was a better response to the Refreshment Fund than was the case in the previous year.

Papers have been read before the Society by Messrs. R. Adkin (2), F. W. MacDonald, E. Step and H. J. Turner.

Field Meetings were arranged at Brentwood, Byfleet, Eynesford, St. Martha's, Chilworth, Princes Risboro, and Wisley, but were not largely attended. The Fungus-Foray was held conjointly with the Essex Field Club in Epping Forest in October.

The lantern was in use on four occasions under the kind supervision of Mr. J. H. Adkin.

Mr. R. Adkin and Mr. H. J. Turner were the Society's Delegates at the Annual Congress of the S.E.U.S.S. (to which the Society is affiliated), held at Brighton from June 5th to the 8th.

The volume of Proceedings for the year 1928 consists of xx+98 pages with 3 plates. In order that a copy of the revised Bye-Laws might be bound up, and issued with the Proceedings, the latter were considerably later in appearance than usual.

The Hon. Curator reports—

"During the past year donations to the Society's Collections have been received from the following gentlemen, Mr. R. Adkin, Mr. H. L. Dolton, British Lepidoptera, Mr. E. J. Bunnett, British Coleoptera. It is hoped that the Lister Collection of British and Palaearctic Butterflies will soon be available for reference. In order to make room for its reception our 60 drawer cabinet is for disposal. Meanwhile the Society's Collection of the British Lepidoptera have been stored."

The special thanks of the Society are due to the Curator for the care and the skill with which he has carried out his arduous task.

The Hon. Librarian reports as follows—

"The Library during the year has maintained its usefulness; many members have borrowed volumes for home reading or for reference at our meetings."

The following is a List of the Additions to the Library.

Books.—Insects of Bermuda: Spiders of Porto Rico: Diptera of Fiji (B.M.): *Empidae* of N. Zealand: Fishes of Panama: British Insect Life (Mr. E. Step): Fishes of the Philippines: N. American Shore Birds: M.S. Notes on Lepidoptera by the late J. J. Lister (Miss Lister): Wayside and Woodland Blossoms, Series III. (Mr. E. Step): *Bryophilidae* of the Philippine Is.: Wainwright's British *Tachinidae* (Mr. H. W. Andrews).

Proceedings, Transactions, Reports of Societies, etc.—S.E. Naturalist and Antiquary: Bull. Société Entomologique de France: Ann. Report of the Smithsonian Institute: Ann. Report of the Conference of Delegates to the British Association (Mr. Adkin): Transactions of the Ent. Society of London (Dr. Fremlin): Bolletino R. Scuola d'Agricoltura, Portici, 1928: Proceed. of the American Ent. Soc.: Trans. Perthshire Nat. Science Soc.: Report

of the United States National Museum : Transactions of the Carlisle N.H.S., IV. (Mr. Routledge) : Annales of the Soc. ent. France : Repertorium : Report Commons and Footpaths Preservation Soc.

Periodicals and Magazines.—Entomologist : Entomologist's Record : Entomologist's Monthly Magazine (purchased) : Entomological News : Natural History (American Museum) : Philippine Journal of Science : Canadian Entomologist : Essex Naturalist : The Vasculum : Revu Russe d'Entomologie : Entomologisk Tidskrift ; Naturalist : Proc. I. of Wight N. H. Socy. : London Naturalist.

Separates.—Ann. Address to the Ent. Soc. London : Lloyd Mycological Notes : Camb. Fauna List of Spiders : ditto Orthoptera : American Smithsonian Ins. 57 : Sweden 3 : Chicago Field Museum 14 : Argentine 10 : Prof. T. D. A. Cockerell 4 : New Zealand 1 : Prof. Strand 12 : Portici, Italy 9.

The thanks of the Society are hereby given to the donors of the foregoing.

TREASURER'S REPORT, 1929.

I have nothing sensational to report this year unless it is that in future we shall have to assist the Government by paying income tax on our investments on which this has not been deducted at the source, and that this decision is retrospective, so that we may be called upon for a substantial sum to bring us up to date. However, this point is not yet decided, and "while there is life there is hope."

On the whole I think I may say we have again had a good year, as our assets show a further increase over liabilities amounting to £36. A more intensive campaign than usual for the collection of subscriptions in arrear had the effect of sending up our subscription total to quite an encouraging extent, and brought in something like £30 against the figure of £8, which they were estimated to produce in the accounts for 1928. Even this leaves room for further improvement if the co-operation of all our members can be secured.

During the year we have converted the 5% War Bonds A. Register which we held into 4½% Treasury Bonds 1932-34 and in doing so the face value of our investments has been increased by £6 7s. 8d. which represents the difference between the cost of the War Bonds, £131 14s. 10d., and the nominal value of the 4½% Treasury Bonds 1932-34 allotted in exchange £138 2s. 6d. Our income from investment remains as it was round about £30 a year.

Deposit interest has gone up a little to just under £4. Entrance fees are up 10/-, and a sum of 11s. 10d. was allowed for the surrender of our two insurance policies, as Mr. T. H. L. Grosvenor very kindly arranged for us a new and much more comprehensive policy to cover the collections, library, and other property of the Society at a lower rate of premium.

The Tea Fund I am glad to say has been particularly well supported this year, and as the catering contract was slightly reduced, very nearly sufficed to meet this liability, the actual balance to be met out of the Society's funds being 44/- only. Sales of Proceedings were about a guinea less than in 1928.

Donations to the Publication Fund in the shape of half-tone blocks as well as cash amount to £14 5s. making our total income

[*continued on p.* xx.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1929.

REVENUE ACCOUNT.

Expenditure.	£	s.	d.	*Income.*	£	s.	d.
To Rent of Rooms	50 0 0			By Subscriptions :—			
,, Insurance	2 3 3			Current	107 12 6		
,, Attendance	2 10 0			Arrears	30 2 6		
,, Secretaries 1928	7 0 0			In advance	11 15 0		
,, Secretaries 1929	9 0 0				149 10 0		
,, Treasurer	2 16 7			Entrance fees	2 2 6		
,, Catering	20 15 0			,, Dividends :—			
Subscriptions.	94 4 10			On 5% War Bonds	3 5 0		
South-Eastern Union of S. Societies	15 0			,, 3½% Conv. Loan	8 2 6		
Commons and Footpaths Preservation Society	10 6			,, 4½% Treasury Bonds	3 2 1		
Transfers.	1 5 6			,, 5% War Loan	7 10 0		
To Entrauce fees to Suspense Account	2 2 6				21 19 7		
,, War Loan div. to Publication Fund	7 10 0			Deposit interest	3 18 11		
Vote to	9 12 6			Insurance refund	11 10		
Publication Fund	50 0 0			,, Donations :—			
Library Fund	4 0 0			Tea fund 1928	6 6		
	54 0 0			,, ,, 1929	18 11 0		
Balance carried forward	132 5 9				18 17 6		
				Balance brought from 1928	94 8 3		
	£291 8 7				£291 8 7		

LIBRARY FUND.

	£	s.	d.		£	s.	d.
To Binding Books	2	18	0	By Balance brought forward	1	3	6
,, Sub. to Ent. Mo. Mag.		15	0	,, Books sold		3	6
,, Balance carried forward	1	15	0	,, Vote from General Fund	4	0	0
				,, Fines		1	0
	£5	8	0		5	8	0

PUBLICATION FUND.

	£ s. d.		£ s. d.
To Printing Proceedings	77 10 9	By Balance brought from 1928	5 8 11
,, Half-tone Blocks	5 17 4	,, Donations	14 5 0
	83 8 1	,, Chapman Memorial div.	15 0 0
,, Postage	2 8 0	,, Sales	5 17 0
,, Balance carried down	4 14 10	,, Vote from General Fund	50 0 0
	£90 10 11		£90 10 11

ENTRANCE FEES AND LIFE-MEMBERSHIP SUBSCRIPTIONS ACCOUNT.

	£ s. d.		£ s. d.
5% War Bonds P.O. Reg. standing in the books at exchanged for Treasury Bonds	131 14 10	By balance brought forward from 1928	7 9 0
To Balance carried down	15 19 2	4½% Treasury Bonds 1932/4, nominal value of received in exchange for 5% War Bond as opposite	138 2 6
		By Entrance fees transferred from Revenue account	2 2 6
	£147 14 0		£147 14 0

BALANCE SHEET.

Liabilities.	£ s. d.	By Balances— *Assets.*		£ s. d.
To Balance, being excess of assets over liabilities ..	831 14 10	General Fund	132 5 9	
		Publication Fund	4 14 10	
		Library Fund	1 15 0	
		Suspense a/c	15 19 2	
		,, Investments at cost		154 14 9
		£300 5% War Stock reg. ..		
		£290 3½% Conversion Loan ..		
		£138 4½% Treasury Bonds ..		667 0 1
		,, Subscriptions in arrears :—		
		Good	10 0 0	
		Doubtful, or bad	10 17 6	
		say		10 0 0
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Examined and found correct, this 21*st January*, 1930. T. W. HALL, H. W. ANDREWS, *Auditors.*

for 1928, £224 16s. 10d. On the other side of the account we find little alteration. Rent £50 and attendance 50/- are as before, but Secretarial expenses appear to be heavier as an item of £7 is included in this account which should have been in the accounts for 1928 had it been received in time.

Cost of Catering is down £2 8s. 9d. Printing Proceedings and cost of half-tone blocks is £14 6s. 8d. below the total for 1929, while the cost of books and bookbinding is 34/- less, making a total expenditure of £187 1s. 11d. for 1929.

I am therefore very glad to be able to say that we have this year succeeded in meeting our regular expenses out of our regular income, a state of affairs which it has long been my aim to attain; and having now attained it I hope you will all help me to keep there in future.

Our thanks are due to all those members who have contributed to the Publication Fund and the Tea Fund, and also to the Hon. Auditors, Messrs. T. W. Hall and F. B. Carr, and to Mr. H. W. Andrews, who completed the audit owing to Mr. Carr's illness, for checking my figures. The Statement of Accounts and Balance Sheet for 1929 as vouched for by these gentlemen is attached.

Memories of some Old London Entomologists.

By F. W. McDonald.—*Read March* 25th, 1929.

About the end of 1874, while attending the Sunday morning classes for reading and writing held at the Quakers' meeting-house, Spitalfields, I made the acquaintance of a Mr. Lindsay, who had been a collector in the early forties. He was by trade a lapidary, and gem-polisher, and our friendship lasted till his death in 1880, at the age of seventy-seven. At about the same time the windows and side-cases of a naturalist's shop then situated in Bishopsgate Street, were a great attraction to me, a boy of thirteen, and I longed for a glimpse of the treasures within. One Saturday evening, the owner, a Mr. Ashmead, came to the shop door, and asked me if I had taken root. That was the beginning of a new friendship, which lasted about ten years. I was asked inside and after a very pleasant hour was told I might pay him a visit once a week, and he was never tired of showing me the wonderful things he had for sale.

The outcome of these two friendships was a resolve to collect natural history specimens. So one Saturday evening in August 1875, I broke the news to Mr. Ashmead. He at once claimed me as a brother collector, gave me an old net and lots of advice; of the two, the net was the more useful. With his dear old face all smiles, he would tell me to start across the Forest from the Green Man to Woodford, then down the Epping New Road towards High Beach, saying, "you will not go far before you will catch a couple of Camberwell Beauties, a few Large Blues, a number of Large Coppers, and a lot of other fine things."

On the following Saturday, a fine day in mid-August, 1875, I left home about six-thirty a.m., and boarded a tram for Stratford, fare twopence before seven-thirty (the trams had been running about three years). I reached Stratford about seven-thirty, and from there walked to the Forest, through which I rambled to Woodford Green, then on to the Epping New Road. I must have chosen the wrong day for I saw none of those rare insects which Mr. Ashmead assured me would be waiting for me to pick up. Tired and dejected I was passing the Warren Wood Tavern, when a young man, about ten years older than myself, caught up to me. After a little conversation, he asked me what I expected to catch with that "spoon," and asked to see what I had caught. I proudly produced

my captures, and they made a great impression on him ; I could tell that by the fervent manner in which he asked the Almighty to to spare his days. Turning to me, he said, "Put those things away you won't catch much to-day, and walk with me to Epping, and I will tell you a little about Butterflies and Moths, as we go along, and perhaps the old gentleman I am going to see will show you some."

Arrived at Epping Town, we went to a house on the left hand past the Church, entering which, he told an old gentleman that I was interested in insects, and that he had picked me up coming along. The only answer he got was, "Have you brought those things ?" My new friend produced three large pocket boxes from his bag. They were carefully examined, then a sum of money changed hands, and he was dismissed. Turning to me, with a "See you later" he left me behind.

The old gentleman then asked me a number of questions, and took me into a room, where there were four large cabinets, and showed me a number of drawers of Butterflies and Moths; then he took my name and address, and saying he would send me word when to come again, had a cup of tea and some cake brought in and then dismissed me. That was the only time I saw Mr. Henry Doubleday, he died in 1877.

I then made my way to my companion who had made friends with a carman, who was going to Aldgate, so we both had a ride to Mile End Gate, reaching there about seven p.m. We then parted, and I promised to meet him at midnight, to be introduced to the "boys." Not such a bad day after all.

As arranged, at midnight the same Saturday, I made my way to the "Salmon and Ball," at the corner of Bethnal Green Road, where I was to meet the "boys." Arriving there, all I could see was a number of middle aged men, but no "boys," so I asked them if they were waiting for Mr. Lamb. One of them turned to me and introduced himself as Dave. He then turned to the others, and said, "Boys, here's that nipper Harry was telling us about." They all said they were very pleased to see me.

At one a.m. Dave gave the order to start, and away we went, fourteen in all, across Lea Bridge, over the marshes to Hale End, to the Warren Wood, reaching there about three-thirty a.m. There was a little cottage on the right just past the tavern, and as we drew near, I saw an old lady about seventy standing at the door waving her hand to us. In the garden there were a number of rough tables and seats of which we took possession, and we were soon supplied with pint basins of hot tea, twopence a basin, new laid eggs, one penny each, bread and butter, two slices a penny. During the breakfast, I was introduced to the "boys," whose ages ranged from forty to seventy-three.

About four-thirty a.m. we made our way to the Forest. Dave, who

had taken charge of me, explaining that the caterpillars of the British Moths were nearly all of them night-feeders, and that we had better chances of taking them in the early hours, when they would be making their way back to their hiding places. I stayed with him till mid-day, when I said good-bye, and returned home by train from Chingford.

On the following Tuesday evening, I was made a member of the East London Entomological Society, whose meetings were held once a week at the "Bell and Mackerel," Mile End Road, entrance fee, one shilling, subscription twopence weekly.

On the following Saturday evening I made one of the party for our midnight walk and Sunday early morning breakfast. Dave, or as I now knew his name, Mr. David Pratt, taking charge as usual. On our arrival at the Forest, before we separated he said, "We shall all try to meet for dinner at one-thirty." This was the regular routine of the society throughout the season, the midnight walk, early breakfast, and the dinner.

Now just a few words about this dinner, which was always spoken of as the Entomological dinner. We used to meet at the "Hawkwood Tavern," on the way to Sewardstone, on Sundays at one-thirty, where a large room was set aside for collectors. A dinner was supplied for one shilling; a cut from the joint, two vegetables, Yorkshire pudding and a portion of pie, and those who sat down to it made themselves at home. The room was open to collectors, whether they had dinner or not, and there was one feature about this dinner I would like to mention. Boxes would be shown, and set and bred specimens of butterflies and moths would appear in numbers, and I had a strong suspicion, that they were brought on by another person who handed them over to their owners. Another great feature was that we had visitors. Among our visitors, there seemed many buyers, and money used to change hands freely, many of the "boys" returning home with fuller pockets than when they started.

On four occasions I saw Lord Walsingham here, twice a Mr. De Grey came with him, and once we had a Colonel Bruce, and many others whose names I have forgotten. It was at these dinners I first met the brothers Meek of Brompton Road, Mr. Cooke of Museum Street, Bloomsbury, Mr. Janson, Senior, also of Bloomsbury, Mr. Spalding of Notting Hill Gate, and Mr. Gardner of Oxford Street. Mr. W. Harwood of Colchester, came on two occasions, and my old friend Mr. Ashmead. These dinners continued till about 1880, when the license was withdrawn, and they ceased. About the same time our old lady died at the age of seventy-four, and many of the "boys" had passed away, so our Sunday morning early rambles came to a close. Still while they lasted they were a great source of pleasure and instruction to me. The society was also going down, so that at the end of 1881, it had ceased to exist.

Before taking leave of the East London Society, just a word or two about the "boys." There was Harry Lamb, a good fellow but a great sufferer, he died in 1881, at the age of 31. Among others were Walter Este, Joseph Ward, George Graham, W. Head, S. Goodacre, G. Pratt, Mr. Bowers, all middle-aged men and good collectors, William Craft, whose son is now a collector and lives at Bourne End, W. Thorn and Thomas Edle, better known as "Tommy," who was with Lord Walsingham collecting in East Africa, and used to tell me he was away from England nine years. A large number of the caterpillars in the Walsingham collection now at the Natural History Museum, were mounted by him.

In 1877 I went with these two last named collectors to Tilgate Forest. They had with them four bred females of the "Kentish Glory," for assembling purposes, and they took that day one hundred and seventy-four males. I asked them if I should be allright for a couple, the answer I got was, "No, my Boy, they will fetch us eight-pence each." Then there was W. Tufnell, the only member about my own age.

On Hackney Marshes there were two taverns, surrounded with gardens laid out with seats and tables. One was the "White Hart," the other was the "Ferry Boat," and it did not matter how crowded these gardens were with people, they were noted for the song-birds that could be heard in them. The cuckoo always paid these gardens a visit before going anywhere else, followed by the blackbird, and the thrush in turn, and in due season, without fail, the nightingale. I have seen crowds sit in awed silence waiting for the birds to sing. This is where W. Tufnel comes in; he was one of the best imitators of birds' notes I have known, and later went on the Music Hall Stage. The bird's fee was two shillings to three shillings and sixpence according to the amount of trade done, and refreshments nightly. This is not Entomology, but it is the truth. With the withdrawal of the licences, strange to say, these birds disappeared from Hackney marshes.

Then Mr. Trotman. I did not know much of him; he was one of the oldest members of the Society and was eighty-two when I was first introduced to him in 1877. He must have been a very keen collector in his time for I was told he had supplied nearly all the dealers in London. He told me himself that he had sold "Large Coppers," bred, sixpence and eightpence each, in quantities of not less than two hundred, and he told me whom he had supplied. I have asked the son of one of these, and he told me that there were entries in one of his father's old day books of the purchase of "Large Coppers," two hundred at a tim e at eightpence each.

On the last occasion that I saw him, in 1879, he wanted to sell the last of his insects as he was about to go into the workhouse. He had a large sized store box, containing among other things fifty-two "Large Coppers," two "Camberwell Beauties," and about two

hundred very fine bred insects, for all of which he wanted a sovereign. I expect Mr. Ashmead bought them at the finish at his own price.

Last but not least, Mr. David Pratt or Dave, our Secretary. I thought him the best fellow breathing, and I wish I could remember all that he told me.

The election ceremony of a new member was as follows:—The new member would stand in front of the table facing Dave, who after reading the few rules, would grasp the member's right hand with great heartiness, and with his left he would hand the new member a foaming quart mug of bitter ale with a, "Drink brother. Drink hearty." One member took him at his word and returned the mug nearly empty. Dave looked sadly at the mug and said, "Man, you have had half your entrance fee back already."

He often used to talk to me about a club to which he had been a few times, and of which he always spoke as that "Club over the water." He told me that it was held at Dunn's Institute Newington Causeway. He said they were allright, but one member in particular was a smart chap, a long-headed cove, but Dave never met him again. It is now fifty-three years ago, since that conversation and that long-headed cove, is still going strong. Shall I name him?—Mr. E. Step.

Then on two occasions in 1879 we had a visit from Mr. Adkin. When asked by a Mr. Albury, a member of the South London Society, what he thought of the Society, he replied that "They seemed a decent lot of chaps, if only they would talk Entomology."

Talking of Mr. Albury; he made things very unpleasant for me at home by informing my father that I had joined my finishing off school. In the same year I joined the Haggerston Entomological Society, whose meetings were held at the "Brownlow Arms," Queen's Road, Dalston. This society was composed of a different class of collector, better educated, a bit higher in the social scale, and better off; among the members were Dr. Crouch, Mr. J. A. Clark, Mr. Gurney the cabinet-maker, Mr. Russell, Mr. Priest, Senr., Mr. Huckett, the brothers W. and T. Harper, and many more whose names I have forgotten. All these have passed away. The Haggerston Society will always be remembered by the four large cases given to the Bethnal Green Museum, containing the Butterflies and Moths, a male and female of each, to be caught at that time within ten miles of the Museum in any direction.

Every few months the society would hold a social evening, or, as some called it, a sing-song, and our time was extended till eleven o'clock. One of these social events was in full swing one Wednesday evening, when the waiter entered the room with a tray of orders, followed by my father, who promptly seized me by the collar of my coat and flung me out of the room. He then turned and told the assembled company what he thought of them; and they thought it

was a little entertainment got up for their amusement. But I never had the courage to go to another of their meetings; I faded away.

Looking back over the fifty odd years that have slipped so quickly by, I have had many very pleasant and instructive times that never come again, but my old friends of the East London Society will always dwell in my memory. They were nicknamed the "Amiables." One tale to prove their right to the title and I will close.

We used to go every August to the New Forest. The August bank holiday of 1878 was very wet, so three of them made their way to the "Lyndhurst Arms," Lyndhurst, and made themselves very much at home; so much so that the landlord got very worried. Getting into conversation with them, he suggested that it was nearly tea time, and said that being holiday time, and as he always had a few regular customers who would be sure to come in, and if our party kept on in that style there would be no beer left for these. He was met with the answer, "That's all right, draw us another couple of pots, and we will make that last till they come in, and then we will help them clear the cellar." The Keepers were never tired of telling this tale. Well! I have been an "Amiable," but after all these years, I have found a home among those chaps 'over the water,' the South London Entomological Society.

On the Occasional Extension of Territory by the Brown-tail Moth, Nygmia phaeorrhoea, and its Ultimate Collapse.

By Robert Adkin, F.E.S.—*Read September 12th*, 1929.

So long as we have history of the Brown-tail Moth, there are records of its occasional abnormal spread over territory not previously occupied by it, usually accompanied by a vast increase in numbers, possibly for a year or two, followed by a period of great scarcity, if not actual disappearance. These cases of abundance do not appear to extend over large tracts of country, but rather to affect restricted areas. Thus, in the notorious outbreak of 1782, Donovan (1813) quoting Curtis, is at pains to show that although the country to the south-west of London was devastated as far as Putney Common, not a web was to be seen at Coombe Wood and Richmond Park. So in the 1877 outbreak at Deal—although the hedges and bushes, including the sea-buckthorns, were completely denuded of their leaves from Upper Deal to the sand-hills, a distance of some two or three miles—there were few, if any, larvae to be found outside that radius ; and I understand a similar state of affairs existed at Sheppey at, or about, the same period.

Normally the species lives in colonies occupying very restricted areas ; chiefly on the coasts of Kent and Sussex, but it is not confined to those districts. These colonies often persist for a considerable number of years on the same spot, without showing any inclination to spread to any great extent ; then, quite suddenly, " nests " appear over a much larger area, with the probability that they start fresh colonies, and should favourable conditions prevail, a considerable area becomes involved in one of the " plagues" that have from time to time occurred, but which have been invariably of short duration.

In the neighbourhood of Eastbourne there is a colony on some patches of blackthorn bushes that grow on the edge of the low cliff in a hollow of the Downs ; it is bounded on the west by Beachy Head, on the north by the high ground leading up to it, and on the east by a spur of the Downs that runs out to the coast, so that it is thus completely shut off from the surrounding country. I have had this colony under fairly close observation for some thirty years, and during that time it has fluctuated very considerably in point of

numbers of larvae. Thus, in 1907 it was in great force; so numerous were the larvae that long before they were full-fed they had completely stripped the blackthorns of their leaves, and were to be seen wandering over the grass and taking possession of any brambles or other bushes on which they might maintain themselves; yet, neither the larvae nor the moths that resulted from them were observed to stray beyond the confines of the hollow; and in the following year it was much less common. Small colonies that had established themselves in other parts of its terrain soon died out, and even on the original blackthorns it had become comparatively scarce. Then the colony began to recover its strength, and year by year "nests" became more and more numerous, until within the last few years the colony appeared to be thoroughly re-established, yet showed no signs of extending its range beyond its normal confines until last year (1928) when, while the moths were on the wing, there appears to have been a very considerable movement.

My attention was first called to it by my finding a female moth at rest on a pear tree in my garden, and beside her a batch of eggs that she had just deposited. The Brown-tail is not a desirable garden insect. The eggs, therefore, were removed and destroyed, Later on, when the leaves had fallen, a "nest" was found on an apple tree. This "nest" was very different in appearance from those usually found on the blackthorns, in that it had large apple-leaves tightly woven on its outside: indeed, I was at first doubtful whether it had been made by this species, but in the spring the larvae came out and sunned themselves on it, so all doubt was set at rest. It was then removed to a wild apple bush growing on the Parade where the larvae soon spun fresh web around it and began to feed, but were eventually overtaken by the same fate as others yet to be mentioned.

The finding of these eggs and larvae in my garden suggested to me that there might be others scattered along the coast, which just here is occupied by the Parades, and by a hollow that is sheltered on its south-west, but at some little distance, by the spur of the Downs that forms the eastern boundary of the area in which the original colony exists. Both the banks along the Parades and this hollow are in a semi-cultivated condition. In the latter, trees of various species have been planted but a certain amount of the original bramble and other bush remains, while along the Parade banks, among the planted shrubs, a number of scattered wild apple and plum bushes grow, probably resulting from seeds that have been thrown down in past years.

A search of this district during winter, when the trees were bare of leaves, showed that "nests" were numerous. In the hollow, two were found on a young white-beam tree and one on another; these "nests" were like the one on garden apple, having the dead leaves webbed on to them. On a small standard hawthorn were three

"nests," one on another, and on a bramble bush two were visible, while on the Parade banks hardly an apple or plum bush was to be found without one or more nests upon it; the furthest being at a distance of a mile or a little more from the original colony on the blackthorns.

As spring began to advance a frequent watch was kept upon the "nests." At first the larvae came out, and sat upon the "nests," sunning themselves in the usual manner. Then, as the leaves began to develop the larvae began to feed upon them and for a time all appeared to be going well. But after a while, when the larvae were about half-grown, it was noticed that the branches of the bushes were not being stripped of their leaves as they should have been, and on a close search being made it was found that the larvae were not feeding in companies, as is usual at this period of their growth, but were scattered all over the bushes, and their numbers appeared to be much smaller than was expected. From this time they rapidly disappeared and, so far as could be observed, not one of them reached maturity.

With regard to the original colony on the blackthorns. Wishing to obtain a typical hibernaculum for figuring, I went over to the bushes in early spring and found that nests were quite numerous. It was a dull afternoon and no larvae were sunning themselves, but most of the "nests" had a certain amount of new web, and two that I selected as being least altered from their winter appearance in this respect, were ultimately found to contain their full complement of larvae, so it was very evident that at that time they were all live "nests." I was unable to visit the bushes again until quite the end of June, when a careful search revealed only two small lots of pupae, containing probably only some dozen or so pupae in all. It was therefore very evident that in this case also the loss of larval life must have been very great.

The questions that these happenings appear to suggest are, what should induce the colony that had, for so many years, kept to its own terrain, to suddenly break bounds, and then, having done so, why should the effort be so suddenly overtaken by disaster? I confess that I am not aware of any very direct evidence bearing upon the subject, but there is a certain amount of circumstantial evidence and there are several possibilities that we may consider.

Of these, the action of wind as an agent of dispersal is one, and as a matter of fact there were several days of continuous strong south westerly winds at the time last year, namely, early in August, when the female moths would be egg-laying, and its direction would be such as to drive them to the places where the winter nests were subsequently found. But it is no uncommon thing to have similar breezes at that time of year, yet we do not find that they usually affect the insect. At best, then, wind cannot be regarded as anything more than a possible secondary agent in the distribution.

As to the collapse, cuckoos have been seen to feed upon the larvae, but cuckoos were not unusually common in the neighbourhood and birds generally are not fond of hairy larvae. The larvae are prone to the attacks of both hymenopterous and dipterous parasites, but they do not kill the larvae until they are full-fed or after they have pupated. Neither of these agencies, therefore, can be regarded as of primary importance in the present case. It is well known that many species of larvae are subject to diseases that kill them off in large numbers, and at various stages of their existence, and further that some of these diseases are transmissible through the egg, therefore the imagines must also be affected. Further, that some of these diseases at first affect a brood only slightly, but become more deadly in succeeding generations.

Larvae that are suffering from disease become restless and inclined to wander, and it is quite conceivable that the imagines of a brood in the early stages of disease may be similarly affected.

That this species is naturally a sedentary one is shown by the fact that a colony will inhabit an exceedingly small area for many years without overstepping its boundaries. It must therefore need some untoward circumstance to cause it to break bounds. And, as we have already seen, any great spread of the species, which in many cases may lead to an unusual abundance, is practically always followed by a collapse.

Having considered all these possibilities in conjunction with the normal habits of the species, it appears to me that the most likely explanation of the sudden spread of the species, its possible great increase in numbers and equally sudden decline, is the presence in the colony of some disease such as is known to affect such species as *Arctia villica* and *A. caia*, *Diacrisia mendica*, *Orgyia antiqua* and so forth. The disease in its early stages would probably affect the imagines only slightly, doing no more than to cause them to become restless ; the action of the wind would then no doubt assist in their movement. In the two cases of which I have details this may well have been so ; at Deal the movement was towards the sand-hills ; at Eastbourne towards the Parades ; thus being from south-west to north-east, therefore in the direction of the prevailing winds. The eggs laid by these females would be infected. If the disease had not progressed very far the majority of the broods would survive for at least another generation and cause a great abundance, as in the Deal case ; if it was more advanced the larvae would be killed off before the abundance had time to develop, as in the case at Eastbourne. I think, therefore, that we may conclude that it is the presence of a disease in the colony that initiates the wanderings of its inhabitants and then causes its collapse.

I ought perhaps to say that I do not regard these exceptional cases that we have been considering, as coming under the same category as the frequent rise and fall in the strength of a colony

that is continually going on. Here I think we need look no further than for what we are pleased to call natural causes, namely, the weather at critical times in the insect's life; predacious enemies of one sort or another; and parasites. That these latter play an important part has been amply proved. On one occasion when our Eastbourne colony was going very strong, I collected at random a number of larvae when they were rather more than half-grown, and sent them to a friend who was interested in parasites in their earlier stages. He found, by dissection, that they were very heavily parasitised, my recollection being that something over 60% of those I sent him were affected. On another occasion two "nests" were transported to a London surburban garden and there placed on a growing hawthorn bush and left unprotected. The larvae were attacked by a dipterous parasite that did its work so thoroughly that not half a dozen moths were reared. Such agencies do not, however, as I have already said, appear to meet the cases of occasional spread and ultimate collapse that we have been considering.

Thorns and Prickles.

By Edward Step, F.L.S.—*Read October* 10*th*, 1929.

In many herbs the stems, leaves or flower-parts are coated, sparingly or profusely, with hairs which serve diverse purposes according to the habit or habitat of the plant so clothed. They may serve to protect from cold or from heat, prevent the stomata from being clogged by too abundant moisture, or may act as a check to excessive transpiration. In various situations on the plant they may serve to discourage the visits of unwanted insects, or by conversion into delicate tubes, as in the Nettles, may become stings that inject an irritant fluid into the skin of meddlesome mammals. In the Sundews they are developed into fleshy tentacles with glandular tips, by whose aid the leaf catches insects for the plant's support. When very short and dense, they furnish the velvety colour spots on the petals of flowers, as in some of our Orchids; when very long and equally crowded they constitute the flannel-like coating of some leaves, such as those of Mullein. They may be adapted to assist climbing or scrambling herbs like Hop and Goosegrass, by becoming coarser and less crowded.

An advance from the hair is seen in the sharp prickle, such as we find terminating the leaf-lobes and stem wing-lobes of the Thistles, and along the midribs and stem of the Teasel; harder and sharper in the soft-wooded Roses and Brambles. This harder kind may be straight or curved, the former acting as defences and the latter serving as climbing hooks. These hooks, despite their formidable appearance, are hollow superficial growths, easily detached by lateral pressure. That they have been developed to assist in climbing is evident if we compare the equipment of Dog-rose and the bush Brambles with the Burnet-rose and the Dewberry: the two latter are spiny, but they have no climbing-hooks.

Thorns and spines such as we know so well on the branches of Blackthorn, Hawthorn, Wild Pear and Buckthorn, are woody and solid like the small trees that bear them; they have a different origin, being the hardened tips of aborted shoots.

Respecting all these awkward outgrowths, there have long been two opposing theories: one school adopting the teleological view that these plants came into existence fully armed against animal foes— the browsing mammals; others telling us authoritatively that though some thorns may serve as a protection, they all owe their origin to the fact that when the thorns first appeared the plants

that bore them were growing under desert conditions, more or less starved, which caused them to stop growth and harden their shoots, instead of keeping the points soft and still developing. The strength of the latter view is derived from the fact that in desert places most of the plants exhibit this thorny character; but its weakness is shown by many prickly plants that inhabit damp ground with a moist atmosphere about them—the opposite of desert conditions. Besides, it is quite certain that the plants of deserts could never have originated there, but must have arisen elsewhere under more congenial conditions and only became adapted to poverty.

If, instead of adopting either of these theories off-hand, we consider some of our native prickly plants separately, we may come to the conclusion that, though the plants of the desert are mainly of this character, the explanation is too sweeping and scarcely to be justified by all the evidence. Our British thorny plants are certainly not the descendants of desert species, if the facts of distribution have any value.

The first armed plant on the British list is a shrub, the Barberry (*Berberis vulgaris*), whose armature is peculiar. It produces long, slender shoots, on which all the leaves have been converted into sharp needle-like spines, and these are in groups of from three to seven. This, clearly, is no result of poverty, for the spines appear on the new shoots in advance of short twigs that bear clusters of normal leaves whose margins have prickle-teeth. The position and direction of these spines are such that the upward lick of a cow's tongue in securing a length of the tender shoot would result in severe punishment; and there can be little doubt that it is against such attacks that this protection is retained, however it may have originated. The Barberry does not grow under desert conditions, but is a shrub of the copse and hedgerow.

Our two species of Buckthorn may give some support to the desert theory; for one is armed and the other is unprotected. The Purging Buckthorn (*Rhamnus catharticus*) grows mainly in dry soils, such as the chalk hills; and the ends of its twigs harden into long spines. The Alder-leaved Buckthorn (*Rhamnus frangula*) is found chiefly in damp hedgerows and copses, and has a fondness for the neighbourhood of streams, but its twigs give it no title to be included among the thorns, in spite of the last syllable of its name.

On the other hand is the Furze (*Ulex europaeus*); it has transformed all its twigs and leaves into spines which are crowded on the green stems, but the shrub is by no means restricted to dry habitats. It avoids chalk, but though found on dry hill-sides and equally dry heaths, it is quite as plentiful in soils that are boggy with a distinctly moist atmosphere above. This, we are told, may be equal to a deprivation of moisture, for peat soil is acid and its water may not be taken freely by all plants. Needle-whin (*Genista anglica*), a low shrub with curved, slender branches, has small leaves, but is made conspicuous

more by its exceedingly sharp, long needles. It climbs to the top of high mountains and grows on low heaths; but those upon which it is most abundant, in my experience, are by no means dry either for soil or atmosphere. Blackthorn (*Prunus spinosa*), too, though it is found under varied conditions, has a distinct liking for wet places, including the margins of bogs and streams. Butcher's Broom (*Ruscus aculeatus*), though it occurs sometimes on chalk, is much more frequent about mixed woods and oakwoods, where both soil and air are moister. Like Furze, it has given up the production of efficient leaves as a hopeless business, and the woody, flat twigs that serve the office of leaves are each tipped with a pungent point, and they are quite inedible except when the new, soft, white stems are sent up rapidly under the protection of the older ones.

Holly (*Ilex aquifolium*) has prickly leaves only low down, where the atmospheric conditions are moister; the upper branches exposed to drying winds, have flatter, unarmed leaves. Much the same may be said of the Wild Pear (*Pyrus communis*), whose lower branches are spiny, but the upper ones are not. In both these cases the new twigs on the upper branches of the tree are produced under much drier conditions and should be, therefore, the more spiny according to the desert theory. Thistles (*Carduus*), bristling with prickles on stem and leaf, are not restricted to dry places; neither is the Teasel (*Dipsacus sylvestris*).

It appears to me to be more reasonable to suppose that spines and thorns originated as mutations and have been perpetuated by natural selection where they were found to give protection to species whose foliage was desirable as food for mammals; the protected individuals being more likely to survive and transmit the thorny tendency to their offspring. Thorns, being aborted shoots, originated probably under adverse conditions which prevented the healthy continuation of the shoot's growth and caused it to shrivel into a sharp point; and the smaller spines represent leaf-stalks or stipules that have become hardened in similar circumstances. Where by some such process the plant has become leafless—as in Furze and Butcher's Broom—the functions of the leaf have to be performed by other parts of the plant; and in the two examples mentioned this is effected by keeping the stems and twigs green.

To some people, this loss of leaves appears to be a reversal of the proper course of evolution, and not a "survival of the fittest." But "fittest" in the Darwinian sense does not imply necessarily perfection according to human or any other standard, but the most fit among its fellows for the work it is compelled by environment to perform—the one of a batch most likely to carry its mission to a successful finish. The survival of this fittest line is brought about by the gradual elimination of the less fit. Natural selection does not *produce* progressive and beneficial variations; but it adopts and stabilises them when they have arisen.

The Season of 1929 at Eastbourne.
A Comparison and Some Additions to the Local Fauna.

By Robert Adkin, F.E.S.—Read *December* 12*th*, 1929.

It is many years since we enjoyed so fine a summer as that of 1929, yet, from the lepidopterist's point of view, it is doubtful whether the 'Season' will be considered as good as that of 1928. At any rate, several species that were excessively abundant in the former year were almost, if not completely, absent in the later one. *Pyrameis cardui* that was so abundant in 1928 has, so far as I am aware, not been seen in the neighbourhood of Eastbourne during the present year. *Plusia gamma*, always a fairly common species, has been a comparative rarity, and *Nomophila noctuella* that in 1928 occurred in such countless thousands as to be a positive plague, has hardly been noticed in 1929. A feature of the former year was the abundance of the larvae of *Heliothis peltigera*, all along our coast-line, wherever any suitable food-plant was to be found. The imagines also were well in evidence. In 1929, although careful search has been made for the larva, not a trace of it has been found, nor has the imago been met with. I am not so bold as to say that the species has been entirely absent, but if it has occurred at all it has been in such small numbers that it has escaped detection.

But for all that, 1929 has not been without some matters of interest. It will perhaps be convenient to take the species seriatim. Our two common Pierids, *P. brassicae* and *P. rapae*. are always liable to considerable fluctuations in point of numbers. The spring emergences were about normal, but the later broods of both species were considerably in excess. It did not appear that there was any sudden increase in numbers, as is the case when immigration takes place, the abundance apparently being due to favourable conditions for their development. *Colias croceus* was seen on May 30th and from August 5th to September 19th, specimens were occasionally met with, but at no time was it at all common. A *Leucophasia sinapis* was captured in the woods on August 12th and two or three others a few days later, while in the latter part of June some dozen specimens of *Melitaea athalia* were taken. It is interesting to know that these two species still occur in our neighbourhood, but it is to be regretted that their continued existence should be jeopardised by the few individuals seen being captured. *Limenitis sibilla* continues to occur fairly commonly, and *Melanargia galathea* is distinctly on the increase. Among the Vanessids *Aglais urticae* was by far the most common. It was first seen on February 2nd, when a specimen was noticed fluttering on a window in the house, and from the middle of March until the

middle of May it was frequently met with, and during August and September it was quite common. *Pyrameis atalanta* was noted on May 26th and 30th, and from August 9th to October 31st, it was continually seen, but never more than three or four specimens at a time. The only note I have of *Vanessa io* is two full-fed larvae seen on July 28th; and of *Polygonia c-album* two specimens have been noted—one at East Dean on August 8th and the other in my garden on September 22nd. *Chrysophanus* (*Rumicia*) *phlaeas* was fairly abundant in certain places in September, and one individual was seen as late as October 23rd. *Polyommatus thetis* (*bellargus*) has been more common than for many years past, and although *Lycaenopsis argiolus* appeared to be on the wing in much the usual numbers in both the spring and summer broods, the larvae on the ivy-flower buds were decidedly scarce in the autumn. *Macroglossum stellatarum* although so common in 1928 has been quite scarce. One was seen as early as March 30th and then between September 22nd and October 27th an individual was occasionally met with—perhaps some half dozen or so in all. The larvae of *Phalera bucephala* were very common on the elms growing along the roads in the town in autumn, and when full-fed might be seen running about on the brick pathways, seeking some soft bit of ground in which they might burrow. The place of *Nomophila noctuella* was taken largely by *Crambus tristellus*, which swarmed over the Downs for many weeks.

Not the least interesting feature of the season was the re-establishment of one species in our local list and the addition of some five others. Our late member, Mr. George P. Shearwood, told me that in 1886 he took *Loxostege* (*Spilodes*) *palealis* on the rough ground that then existed between the old lime kilns at Holywell and the Convalescent Home, and Mr. Alfred Sich had met with it near the same spot some ten years earlier. So far as I know these are the only records for the species in the Eastbourne district. It was therefore with considerable interest that I was shown, on July 24th, by our fellow member, Mr. A. L. Rayward, a live specimen that he had just captured on the ground occupied by the Summerdown Camp during the war, which has since run to waste and is now being built over. We subsequently found that the species was not uncommon there, and in September succeeded in taking the larva in the green seed-heads of the wild carrot. A specimen was also taken on the banks of the Cuckmere estuary, some seven miles away. On the Summerdown ground Mr. Rayward also took two specimens of *Myelois cribrella*, while a third was taken on the Crumbles, where he also captured a specimen of *Salebria semirubella* (*carnella*). On swampy ground near Hampden Park Mr. E. P. Sharp took, and very kindly handed over to me, a couple of *Chilo phragmitellus*; and in the same place Mr. Rayward turned up *Eucosma* (*Paedisca*) *semifuscana* and *Orthotaelia sparganella*.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 23rd, 1930.

By H. W. Andrews, F.E.S.

LADIES and GENTLEMEN. You have just heard the Report of the Council and the Treasurer's Report, and I do not think they call for any special remarks on my part, except congratulations to our Treasurer on the result of his labours last year. I think on looking back that Dr. Cockayne's remarks from this chair, at our last Annual Meeting, on the desirability of more exhibits has borne fruit, but too often these exhibits are made by the "veterans" of the Society, and I feel a good deal more ought to be done in the way of exhibits by our younger members. I am sorry that the Council's suggestion as to putting out suitable exhibits on the side desks before the General Meeting has not met with much support. I still think that it would add to the interest of the General Meeting if members knew something *beforehand* of forthcoming exhibits and did not have to wait until they reached them in the meeting itself. With this small grumble I pass on to my address proper.

THE EARLIER STAGES OF DIPTERA.

Introduction.

A good many years ago I had the privilege of reading a paper on Diptera before this Society, dealing mainly with the adult stages. And in casting around to find a subject for that ordeal, the Presidential Address, which custom dictates shall be delivered annually, whether the deliverer is competent or not, I thought I could do no better than make some remarks on the earlier stages of this Order. There is an extensive literature on this subject but

until recent years it was very unevenly distributed over the different divisions of the Order. The life-history of some aquatic species has been known since the time of Reaumur (1734), that of many others known more or less, but it was not until the latter part of the nineteenth and the early years of the present century, that the growing knowledge of the economic importance of Diptera gave special impetus to the study of their life-histories. Since the discovery (circ. 1897) of the connection between Malaria and Mosquitoes, the life-history of the latter all over the world has been attacked from every possible angle and point of view. The pathology of Yellow Fever and Sleeping Sickness has led to intensive study of their dipterous agents, and agricultural economists have closely investigated the dipterous pests of domestic animals and crops. Especially in recent years has attention been paid to the numerous cases of parasitism occurring throughout the Order. All this knowledge is scattered in various reports and proceedings in entomological, medical and agricultural literature; and as it is usually rather briefly referred to in systematic works, I thought it might be of interest to try and give a resumé of certain interesting facts gathered from some of these publications.

The Egg Stage.

The eggs of Diptera do not, as a rule, show that difference in form and structure that is characteristic of orders such as the Lepidoptera. They are generally white in colour, oblong or spindle shaped, mainly smooth and unsculptured, sometimes with a finely shagreened surface (*Stratiomyidae*) or with keels or flanges lying along their longitudinal axis (*Muscidae*)—Exceptionally the eggs of *Microdon*—a Syrphid which passes its earlier stages as a commensal in the nests of certain species of ants—are oval and distinctly sculptured, and those of *Conopidae*, parasitic on Hymenoptera, have groups of hooks or filaments at their micropylar end. The eggs are deposited in varying ways, and those species whose early stages are aquatic show curious and interesting adaptations for purposes of development and protection. The egg-rafts of Culicids so formed that their upper portions are kept aërated even during temporary submersion, and the egg-ropes of Chironomids, so formed that air and sun can get to them, while at the same time a degree of protection is afforded from enemies, have been fully described by Miall in his "Natural History of Aquatic Insects." Perhaps the most curious method of oviposition in an aquatic species is that of

Atherix ibis, a Leptid fly rare in Britain, the females of which lay their eggs in common on the branches or twigs of some shrub overhanging a stream, and dying as they do so, add their bodies to this viscid mass which may often consist of thousands of individuals. From this bunch of eggs and dead flies the newly hatched larvae drop into the water underneath. In this connection it may be mentioned that an American species of *Atherix* (*A. variegata*) was formerly used as an article of diet by the Indians of Oregon, who collected them from the riverbanks and after baking them, made them into a kind of paste. From the accounts given by Aldrich, who records this interesting fact, it appears that it was the egg-masses that were collected.

The female of the common St. Mark's fly (*Bibio marci*) burrows bodily into the earth and lays a mass of eggs in a small subterranean cell. The Daddy-long-legs (*Tipula oleracea*) thrusts the end of the abdomen into the ground and then oviposits. The cluster fly (*Pollenia rudis*) scatters its eggs loosely on the ground, leaving the young larvae to find their own way to the earthworms on which they prey ; and in like manner species of *Bombyliidae* lay their eggs in the open, the young larvae having the formidable task of penetrating the cemented cells of the mason-bees or perishing. Hover-flies (*Syrphidae*) as a rule oviposit amongst the Aphids on which their larvae prey. *Conopidae* are said to oviposit during flight on the bodies of bees and wasps. The Bot-flies (*Oestridae*) glue their eggs on the hairs of the skin of their equine or bovine hosts. Pipunculids oviposit on or in frog-hoppers and other Homoptera, and the *Cyrtidae* lay their quantities of black eggs in the neighbourhood of spider-webs, for these curious globular flies reverse the usual role and (in their larval stage) are parasitic on spiders. Further instances could be adduced but enough has been said to show that there is no lack of variety in this stage of the life-history of Diptera.

It often happens that species of the same family oviposit in quite different ways. For example, some Asilids (Robber-flies) drop their eggs loosely ; others lay in cracks in stumps of trees or near burrows of beetles therein ; others glue their ova to sticks or moss ; others bury them in soil, and yet others lay *in* the ears of flowering grasses, *in* the stems of grasses, or *in* buds of twigs and branches ; the ovipositors of the females being modified according to the manner of oviposition. In the *Tachinidae* again some lay very minute eggs on the foodplants favoured by the hosts, the eggs being

eaten with the food; others deposit directly *on* the skin of their host larvae, others *in* the bodies of larvae, piercing the skin with their ovipositors; and the species of *Carcelia* lay stalked eggs on the hairs of the larvae of *Chelonia*.

The Diptera are not all oviparous: the eggs of many parasitic Tachinids hatch out directly they are deposited (ovo-viviparity), they are usually laid in large numbers and very small in size. In Sarcophagids, whose larvae are scavengers (saprophagous), the eggs are of considerable size and fewer in number and are deposited as larvae (larviparity); while in certain Muscids, the eggs are still larger in proportion, and single larvae are laid which moult directly on deposition, passing their first stage while in the egg state in the body of the female.

In the above mentioned cases there is no anatomical modification of the eggs and they never appear to obtain nourishment directly from the parent, but when we come to the Tsetse flies (Glossinids), and the Forest-, sheep- and bird-flies (Hippoboscids, Melophagids and Ornithomyiids, forming the sub-division Pupipara) the egg is anatomically modified, and is nourished by the parent for the full duration of the larval stage, oviposition consisting of the deposition of single full fed larvae which immediately pupate.

I conclude this section by mentioning that the phenomenon of paedogenesis in the larval state has been observed in a species of Cecidomyid fly and also in species of *Chironomidae*: in the latter case fully developed pupae produced ova whence normal larvae hatched. Parthenogenesis, resulting in females only, also occurs in some other Chironomids.

The number of eggs laid varies immensely; little is known with certainty about most species, but there is a fair amount of data with respect to species of economic importance, whose life-histories have been closely studied. The Anopheles mosquito (*maculipennis*) lays from 50-100 eggs: *Culex pipiens* 400: the Daddy-long-legs (*Tipula oleracea*) 400-500: Blow-flies (*Calliphoridae*) 400-600: the house fly (*Musca domestica*) 120-140; its biting relation the stable-fly (*Stomoxys calcitrans*) 50-70, and another closely related species, the raven fly (*Musca corvina*) only about 25. In laboratory experiments a Tsetse fly (*Glossina palpalis*) deposited single fully grown larvae at intervals of nine to ten days, eight larvae being deposited in thirteen weeks. The greatest number of eggs deposited by any dipteron of which I have found records occurs in an American species of *Cyrtidae* (*Pterodontia flavipes*) where the following series

of egg-counts was made from three captured females :—number one, 987 ; number two, 3344 ; number three, 3997. Most of these eggs were deposited during the morning of the first day and in no case did the captives live more than two days.

In considering the number of eggs laid, it must be remembered that it is not known with any certainty whether oviposition occurs more than once during the life-time of any individual ; the house-fly for instance, having been recorded as laying three or four batches of eggs during its lifetime.

From the above remarks it will be realised that there is no lack of variety in this stage of the life-history, and I will pass on to the next.

The Larval Stage.

It may well be claimed of Dipterous larvae that they surpass those of all other Orders in variety of their life-history, and to deal adequately and fully with this stage would take far more space and time than is possible in an address such as this. They may occur almost anywhere, and their pabulum may consist of almost any animal or vegetable matter, living or in decay, while they attack as parasites the whole animal kingdom (excluding fishes) from man to earthworms. They have been aptly summed-up as " omnipresent and omnivorous " ; yet, as the majority are either aquatic or live in concealment, they are but little noticed and make no such appeal to the average entomologist as do, for example, the handsome open-feeding caterpillars of Lepidoptera.

The main characteristic of a dipterous larva is the absence of true legs. No dipterous larva has true legs ; their place in locomotion is taken by pseudopods, rows of stiff bristles, or roughened ridges on the segments. Cases of legless larvae occur in some families of other orders, but in none is this universally the case as in Diptera. Another special characteristic is the frequent diminution of the size of the head, which in many cases can be so drawn back within the following segments, that the larva appears to be headless. This state is well exemplified in the maggots of the house-fly. At the other extreme are mosquito larvae which have a large exserted head, and between these two forms are many intermediate stages.

The number of segments is usually twelve, excluding the head, but this is not constant, families occurring with both greater and lesser numbers of body segments. The shape of the larval body varies greatly ; besides the common caterpillar-like forms others

occur that have numerous spiny or flattened excrescences arranged along the sides of the body. Some larvae are pear-shaped (*Conopidae*); others oval (*Platypezidae*); and the larvae of *Microdon* referred to above are so slug-like that they have been described at least twice, and named, as new species of Molluscs. The shape of a larva may change entirely in its different stages, especially in certain parasitic forms (*e.g.*, *Bombyliidae*) where the newly-hatched larvae are extremely elongate and hairlike (triungulin), but in their subsequent stages, in the cells of the bee larvae that they parasitize, are short, plump and maggot-shaped. The antennae are very minute and inconspicuous, and there is no trace of ocelli in the majority of families (though they are present in certain Chironomids). There is great variation in the size of the mandibles and these are frequently used for classificatory purposes. It suffices to say here that they may be placed horizontally or vertically, and in one large division (Cyclorrhapha), are reduced to hook-like shapes somewhat like the tusks of a walrus.

With regard to the breathing apparatus, the normal insect arrangement of a number of spiracles ranged along the sides of the body (peripneustic) is rare, and confined to the more primitive forms. As a rule there are either two pairs, one at either end of the body (amphipneustic), or one pair only, at the posterior end (metapneustic). In the parasitic forms it frequently happens that the newly-batched larvae have only the one posterior pair, and in subsequent moults develop an anterior pair as well. Varying contrivances for obtaining air occur amongst aquatic forms. The larva of *Stratiomys* pierces the surface-film of the water with its tail, which then expands the bunch of 30 or so filaments at its extremity, like the petals of a flower, and the larva hangs head downwards suspended from the surface by this tail coronet. Mosquito larvae in like manner pierce the surface-film with the "respiratory syphon" springing from their eighth abdominal segment, and the five flaps at the extremity open out in the same way as the coronet filaments of *Stratiomys*. The larva of the Bee-fly—commonly known as the "rat-tailed maggot"—which lives in semi-liquid mud or filth, has no such apparatus, but the end segments are capable of telescopic extension to five or six times the normal length of the body, thus enabling the posterior spiracles to reach the surface from varying depths. A Tipulid fly (*Ptychoptera*) has a very similar arrangement to that of the Bee-fly, though systematically the Tipulids are placed far away from the Eristalids.

The duration of the larval stage varies in relation to the biology of the larva, and is also influenced by temperature and abundance of food supply. A mosquito larva in favourable conditions may become full grown in a week, and a house-fly in like conditions takes about the same time, but in unfavourable conditions it may take six or eight weeks to attain its full growth. Bot-fly larvae on the other hand spend from six to eight months in the bodies of their hosts. There are as a rule three larval stages, separated by two moults, or three if the change to pupa is included; but exact knowledge on this point is lacking in some families.

Dipterous larvae may occur almost anywhere, and I cannot attempt to give more than an outline of their various habitats. A vast number of species, especially in the Nematocera, are aquatic in this stage and are to be found in every kind of water; rapid rivers, still pools, in hot springs at a temperature of 109° F., in casual water in hollows of trees (sap exudations from wounds in trees are often found to contain Dipterous larvae), and in the cups of pitcher plants, in gutters, old tins, puddles formed by animals' hoofs, etc. Nor is it necessary that the water be pure or fresh. Cesspools, sewage filter beds, alkaline waters and springs salter than sea water, saltmarshes and marine estuaries, all have their complement of Dipterous larvae. Even the sea itself—the only large expanse of the surface of the globe free from the presence of insect life—has been invaded by Diptera. The larvae of certain gnats (Chironomids) live in sea-water and have been dredged from a depth of 30 fathoms, and several species of these gnats have been found breeding in sea-water off our British shores. The most extraordinary case of all is that of a Samoan species of the same family, found by Dr. Buxton in 1926. This species (*Pontomyia natans*, Edwards) spends not only its earlier stages, but also its adult life *under the surface*, being the only case known of a submarine insect. Another unique case is that of a species of Ephydriid (*Psilopa petrolei*) which cannot be justly termed either aquatic or terrestrial, inasmuch as its larvae occur in the pools of crude petroleum found in the oilfields of Southern California. This is the only insect known to breed in such a medium. As is the case with the aquatic species, terrestrial larvae may be found in all kinds of habitats according to their manner of living, as will be seen in the following paragraphs. In their feeding habits both aquatic and terrestrial forms may be classed as :—

(1) Phytophagous (or herbivorous), feeding on living vegetable matter.
(2) Sarcophagous (or predaceous), feeding on living animal organisms.
(3) Saprophagous (or scavengers), feeding on dead and decaying matter, vegetable or animal.
(4) Parasitic, wholly or partially.

Aquatic forms favour the first three of these divisions with a preponderance of the second, and are very seldom parasitic, but there is a record of a gnat-larva (Chironomid) that was found in watersnails (in the Trafalgar Square fountain pools !). Terrestrial forms favour all four divisions with perhaps a preponderance of the third and fourth. Herbivorous larvae attack vegetation in various ways, as leaf or stem miners ; gall makers on leaves, stems and roots; and feeders on flower-heads, seed capsules and fruits. Several are of considerable economic importance as pests; *e.g.*, the Hessian fly (*Mayetiola destructor*) on corn crops, the Mediterranean fruit fly (*Ceritatis capitata*) and our common daddy-long-legs whose larvae—popularly known as " leather-jackets "—feeding on the roots of grasses are well-known as depredators of pastures and golf-greens. Of predaceous species the best known example is furnished by the Syrphids whose larvae are well known to gardeners as voracious enemies of Aphids. A less known case is that of a European genus of Leptids (*Vermileo*) whose larvae make sand-pits for ants as do the larvae of the Ant Lions (Neuroptera). The larvae of certain Anthomyiids were long considered to be scavengers (saprophagous) until closer observation showed that they really preyed on other scavenging larvae amongst which they occurred, and a large number of species living in rotten wood, under bark, etc., are predaceous on other inhabitants of such situations. The scavenging larvae include very numerous examples in nearly all the families, and also some interesting cases of commensals, *e.g.*, larvae of *Volucella* in the nests of bees and wasps, and those of *Microdon* (a Syrphid), and Phorids in ants' nests. Other Phorids are especially associated with dead snails, and Mr. Hamm has bred 31 species belonging to 23 genera and 17 families from old birds' nests collected in the neighbourhood of Oxford. Fungi and decayed vegetation both harbour a large dipterous fauna. Finally a majority of that great division of the Order known as " Cyclorrhapha " are true parasites spending their larval existence inside the bodies of living hosts. Very full descriptions

both of the morphology and biology of these parasitic larvae may be found in numerous papers by D. Keilin, who has made a special study of this subject, and to whose writings I am much indebted. Many are of beneficial economic value, especially amongst the *Tachinidae* (well known to breeders of Lepidoptera who perhaps do not see eye to eye with economic entomologists on this point) and in recent years experiments have been made in using certain species to control other harmful insects (*e.g.*, earwigs in New Zealand and certain pests of sugar plants in Hawaii).

Two final points of miscellaneous interest in dipterous larvae are the occurrence of certain luminous larvae of fungus-gnats (Mycetophilids) in New Zealand, known locally as glow-worms; and the migratory habits of another fungus-gnat larva which occasionally assembles in vast numbers forming a snake-like mass composed of living larvae, 12-to 15 feet long, about 3 inches wide and perhaps ½ inch or 6 or 7 larvae deep, all more or less stuck together, and " flowing " at the rate of about an inch a minute. This migratory habit has been noticed both in Europe and America, but the precise reasons for it do not appear to be known.

The Pupal Stage.

We now pass to the last of the earlier stages, the pupa; here it is noteworthy that the two primary divisions of Diptera, the Orthorrhapha and the Cyclorrhapha are based not on imaginal but on pupal characters. In the former the pupa resembles that of a Lepidopteron with the appendages of the future imago obvious on the outer surface, and the fly emerges by a T-shaped slit on the dorsum. In the latter the pupa is barrel-shaped and without any sign of imaginal appendages, being formed by the hardening of the larval skin into a chitinised case known as the puparium within which the true pupa or nymph develops. Emergence takes place by forcing off the top of the puparium (along a line of weakness in the chitin) by means of the ptilinum, an air-filled bladder which is used for this purpose only, and after emergence is withdrawn into the framework of the head. Very rarely a cocoon is formed within the puparium.

In those species that have a number of spiracles in the larval stage (*e.g.*, *Bibio*) the pupal spiracles are similarly arranged, but where the larva has only two pairs of spiracles (amphipneustic), pupal respiration is carried on by the prothoracic spiracles alone, the anal pair, though often obvious at the end of the puparium in Cyclorraphous

species, are remnants of the larval state and not connected with the true pupa. In Orthorrhaphous species the prothoracic spiracles are often very obvious (*e.g.*. respiratory trumpets of *Culex*), but in the Cyclorrhapha they appear as two minute excrescences protruding through specially weakened areas in the chitin of the puparium, and often are not visible externally at all.

The pupae of aquatic species either float to the surface of the water for emergence, or the larvae leave the water and pupate in the earth. The Simuliids, whose pupae are anchored to waterweeds or stones in rapid streams, rise to the surface in an air bubble released by the splitting of the back of the pupa and run along the surface film to the nearest solid support. Orthorrhaphous pupae are mobile and in certain species of Leptids, Bombyliids, and Asilids, are strongly armed with rings of backward-pointed spines on the abdomen, and a series of strong thorns on the thorax. The former serve to brace the pupa against the soil or burrow in which it may lie, while the latter are used to break through to the surface. In the case of those species of *Anthrax* that parasitize the larvae of the mason-bee, the dipterous pupa has thus to quarry its way through the cemented covering of the cell, which in the ordinary way would be gnawed through by the strong mandibles of the freshly emerged bee, but would prove an impassable barrier to the purely sucking mouth of the adult dipteron. Parasitic larvae either leave the bodies of their hosts when full fed and pupate in the earth, or else pupate in the bodies of their hosts, and the full fed larvae of the Pupipara pupate in the earth immediately on leaving the body of their parent.

Conclusion.

I have now to the best of my ability run through some of the facts and characteristics of the three early stages of Diptera, and have only to make a few concluding remarks. The keynote of my former paper on the adult forms was the very great degree of variability that obtained within the Order, and I think you will agree that the same keynote applies in the same, if not in a still greater degree, when the earlier stages are considered.

Two striking facts to my mind are: firstly, the way in which the life-history of so many species runs right athwart the systematic arrangement of the adults. Species of the same family or genus show extraordinary differences in mode of life and habitats in their earlier stages. I have already mentioned the various methods of

oviposition in Asilids. In the larvae of Syrphids (*sensu lato*) we find both aquatic and terrestrial forms, and the latter include phytophagous, predaceous, and scavenging forms, these last including feeders on decaying vegetable matter, and commensals in the nests of other insects. In one group of Anthomyiids (*Hylemyia-Chortiphila*) some species are herbivorous, others parasitic, and others again predaceous, or carnivorous. Many similar cases could be quoted if space and time permitted. On the other hand the converse of the above remarks is shown in what has been termed " convergence " of habits in the earlier stages of species of widely separated systematic position. Referring again to the preceding pages we notice the similar method of respiration adopted by Culicid and Stratiomyid larvae ; or by Eristalid and Tipulid ; both pairs belonging to absolutely unrelated families, and another instance is found in the great similarity of larval habits in the parasitic Cyclorrhapha, a division of the order containing many different systematic groups.

There is still a very wide field open for investigation and experiment in the study of the earlier stages of Diptera, and if this paper should turn the thoughts of any young entomologist away from the well-trodden paths of the better known Orders and towards this all too little studied subject, I feel sure that he will not regret it.

Ladies and Gentlemen, I am obliged to you for listening patiently to a rather lengthy address on an Order not in favour with Members of this Society. To all of you, and more especially to the Officers and Council, I tender my thanks for help and consideration during my year of office as your President, and I feel sure you will support me in my last Presidential act, namely, in extending a sincere welcome to my successor, Mr. Carr, well known to us as one of the senior members of the Society, who I am sure will, on his recovery from the illness that most unfortunately has prevented him from being present with us to-night, take the Chair with the hearty good wishes of all.

APPENDIX I.

Key to Sub-Orders.

(Copied from Malloch : Preliminary Classification of Diptera : Bulletin of Illinois State Laboratory, March, 1917).

Larvae.

1. Head complete, or the posterior portion with deep longitudinal incisions : mandibles moving horizontally.

Orthorrhapha-Nematocera.

— Head incomplete, without a strongly developed arcuate plate, mandibles moving vertically 2

2. Maxillae well developed, their palpi distinct, mandibles normally sickle-shaped, not protruded much beyond the apices of the maxillae, often extending less than halfway to their apices: antennae well developed, situated upon the upper surface of a slightly arcuate chitinized dorsal plate . Orthorrhapha-Brachycera.

— Maxillae poorly developed, the palpi visible only in a few groups, mandibles short and hook-like, usually capable of protrusion much beyond apices of maxillae if these are present; antennae poorly developed or absent, when present situated on a membranous surface.

Cyclorrhapha.

Pupae.

1. Pupa not enclosed within the indurated last larval skin or if so the head is distinct as in the larva, or the puparium is slightly flattened dorsoventrally, its texture leathery, not chitinous, and the anterior respiratory organs not distinguishable, imago (or pupa) emerges through a rectangular split on dorsum of larval skin.

Orthorrhapha.

— Pupa enclosed within the indurated last larval skin, head always retracted, the chitinous portion occupying a position on the inner side of the ventral surface of the puparium: anterior respiratory organs distinct, either protruding from the antero-lateral angles of the cephalic extremity or from dorsum of base of abdomen: imago usually emerges by forcing off the rounded anterior extremity of the puparium in cap-like form or the dorsal half of the thoracic portion—the lines of cleavage being along the lateral margins to a point at base of abdomen: rarely emergence is through rectangular splitting of the dorsum of the puparium.

Cyclorrhapha.

D. Keilin ("Bull. Scientifique de la France et Belgique" Tome LXIX. 1915-16) divides the larvae of Cylorrhapha biologically as follows.

1. All larvae parasitic on animals, carnivorous, predacious, those that pass their life in the uterus of their mother (Pupipara) and nearly all phytophagous larvae (gall

makers or miners) may be united in one ethologic group of :—

Biontophagous larvae, nourishing themselves on living matter and (morphologically) deprived of ridges on the basal portion of the pharynx.

as opposed to

— All larvae that nourish themselves on animal or vegetable matter in decomposition, which form the ethologic group of *Saprophagous larvae*, with (morphologically) well developed ridges on the basal portion of the pharynx.

APPENDIX II.

Families, Genera and Species from old birds' nests from Oxford, bred by A. H. Hamm.

Cecidomyiidae, 1 gen. 1 species.
Mycetophilidae, 2 gen. 3 sp.
Chironomidae, 1 gen. 1 sp.
Bibionidae, 1 gen. 1 sp.
Tipulidae, 1 gen. 1 sp.
Pipunculidae, 1 gen. 3 sp.
Phoridae, 1 gen. 2 sp.
Tachinidae, 1 gen. 1 sp.
Anthomyiidae, 4 gen. 5 sp.
Helomyzidae, 1 gen. 2 sp.
Dryomyzidae, 1 gen. 1 sp.
Sapromyzidae, 1 gen. 3 sp.
Sepsidae, 1 gen. 1 sp.
Piophilidae, 1 gen. 1 sp.
Geomyzidae, 2 gen. 2 sp.
Milichidae, 1 gen. 1 sp.
Hippoboscidae, 2 gen. 2 sp.

Total—17 Families ; 23 Genera ; 31 species.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 14th, 1929.

Mr. H. W. Andrews, F.E.S., *President*, in the Chair.

Mr. G. Stubbs, of Cambridge, and Mr. J. K. Bell, of Caterham Valley, were elected members.

The exhibits of the evening were mainly examples of Melanism in the Lepidoptera and a few in Coleoptera and Diptera.

Mr. L. W. Newman exhibited a large number of melanic specimens of various families of the Macro-Lepidoptera including particularly *Polyommatus thetis* ♀, and *Ematurga atomaria*.

Dr. Cockayne exhibited the following melanic forms among the Geometers:—*Selenia bilunaria*, 1st and 2nd brood, Harrison's manganese experiments; *Crocallis elinguaria* ab. *unicolor*, Prout, and ab. *fusca*, Reutti; *Odontopera bidentata* ab. *nigra*, Prout; *Ennomos autumnaria* ab. *schultzi*, Siebt; *Ennomos quercinaria* (*angularia*) ab. *perfuscata*, Prout; *Cepphis* (*Epione*) *advenaria* ab. *fulva*, Gillmer; *Phigalia pedaria* ab. *monacharia*; *Lycia hirtaria* ab. black; *Tephrosia bistortata* ab. *defessaria*, Frr.; *Tephrosia crepuscularia* ab. *delamerensis*, B.-W.; *Biston* (*Amphidasis*) *betularia* ab. *carbonaria*, Jordan, and ab. *insularia*, Th. Meig.; *Hemerophila abruptaria* ab. *fuscata*, Prout; *Boarmia punctinalis* (*consortaria*) ab. *consobrinaria*; *Boarmia roboraria* ab. *infuscata*, Stgr.; *Boarmia repandata* ab. *nigricata*, Fuchs; *Boarmia ribeata* (*abietaria*) ab. black; *Boarmia rhomboidaria* (*gemmaria*) ab. *rebeli*, Aigner; *Ectropis* (*Tephrosia*) *consonaria* ab. *nigra*, Bankes; *Oporinia autumnata* ab. melanic; *Lampropteryx suffumata* ab. *piceata*.

Capt. B. S. Curwen exhibited the following melanic forms of Geometers (in most cases typical and transitional forms included):—*Cidaria bicolorata* race *plumbata* and ab. *fumosa*; *C. obeliscata* ab. *obliterata*; *C. furcata* ab. *cinereata*; *C. coerulata* (*impluviata*) ab. *obsoletaria*; *C. albulata* form *subfasciaria* and ab. *thules*; *C. obstipata* (*fluviata*) bred dark ♀ ♀; *C. suffumata* ab. *piceata*; *Ennomos quercinaria* ab. *angularia* and ab. *perfuscata*; *Selenia lunaria* ab.

sublunaria; *Gonodontis bidentata* ab. *nigra*; *Cidaria hastata* race *subhastata*; *Oporinia dilutata* ab. *obscurata* and ab. *melana*, etc.; *Erannis leucophaearia* ab. *nigricaria* and ab. *merularia*; *E. defoliaria* ab. *holmgreni*; *E. marginaria* melanic ♀; *Apocheima hispidaria* ab. *obscura*; *Boarmia rhomboidaria* ab. *rebeli*; *B. repandata* ab. *conversaria* and ab. *nigricata*; *B. crepuscularia* ab. *delamerensis*; *B. bistortata* race *laricaria* and ab. *defessaria*; *Biston betularia* ab. *ochrearia* and ab. *carbonaria*; *Ematurga atomaria* ab. *ustaria*; *Hemerophila abruptaria* ab. *fuscata*; and *Calocalpe cervinalis* ab. *infuscata*.

Mr. A. A. W. Buckstone exhibited melanic forms of most of the species already noticed and in addition those of *Semiothisa liturata*, *Abraxas grossulariata*, *A. sylvata*, *Hydriomena furcata* (*elutata*), and *Cidaria bicolorata* (*rubiginata*).

Dr. Harold B. Williams exhibited the following melanic forms: *Boarmia punctinalis* (*consortaria*) and ab. *humperti*, N. Kent, and a melanic form from Oxshott; *B. roboraria*, dark forms, N. Kent and Ascot, and ab. *infuscata*, Prout, N.E. Surrey; *B. rhomboidaria* (*gemmaria*) ab. *perfumaria*, N. Kent, dark forms, Lancs, Surrey and Glasgow, ab. *rebeli*, N. Kent; *B. repandata* ab. *nigricata*, Fuchs, Yorks; *Ectropis* (*Tephrosia*) *crepuscularia* ab. *delamerensis*, *E. bistortata* and dark form, Oxshott; *E. consonaria* and ab. *nigra*, Kent; *E. punctulata*, and dark form, Oxshott; and *Boarmia ribearia* (*abietaria*) ab. *sericearia*, Surrey, and a black form.

Mr. Hy. J. Turner exhibited the remarkable melanic form of *Parnassius mnemosyne*, ab. *umbratilis* from the Tyrol.

Capt. Bliss exhibited an aberration of *Limenitis sibilla* a near approach to ab. *nigrina*, a *Brenthis euphrosyne* with much increased area of black marking forming a prettily banded insect, and an unusually dark *Abraxas grossulariata*; all were captured.

Capt. Murray exhibited an example of *Ectropis* (*Tephrosia*) *punctulata* of which the R. side wings were normal and the L. side wings melanic, a very dark ♀ *Argynnis aglaia* and a very pale yellow *Colias croceus* ♀.

Mr. H. Moore exhibited the black form *harrissellus* of the "humble-bee," *Bombus ruderatus*.

Mr. H. W. Andrews exhibited melanic forms of several species of Diptera.

Mr. J. F. Perkins exhibited a case of British bees and sawflies.

Mr. Hugh Main exhibited the melanic forms *robsoni* and *thompsoni* of *Aplecta nebulosa* and summarised the work which was done with the breeding of this species some quarter of a century ago.

Mr. de Worms exhibited the melanic forms of five British species of *Boarmia* and four species of *Ectropis* (*Tephrosia*) especially calling attention to *rhomboidaria* (*gemmaria*), to *roboraria* from Surrey where its melanic forms were scarce, and to *punctulata* which was year by year getting darker in the Oxshott district.

Mr. C. N. Hawkins exhibited (1) two melanic specimens of the Coleopteron, *Phyllobius pyri*, L. taken with other similar specimens from various plants growing on the sea-shore at Reculver, Kent, in 1924. Also a normal specimen for comparison.

(2) *Melanic pupa cases of the following Lepidoptera*:—Two of *Macroglossum stellatarum*, L., bred in 1928 from nearly full-grown larvae taken on Wimbledon Common. Of 14 larvae taken at the time, 2 were preserved, 1 died and the remainder produced more or less melanic pupae. The imagines were normal. One of *Cosymbia* (*Zonosoma*) (*Ephyra*) *orbicularia*, Hb., bred in 1927 from New Forest stock. All other pupae were normal. In each case a normal pupa was shown for comparison. The pupa of *M. stellatarum* normally turns dark a day or two before the emergence of the imago, but this is due to the dark colour of the moth showing through the pupal shell and after the imago has emerged the pupa regains its pale brown colour. In the case of the pupae shown, however, the pupal skin itself appears to contain a definite black pigment. As this species usually pupates in a cocoon on, or just under the surface of the ground (all these larvae did so) and the pupa is consequently concealed, the dark colour of the pupa can be of no value for protective purposes, and indicates that melanism in its origin is a phenomenon quite independent of protective resemblance.

Mr. Hawkins also showed separately a living larva of *Zeuzera pyrina*, L., (*aesculi*), from Herne Bay.

In the discussion which ensued Mr. Grosvenor stated that the black *Zygaena* forms, which he had obtained, were always near a particularly smoky spot bordering a railway line. Mr. Hewer said that a cutting such as Mr. Grosvenor referred to would tend to retain much of the smoke with a resultant chemical deposit upon the foliage around. Mr. Grosvenor said that the melanism was inherited, as larvae from a melanic origin produced melanic imagines. Dr. Williams referred to the enormous increase in melanic forms in Surrey in recent years. It was now nearly impossible to obtain the typical form of *Boarmia ribeata* (*abietaria*); all were jet black. The *perfumaria* form of *B. rhomboidaria* were much darker now than years ago. Mr. Buckstone said that

Thera obeliscata were much darker now than they were thirty years ago.

Mr. Main and several others particularly urged members not merely to obtain melanic forms but to experiment more and more to discover the causes of melanism.

It was notable that melanic forms of *Noctuidae* were conspicuous by their absence among the various exhibits.

Mr. C. G. M. de Worms exhibited a series of diminutive forms of British and Foreign Lepidoptera, together with normal-size specimens of the respective sex and species for comparison.

Rhopalocera.—*Papilio machaon*, male bred, emerged May, 1926, from larva taken in Wicken Fen in August, 1925. Expanse 55mm. (Normal male = 64mm.)

Pieris napi, male and female, taken in Surrey. Date uncertain. Expanse, male = 31mm.; female = 36mm. (Normal male = 41mm.; Female = 43mm.)

Euchloë cardamines, male (kindly lent by Mr. Palmer), taken near Ascot, May, 1928. Expanse = 33mm, normal 39mm. Female taken at Wicken Fen, May, 1926. Expanse = 33mm., normal = 41mm.

Gonepteryx rhamni, male bred, emerged July, 1927, from larva found in Wicken Fen in preceding May. Expanse = 39mm. (Normal male = 51mm.)

Colias croceus (*edusa*) var. *pallida*, female, taken in France near Tours, September, 1928. Expanse = 39mm. (Normal female = 48mm.)

Melitaea cinxia, male, taken in France near Tours, August, 1923. Expanse = 30mm., normal = 36mm.

Aphantopus hyperantus, male (kindly lent by Mr. D. Palmer), taken near Ascot, August, 1927. Expanse = 30mm., normal = 41mm.

Strymon (*Thecla*) *quercus*, male, taken in Blean Woods (kindly lent by Mr. Palmer), July, 1928. Expanse = 24mm., normal = 32mm.

Plebeius aegon, female taken near Chobham, Surrey, July, 1913. Expanse = 19mm, normal = 23mm.

P. medon (*astrarche*), ? male, without red spots on border, taken near Tours, France, July, 1923. Expanse = 20mm. Normal male, expanse = 24mm.

Heterocera.—*Hepialus lupulina*, male taken near Cambridge. May, 1927. Expanse = 21mm. Normal male 29mm.

Hepialus humuli, female taken in Surrey, June, 1926. Expanse =45mm. Normal female=60mm.

Leucoma (*Porthesia*) *similis*, male taken near Tonbridge, Kent, on August 26th, 1925. Expanse=23mm. Normal male=31mm.

Cosmotriche potatoria, male taken at Wicken Fen, August, 1926. Expanse=39mm. Normal male=49mm.

Selenia bilunaria, male taken at Wicken Fen in July, 1926. Expanse=31mm. Normal male=38mm.

Erannis (*Hybernia*) *defoliaria*, male (kindly lent by Capt. K. F. M. Murray), taken at light near Lyndhurst, Hants, on the night of November 17th, 1928. Expanse=30mm. Normal=40mm.

FEBRUARY 28th, 1929.

The PRESIDENT in the Chair.

Mr. Rait-Smith exhibited a store-box containing a long series of the various broods of *Lymantria monacha* reared by Mr. Pickett in his experiments from 1894 to 1902 to induce forms showing strong melanism.

Mr. Whitting exhibited a long bred series of *Colias croceus* (*edusa*), and communicated the following data :—Bred from 2 typical ♀ ♀ captured at Brading, Isle of Wight, August 1928, on the Downs. 130 eggs were laid from August 24th-25th. 100 hatched September 3rd-5th. Egg state, 9 days. First larva full grown, October 1st. Larval state about 1 month. Pupated 6th. First imago emerged November 5th. No. of males bred=39. No. of females=26. Total=65. Deformed, ♂ ♂ 5, ♀ 1. 26 larvae and 9 pupae died.

Mr. H. W. Andrews exhibited a small series of the Dipteron *Xylota segnis*, L. including typical forms; some melanic ♀ ♀ : and two very pale and dwarfed ♀ ♀ .

Mr. Hy. J. Turner exhibited two series of the small Satyrid *Coenonympha arcania* from Spain. The one was of the typical form from Santa Fa, in Catalonia, and the other which had been named race *clorinda*, Sag., was from Cuenca in New Castile. The latter was a form apparently not found elsewhere and was characterised by a more or less definite amount of the yellowish brown clouding on the disc of the hindwing and the anal angle. He had series of the species from Moncayo, La Granja and Casayo in Spain, from Digne, St. Martin Vésubie and Hyéres in the South of France, from Florac in the Central Tarn district of France, from

Fontainebleu, from Gavarnie in the Pyrenees, from Grésy-sur-Aix in the French Alps, from Biedenkoff in Rhineland, from Vienna and from Macugnaga in the Italian Alps but not one example from any of these localities had this form of variation. The race was also slightly smaller than most of those from other localities. Dr. Zerny (" Eos," III. 350) reports it as the prevailing form in the Albarracin (Arragon) area, the adjoining province to that of Cuenca (New Castile).

Mr. de Worms exhibited series of *Apamea dumerilii*, examples of both ♂ and ♀ *Hipparchia semele* without the usual eyespots on the hindwings above, and of *Epinephele jurtina* with partially bleached wings, from central France.

Mr. Glegg exhibited a number of species of *Ornithoptera* and a discussion took place on their habits. Dr. Cockayne stated that he had seen five different species alive but not one specimen had he ever seen come down to water. Mr. Grosvenor said that *Ornithoptera* and most species of *Papilio* he had met with in India would come down to flowers especially to a green daisy in the late afternoon. Mr. Glegg said that some species did come to moisture.

MARCH 14th, 1929.

Mr. H. W. Andrews, F.E.S., President, in the Chair.

Mr. James Wainwright and Mr. J. Chas. Wainwright, of 8, Kingsdown Avenue, Ealing, W., were elected members.

Mr. Buckstone exhibited a Geometer taken at Horsley in June some years ago, which he had been unable to identify. It was subsequently ascertained to be a form of *Eupithecia satyrata*.

Mr. Hugh Main exhibited a living example of *Blaps mucronata*, of which he had been studying the life-history, and also examples of his new form of sub-terrarium containing the earlier stages of the beetles *Cicindela campestris* and *Lucanus cervus*.

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

Mr. E. J. Bunnett exhibited leafy flowers of Dutch clover, flowers of tulips with petals down the stem ; primrose flowers with large leaf-like sepals, broomrape parasitic on hop, etc.

Mr. Dennis exhibited various species of the rose family, agrimony, lady's tresses, various thorn bushes, the white beam, wild pear, wild service, ash, etc.

Mr. Tonge exhibited a series of pupae of the Pierids, etc.

Mr. Main exhibited stages in the life-histories of the cuckoo-spit insect, stag-beetle, Blaps, *Clotho durandi* (a spider from S. France), etc.

Mr. Dodds exhibited some denizens of the Zoological Gardens.

Mr. J. H. Adkin exhibited a series of studies of the trees from his neighbourhood.

MARCH 28th, 1929.

The PRESIDENT in the Chair.

Mr. Barnett showed bred examples of *Pyrameis cardui*, one of which had all the black and darkest markings increased in area and in depth of shade.

Capt. B. S. Curwen exhibited a series of *Apatura iris* and of *A. ilia* with forms of the latter species, viz., *iliades*, *clytie*, *metis* and *eos*, all taken when collecting in the Samoussy woods near Laon in N. France, with Dr. Rosa of Edinburgh, during the last two days of June, 1914. A few weeks after, these woods were completely devastated in the German advance. The chief attraction seemed to be bullock droppings in the roads, but numerous *iliades* were attracted by the bread and cheese which the entomologists had with them.

Mr. F. W. McDonald read a paper, "Memories of some of the Old Entomologists." (See page 1).

APRIL 11th, 1929.

The PRESIDENT in the Chair.

Lt.-Col. W. G. B. Hawley, 13, Colville Rd., W. 11, was elected a member.

Captain Curwen exhibited series of *Melitaea didyma* from various localities and referred to the great range of variation shown, especially in the females.

Mr. Turner referred to the interesting article appearing in the *Entomologists' Record* from Dr. Verity, in which he was endeavouring to work out the origin of the extreme variability in this species as due to the line of migration arising in the far East, taking three directions, one north of the Black Sea, another through

Asia Minor and the third along the North African route, all three meeting again and coalescing in Central and Western Europe.

Mr. Hugh Main exhibited Dipterous larvae and pupae dug up in his garden, and enquired as to the species.

Mr. Jacobs exhibited a coloured print of *Pyrameis cardui* dated 1800, by F. P. Nodder, showing white dead-nettle as foodplant of the larva. The larva is said to be more or less polyphagous.

Notes on the effect of the past cold winter on hibernating larvae were given by—

Mr. Grosvenor who said that during the late severe winter all his British and Irish hibernating Zygaenid larvae succumbed, while large numbers of his *Z. stoechadis* from Italy survived, in fact practically all his continental larvae came through. Of *Z. achilleae* only one died although, others were delayed in coming from hibernation. His I. of Wight *Z. trifolii* had not yet woken up, and were a month late at least.

Mr. A. Bliss lost the whole of his *C. potatoria* larvae, which were on grass outdoors in the sun. Of *Lasiocampa rubi* 3 had lived. *A. villica* kept indoors were nearly all full-fed.

Mr. Newman gave an account of his experiences this season. First he spoke of wild hibernating larvae. It was his custom to turn out thousands of larvae each autumn in certain lanes, and search for the species again in the spring. This year in 4 hours he got 1 *Arctia caja* and 3 *Lasiocampa quercus*. *Cosmotriche potatoria* and *Arctia villica* were absent, and only about a dozen and a half of *Gastropacha quercifolia* survived. In one sleeve, out of 300 hibernating larvae only 2 remained, in another only 3. In the Isle of Wight and at Eastbourne *A. villica* was practically extinct. Of the fritillaries, *Brenthis euphrosyne* some 800 larvae came through the winter, *B. selene* were all lost, *Melitaea athalia* did fairly well with 50% through, while in the I. of Wight *M. cinxia* had been absolutely abundant in some spots but scarce in others. *Dryas paphia* larvae had been kept on a cold stone floor until March, when they were transferred to a greenhouse; very few were lost. He had found that if the heat was started in the spring the larvae went through well in spite of after changes, which did not seem to affect them. *Argynnis aglaia*, which hibernated just out of the egg, exposed out of doors had nibbled the seedling violets and probably a good many had survived. *A. cydippe* (*adippe*) hatched in March. They were outdoors and probably all right, as a good many were to be seen. Tree-feeding larvae, like *Angerona prunaria* and *Urapteryx sambucaria*,

had done well. *Brephos parthenias* had been common this year, as had *Polyploca flavicornis*. *Polygonia c-album* were put in a cage in the warm sun in March and all succumbed. This species was gradually spreading over the British Isles, but none could be found at Simon's Yat on a four days visit. He had found larvae of *Rumicia phlaeas* abnormally abundant on a railway bank and had taken about 80 full fed in an hour and a half. At the same place quantities of larvae of *Camptogramma bilineata* were on the sorrel. *Rumicia phlaeas* was very early; it hibernated at different stages. This bank faces due south. An interesting point is that the grass had all been burnt and many of the sorrel plants were badly singed but these grass fires had done no damage to larvae on this ground.

Dr. Cockayne said that he had fed larvae of *Celaena haworthii* from egg to full-growth entirely on cotton-grass. When young they eat the centre of the stem just above the root-stock; when older they eat part of the root-stock also. This year he had a few ova of *Helotropha leucostigma*. A piece of dandelion stem was put in to keep the eggs slightly moist. He could see no sign of larvae though the eggs were hatched. They had bored the dandelion stem and eaten it. Not realising this he killed most of them, but two were now eating iris stems. They are exactly like the larvae of *C. haworthii* of the same age; and, as Mr. Tams can find no great differences in the genitalia, it appears to be misleading to place the two in separate genera. They are congeners, but whether *Celaena* or *Helotropha* should be the generic name he did not know.

Revision of the Bye-Laws.

Shortly before the date of this meeting the following notice was posted to every member of the Society.

Notice.—Owing to the 1891 (present) edition of the Society's Bye-Laws being exhausted, a further printing has become urgently necessary. Your Council, as mentioned in their Annual Report, has taken the opportunity of revising the Bye-Laws and bringing them up to date.

The following resolution was passed unanimously at their Meeting held on the 28th March, 1929.

> "That a copy of the proposed Bye-Laws be deposited in the Library at once, and remain there till April 25th next.
>
> "That any member wishing to propose any amendment shall give notice in writing to the Secretary, Stanley Edwards,

Esq., F.L.S., 15, St. Germans Place, Blackheath, S.E. 3, before May 2nd. Such notice to embody the terms of the proposed amendment, and to be signed by at least two members.

"That a Special Meeting be called for May 23rd next for the purpose of moving the proposed Bye-Laws. No amendments other than those of which notice has been given in accordance with the above shall be moved. An announcement shall be made from the Chair to-night, and a circular sent to each member embodying the foregoing, and giving notice of the Special Meeting.

Mr. Step moved and Mr. Worsley-Wood seconded

"That the Notice of Meeting to consider the Bye-Laws be withdrawn until every member has a copy of them."

After considerable discussion this was carried.

APRIL 25th, 1929.

The PRESIDENT in the Chair.

Mr. J. Tetley, of "White Cottage," Silverlea Gardens, Horley, was elected a member.

Mr. K. G. Blair exhibited the Coleopteron *Timarcha laevigata*, ♀ from S. Devon from which had emerged about 100 larvae of a Braconid (*Perilitus falciger*, Ruthe.).

Mr. Grosvenor stated that last July he had Zygaenid ova sent to him from the Scotch locality of *Zygaena achilleae*, which were not olive-green like the ova from continental females of that species, but were of the pale apple-green characteristic of the ova of *Z. filipendulae*. The resultant larvae were very active, which was a characteristic of *Z. achilleae*. Mr. Adkin remarked that *Z. filipendulae* occurred on the same ground as *Z. achilleae* in one of the Scotch localities.

Dr. Bull exhibited ova of *Pachnobia rubricosa* and larvae of *Boarmia* (*Tephrosia*) *crepuscularia* from East Sussex.

Dr. E. A. Cockayne exhibited examples of preserved larvae of the following species of British Grypocera (Skippers): *Nisoniades* (*Thanaos*) *tages*, *Adopaea flava* (*linea*), *Adopaea lineola*, *Augiades sylvanus*, and *Urbicola comma*; and referred to the remarkable ejectory comb, at the exit of the alimentary canal of the larva of

some species, for the purpose of propelling the pellicles of frass to a distance.

Mr. B. Adkin exhibited British species of "skippers" including the following aberrations:—

Ab. *taras* and extreme grey and black forms of *Hesperia malvae*.

Pale forms and one unusually dark form of *Nisoniades tages*.

Various shades of ground colour in *Adopaea flava*, *A. lineola* and *Thymelicus acteon*.

Extreme forms and the very dark brown form of *Augiades sylvanus* taken at Eltham, Kent, and figured by Frohawk.

Some unusual dark forms of *Urbicola comma* and of *Cyclopides palaemon*.

Mr. Robert Adkin exibited series of *Hesperia malvae* from the New Forest and Sussex and pointed out the strong tendency of the latter towards the var. *taras*; this, he said, was noticeable not only in the specimens that occurred on the chalk Downs, but also in those from the clay soils of such places as Arlington and Abbot's Wood.

Mr. Mera's exhibit of the same group included numerous very well-marked ab. *taras* of *Hesperia malvae* and a very dark aberration of *Adopaea flava*.

Mr. Buckstone exhibited short series of the same group and pointed out pale specimens of *Urbicola comma*, which had occurred in a damp season; he also had an example of a second brood.

Mr. Tonge, in referring to the ova of the Grypocera, pointed out that in *A. sylvanus* and *U. comma* they were like an inverted pudding basin in shape and smooth of surface, in *H. malvae* and *N. tages* they were the same shape with ribbed surface, while in *A. flava*, *A. lineola* and *Thymelicus palaemon* they were oval in shape.

Mr. Turner exhibited a large number of Grypocera mainly from S. America and from the Ethiopian Region, and read the following Notes on the Sub-order.

The Grypocera.

In these days of rapid advance, it is difficult to keep pace with the progress of our science, particularly if one does not peruse the current periodical literature, and relies on text-books; these latter may be extremely useful for the identification of our captures, but are necessarily stagnant as to later knowledge.

Students of our native butterflies have been accustomed to look upon the "skippers" as quite distinct from the rest, and it has

even been averred that they were more nearly related to the moths than to the butterflies.

At first it seemed sufficient to refer to them *en masse* as HESPERIIDES, a name derived from that of one of the most familiar of the genera, *Hesperia*.

In 1891 Haase, "Syst. Tagfälter," proposed that the skippers be constituted as a suborder under the term NETROCERA: netros=a spindle and cera=a horn.

In the following year, 1892, Karsch, "Ins. v. Baliberg," pointed out that the name Netrocera was preoccupied as a genus name by Felder and hence not valid. He proposed to substitute the subordinal name GRYPOCERA: grypos=a hook-tip or nose, and cera=a horn, a much more suitable name as expressing an almost universal character in the species comprised.

In 1905, Tutt, "Brit. Lep.," VIII., apparently in ignorance of the action of both Haase and Karsch (he does not refer to either), and not appreciating the great differentiation of the group, proposed to substitute the superfamily name URBICOLIDES for that of Hesperiides.

Since the publication of Seitz' "Macrolep." Vol. I., in 1911, and its distribution throughout the great libraries of the world, the skippers have been considered generally as a group of subordinal value and the term GRYPOCERA has met with due acceptance.

In 1928, in his recently published work on "Brit. Lepid.," Meyrick, comparing the skippers and the rest of the butterflies, says, "differences profound," although as usual, he gives no details but adds another name to the suborder, HESPERIINA.

In the address recently read before us, Dr. Cockayne, notes "with concern," the "greater and greater separation between entomologists who are systematists and those who are interested primarily in genetics;" I would go further and say that two other factors come into the question, insular habit, if not prejudice, and language. In fact it almost amounts to each worker "ploughing his lonely furrow." Still another factor in this want of knowledge among our workers must be emphasised, and that is, the enormous mass of literature, which is annually produced. Although my connection with the "Entomologists Record" has compelled me to endeavour to keep in touch with what is going on in the entomological world, I feel that from sheer "force of circumstances" I have failed to do very much to decrease this want of knowledge.

There is one habit that should be cultivated and that is, work at

the literature; look up every reference in whatever subject, and whatever you do substantiate your work with these references. The spread of knowledge is slow, appallingly slow, rendering advance still slower.

Let us now take our insects more in detail. Looking at them in the face we shall note that the eyes are comparatively widely separate and large and that the antennae are widely separate at their base, the head being as wide as the thorax. We have already referred to the hook-tipped antennae. Reuter has told us, "Palpi den Rhop.," that the uniformity in the structure of the palpi in the skippers is so great that he can find no generic distinctions such as exist in the various groups and genera of the Rhopalocera. The tongue is a very efficient organ and in some species extremely long; at least twice as long as the body in *Calpodes ethlius*. The eyes are usually prominent and comparatively large. The thorax is robust and well developed, as necessitated by the rapid movements of the flight-habit. The abdomen, comparatively short and pointed, is not unusually heavy; even the females exhibit but slightly increased size, suggesting that the output of ova must be restricted. Speaking generally, the build is compact, never big, in fact for butterflies their size is on the small side.

The wings are of medium size to small; in venation they are very uniform. Many species have hyaline spots, which occur in similar areas in different species throughout the world. In numerous species there are costal pockets of specialised scales. A few species have long tails, but this is only in the S. American fauna. The colours are non-obtrusive, as a rule black, brown, dull yellow, only in very few species do we get white, blue, red or iridescent colour. In fact the type of marking, shape of wing and coloration are quite distinctive of the group.

Mimicry within the group has been suggested with doubt, but there appear to be several quite good examples. On the other hand protective resemblance must be very strong, the absence of bright colours and general dullness would suggest it as probable.

Dimorphism is only slight. I know of only a few strongly sexually dimorphic species; in many it is difficult to separate the sexes at a mere glance. Second generations are, so far as I know, rarely recorded and thus seasonal dimorphism is not possible.

They are a sun-loving group, with a sharp, skipping, zigzag, jerky flight most difficult to follow with the eye, and which consequently precludes the successful attacks of birds. Their

resting habit is varied, in some with wings adpressed, erect, in others depressed folded around a stem, in others with fore and hindwings at different angles. In fact everything points to the correctness of the grouping as at present accepted, *viz.* that they are a group equal in status to the Rhopalocera on the one hand and to the Heterocera on the other.

In distribution they occur over the whole world except in New Zealand, but are particularly abundant in species in the warmer regions ; the American fauna, especially the southern portion, has at least 1000 species listed, and the Indo-Malay region above 800. They are certainly a strong, dominant group.

MAY 9th, 1929.

The PRESIDENT in the Chair.

Mr. J. A. Nash, of Blackheath Hill, was elected a member.

Mr. Dennis exhibited a nest of the larvae of the Brown-tail Moth, *Nygmia phaeorrhoea* (*chrysorrhoea*), sent to him by Mr. R. Adkin from Eastbourne, where the species has remained for many years along the chalk cliffs.

Mr. H. Moore exhibited fine examples of the very striking and beautiful *Morpho hecuba* from Brazil, which was a few years ago considered one of the rare butterflies of the world, until its habit of flight was discovered.

Mr. Tonge exhibited the cocoon of the large sawfly of the hawthorn, *Trichiosoma lucorum*.

Mr. Hugh Main exhibited the living larvae of *Taeniorhynchus richiardii*, which obtains its necessary supply of air by tapping the air cells of the roots and stems of water plants, unlike the larvae of the common gnat which must come to the surface of the water for its supply of air. He also showed the larva of a species of *Donacia*, likewise an inhabitant of the water. He reported that the pupae exhibited at the last meeting, found in earth, had produced a black dipteron, *Bibio marci*, as had been suggested.

Mr. Blair exhibited the death-watch beetle, *Xestobium rufovillosum*, which had been sent to him. It was the same species as had caused so much destruction in Westminster Hall. The tapping noise was made with its head.

Mr. D. L. Glegg exhibited several South African *Papilio* mimics and their models. *Papilio dardanus* f. *cenea* and its model *Amauris*

albimaculata, *P. dardanus* f. *trophonius* and its model *Limnas chrysippus*, *P. dardanus* f. *hippocoon* and its model *A. niavius*, *P. leonidas* and its model *Tirumala petiverana*, and *P. ridleyanus* and its model *Acraea egina*.

Dr. Bull exhibited an almost unicolorous form of *Amorpha populi* from Kent and reported *Brenthis euphrosyne*, *Nisoniades tages* and *Hesperia malvae* as flying on May 8th.

Mr. Newman reported that he had seen *N. tages*, *H. malvae* and *Callophrys rubi* while his *B. euphrosyne* larvae were not yet in pupa under glass shelter.

Mr. Stanley Smith exhibited a bred series of *Phragmatobia fuliginosa* and communicated the following note on the brood.

"First is shown what is possibly a typical Wicken male. The female which follows was taken in Wicken Fen in June, 1926. As she showed very little smoke colour on the hindwings and the band was broken up, my wife bred from it, getting over 100 eggs. The larvae were fed mostly on lettuce, dandelion being used only when things were getting too wet. The majority pupated in July and moths of both sexes emerged in August and September. Specimens of these are in the next group of 8; considerably larger than the parent, and in some the black band of the hindwings is well broken up. Whether these approach anywhere near the South European form v. *fervida* mentioned in South would be interesting to know. The remainder of the larvae hibernated, and the moths which emerged from them in the following May and June run slightly smaller, and still tend to our southern form, as shown in the next group of 3 moths. The thirteen we had were all males. Larvae from a Beccles female in August, 1926, also hibernated, and these produced small but typical specimens of both sexes as shown in the third group."

MAY 23rd, 1929.

The PRESIDENT in the Chair.

Dr. Harold B. Williams exhibited:—1. Series of *Triphaena janthina*, bred February, 1929, from Glasgow ova, showing some variation, more particularly in the development of the white markings of the stigmata.

2. Series of *Hibernia marginaria* bred from dark Glasgow ♀ ♀. All the forms bred show considerable darkening, but the ♂ ♂ are

quite distinct from ab. *fuscata*, which is reported to occur in this area.

Mr. D. G. Sevastopulo exhibited *Colias croceus* subsp. *fieldii* :— Female with the cell spot of the right forewing enlarged and also a slight bulge in the termen. There is no extra vein. Taken at Manibanjam in the Darjiling Hills.

Epinephile jurtina (*janira*) :—Female with all the usual fulvous markings a pale cream. Taken at Beaconsfield.

Hypolimnas bolina :—Male with pale brown patches, due to partial failure of the pigment in the scales. Taken at Amritsar.

Stibochiona nicea :—Male showing same form of variation as *H. bolina* above. Taken at Pamionchi in Sikkim.

Argynnis lathonia subsp. *issoea* :—Male with a branch to vein 5 in both hindwings. Taken at Murree.

Zizera lysimon :—Female with left forewing deformed probably as the result of an injury to the pupa. Taken at Cawnpore.

Dr. Cockayne exhibited larvae of *Leucania conigera*, *L. impura*, *L. impudens* (*pudorina*) and *Triphaena janthina*, and pointed out their leading characteristics.

Mr. Barnett exhibited series of *Erannis* (*Hibernia*) *defoliaria* from the South Croydon area, showing much variation in colour and marking.

The meeting was then declared special for Consideration of the Bye-Laws revised by the Council and of which a copy had been posted to each member in accord with the resolution passed at the meeting held on April 11th.

After considerable discussion, the various suggested alterations having been considered and still further revised, the following Resolution was carried :—

Resolved

That the proposed new Bye-Laws, contained in the annexed print*, as amended at the special meeting and initialled and copied by the President be and are hereby approved and adopted as the Bye-Laws of the S.L.E. and N.H. Soc. in lieu of those now in force.

President—H. W. Andrews.

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* See end of present volume.

MAY 25th, 1929.

FIELD MEETING—ST. MARTHA'S CHILWORTH.

Leader—HY. J. TURNER, F.E.S.

The weather was completely fine and pleasant the whole day in contrast to that of last year's visit. The usual spring larvae were common, even plentiful in some cases, on trees and bushes, including representatives of *Strymon w-album* and *Zephyrus quercûs*. Imagines were scarce; but *Pararge megera*, *Rumicia phlaeas* and *Callophrys rubi* were seen. Tree trunks produced a number of *Ectropis* (*Tephrosia*), *E. punctulata* being common. A few stray Geometers were noted, among which *Lithina* (*Panagra*) *chlorosata* (*petraria*) was abundant. Only eight members were able to be present two of whom did not reach the meeting until later in the day. The locality is one that is as yet unspoiled by the advent of modern "tripping."

I am indebted to Mr. E. Step for the following note on the locality.

"Although the soft Thanet Sands of which St. Martha's is built are not famed for many of the less-common species of plants, they bear a very varied flora, which includes many of the familiar spring favourites. Naturally, the woods appear to be of the Oak-Birch type, but the northern slopes have been planted with conifers—Scots' Pine, Spruce, Larch and many magnificent examples of the Lawson Cypress. In the more natural woods of the eastern slopes, where we spent the greater part of the afternoon, there was more variety, with a sprinkling of Whitebeam, Wych Elm, Spindle and Alder.

"Of the ground vegetation, the most conspicuous item was the continuous sheets of brilliant blue contributed by the Bluebells, but at closer range this was seen to be varied by abundant Yellow Archangel and Red Campion, Scorpion-grass and Wild Strawberry; another wild fruit not yet at eating stage was the Red Currant, with strings of green berries. In the marshy ground between the Tillingbourne and the ponds at Chilworth was a golden blaze from the crowded Marsh Marigolds.

"There is a good deal of Heather, a little Broom, and a few ferns other than the plentiful Bracken: those noticed being Male-fern and the Broad-buckler."

JUNE 8th, 1929.

FIELD MEETING—BRENTWOOD.

Leaders—Mr. F. B. CARR and Mr. E. E. SYMS, F.E.S.

The day arranged for the field meeting at Brentwood was most unfortunate, for it rained the whole time, making beating almost hopeless. Six members, however, braved the weather and were rewarded by finding both *Orgyia gonostigma* and *Erastria venustula*, the two species the finding of which was the object of the meeting. Tea was taken at the "Horse and Groom," after which it was decided to return home as the weather did not improve.

JUNE 13th, 1929.

The PRESIDENT in the Chair.

Mr. D. G. Sevastopulo exhibited a box containing specimens of *Papilionidae* and *Pieridae* common to England and India, showing some of the subspecies found in each place. They were *Papilio machaon* and ssp. *asiatica*; *Pieris napi* and ssp. *ajaka*; *Gonepteryx rhamni* and ssp. *nepalensis*; *Colias hyale* and ssp. *glicia* and ssp. *nilgiriensis*; *C. croceus* and ssp. *edusina*. The specimens of *P. machaon* were taken in France.

Mr. C. G. M. de Worms exhibited specimens of the larvae and pupae of some of the scarcer and more local species of British Lepidoptera taken April to June, 1929.

A. RHOPALOCERA.

(1) Larva and several ova of *Papilio machaon*, taken in Wicken Fen on June 9th, 1929.

(2) Larvae of *Ruralis* (*Zephyrus*) *betulae*, taken in Monkswood on May 31st.

(3) Larvae and pupae of *Zephyrus quercus*, taken in various districts May, 1929. It was plentiful this year in the Midlands.

(4) Pupae of *Thecla w-album*, from larvae taken near Guildford, on May 26th, 1929. It has been plentiful near Guildford.

(5) Pupa of *Strymon pruni*, from larva taken in Warboys Wood, June 1st. They were far scarcer than formerly.

(6) Larvae of *Polyommatus coridon*, taken in Fleam Dyke, near Newmarket, June 8th.

B. Heterócera.

(7) Larvae of *Gasteropacha quercifolia*, taken in Wicken Fen, June 9th. They fed on apple.

(8) Pupating larva of *Catocala sponsa*, taken near Oxford, May 26th, 1929.

(9) Larvae of *Synanthedon* (*Sesia*) *myopaeformis*, taken under apple bark at Wicken, June 10th, 1929.

He also showed a male specimen of *Hydrilla palustris*, taken at light on the sheet at 1 a.m. in Wicken Fen on June 11th, 1929. Only a few specimens were taken and all at about that time.

Mr. Glegg exhibited a box arranged with direct and transmitted light to exhibit microscopic slides. It was also fitted to pass round. The exhibitor was presenting it to the Society, for use at the meetings.

JUNE 30th, 1929.

Field Meeting—Princes Risborough.

Leader—K. G. Blair, B.Sc., F.E.S.

Although it had commenced to rain when the party left Marylebone and heavy rain fell most of the way down, on arrival at the station we found that there had not been a drop, so hoped for the best. Such hopes however were short-lived; as soon as we reached a collecting ground the rain commenced, and fell steadily until after tea. The bag consequently was a light one. A few *Hydrelia* (*Athena*) *flammeolaria* (*luteata*) were beaten from maple, and larvae of *Triphosa dubitata* were not uncommon on *Rhamnus catharticus*; *Cosymbia* (*Zonosoma*) *linearia* was plentiful on the beech trunks. On arrival at "The Plough" the only available rooms were already fully occupied, but the party, at considerable inconvenience to our hosts, were very hospitably accommodated in the kitchen rather than in an open shed in the garden. While waiting for tea, some *Zygaena* cocoons were collected both from alongside the road past the inn and from along the road at the top of the hill. From both series of cocoons *Z. lonicerae* emerged in a few days, though the great majority of the cocoons from both colonies produced *Z. filipendulae* about a week later.

On the walk back to the station after tea one example of *Lebia chlorocephala* and a number of *Staphylinidae* were collected under heaps of cut grass. There were present: 6 members and 1 visitor.

JULY 11th, 1929.

The PRESIDENT in the Chair.

Mr. Farmer exhibited bred specimens of *Biston* (*Amphidasis*) *betularia* the larvae of which came from ova laid on an unidentified herbaceous plant. All the imagines bred were small. The typical form, the ab. *carbonaria* and intermediate forms were represented. Dr. Cockayne remarked that it was unusual to get the three forms in one brood and said that the larvae were known to feed in nature on various herbaceous plants.

Dr. Fremlin exhibited examples of fasciation of the thistle, *Carduus lanceolatus*; a gall on the "crack" willow, *Salix fragilis*; a young larva of *Rumicia phlaeas*; an asymmetrically marked *Spilosoma menthastri*, a portion of the R. forewing being without trace of black marking; and a *Triphaena fimbria*, with curious, pale scales scattered over the forewing breaking up the usual pattern irregularly.

The gall was subsequently found to be the work of the mite *Eriophyes triradiatus*.

Mr. Tonge exhibited a bred *Vanessa io* from Reigate, July, 1918, with the "eyes" on the hind-wings very incomplete.

Dr. Cockayne referred to the pale colour occurring in an example of *Pseudoterpna pruinata* bred in Wiltshire and said that the pale coloration was a defect in the pigment. He showed the living larvae of *Euphyia luctuata* (*lugubrata*) from Saxony, of which species the occurrence had been reported in this country. They fed on the willow-herb, *Epilobium*. There were two forms of the larva, a brown and a less common, green form; in the former the blood and fat were brown and in the latter they were both green.

Mr. Hugh Main exhibited the "baker's brat," *Thermobia furnorum*, a Lepismid, allied to the well-known "silver fish," *Lepisma saccharina*. He also called attention to the fact that now was the time to observe the curious habits of the larva of the sycamore sawfly, *Phyllotoma aceris*.

Mr. J. J. F. X. King exhibited the curious *Oenestis quadra* with 5 wings which he obtained in the New Forest many years ago.

Mr. Witting exhibited the living larvae of *Rumicia phlaeas* from Kent.

Mr. de Worms exhibited *Acronicta psi* of the very dark London form from the Brompton Road and also a larva of *Zeuzera pyrina* (*aesculi*). Mr. R. Adkin noted the rare occurrence of the latter

species in Eastbourne; he said that forty or fifty years ago it was very abundant in Lewisham and in fact all around London, quite an urban species and the larvae were then very destructive to trees and shrubs in London public gardens.

Mr. H. W. Andrews exhibited the very local Therevid dipteron, *Dialineura anilis*, L., found in Britain only on the Welsh coast sandhills; the allied species *D. annulata* was common on most sandhills.

Capt. Curwen exhibited series of *Ematurga atomaria* to show the differences between the heath form from Wisley and Lyndhurst and the marsh form from Oxford.

JULY 25th, 1929.

The PRESIDENT in the Chair.

Mr. Priest exhibited some well-spotted *Spilosoma menthastri* bred; a very dark *Acronicta aceris* in which the hindwings were strongly streaked, and a very yellow form of *Spilosoma lutea* (*lubricipeda*).

Mr. E. Step exhibited a living larvae of *Saturnia pavonia*, from Lynton.

Mr. Hugh Main exhibited the apterous female of the parasitic hymenopteron *Methoca ichneumonoides*, the host of which was the larva of the tiger-beetle *Cicindela*, which it stings and paralyses, laying its egg upon it. The original female was captured at Oxshott and 9 ova were laid upon 9 larvae in his subterraria; the resultant imagines bred so far were 4 ♂s and 2 ♀s, the metamorphosis taking about a year. The exhibitor explained his method of keeping the soil in a subterrarium moist and at the same time free from mould.

Mr. Sevastopulo exhibited a very instructive series of *Lycaenidae*, each species shown having with it a microphotograph of its androconia.

Mr. K. G. Blair exhibited the scarlet and black seeds of *Abrus precatorius*, L., from E. Africa, infested by a Bruchid beetle, *Caryopemon cruciger*, Steph.; and a ♀ Tachinid fly, *Metopia leucocephala*, Rossi, interested in the burrowing operations of a hunting wasp, *Ammophila sabulosa*.

Mr. H. W. Andrews exhibited examples of the British species of the *Berinae*, a subfamily of the *Stratiomyidae* (Diptera).

Mr. Anderson exhibited an example of the dark Aberdeen race of *Abraxas grossulariata* somewhat asymmetrical in markings. The usual dark scaling was increased irregularly about the disc, the yellow marking being partially removed and more or less massed toward the inner margin.

Mr. de Worms exhibited the following aberrations:—*Argynnis cydippe* (*adippe*) in which the spots on the L. side were more emphasised, while those on the R. side were smaller and the submarginal series were moved nearer to the margin; a somewhat melanic form of *Melitaea aurinia*; and an *Adopaea lineola* of which the L. hindwing was smaller than the R.

Dr. Robertson exhibited the *trifolii*-like form of *Zygaena lonicerae*, which he had bred from cocoons collected during the field meeting near Princes Risborough on June 30th.

Mr. Jacobs exhibited a short series of the Tortrix *Enarmonia corticana* from Henley-on-Thames showing the normal form the more plentiful, and the very light form with white dorsal blotch less so. (1922).

Also a series of 29 specimens taken at Bromley, 1929, showing preponderance of the darker forms and absence of the lightest forms. This series was unselected both in taking and in setting.

Remarks were made on the present season. Mr. Andrews had met with an extremely black form of *Biston betularia* at Eltham, ab. *carbonaria* (*doubledayaria*). Mr. A. Bliss reported *Leptosia sinapis* as being quite common this year. It was also reported from West Sussex. Mr. Main said that the larvae of *Plusia moneta* had been met with in dozens around Woodford. It was noted that the young larvae of this species hibernated in the dead stems of the monkshood. Attention was called to the cocoon which was white in colour at first but subsequently became yellow when subjected to moisture, heavy dew or rain.

Mr. Grosvenor called attention to the large number of *Zygaena* specimens which were of small size this season, and suggested that the dwarfing was probably caused by the exceptionally long spells of dry atmosphere during the present year. Other members had noted an unusual number of small-sized specimens in various species this year.

JULY 28th, 1929.

FIELD MEETING—BYFLEET.

Leader—K. G. BLAIR, B.Sc., F.E.S.

The route taken was along the canal bank towards Woking. In the canal itself the Frogbit, *Hydrocharis morsus-ranae*, was plentiful, several plants being noted in bloom; the Flowering Rush, *Butomus umbellatus*, was also observed but scarce. The day being dull, with occasional threats of rain the Odonata were little in evidence, though *Ischnura elegans* and *Enallagma cyathigerum* were fairly plentiful. On the heath bordering the canal *Limenitis sibilla* was observed, while *Satyrus semele*, *Epinephele tithonus* and *Plebeius aegon* were not uncommon. *Hypenodes costaestrigalis* was taken together with a few *Phytometra viridaria*. Larvae were scarce, but a few young *Smerinthus ocellatus*, *Pygaera pigra* and *Calocalpe* (*Eucosoma*) *undulata* were found on the sallows. The long-horned grasshopper, *Metrioptera brachyptera*, was in some numbers among the heather, and a colony of the bee, *Saropoda bimaculata*, was discovered; the rapid motions of this bee and its peculiar high-pitched note excited comment. The Psocid, *Reuterella helvimaculata* (*Caecilia corticis*) was in numbers on the bark of one oak tree, the winged males and apterous females lurking in crevices of the bark protected by a sheet of web covering the crevice. Of the Heath plants *Drosera rotundifolia* and *Narthecium ossifragum* were abundant in places, and *Linaria minor* (?) was found in some of the ditches.

Commander J. J. Walker had kindly promised to meet the party at 4 p.m. and conduct them to the famous sand-pit on Horsell Common, but by this time the rain was falling steadily, so that an immediate retreat was made to Woking for tea. Nine members and eight visitors attended.

AUGUST 18th, 1929.

The PRESIDENT in the Chair.

Mr. Robert Adkin exhibited some leaves of a lilac bush showing the manner in which they were distorted by the larvae of *Gracillaria syringella* having fed in them. Also an apple leaf, and called attention to the very symmetrical manner in which the edge had been turned down by the larva of *Ornix guttea*. He said that this

species had recently been very common both in his garden on cultivated apple trees, and on some wild apple bushes growing on the banks along the Parades at Eastbourne. Both species leave the leaves for pupation.

He also showed pieces of reed stem containing the pupa of *Nonagria geminipuncta* and called attention to the small round hole at the lower part of the stem where the larva enters, and to the oval "window," some distance above it, which is caused by the larva eating away the substance of the stem before assuming the pupal stage, leaving only the very thin outer skin of the reed, through which the moth pushes its way on emergence. The pupa is usually to be found in the stem between these two points.

Mr. K. G. Blair exhibited a series of the British may-fly known as *Ecdyonurus venosus*, F., showing its composite nature involving four distinct forms (? species). One of these had been identified as *E. fluminum*, Pictet, and the other two he suspected were new species.

Mr. D. G. Sevastopulo exhibited a very common form of coloration in Indian butterflies, and communicated the following note :—

My exhibit consists of 3 Satyrids, 1 Nymphalid, 1 Erycinid and 1 Hesperiid, all of which show a very similar form of marking, consisting of a dark brown ground with an oblique light band on the forewing. This type of coloration is found very commonly in India in the *Satyridae*, *Erycinidae* and *Hesperiidae*, more rarely in the *Amathusiidae* and *Nymphalidae* and not at all in the *Papilionidae*, *Pieridae*, *Danaidae* and *Lycaenidae*. Possibly some one can throw some light on the popularity of this pattern.

The species shown were, *Lethe rohria* (*confusa*), *L. verma*, and *Pararge masoni*, *Satyridae* : *Euthalia phemius* (♀), *Nymphalidae* : *Abisara fylla*, *Erycinidae* : *Celaenorrhinus leucocera*, *Hesperiidae*.

Mr. Witting exhibited an asymmetrically marked *Colias croceus*, bred in 1928, and a variety of *Euclidia mi* with much irregular suffusion of black scaling especially on the basal half of the hind-wings and the costal half of the discal area of the forewings. From W. Wickham, 1929.

Mr. C. N. Hawkins exhibited living larvae of :—

(1) *Hecatera serena*, F., green and brown forms from Bucks. feeding on a species of *Crepis*.

(2) *Cucullia lychnitis*, Ramb., from Bucks. feeding on figwort (*Scrophularia nodosa*).

(3) *Cosymbia* (*Zonosoma*) *annulata*, Schulze (*omicronaria*, Hb.) from Bucks.; the green form.

(4) *Euphyia* (*Cidaria*) *picata*, Hb. (*biangulata*, Haw.), bred ab. ovo from a Surrey ♀.

(5) Preserved larvae of *Cucullia lychnitis*, Ramb. and of *C. verbasci*, L. to show the differences in the markings.

Mr. A. E. Tonge exhibited wild laid ova of *Pheosia* (*Notodonta*) *dictaeoides* on birch.

Mr. Hawkins called attention to the abundance of *Cerura vinula* larvae. An "invasion" of Scotland by an unusual number of the Crossbill was also reported.

AUGUST 22nd, 1929.

Mr. F. B. Carr, Vice-President, in the Chair.

Mr. Jacobs exhibited a fine melanic female of *Ptychopoda aversata*, Bromley, July 30th, 1929; a dwarf ♂ of *Cacoecia crataegana* and one of *C. rosana* both from Bromley in July; and a dark ferruginous aberration of *Euxanthus zoegana* taken at light on August 1st, at Bromley.

Mr. H. Moore exhibited two insects, a "skipper" and an ant, which had been killed by a fungoid growth. Branched processes protruded from the bodies.

Captain Murray exhibited a *Pararge megera* in which the R. hindwing was dwarfed. It was taken in Dorset on August 17th.

Mr. Robert Adkin exhibited a short series of *Hyponomeuta stannella*. He said that in May last Mr. H. W. Daltry very kindly sent him some larvae of this species, together with a supply of its foodplant, *Sedum telephium* from Dovedale. The larvae were feeding in a slight web on the plant, and almost directly after their arrival spun their characteristically *Hyponomeuta* cocoons on the receptacle in which they were placed, suggesting that it may be a habit of the larva to forsake the food-plant and seek some more substantial position for pupation. The moths emerged between the 21st and 26th of June.

Mr. Hugh Main exhibited part of the life-history of the house-cricket, *Acheta domestica*. The eggs were laid $\frac{1}{4}$ to $\frac{1}{2}$ in. below the surface of the ground, and ovipoistion took place some 2 days after mating, which was effected in a similar way to that described by Fabre for the field-cricket. He also exhibited pupae of *Acronicta*

menyanthidis from ova laid by a ♀ taken at Witherslack. The larvae fed up well and pupation took place in short tubes which were plugged after the larvae had been induced to take possession.

SEPTEMBER 12th, 1929.

The PRESIDENT in the Chair.

Mr. A. E. Tonge exhibited a living male example of the large ichneumon *Rhyssa persuasoria* taken at Chiddingfold, Surrey.

Mrs. Brookes exhibited the minute parasitic hymenopteron, *Enarsia formosa*, which is being distributed by the Cheshunt Research Station to tomato growers to check the ravages of the glasshouse white-fly; the living larva of *Eumorpha elpenor*, and a minute dipterous parasite on the mite which is attached to the apple.

Mr. Jacobs exhibited a species of *Ephestia* taken in côp. on the wall of Hibernia Chambers on August 22nd. Ova were laid on the 24th. They were at first creamy white in colour, but on August 31st they began to turn to orange. The hatching commenced on this morning (Sept. 12th).

Dr. Cockayne exhibited living larvae of *Hadena adusta* feeding on heath, of *Venusia cambrica* and *Eupithecia exiguata* feeding on mountain ash, all from E. Aberdeen, and of *E. cauchiata* (*pernotata*) from Bohemia feeding on *Solidago*. He stated that the weather in Aberdeenshire had been cool, cloudy and showery, and the nights were cold. Insects were not common at heather flowers. He had met with *Noctua glareosa* abundant, *Triphaena comes* very scarce, *N. castanea* v. *neglecta* not common, *Calocampa solidaginis* fairly common, *T. janthina* very abundant, *T. pronuba* scarce, *N. xanthographa* very scarce, *Charaeas graminis* very abundant, *Anarta myrtilli* very common, *Noctua sobrina* fairly common, *Calostigia olivata* not common, *Lygris populata* (*dotata*) common, *L. pyraliata* (*populata*) scarcer than of late, *Thera firmata* common, *Dysstroma citrata* (*immanata*) the commonest Geometer, *Miana literosa* was absent. Larvae were by no means common, *V. cambrica* very few, *E. exiguata* very few, *Odontopera bidentata* very scarce, *Lophopteryx camelina* common, *Opisthograptis luteolata* very scarce, *Celaena haworthii* common, *Lygris prunata* (*ribesiaria*) in the garden where he was staying.

Mr. R. Adkin read a short paper entitled, "On the Occasional Extension of Territory by the Browntail Moth, *Nygmia phaeorrhoea*, and the Ultimate Collapse of the Effort." (See page 7).

In the discussion which ensued Mr. Buckstone said that there had been a very abundant colony near the beach Herne Bay but restricted to about three quarters of a mile inland and about a mile wide. It had since become very small. Mr. Turner said that a very abundant colony existed in the Wakering Marshes some twenty years ago. Mr. Jacobs recorded a similarly restricted colony on the coast of France. Dr. Cockayne doubted the fact of immigration. Colonies had existed all along the coast as far as Yorkshire and all of them had their ups and downs. He suggested climatic rather than other causes such as disease ; widely separated colonies had their ups and downs but not at the same times. Mr. Tonge was inclined to suggest parasites ; at Deal all that he turned out in the garden succumbed while most of those kept indoors were bred. Mr. Andrews reported a colony at Higham near Chattenden about twenty years ago and Mr. Adkin had observed this colony in the '80s.

Various members spoke on the increase in the area of distribution in recent years of the butterfly *Polygonia c-album* in this country. For many years it had been looked upon as almost exclusively a Herefordshire insect, where it was carefully watched over by the late Mrs. Hutchinson, although it had occurred in Yorkshire. In 1919 it was reported from Bucks, in 1921 from Wilts, in 1923 in Hertford, in Dorset and Oxford it was now even common, it was reported in places in Sussex ; perhaps Basingstoke was the nearest approach to London from whence it had been reported.

SEPTEMBER 14th, 1929.

FIELD MEETING—OCKHAM COMMON AND WISLEY.

Leader—HY. J. TURNER, F.E.S.

About a dozen members and friends were present at this meeting which was arranged particularly for a larva-beating expedition. A different route of approach to the ponds was taken, diverging by the second turning on the right from Effingham Station and then by devious footpaths and lanes to a very beautiful corner of the forest lands. Thence various tracks lead down to Boldermere around which the morning party worked meeting the afternoon party en route. Nothing of particular note was reported but a considerable bag of useful material was made.

The Society has visited this locality on various previous occasions and detailed accounts may be found in the " Proceedings " for the years 1894, 1910, 1916, 1919 and 1922.

SEPTEMBER 26th, 1929.

The PRESIDENT in the Chair.

Mr. Bliss exhibited the beautiful green lichen-like form of the larva of *Gonodontis bidentata*, the peculiar larva of one of the " footman " moths, and the nest of a species of Hymenoptera with the maker, found among bananas.

Mr. R. Adkin exhibited some leaves of nut which had been mined, presumably by a species of Hymenoptera, and also apple leaves similarly blotched, the former from Abbot's Wood and the latter from his garden at Eastbourne.

Mr. Hy. J. Turner exhibited a varied series of pupae of the Geometrid genus *Ephyra = Cosymbia* presumably late broods of *C. pendularia* on birch and *C. linearia* on beech.

Mr. C. B. Williams gave a short account of the green-house " white-fly," (*Aleurodes vaporariorum*), a pest particularly attached to the tomato, of which he stated there were two distinct races, one composed almost entirely of females and the other of both males and females in about equal numbers. The former race was at one time very common but now it was scarcely ever seen, and he wished to know if any member could obtain the race for him. Mr. Grosvenor said that this pest had been particularly scarce in his experience this year at Redhill. Mr. Bliss noted that it had been particularly abundant at Purley on his tomatoes during the season.

Mr. Williams subsequently said that the " white-fly " on cabbage (*Aleurodes brassicae*) and the " white-fly " on the greater celandine could not be separated structurally, but that the species on celandine (*A. proletella*) would not live on cabbage and vice-versa.

Mr. Bliss reported the occurrence of *Polygonia c-album* in the Isle of Wight and also on sugared trees in the New Forest, *Leucoma salicis* was also noted as having occurred this year on aspen along the coast of Suffolk.

Mr. Grosvenor reported that out of some 200 ova of *Zygaena trifolii* he had about 180 larvae. Of these 2 had fed up and pupated this year. This was the first time in his experience that this species had produced imagines in Autumn. He also had a

considerable brood of larvae of the South of France *Zygaena*, form *anceps*, which on previous experience had only given him about 1% of a second brood, but this year had yielded about 50%. The imagines included both 5- and 6-spotted forms.

Mr. Robert Adkin showed a series of six slides illustrating the life-history of one of the British species of *Simuliidae* (Diptera) and gave notes on their habits. Also some slides of Lepidopterous studies.

Mr. W. H. T. Tams exhibited a short series of slides of the genitalia of the Phycid group of which *Dioryctria abietella* is a member.

Mr. Dennis exhibited slides.

OCTOBER 19th, 1929.

The PRESIDENT in the Chair.

Mr. Jacobs exhibited a specimen of the Hornet taken at Ealing on September 27th.

Dr. Bull exhibited undersized *Pieris napi*, captured, of both spring and summer broods and measuring 3·5-4cm.; also a small *Colias croceus*, 3·5cm., bred in 1928; a small living larva of *Amorpha populi* probably representing a second brood; larvae of *Boarmia roboraria* taken in August; and reported the capture in N.E. Sussex of an example of *Herse convolvuli*. Mr. Newman said that he always obtained a second brood of *A. populi*. He had 70 or 80 larvae this year which were at the present time pupating.

Mr. Tonge exhibited a melanic specimen of *Xanthorhoë* (*Melanippe*) *fluctuata* which flew in to light at Reigate in August last.

Mr. Blair called attention to the finely illustrated articles appearing occasionally in the "National Geographical Magazine" (Amer.) dealing with Insects and their Life-history.

Mr. Robert Adkin exhibited a leaf of a birch tree showing the mine and fold made by the larva of *Ornix betulae*, Stt. He said that on September 25th he collected in a wood near Eastbourne a few leaves containing larvae of this species. As is well known, the moth lays its egg on a birch leaf, and the larva on hatching burrows into the leaf where it feeds for a time, thus forming a blotch. The larva in the leaf exhibited was still in the blotch when taken. A few days later he had the good fortune to see the larva leave the blotch, and to follow the greater portion of its pre-

paration of the fold in which to complete its feeding. Having left the blotch the larva wandered about the underside of the leaf for some minutes apparently seeking a suitable position for the fold and eventually selected a lobe of the leaf near the stalk. It commenced operations by spinning strands of fine silk across this portion of the leaf, throwing its head and anterior part of its body violently from side to side in doing so; this operation occupied about half an hour. The larva then rested, stretched out quite straight for a considerable time; he had it under observation for an hour and a half during which time it was quiescent, he then was called away. On his return after some three quarters of an hour, the fold was just turned over and the larva was busily engaged in sealing down its edge. He was therefore unable to say whether the edge of the leaf is drawn over by the tightening of the strands of silk as they dry, or whether the larva employs any further means of attaining that object, but having regard to the small size of the larva, he thought the former proposition the most probable.

He also exhibited a seed-head of the common rush (*Juncus communis*) on which were a number of cases and living larvae of *Coleophora caespititiella*, Zell., a species that had been very abundant in the neighbourhood of Eastbourne this autumn, the seed-heads in many places being literally smothered with them.

Mr. Step exhibited, on behalf of Mrs. Step, living first year plants of the Furze (*Ulex europaeus*), showing clearly the transition from trifoliate leaves, through unifoliate leaves to spines on the upper parts of the plants. They had developed from self-sown seeds which had germinated in the peat-soil in which an Azalea was potted. Mr. Step described it as an object-lesson in evolution.

Mr. C. J. M. de Worms exhibited lepidoptera taken near Tours (Indre-et-Loire) during September, 1929, including—(1) two specimens of *Colias hyale*, both males, one being of an unusually deep yellow colour and the other of the normal cream tint but having a greatly extended border on the hindwings. (2) A series of 4 males and 1 female specimens of *Lampides boeticus* (the "long-tailed blue," taken September 11th-15th on lucerne flowers. It was the first time he had met with the species, which he understood was extremely infrequent in that part of France and only seen at very long intervals.

Mr. Hugh Main exhibited a female "black-bellied tarantula" (*Lycosa*) with its family posed on its back. It came from Agay, South of France.

Mr. C. N. Hawkins exhibited :—

(1) *Leucania impura*, Hb. Bred this year from Bookham larvae. A short series showing a fair amount of variation in the tint of the hindwings and in the development of the black streaks on the forewings. One specimen had the short black dashes at the anal angles of the forewings unusually well marked.

(2) *Eupithecia absinthiata*, Clerck. A short series bred last year from Oxshott larvae, showing variation in tint and development of markings. In two specimens some of the costal spots have joined and formed large black blotches.

Also living larvae of *Apamea unanimis*, *Eupithecia exiguata*, *Horisme* (*Phibalapteryx*) *vitalbata*, *Melanthia procellata*, and *Ligdia adustata*.

Dr. Bull reported the occurrence of a second brood of *Vanessa io* some six weeks previously. Mr. Newman had never met with a second brood, but Mr. Frohawk had recorded it once. The species was generally found to be very scarce this season.

Mr. E. Step read a short paper "Thorns and Prickles." (See page 12).

OCTOBER 24th, 1929.

ANNUAL EXHIBITION.

Mr. C. D. Anderson exhibited five *Melitaea cinxia*, bred, Isle of Wight, 1928 ; 1 and 2, minor aberrations ; 3 and 4, under-side aberrations with a paucity of black markings ; 5, a typical specimen. Four *Polyommatus thetis* (*bellargus*) taken at Folkestone, September, 1928 ; 1 and 2, slate grey males ; 3 and 4, minor under-side aberrations. Three *Arctia caja*, 1, absence of brown and blue markings on all four wings ; 2, L. side normal, R. side forewing lacking full brown markings, taken in the Isle of Wight, 1929 ; 3, yellow hindwings, taken at Bexley, 1929. Aberrations of *Abraxas grossulariata*, and other species.

Mr. S. R. Ashby exhibited his collection of the genera *Necrophorus*

and *Silpha* and the families *Tenebrionidae* and *Melandryidae* in British Coleoptera.

And on behalf of the Society he exhibited the collections of British Paraneuroptera, Orthoptera, Neuroptera and Hemiptera.

Mr. H. W. Andrews exhibited series of species of British *Trypetidae* (Diptera).

Mr. R. Adkin exhibited series of British Pyrales including the rarer species *Mecyna polygonalis*, *Pyrausta repandalis*, *P. nubilalis*, etc.

Lieut. E. B. Ashby exhibited *Pontia daplidice* and its spring brood *bellidice* including an aberrant female, and also the Guéthery form of *Epinephele tithonus* with broadened and darkened markings and typical examples for comparison.

Mr. L. C. Bushby exhibited the following living species :—

Arachnida :—Variegated Scorpion (*Opisthophthalmus capensis*), South Africa. Long-tailed Scorpion (*Ischnurus trichiurus*), South Africa. Fat-clawed Scorpion (*Scorpio maurus*), Algeria.

Crustacea :—Land Hermit Crab (*Coenobita rugosa*), Sumatra.

Coleoptera :—*Anthia venator* (*Carabidae*), Algeria.

Orthoptera :—Green-mottled Mantis (*Blapharis mendica*), Algeria.

Hymenoptera :—Nests of a Mud Wasp, Texas.

Neuroptera :—Ant-lions (*Acanthaclisis* sp.), South France.

Orthoptera :—Cockroach (*Blabera* sp.), Trinidad.

Dr. Bull exhibited the following aberrations of *Brenthis euphrosyne*, (1) with hindwings suffused and forewings with obsolete markings ; (2) with all four wings suffused and with a " hook-tip " deformity on the left side which is smaller than the right ; (3) a partial second brood which appeared in August, 1927 ; etc.

Mr. A. A. W. Buckstone exhibited comparative series of *Melitaea aurinia* from various localities in Great Britain and Ireland.

Mr. T. L. Barnett exhibited—(1) long comparative series of *Plebeius aegon* from Surrey, Kent and S. Devon including aberrations, a ♂ with dark brown spots on the outer margin of the hindwings, a ♀ with the right hindwing upperside of purple coloration, Kent, and a ♀ from S. Devon with the underside spots elongated ; (2) a long series of *Plebeius* (*Aricia*) *medon* of the spring and summer broods with ♂ and ♀ ab. *obsoleta*, a ♂ dark brownish grey underside, a striated ♀ Surrey, 1919, race *salmacis* from Durham and race *artaxerxes* from Aberdeenshire.

Miss Winifred W. M. A. Brooke exhibited (1) Specimens and drawings of *Arthrocnodax wissmani*, Kieffer, a gall midge (Diptera), named by Mr. Barnes as being the above species " almost without a doubt," and probably the first specimen found in Great Britain. (2) Specimens and drawings of *Encarsia formosa*, a minute Hymenopteron parasitic on " snowy-fly."

Mr. H. M. Edelsten exhibited a long and variable bred series of the two Noctuids *Xylina socia* and *X. semibrunnea* from mid Sussex in 1929.

Mr. L. T. Ford exhibited (1) a brood of *Leptogramma* (*Peronea*) *literana*, all the 42 specimens being alike but unlike the ♀ parent; (2) a brood of *Peronea cristana*, all dissimilar from the ♀ parent and including 3 ab. *striana* and 7 ab. *profanana*, the ♀ parent being ab. *cristalana*. He also showed *Coleophora paripennella*.

The Rev. E. E. Frampton, a long series of *Boarmia repandata* including local forms and aberrations from W. Kent, Wales, N. Cornwall and S. Derbyshire.

Mr. B. S. Harwood exhibited:—

Orthoptera.—(1) *Metrioptera roeselii*, a macropterous ♀ with typical brachypterous pair. (2) *Xiphidium dorsale*, a macropterous ♂ with typical brachypterous pair.

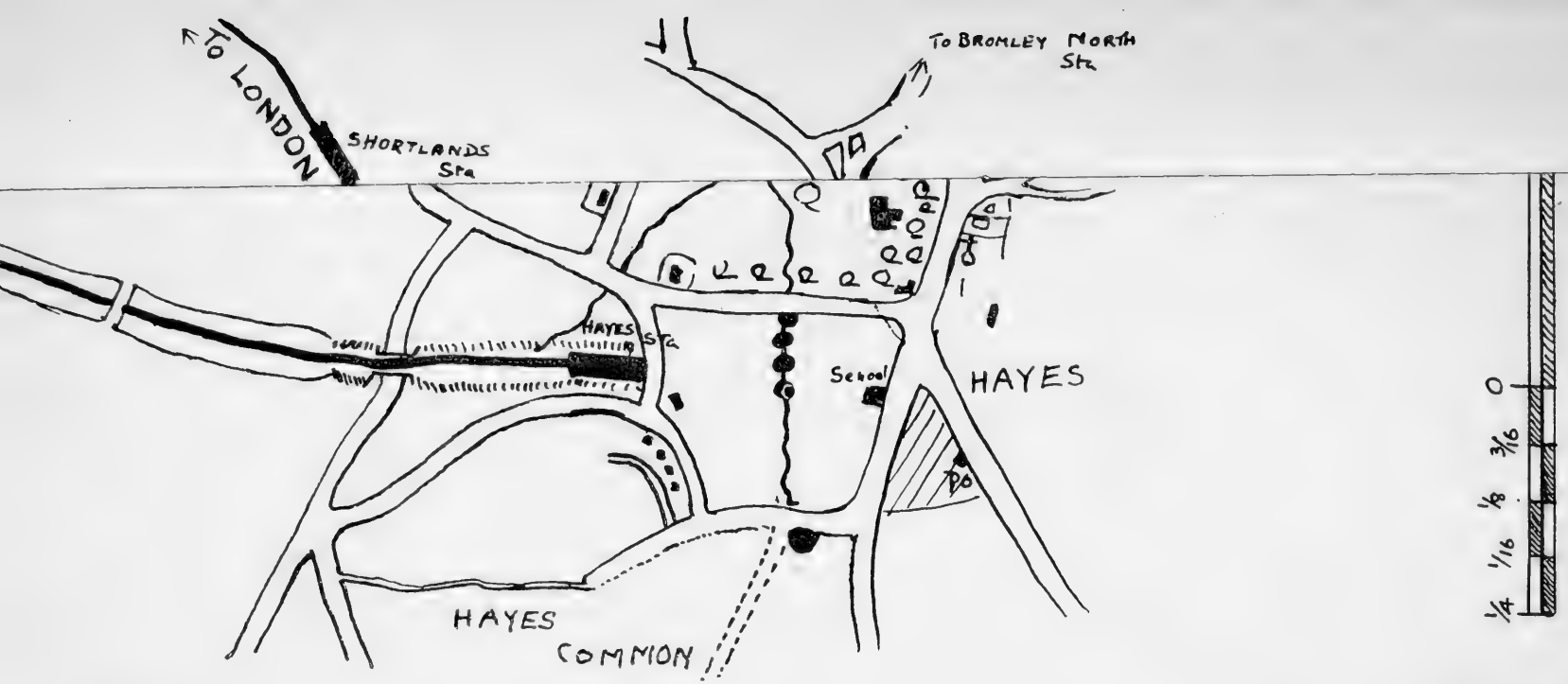
Aculeata.—(1) *Bombus lapidarius*, right side ♀ left side ♂. (2) *Cerceris rybyensis*, a white banded var. with white marked legs, and a typical specimen.

Diptera.—Scarce British Diptera including *Didea alneti*, *Callicera aenea*, *Mallota cimbiciformis*, *Laphria flava*, *Pamponerus germanicus*, *Gastrophilus pecorum* and *G. equi*, *Cephenomyia rufibarbis* and *Tabanidae*.

Lepidoptera.—*Papilio machaon* bred without tails and 2 others; *Abraxas grossulariata* vars.; *C. pamphilus* vars.; *P. coridon* vars.; *Mellinia gilvago*, light and dark forms, and *M. ocellaris*, W. Suffolk, September, 1929 (one very dark form).

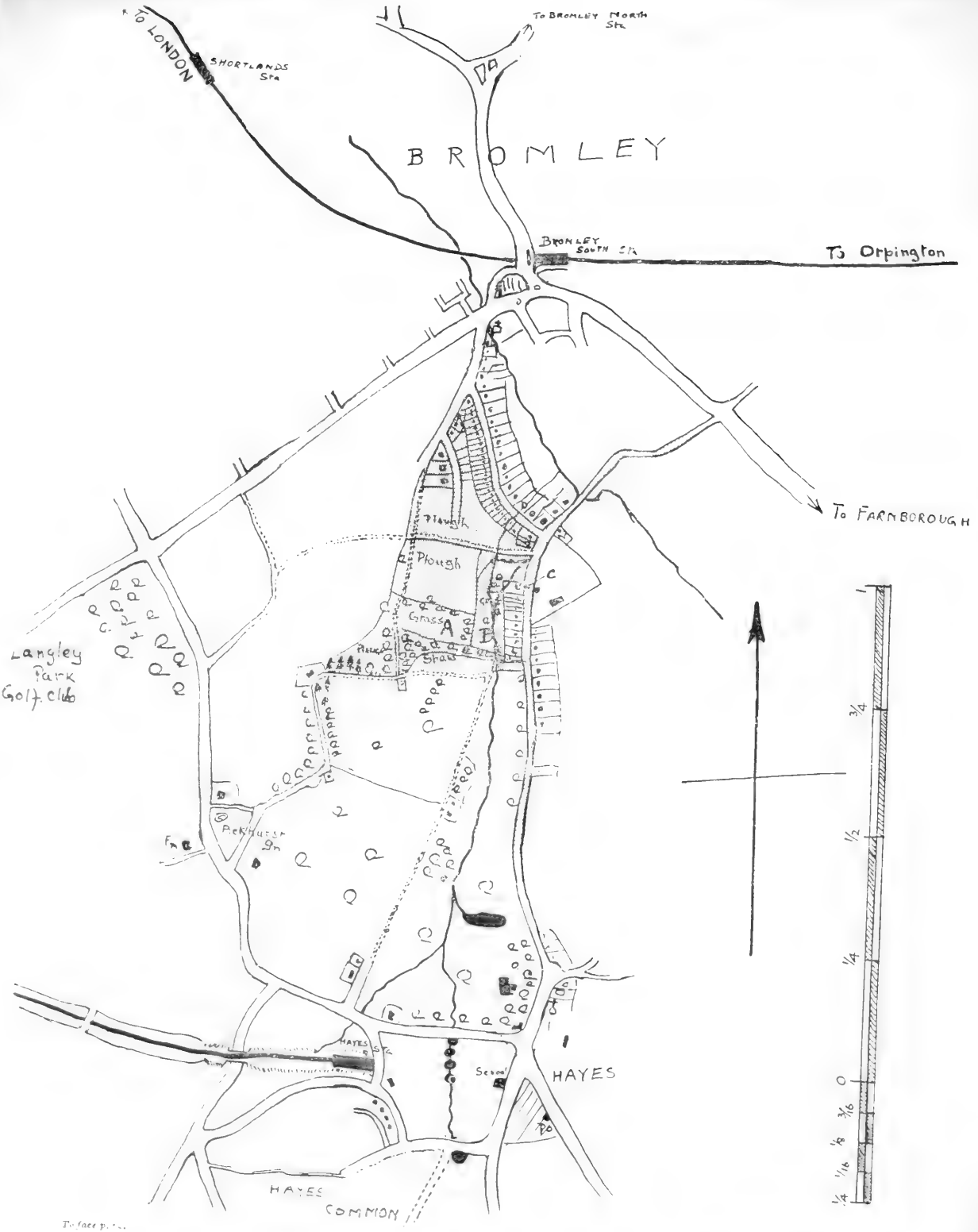
Mr. C. N. Hawkins exhibited a series of aberrations of British Lepidoptera together with many preserved larvae showing variation in each species.

Mr. S. N. A. Jacobs exhibited a most interesting local collection, representative of some 70 species of Tortrices taken in a small area (demonstrated in a map) at Bromley, Kent, during the years 1928 and 1929 alone. These included:—



To face p. 62.

del. S. N. A. Jacobs.



To face p. ...

del. S. N. A. Jacobs.

Bactra
lanceolana.
Eucosma
variegana,
pruniana,
oblongana,
urticana,
lacunana,
striana.
Enarmonia
corticana,
woeberiana.
Tmetocera
ocellana,
Ancylis
lundana.
Gypsonoma
dealbana,
aceriana.
Cydia
trimaculana,
ramella,
achatana,
nigromaculana.
Notocelia
uddmanniana,
trimaculana.
Epiblema
immundana,
tetraquetrana,
pflugiana,
trigeminana,
Epiblema
bilunana,
solandriana ?,
scopoliana,
cana.
Hemimene
politana,
petiverella,
tanaceti.
Pammene
ochsenheimeriana
rhediella,
splendidana,
argyrana,
regiana.
Carpocapsa
juliana,
splendana.
Acalla
sponsana,
variegana,
reticulana,
ferrugana,
holmiana.
Epagoge
grotiana.
Capua
angustiorana.
Cacoecia
podana,
xylosteana,
roseana,
Cacoecia
costana,
unifasciana.
Pandemis
ribeana,
cinnamomeana,
heparana.
Tortrix
forskaleana,
bergmanniana,
conwayana,
loeflingiana,
viridana,
paleana,
sinuana,
virgauriana,
incertana,
pascuana.
Isotrias
hybridana.
Lozopera
francillana,
notulana,
manniana,
implicitana,
smeathmanniana.
Euxanthis
zoegana,
hamana.

The above were collected in the area shaded in the accompanying map.

Most of the collecting was done in fields A and B, and the shaw to the south of them; A being a dry field sloping steeply down towards B which is also grass but of a boggy nature.

Several species that came to light were taken at his house. *Isotrias hybridana* was taken from the elms bordering the road to the south, and several species from garden fences in the road to the north.

Mr. H. A. Leeds exhibited a series of aberrations of British butterflies, all wild, captured during 1929.

Epinephele jurtina, 2 ♂ uppersides with large whitish areas. ♀ uppersides symmetrically marked with brown base and streaks, the latter crossing to the outer border over a wide and almost white ground ; another with black spot and pale surrounding on hindwings. ♀ underside, homoeotic-fulvous streaks on the upper portion of the left hindwing.

Melanargia galathea, ♂ upperside, cream ground and reduced black markings.

Aglais urticae, ♂ uppersides, abs. *ichnusa* and *polaris*.

P. coridon, ♂ upperside, wood-pigeon colour ; ♂ undersides with the black spots of the outer border absent from forewings, also abs. *obsoleta* and *posticocaeca*. ♀ undersides, abs. *deatroconfluens*, *flavescens*, and *posticocaeca*.

P. aegon, ♂ uppersides with outer area very broadly white on forewings, *lilacina-minutissimus*, 20mm. Several ♀ uppersides, *inequalis*-homoeotic, the 3rd submedian spot with pale area of the left forewing being reproduced on upperside. Also a dark unicolorous specimen without markings, and 2 with wainscot streaks. A ♀ underside with 6th submedian spot forming a very long streak on hindwings ; and abs. *flavescens* and *magnipuncta*.

P. medon, ♂ upperside with golden lunules. And ♂ undersides abs. *discreta* and *anticocaeca-posticoobsoleta*.

C. pamphilus, ♂ upperside with large white patches near centre of each wing.

P. icarus, a ♂ underside with a broad black band from centre of thorax to twin spot chevrons near inner border of hindwings. Two well streaked female *inequalis*, the left forewing of one on a brown ground and the other on a blue ground. A very black ♀ specimen with blue apex and base, but entirely devoid of the orange lunules. ♀ undersides, like *coridon*, ab. *confluens*, and an exceptionally well marked *radiata*.

Rumicia phlaeas, a ♀ upperside with a small basal spot below the normal one on each forewing.

Papilio machaon, a ♂ underside with hindwings buff tinted instead of pale yellow.

Mr. R. M. Long exhibited *Epinephele jurtina* (*janira*) ♂, with apical spots missing, Cheltenham, 1929 ; *Polyommatus icarus* ♂, upperside of right forewing streaked with dark brown, Reigate, 1929 ; and *P. thetis* (*adonis*) ♂, underside hindwings partially striated, Worthing, 1929.

Mr. H. Moore exhibited specimens of the large and beautiful *Morpho hecuba* and *M. eugenia* from S. America.

Mr. L. W. Newman exhibited a long series of aberrations of British Lepidoptera taken in 1929, including *Brenthis euphrosyne*, *Rumicia phlaeas*, *Polyommatus thetis*, *Plebeius aegon*, *Papilio machaon*, *Aglais urticae*, etc.

And on behalf of Mr. A. N. C. Treadgold a collection of Lepidoptera captured in June, 1928, at Klondyke, and called attention to a number of the species almost exactly agreeing with British forms of the same species.

Mr. L. Hugh Newman exhibited a series of numerous garden pests with preserved larvae and pupae of the same.

Mr. S. R. Ashby, on behalf of Mr. Jacobs, exhibited a North American Longhorn Beetle, *Monochamus titillator*, Fb., taken in Cannon Street, City, September 11th, 1929, and exhibited alive.

Mr. C. G. Priest exhibited varied local series of *Hipparchia semele*, *Polyommatus thetis* (*adonis*), and *P. coridon* of both sexes.

Mr. Percy Richards exhibited a number of life-histories of British Lepidoptera.

Dr. E. Scott exhibited a collection of Rhopalocera he had made in the Belgian Ardennes Mts.

The Rev. C. E. Tottenham exhibited the following Coleoptera :—

(*a*) Series of *Osphya bipunctata*, ♂ ♂ and ♀ ♀ with ♂ coloured as ♀ and vice versa.

(*b*) Series of *Saprosites mendax*, a South Australian beetle, occurring in Sussex together with its larva.

(*c*) Long series of *Donacia sericea*, showing great colour variation.

(*d*) Series of *Melanotus castanipes*, from Savernake Forest (with *M. rufipes* for comparison).

He also showed (1) *Depressaria nervosa* (Lep.) and larva, together with a parasitised specimen of the larva ; (2) Earwigs, set to show the method of folding the wings.

Dr. Harold B. Williams exhibited 1. Series of *Cosmotriche potatoria* ♀ ♀ from (*a*) Eastbourne, (*b*) N.E. Surrey, bred 1929, including pale, brown, and well-marked forms in each series.

2. *Xylophasia monoglypha*, dark form, Esher, 1929, with the ordinary form from the district for comparison.

3. Series of *Sarrothripa revayana* bred recently from the Oxshott district, nearly all of a melanic form ; and selected *Calymnia pyralina* bred and captured in recent years in Surrey, including examples of

the plain brown "type" form, which appears to be rare in England.

Mr. C. H. Williams exhibited long series of aberrations of *Abraxas grossulariata*, *Polyommatus coridon*, and *Lycia* (*Biston*) *hirtaria*.

Mr. C. G. M. de Worms exhibited (1) a ♂ specimen of *Hydrilla palustris* taken in Wicken Fen June 11th, 1929; (2) Melanic specimens of *Melitaea aurinia* ♂, Dorset, May, 1929, *Agrotis segetum* ♀, Wicken, June, 1929, *A. corticea* ♂, Surrey, June, 1929, and *Xylophasia monoglypha* ♀, Scotland, August, 1928; (3) a short series of xanthic examples of *Epinephele jurtina* (*janira*) of both sexes; and specimens taken in France of the rare *Apamea dumerilii*.

Mr. H. Worsley-Wood exhibited an example of *Colias croceus* ab. *pallida*, with hindwings brownish grey and no black margin; a *Metachrostis* (*Bryophila*) *muralis* var. *impar* from Cambs. with preserved larva and pupa and a photograph of the ova (×10) by A. W. Dennis.

Mr. C. C. Stubbs exhibited several ♂ *Ematurga atomaria* with the transverse lines on a creamy-white ground and all other usual markings absent.

Mr. S. G. Castle-Russell exhibited *Colias croceus*, Bognor, bred 1928, including a male assimilating colour of ab. *helice*, and a series showing colour variation.

Brenthis euphrosyne, N. Hants, 1929, including three upper and one underside aberrations.

B. selene, N. Hants, 1929, an upperside aberration.

Polyommatus coridon, Wilts, a gynandromorph: one hindwing being principally female: remaining wings male; two dark forms of var. *syngrapha*.

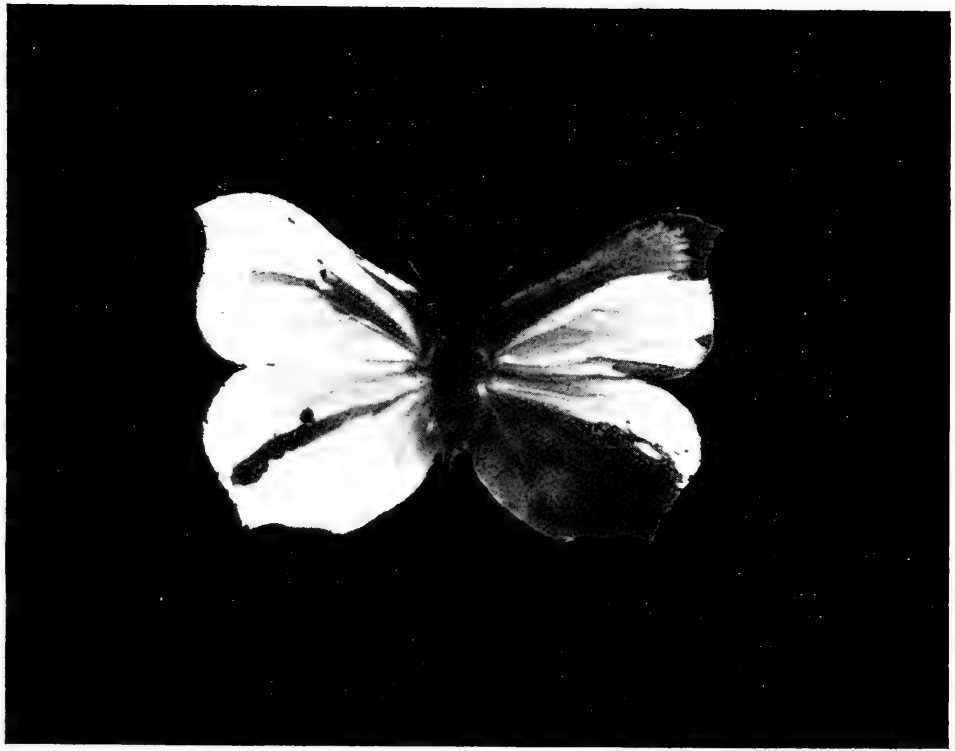
Aglais urticae, Godalming, a cream-white specimen.

Coenonympha pamphilus, N. Forest, a dark suffused form, var. *lyllus*.

Nisoniades tages, N. Hants, a partially bleached form.

Hamearis lucina, N. Hants, a specimen with upper wings partially cream.

He also exhibited four volumes of original paintings made by William Buckler and used for the plates in the volumes on the Larvae of British Lepidoptera issued by the Ray Society.



To face p. 67.

Photo. W. Randall Parkes.

NOVEMBER 14th, 1929.

The PRESIDENT in the Chair.

Mr. H. Moore exhibited *Lycorea atergatis* from Costa Rica with the anal tuft displayed, and a number of Hymenoptera about which he asked for information.

The Rev. E. E. Frampton exhibited a long varied series of *Boarmia repandata* from Cornwall. There were none of the form *conversaria* so well known on the N. Devon coast.

Dr. Bull exhibited *Vanessa io* showing colour variation and asymmetry, also 2nd brood larvae in their 3rd instar from the end of August imagines.

Mr. Dennis exhibited photo-micrographs of the ova of the Diptera *Musca domestica*, *Fannia canicularis*, and *Calliphora erythrocephala*; all $\times 30$ diameters.

Mr. W. Randall Parkes exhibited a specimen of *Gonepteryx rhamni*, and communicated the following note.—

"I should like to report the capture of a particularly interesting gynandrous specimen of this common butterfly, which I was fortunate enough to take while collecting on Honiton Common, S. Devon on August 25th, 1929. The insect had apparently recently emerged and was in perfect condition.

"It shows a predominance of the pale greenish yellow colour of the female sex on the left wings, whereas on the right side the dark yellow of the male predominates.

"On the left side the dark yellow occupies an area of about one eighth of the total and is distributed in a bold streak across the middle portion of each wing, extending from their bases to within a short distance of their outer margins. On the forewing there is also another small patch extending along the costal margin for about its medial third.

"On the right side the dark yellow colour occupies the anterior third of the forewing, extending in a broad band from the base to the outer margin. There is also a small patch at the inner angle. On the hindwing the dark yellow occupies the posterior two thirds. The remaining portions of these two wings display the pale greenish yellow colour of the female, but in a very slightly darker shade than on the left side.

"The orange spots on the wings are equal in size and colour on both the right and left sides. On the underside the distribution of

the dark yellow colour is approximately the same as on the upperside.

"Another interesting feature is that there is a marked increase in the amount of the downy hair on the medial portion of the left hindwing as compared with the opposite side. In other respects the right and left sides of the specimen are alike."

Mr. Buckstone exhibited a very dark male specimen of *Polyommatus icarus* from Folkestone, and noted that on August 15th males were far more plentiful than females, and a week later females were worn but males still fresh and plentiful.

Mr. Bunnett exhibited 6 ♂s and 2 ♀s of a Dipteron *Conops ceriiformis*, taken in Petts Wood, N.W. Kent; a specimen of *Sphinx convolvuli* taken by a school-boy on Folkestone pier.

Dr. Cockayne exhibited living larvae of *Caradrina taraxaci* from Kent.

Capt. Curwen exhibited a large number of Lepidoptera taken by him in the woods and hills between Bad Kreuznach and Bad Münster and on the 'Seven Mountains,' Konigswinter, in the German Rhineland. He said that most of the early summer species were worn out and the mid-summer species were just commencing to emerge. Although species were few, their numbers were very great and almost every tree in the wood had one or more moths on its trunk. In some cases there were about a dozen moths on one oak trunk. Out of 22 species of butterflies 6 were non-British, and out of 27 species of moths only 1 was non-British.

NOVEMBER 28th, 1929.

The PRESIDENT in the Chair.

Mr. R. Adkin exhibited an album containing long series of leaves and plants showing the mines of *Nepticulae* and some other species. The mines made by the larvae of these small moths are very distinctive and often form a more easy method of distinguishing the species than the moths themselves. The album was loaned by Prof. Waters who had made a close study of this branch of the Lepidoptera.

He also exhibited a number of Tortrices and Tineina reared during the past summer from larvae found on fruit trees in his garden at Eastbourne and read notes on them.

DECEMBER 12th, 1929.

The PRESIDENT in the Chair.

Mr. B. W. Adkin exhibited—

1. An *Arctia caja* with red scaling on the forewing.

2. A possibly gynandrous specimen of *Cosmotriche potatoria*, which, when bred, had an abdomen of female size, now shrivelled, but otherwise resembled a male. One hindwing was white in colour.

3. *Limenitis sibilla* ; a specimen with unequal wings possibly gynandromorphous.

4. *Vanessa io* ; a similar specimen with unequal wings and unequal markings.

5. Three specimens of a very dark race of *Euphyia* (*Cidaria*) *silaceata* from S. Devon and three specimens from Kent for comparison. Also

6. *Chiasmia* (*Strenia*) *clathrata* ; six unusual varieties including unicolorous white, unicolorous yellow, almost white and almost black forms.

Mr. Hy. J. Turner, on behalf of Mr. A. J. Wightman and himself, exhibited a long series of bred specimens of *Nonagria sparganii*, including the following forms—*obsoleta*, with all the markings obsolescent; *bipunctata* with a short black lineola on the median nervure and above it a trace of the orbicular mark and the characteristic black lunular mark ; *rufescens*, suffused reddish ochreous, a form with a blackish shaded central nervure, another with dots on the central nervure joined by two fine lines, another with a pinkish suffusion spreading inwards from the outer margin with pink cilia, and another of a bright coppery red. In addition Mr. Wightman had sent six very extreme aberrational forms which were quite new and distinct.

Capt. Curwen exhibited a curious teratological example of *Rumicia phlaeas* with a very decided hooked apex on the left forewing. It was taken at Hengistbury Head. It was noted that *Coenonympha pamphilus* had a tendency to the same malformation in two specimens that were shown. He also showed aberrations of *Polyommatus icarus*, a bleached example, several strongly blue-marked females, a dwarf of 17mm., a striated underside and one with an arcuate confluence of inner margin spots. Dr. Bull stated that he had seen *Brenthis euphrosyne* with a hooked forewing.

Mr. W. R. Parkes exhibited *Nygmia* (*Euproctis*) *phaeorrhoea* (*chrysorrhoea*), the "Brown-tail Moth," and communicated the following note:—I have been fortunate enough to obtain a series of this species, which I reared from larvae obtained on the Undercliff near Ventnor, Isle of Wight, in June, 1929. The larvae were found feeding on low-growing sloe bushes near the sea shore, the bushes for the most part being about 2-3 ft. in height.

One of the specimens, a male, is particularly interesting owing to its having four conspicuous black dots on its forewings and one on each of its hindwings. In other respects it agrees with the normal specimens shown. The tail was also of a lighter brown.

Mr. Tonge remarked that he had obtained a few examples of a similar form from Eastbourne.

Mr. E. J. Bunnett exhibited a large *Mygale* sp. alive which had been found in a bunch of bananas from the West Indies.

Mr. S. N. A. Jacobs exhibited several specimens of the Hemipteron, *Ploiariola culiciformis*, remarkable for its extremely long and fragile structure. They were found in a comatose condition on rafters in the roof of a house at Lewisham. After remaining comatose in a box for about a week they became active in the warmth of his pocket.

Mr. Tonge exhibited a stereoscopic photograph of the hammock-like cocoon of the micro moth *Lyonetia clerkella*.

Dr. Bull exhibited various teratological specimens of Lepidoptera: *Aphantopus hyperantus* with a white patch on the L. forewing, a striking failure of scaling; *Aglais urticae* with dwarfed L. hindwing; *Nisoniades tages* with dwarfed R. hindwing; and *Xylophasia monoglypha* which had been attacked on the sugar patch by the beetle *Carabus violaceus*.

Mr. Andrews exhibited types of all the British species of the family *Conopidae* (Diptera) from his own collection and species kindly lent by Mr. Collin. This family of which 6 genera and 15 species are known in Britain, is a distinct group more brightly coloured than usual among diptera, and having in several cases a strong superficial resemblance to Hymenoptera (*e.g.*, *Conops* to the smaller Fossores and *Physocephala* to *Ammophila*).

All the species are parasitic on Hymenoptera, and in some cases are stated to oviposit on their hosts during flight. The ova have a bunch of filaments or hooks at the micropylar area. The pear-shaped larvae feed internally on their hosts and eventually pupate within their bodies. Notwithstanding the fact that some species

are quite common there are very few records of their having been bred in this country, and most of our knowledge of their life-histories is taken from Continental workers from whose writings the following list of genera and their hymenopterous hosts is also taken.

Conops (Dip.) on *Bombus*, *Osmia* and *Vespa* (Hym.).

Physocephala (Dip.) on *Apis*, *Bombus*, *Colletes*, *Eucera* and *Vespa*, (Hym.).

Zodion (Dip.) on *Halictus* (Hym.).

Oncomyia (Dip.) on ? *Halictus* (Hym.).

Sicus (Dip.) on *Bombus* (Hym.).

Myopa (Dip.) on *Andrena*, *Bombus*, *Megachile*, *Halictus*, and *Xylocopa* (Hym.).

7 of the 15 British species have been taken by Mr. Andrews in the N. Kent district.

Mr. R. Adkin then read a short paper, "The Season of 1929 at Eastbourne." (See page 15).

This led to a considerable number of remarks from members on the Season.

Mr. Newman had had about 50 pupae of *Heliothis peltigera*. They were kept in the ordinary way and about 16 emerged in the winter, the remainder from the end of May to mid-July. *Lycaenopsis argiolus* was not as common as usual at Folkestone, but it was distinctly scarce at Bexley and in some places was not observed at all. A *Spilodes palealis* was taken in mid September. *Colias hyale* was very common on the Essex coast and at Herne Bay. Mr. Adkin suggested that *L. argiolus* at Eastbourne may have been driven inland by the long continued strong wind. Capt. Curwen said that *L. argiolus* was unusually common at Twickenham. Dr. Cockayne said that he forced most of his *H. peltigera*. Those which emerged soon after pupation in July were very pale while those which emerged last in October were the darkest. He found it fatal to leave the pupae alone; he was most successful with those dug up and placed in a dry tin. Mr. B. W. Adkin reported *Euchloë cardamines* very scarce. In Cornwall he saw only one specimen. Mr. Newman had seen only one. Mr. Hawkins saw no *Colias croceus* nor *C. hyale* at Sandown, I. of Wight during the early part of September, but took two and saw a third *C. croceus* near Ranmore Common on September 28th; *Ematurga atomaria* was very scarce. Dr. Cockayne said that both imagines and larva of the last named species were common in Aberdeenshire. Mr. Bunnett had seen only four *C. croceus* at Lewes. Dr. Bull had seen no *E. cardamines* in E. Kent.

JANUARY 9th, 1930.

The PRESIDENT in the Chair.

Mr. Syms exhibited a specimen of the uncommon snake-fly, *Raphidia cognata* taken on June 15th, 1929, by beating oak in Huntingdonshire.

Mr. C. N. Hawkins, on behalf of Dr. E. A. Cockayne, exhibited galls made by larvae of *Sciapteron tabaniformis*, Rott., (*vespiformis*, Westwood, non L.; *asiliformis*, Steph.) in small branches of Poplar; and communicated the following note.—

"The specimens are of German origin, from the neighbourhood of Berlin, and three of them contain living larvae. These galls are slender swellings on the twigs and one in particular is not very conspicuous. One gall has been partially opened and the larva may be seen in its chamber within. This gall is, however, presumably abnormal, as when opened from the other (lower) end it was found that the central and thickest part of the gall was occupied by another chamber having an external opening through the side of the gall and containing five small red and black ants (very kindly identified by Mr. H. Donisthorpe as *Leptothorax acervorum*, F., and also exhibited). The ant chamber has been carefully smoothed inside and would, Mr. Donisthorpe informs me, probably serve as the foundation of a larger nest in due course. The larva has withdrawn into the narrow, upper, part of the gall and has completely closed its burrow above the ants with a thick plug of bitten wood, and so seems safe from attack. A fourth gall, from which the larva has been removed, has been opened completely, to show the form of burrow and the plugs made by the larva across the burrow above and beneath, to form a pupation chamber. Some of the gall-bearing branches sent to Dr. Cockayne, had, he told me, little rootlets attached and others obviously came from higher up the trees, whilst some larvae had bored in hard, woody pieces of root, so that the species must vary considerably in its larval habits. This is confirmed by the accounts given by different authors as the few following notes will show."

SOUTH, "Moths of the British Isles, series ii.," states that the larva "lives under the bark of poplar trunks."

SCORER, "Entomologists Log Book," says "Feeds under the bark of Poplars."

BOISDUVAL, "Spec. Gen. Lep. Het. vol. i., 1874," says the larva lives at the base of young Poplars (*P. fastigiala* (sic) and *P. nigra*) at about 6 to 7 inches above the root.

Staudinger, "De Sesiis Agri Berolinensis, 1854," records branches, trunks and roots of *Populus nigra* and more rarely in *P. tremula* (or also in *Betula alba* ?).

Bartel-Seitz, "Macro-Lepidoptera of the World, vol. II.," says "Lives in swellings of small stems and branches of Poplar, especially of *P. nigra* and *P. tremula* ; also in the stronger roots of young trees, in stumps of branches and at the base of the trunk, but has also been bred from bushes of crippled *Salix*." He adds, "The statement that the larva of *rhingiaeformis* " (a form of *tabaniformis*), "has been found in *Ebulum humile*, has not been corroborated."

Newman, "Ent. Mag. I., p. 83, Sept. 1832" gives it as living under the bark of Birch and *Populus dilatata*.

Barrett, "Lep. Brit. Is., ii., p. 78, 1893" quoting Hoffmann says "Lives in trunks of Poplars (*P. nigra* and *tremula*) making a gallery under the bark."

The Rev. F. O. Morris, "Natural History of British Moths, vol. i., pp. 25, 26, 1872" says "It feeds in the stems and branches of the Poplar, the Aspen and, it is said, the Beech."

Wilson, "Larvae of Brit. Lep." "Foodplants, Ash, Aspen, Poplar, stem and roots."

Edward Newman, "The Illustrated Nat. Hist. Brit. Butterflies and Moths," "the caterpillar feeds on the roots of Ash and Aspen trees."

Kirby, "Allen's Naturalists' Library " "The larva lives in Sallow, Ash and Aspen."

While Meyrick, "Handbook of Brit. Lep. Rev. Ed. 1928," merely says "In stems and roots of Poplars."

"With regard to three of the foodplants mentioned above, Mr. Step (to whom my best thanks are due) informs me that *Ebulus humilis* (or *Ebulum humile* as Seitz has it) is a very old name used by Gerard (1597) for the Dwarf Elder or Danewort (*Sambucus ebulus*, Lin.) while *Populus dilatata* and *P. fastigiala* have both been used as synonyms for the Lombardy Poplar, now regarded as a hybrid, *P. nigra* × *deltoidea*.

"There are many other references, particularly in the works of Continental authors, but enough have been given to show how varied the records are.

"Probably some of the foodplants have been allotted to this species owing to a confusion of names or a mistaken identification of larvae, but it seems clear the species is not confined to Poplar.

"The species, apparently, has always been very rare in this country, and so far as I can find the only records are from Essex, Middlesex, Kent, Surrey and Hants. It will be noted that four of these counties are grouped around the Port of London, while the other has Southampton.

"Possibly the examples shown and the information given above may enable some of us to recognise the galls and turn the species up in unsuspected localities."

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

Mr. R. Adkin exhibited coloured slides of a number of the larger and more conspicuous lepidoptera and some details of their life histories.

Mr. Bunnett exhibited coloured slides of common wild flowers, galls and wild life with a few slides of lepidoptera.

Mr. Dennis exhibited slides of British wild flowers and fruits, of a termite's nest from S. Africa, etc.

Mr. Hugh Main exhibited slides showing the habitations of the trapdoor spider from both Epping Forest and Hyères.

Mr. Dannatt exhibited slides of a number of African and Madagascan Papilios, the Moths of the Limberlost and collecting localities such as Pett's Wood, Kent, Holland's Wood, New Forest, Pont du Gard, the Cevennes and Nimes.

JANUARY 23rd, 1930.

ANNUAL MEETING.

The PRESIDENT in the Chair.

The Reports of the Treasurer and Council and the Balance Sheet for the past year were read and adopted.

The following is a List of Officers and Council elected for the year 1930:—

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Vice-Presidents.—H. W. Andrews, F.E.S., and C. N. Hawkins, F.E.S.

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Hon. Editor of Proceedings.—Hy. J. Turner, F.E.S., F.R.H.S.

Hon. Secretaries.—Stanley Edwards, F.L.S., F.Z.S., F.E.S., etc., and Hy. J. Turner.

Hon. Lanternist.—J. H. Adkin.

Council.—J. H. Adkin, K. G. Blair, B.Sc., F.E.S., L. C. Bushby, F.E.S., Dr. E. A. Cockayne, A.M., F.E.S., F.R.C.P., Capt. B. S. Curwen, T. H. L. Grosvenor, F.E.S., S. N. A. Jacobs, Col. F. A. Labouchere, F.E.S., A. E. Stafford, E. Step, F.L.S.

The President, H. W. Andrews, F.E.S., read the Annual Address.

In the unavoidable absence of the new President Mr. F. B. Carr, Mr. Andrews continued in the chair.

The usual Votes of Thanks were passed including a special vote of thanks to the Hon. Curator for the arduous work he had had in the transfer of the collections and to the Librarian for his assistance.

Ordinary Meeting.

Mr. H. W. Andrews, F.E.S., Vice-President in the Chair.

Mr. K. G. Blair exhibited a living specimen of a tortoise-beetle, *Coptocycla atroannulus*, Champ., found on bananas from Central America, and also the pupal sheaths of the Sphingids *Sphinx ligustri* and *S. pinastri* for comparison. The larva of the latter was from Dunwich, Suffolk, in September, 1928. The imago emerged in June, 1929.

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THE ABSTRACT OF PROCEEDINGS

For 1886, 1887, 1888-9 (1 Vol.),
1890-91 (1 Vol.), 1892-3 (1 Vol.),
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1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917,
1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925,
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1902, price 2/6; 1903, price 2/-; 1904, price 2/-;
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1921.—January 8th, 22nd; February [illegible] 26th; April 9th, 23rd; May 14th, 28th [illegible] 23rd.

LIBRARY OPEN AT 6.30 p.m. CHESS [illegible]

MEMBERS exhibiting specimens at the Meetings are requested to be good enough to hand in [illegible] Meeting, a note in writing of the generic and [illegible] specimens exhibited, together with the names [illegible] which such specimens were obtained, and [illegible] which the exhibitors have to make. [illegible] in writing the Secretary cannot be responsible [illegible] connection with his report of such exhibits [illegible] any reference thereto in the Proceedings.

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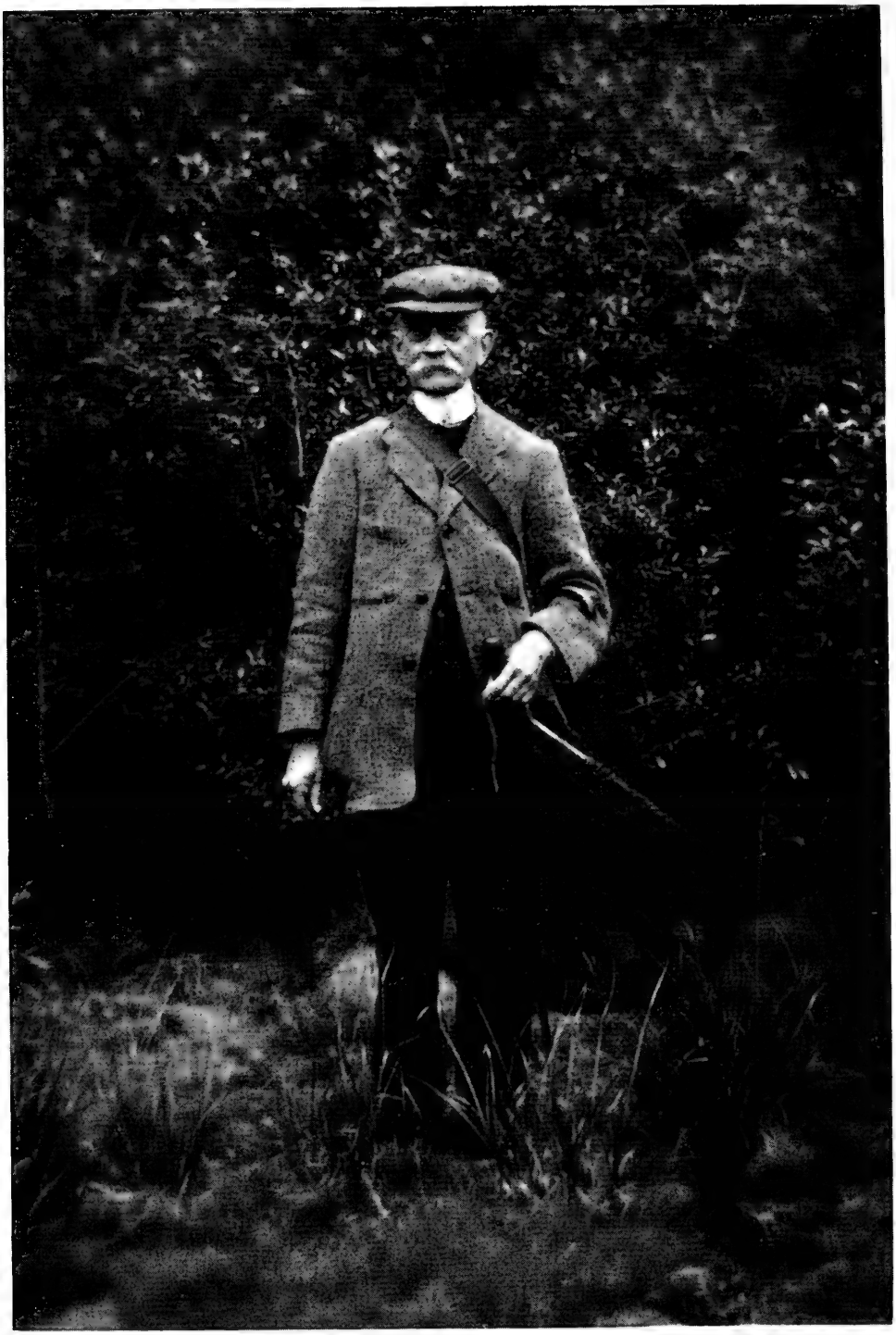

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1905 .. H. Main, B.Sc., F.E.S.
1906-7.. R. Adkin, F.E.S.
1908-9.. A. Sich, F.E.S.
1910-11. W. J. Kaye, F.E.S.
1912-13. A. E. Tonge, F.E.S.
1914-15. B. H. Smith, B.A., F.E.S.
1916-17. Hy. J. Turner, F.E.S.
1918-19. Stanley Edwards, F.L.S. etc.
1920-21. K. G. Blair, B.Sc., F.E.S.
1922 .. E. J. Bunnett, M.A., F.E.S.
1923-4.. N. D. Riley, F.Z.S., F.E.S.
1925-6.. T. H. L. Grosvenor, F.E.S.
1927-8.. E. A. Cockayne, D.M., A.M., F.R.C.P., F.E.S.
1929 .. H. W. Andrews, F.E.S.
1930 .. F. B. Carr, (dec.).
1930 .. C. N. Hawkins, F.E.S.

LIST OF MEMBERS.

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

YEAR OF ELECTION.

1886 ADKIN, B. W., F.E.S., "Highfield," Pembury, Tunbridge Wells. *l, orn.*

1922 ADKIN, J. H., *Hon. Lanternist, Council*, Lamorran, Oak Lane, Sevenoaks. *l.*

1882 ADKIN, R., F.E.S., "Hodeslea," Meads, Eastbourne. *l, ec. ent.*

1901 ADKIN, R. A., "Hodeslea," Meads, Eastbourne. *m.*

1930 ALEXANDER, O. A., 28, New Cavendish Street, W.1. *l.*

1928 ANDERSON, C. D., 22, Mount Park Road, Ealing, W.5.

1907 ANDREWS, H. W., F.E.S., *Council*, "Woodside," 6, Footscray Road, Eltham, S.E. 9. *d.*

1901 ARMSTRONG, Capt. R. R., B.A., B.C. (Cantab), F.R.C.S., F.R.C.P., F.E.S., 3*a*, Newstead Road, Lee, S.E.12. *e, l.*

1895 ASHBY, S. R., F.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c, l.*

1930 AUBERTIN, Miss Daphne, F.E.S., British Museum (Nat. Hist.) Cromwell Road, S. Kensington, W.7.

1896 BARNETT, T. L., "The Lodge," Crohamhurst Place, Upper Selsdon Road, S. Croydon. *l.*

1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, S.E. 15. *l.*

1930 BARTER, G. L., 50, Wroughton Road, Clapham Common, S.W. 11.

1927 BEDWELL, E. C., F.E.S., 54, Brighton Rd., Coulsdon, Surrey. *c.*

1929 BELL, J. K., F.E.S., Marden Lodge, Caterham Valley, Surrey.

1924 BIRD, Miss F. E., "Red Cottage," Cromwell Avenue, Billericay, Essex. *orn.*

1911 BLAIR, K. G., B.SC., F.E.S., *President*, "Claremont," 120, Sunningfields Road, Hendon, N.W. 4. *n, c.*

YEAR OF ELECTION.

1898 BLISS, Capt., M. F., M.C., M.R.C.S., L.R.C.P., F.E.S., Butlin's Hill, Braunton, near Rugby. *l.*

1926 BLISS, A., "Musgrove," Brighton Road, Purley.

1925 BLYTH, S. F. P., "Cleveland," Chislehurst, Kent. *l.*

1923 BOUCK, Baron J. A., F.E.S., "Springfield," S. Godstone, Surrey. *l.*

1909 BOWMAN, R. T., "Rockbourne," Keswick Road, Orpington, Kent. *l.*

1909 BRIGHT, P. M., F.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l.*

1927 BROCKLESBY, S. H., "Long Lodge," Merton Park, S.W.19. *l.*

1923 BROCKLEHURST, W. S., "Grove House," Bedford. *l.*

1924 BROOKE, Mrs. M. L., cf. Dr. C. O. S. Brooke, "Danesmere," Rosetta Avenue, Belfast. *l.*

1930 Brooke, Miss W. M. A., cf. Dr. C. O. S. Brooke, "Danesmere," Rosetta Avenue, Belfast. *ec, ent, b.*

1909 BUCKSTONE, A. A. W., 5, Haynt Walk, Merton Park, S.W. 20. *l.*

1927 BULL, G. V., B.A., M.B., F.E.S., "White Gables," Sandhurst, Kent. *l.*

1915 BUNNETT, E. J., M.A., 72, Colfe Road, Forest Hill, S.E. 23 *mt.*

1922 BUSHBY, L. C., F.E.S., 11, Park Grove, Bromley, Kent. *l.*

1922 CANDLER, H., "Broad Eaves," Ashtead, Surrey. *l, orn, b.*

1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n.*

1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.

1922 CHEESEMAN, C. J., 100, Dallinger Road, S.E. 12. *l.*

1879 CLODE, W. (*Life Member.*)

1915 COCKAYNE, E. A., M.A., M.D., F.R.C.P., F.E.S., *Council*, 116, Westbourne Terrace, W. 2. *l.*

1930 COLBY, F. E. A., F.R.C.S., "Meadow Cottage," White Rose Lane, Woking.

1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E. 22. *l, ool, orn.*

1928 COMMON, A. F., "Tessa," St. James Avenue, Thorpe Bay.

1907 COOTE, F. D., F.E.S., 32, Wickham Avenue, Cheam, Surrey. *l, b.*

1919 COPPEARD, H., 26, King's Avenue, Greenford, Middlesex. *l.*

1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W. 3. *l.*

YEAR OF ELECTION.

1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E. 18. *l, c.*

1922 COUCHMAN, L. E., c/o Mrs. A. Couchman, May Cottage, Brooklane, Bromley, Kent. *l.*

1909 COULSON, F. J., *Council*, 17, Birdhurst Road, Colliers Wood, Merton, S.W. 19. *l.*

1918 COURT, T. H., F.R.G.S., "Oak Leigh," Market Rasen, Lincolnshire. *l.*

1925 COX, R. Douglas, 12, Blakemore Road, Streatham, S.W. 16.

1911 COXHEAD, G. W., 45, Leicester Road, Wanstead, E. 11. (*Life Member.*) *c.*

1899 CRABTREE, B. H., F.E.S., "Holly Bank," Alderley Edge, Cheshire. *l.*

1918 CRAUFURD, Clifford, "Dennys," Bishops Stortford. *l.*

1920 CROCKER, Capt. W., Constitutional Club, E. Bexley Heath. *l.*

1898 CROW, E. J., 70, Hepworth Road, Streatham High Road, S.W. 16. *l.*

1928 CURWEN, Capt. B. S., 9, Lebanon Pk., Twickenham. *l.*

1927 DANBY, G. C., 33, Huron Road, Tooting Common, S.W.17.

1925 DANNATT, W., "St. Lawrence," Gaibal Road, Burnt Ash, S.E. 12. *l.*

1900 DAY, F. H., F.E.S., 26, Currock Road, Carlisle. *l, c.*

1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*

1930 DENVIL, H. G., 22, Red Down Road, Coulsdon, Surrey. *l.*

1918 DIXEY, F. A., M.A., M.D., F.R.S., F.E.S., Wadham College, Oxford. *Hon. Member.*

1901 DODS, A. W., 88, Alkham Road, Stamford Hill, N. 16. *l.*

1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*

1930 DOWNES, J. A., 5, Trinity Road, Wimbledon, S.W.19. *l.*

1930 DUDBRIDGE, B. J., 13, Church Lane, Merton Park, S.W. 19.

1912 DUNSTER, L. E., 44, St. John's Wood Terrace, N.W.3. *l.*

1927 EAGLES, T. R., *Council*, 32, Abbey Road, Enfield, Middlesex. *l.*

1928 EARLE, Edw., F.E.S., 16, Addison Gardens, W.14.

1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Secretary*, Avenue House, The Avenue, Blackheath, S.E. 3. *l, el.*

YEAR OF ELECTION.

1923 ELLIS, H. Willoughby, F.E.S., F.Z.S., M.B.O.U., "Speldhurst Close," Sevenoaks, Kent. *c, orn.*

1926 ENNIS, P. F.,

1920 FARMER, J. B., 31, Crowhurst Road, Brixton, S.W. 9. *l.*

1918 FARQUHAR, L., "Littlecote," Pield Heath Avenue, Hillingdon, Middlesex. *l.*

1924 FASSNIDGE, Wm., M.A., F.E.S., 47, Tennyson Road, Portswood, Southampton. *l, n, trich, he.*

1930 FERRIER, W. J., 22, Dagnall Park, S. Norwood, S.E.25. *l.*

1887 FLETCHER, W. H. B., M.A., F.E.S., Aldwick Manor, Bognor, Sussex. (*Life Member.*) *l.*

1926 FLETCHER, P. Bainbrigge, B.SC., 65, Compton Road, Wimbledon, S.W.19. *c.*

1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*

1920 FORD, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*

1915 FOSTER, T. B., "Lenore," 1, Morland Avenue, Addiscombe, Croydon. *l.*

1907 FOUNTAINE, Miss M. E., F.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*

1921 FRAMPTON, Rev. E. E., M.A., Halstead Rectory, Sevenoaks, Kent. *l.*

1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.E.S., Government Lymph Laboratories, The Hyde, N.W.9. *l.*

1919 FRISBY, G. E., F.E.S., 29, Darnley Road, Gravesend. *hym.*

1912 FROHAWK, F. W., M.B.O.U., F.E.S., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*

1914 FRYER, J. C. F., F.E.S., M.A., "Chadsholme," Milton Road, Harpenden, Herts. *l, ec. ent.*

1911 GAHAN, C. J., D.SC., M.A., F.E.S., "The Mount," Aylsham, Norfolk. *c.*

1920 GAUNTLETT, H. L., M.R.C.S., L.R.C.P., F.E.S., 37, Howard Lane, Putney, S.W.15. *l.*

1927 GIBBINS, F. J. F.I.A.A., F.I.A.S., 51, Weldon Crescent, Harrow, Middlesex. *l.*

1928 GILLES, W. S., F.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*

1930 GILLIATT, F. T., F.E.S., 25, Manor Road, Folkestone, Kent. *l.*

1929 GLEGG, D. L., F.E.S., "Vermala," 9, Westleigh Avenue, Putney, S.W.15. *l.*

YEAR OF ELECTION.

1920 GOODMAN, A. de B., F.E.S., *Council*, "Normanby," Darkes Lane, Potters' Bar, Middlesex. *l.*

1926 GORDON, D. J., B.A., F.E.S., Craigellachie House, Strathpeffer, N.B. *col., lep.*

1924 GRANT, F. T., 37, Old Road West, Gravesend. *l.*

1925 GRAVES, P. P., F.E.S., 5, Hereford Square, S.W.7. *l.*

1923 GRAY, C. J. V., BM/BRWX., London, W.C.1. *l.*

1918 GREEN, E. E., F.E.S., F.Z.S., "Ways End," Camberley, Surrey. *hem.*

1924 GREER, T., J.P., "Milton," Sandholes, Dungannon, Co. Tyrone. *l.*

1926 GREY, Olive, Mrs., F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*

1911 GROSVENOR, T. H. L., F.E.S., Springvale, Linkfield Lane, Redhill. *l.*

1884 HALL, T. W., F.E.S., 61, West Smithfield, E.C. 1. *l.*

1926 HALTON, H. C. S., Essex Museum, West Ham, E.

1891 HAMM, A. H., A.L.S., F.E.S., 22, Southfields Road, Oxford. *l.*

1903 HARE, E. J., F.E.S., 4, New Square, Lincoln's Inn, W.C. 2. *l.*

1926 HARMSWORTH, SIR H. A. B., F.E.S.,

1926 HARRIS, A. G. J., B.A., 21, Nevern Place, S.W.5.

1924 HARWOOD, P., F.E.S., Westminster Bank, 92, Wimborne Road, Winton, Bournemouth. *l.*

1927 HAWGOOD, D. A., 89, Leigham Vale, Tulse Hill, S.W.2. *l.*

1924 HAWKINS, C. N., F.E.S., *Council*, 23, Dalebury Road, Upper Tooting, S.W.17. *l.*

1929 HAWLEY, Lt.-Col. W. G. B., 13, Colville Road, W.11.

1913 HAYNES, E. B., 82a, Lexham Gardens, W. 8. *l.*

1923 HAYWARD, Capt. K. J., F.E.S., F.R.G.S., Estancia Santa Rosa, Patquia, Prov., La Rioja, F.C.C.N.A., Argentine. *l. orn.*

1920 HEMMING, Capt. A. F., F.Z.S., F.E.S., 29, West Cromwell Road, S.W. 7. *l.*

1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *col.*

1931 HERRMANN, E. R., 38, Lebanon Park, Twickenham. *l.*

1927 HEWER, H. R., M.SC., D.I.C., Royal College of Science, S. Kensington, S.W. 7.

1927 HEWITT, A. C., 83,

1920 HODGSON, S. B., "St. Philips," Charles Street, Berkhamsted, Herts.

YEAR OF ELECTION.

1927 HOWARD, J. O. T., B.A., 78, St. John's Wood Court, N.W.8.
1931 HOWARTH, T. G., 77, Woodland Rise, Muswell Hill, N.10. *l.*
1927 HUGHES, A. W. McKenny, 22, Stanford Road, Kensington, W. 8. *ec. ent.*
1929 HUGHES, A. W., "Delamere," Buckingham Way, Wallington.
1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.
1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*
1923 JACOBS, S. N. A., *Council*, Ditchling, Hayes Lane, Bromley. *l.*
1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l.*
1924 JAMES, R., F.E.S., 14, Golden Lane, E.C.1.
1927 JANSON, O. J., F.E.S., *Council*, *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent.*
1925 JARVIS, C., *Council*, 12, Claylands Road, Clapham, S.W.8. *c.*
1930 JOHNSON, E. E., Pilgrim Way, Drive Spur, Kingswood, Surrey. *l.*
1923 JOHNSTONE, J. F., F.E.S., "Ruxley Lodge," Claygate, Surrey. *l.*
1918 JOHNSTONE, D. C., F.E.S., 26, Granville Park, Lewisham, S.E *l.*
1920 JOICEY, J. J., F.L.S., F.E.S., F.R.G.S., etc., "The Hill," Witley, Surrey. *l.*
1898 KAYE, W. J., F.E.S., "Caracas," Ditton Hill, Surbiton, Surrey. *l, S. American l.*
1928 KETTLEWELL, H. B. D., "Hovedene," 15, St. Augustine's Road, Edgbaston, Birmingham. *l.*
1910 KIDNER, A. R., "The Oaks," Station Road, Sidcup, Kent. *l.*
1925 KIMMINS, D. E., 16, Montrave Road, Penge, S.E. 20. *l.*
1925 LABOUCHERE, Lt-Col., F. A., *Vice-President*, 15, Draycott Avenue, S.W.3.
1924 LANGHAM, Sir Chas., Bart., F.E.S., Tempo Manor, Co. Fermanagh. *l.*
1927 LAWSON, H. B., F.E.S., "Brookhill," Horsell, Woking. *l.*
1922 LEECHMAN, C. B., "Pansala," Roundabouts, Storrington, Sussex. *l.*
1914 LEEDS, H. A., 2, Pendcroft Road, Knebworth, Herts. *l.*
1919 LEMAN, G. C., F.E.S., "Wynyard," 52, West Hill, Putney Heath, S.W. 15. *c.*
1926 LONG, R. M., Witley, 3, Cedars Road, Beddington, Surrey. *l.*
1896 LUCAS, W. J., B.A., F.E.S., 28, Knight's Park, Kingston-on-Thames. *Brit. p, o, n.*

YEAR OF ELECTION.

1925 MACCALLUM, C., 1, Aston Road, Ealing, W.5. *l.*

1926 MACDONALD, F. W., 82, Trinity Street, Leytonstone, E.11. *l.*

1892 MAIN, H., B.SC., F.E.S., F.Z.S., "Almondale," 55, Buckingham Road, S. Woodford, E. 18. *l, nat. phot., col.*

1889 MANSBRIDGE, W., F.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc.*

1930 MARSH, D. J., "Delville," Oxenden Square, Herne Bay. *l.*

1922 MASSEE, A. M., F.E.S., East Malling Research Station, Kent. *l.*

1930 MERCHANT, A. J., "Clairville," Champion Road, Upminster, Essex. *l.*

1889 MOORE, H., F.E.S., 12, Lower Road, Rotherhithe, S.E.16. *l, h, d, e l, e h, e d, mi.*

1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.

1928 DE MORNEY, C. A. G., Flat 5, 60, Hogarth Road, Earls Court, S.W.5.

1920 MORISON, G. D., F.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marichall, Aberdeen. *ec. ent.*

1927 MURRAY, Capt. K. F. M.,

1929 NASH, J. A.,

1923 NASH, T. A. M., F.E.S., 16, Queen's Road, Richmond, Surrey. *l.*

1923 NASH, W. G., F.R.C.S., "Clavering House," de Pary's Avenue, Bedford. *l.*

1906 NEWMAN, L. W., F.E.S., Salisbury Road, Bexley, Kent. *l.*

1926 NEWMAN, L. H., Salisbury Road, Bexley, Kent. *l.*

1930 NIBLETT, M., 10, Greenway, Wallington, Surrey. *l.*

1926 NIXON, G. E., 315B, Norwood Road, Herne Hill, S.E.24. *h, l.*

1911 PAGE, H. E., F.E.S., "Bertrose," 17, Gellatly Road, New Cross, S.E. 14. *l.*

1927 PALMER, D. S., "North Lodge," Esher.

1929 PARKES, W. R., B.A., M.R.C.S., L.R.C.P., F.E.S., St. Thomas's House, Lambeth Palace Road, S.E.1.

1930 PEARMAN, Capt. A., Elm Cottage, Purley, Surrey. *l.*

1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W. 1. *l.*

1928 PERKINS, J. F., F.E.S., 19, Courtfield Gardens, S.W.5. *h.*

1925 PORTSMOUTH, J., 15, Victoria Street, Westminster, S.W.1. *l.*

1925 PORTSMOUTH, G. B., 15, Victoria Street, Westminster, S.W.1. *l.*

Year of Election.

1912 Poulton, Prof. E. B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.E.S., "Wykeham House," Oxford. (*Hon. Member.*)

1927 Pratt, W. B., 10, Lion Gate Gardens, Richmond Lane.

1897 Prest, E. E. B., 8 and 9, Chiswell Street, E.C. 1. *l.*

1924 Priest, C. G., 30, Princes Place, Notting Hill, W.11. *l.*

1904 Priske, R. A. R., F.E.S., 136, Coldershaw Road, W. Ealing, W. 5. *l, m.*

1919 Quilter, H. J., "Fir Cottage," Kiln Road, Prestwood, Great Missenden. *l, c, d, mi.*

1922 Rait-Smith, W., F.Z.S., F.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*

1925 Ralfs, Miss E. M., F.E.S., "Montpelier House," 60, Clarendon Road, Holland Park, W.11.

1922 Rattray, Col. R. H., Halliford House, Newton Abbot, Devon. *l.*

1887 Rice, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. 4. *orn.*

1927 Richards, Percy R., "Wynford," 69, Upton Road, Bexley Heath. *l.*

1920 Richardson, A. W., F.E.S., 28, Avenue Road, Southall, Middlesex. *l.*

1908 Riley, Capt. N. D., F.E.S., F.Z.S., 5, Brook Gardens, Beverley Road, Barnes, S.W.13. *l.*

1910 Robertson, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*

1922 Robertson, W. J., M.R.C.S., L.R.C.P., F.Z.S., 69, Bedford Road, S.W. 4. *l.*

1911 Robinson, Lady Maud, F.E.S., Kirklington Hall, Newark. *l, n.*

1920 Rothschild, The Right Hon. Lord, D.Sc., F.R.S., F.L.S., F.Z.S., F.E.S., Tring, Herts. *l, orn.* (*Life Member.*)

1887 Routledge, G. B., F.E.S., "Tarn Lodge," Heads Nook, Carlisle. *l, c.*

1890 Rowntree, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*

1915 Russell, S. G. C., F.E.S., "Brockenhurst," Reading Road, Fleet, Hants. *l.*

1908 St. Aubyn, Capt. J. A., F.E.S., 14, Purley Knoll, Purley.

1914 Schmassmann, W., F.E.S., "Beulah Lodge," London Road, Enfield, N. *l.*

1910 Scorer, A. G., "Hillcrest," Chilworth, Guildford. *l.*

YEAR OF ELECTION.

1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*

1923 SEVASTOPULO, D. G., F.E.S., c/o Ralli Bros., Calcutta. *l.*

1910 SHELDON, W. G., F.Z.S., F.E.S., "West Watch," Oxted, Surrey. *l.*

1898 SICH, ALF., F.E.S., "Grayingham," Farncombe Road, Worthing. *l.*

1925 SIMMONS, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*

1927 SKELTON, HY. E., 12, Mandrake Road, Upper Tooting, S.W. 17.

1921 SMART, Major, H. D., R.A.M.C., M.D., D.SC., F.E.S., 172, High Road, Solway Hill, Woodford Green. *l.*

1927 SMITH, Capt. F. S., F.E.S., "Sunnyside," Middlebourne, Farnham. *l.*

1928 SMITH, Mrs. Maud Stanley, "Sunnyside," Middlebourne, Farnham. *l.*

1882 SOUTH, R., F.E.S., 4, Mapesbury Court, Shoot-up-Hill, Brondesbury, N.W.2. *l, c.*

1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*

1920 STAFFORD, A. E., *Council*, 98, Cowley Road, Mortlake, S.W. 14. *l.*

1872 STEP, E., F.L.S., *Vice-President*, 158, Dora Road, Wimbledon Park, S.W. 19. *b, m, cr*; *Insects, all Orders.*

1928 STOCKEN, H. E. W., Orchard Cottage, W. Byfleet, Surrey.

1924 STOREY, W. H., 63, Lincolns Inn Fields, W.C.2. *ent.*

1929 STUBBS, G. C., 41, St. Mary's Street, Ely, Cambs.

1916 SYMS, E. E., F.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *l.*

1920 TALBOT, G., F.E.S., "The Hill Museum," Witley. *l.*

1922 TAMS, W. H. T., F.E.S., 5, Dairy Lane, Hurlingham, S.W. 6. *l.*

1894 TARBAT, Rev. J. E., M.A., Colbourne Rectory, I. of Wight. *l, ool.*

1913 TATCHELL, L., F.E.S., Swanage, Dorset. *l.*

1925 TAYLOR, J. S., F.E.S., Dept. Agriculture, Div. Ent., Pretoria, Union of S.A. *l.*

1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.

1931 THOMPSON, J. A., Tan-y-Bryn School, St. Margarets Drive, Llandudno, N. Wales. *l.*

YEAR OF ELECTION.

1926 TOMLINSON, Florence B., "The Anchorage," Lodge Road, Croydon. *l.*

1902 TONGE, A. E., F.E.S., *Hon. Treasurer*, "Aincroft," Grammar School Hill, Reigate. *l.*

1927 TOTTENHAM, Rev. C. E., F.E.S., "Keswick," 18, Tyrone Road, Thorpe Bay, Essex. *c.*

1887 TURNER, H. J., F.E.S., F.R.H.S., *Hon. Editor*, "Latemar," West Drive, Cheam, Surrey. *l, c, n, he, b.*

1921 VERNON, J. A., "Firlands," Ascot, Berks. *l.*

1923 VREDENBERG, G., 38, Ashworth Mansions, Maida Vale, W.9. *l.*

1889 WAINWRIGHT, C. J., F.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*

1927 WAINWRIGHT, Chas., 8, Kingsdown Avenue, W. Ealing, W.13.

1929 WAINWRIGHT, J. Chas., 8, Kingsdown Avenue, W. Ealing, W.

1929 WAINWRIGHT, John, 8, Kingsdown Avenue, W. Ealing, W.

1911 WAKELY, L. D., 11, Crescent Road, Wimbledon, S.W.20. *l.*

1930 WAKELEY, S., 8, Woodland Hill, Upper Norwood, S.E.19.

1880 WALKER, Comm. J. J., M.A., F.L.S., F.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*

1927 WALKER, W. H., "Ranworth," Potters Bar. *l.*

1925 WARD, J. Davis, F.E.S., "Limehurst," Grange-over-Sands. *l.*

1920 WATSON, D., "Proctors," Southfleet, Kent. *l.*

1928 WATTS, W. J., 42, Bramerton Road, Beckenham. *l.*

1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l.*

1911 WELLS, H. O., "Inchiquin," Lynwood Avenue, Epsom. *l.*

1911 WHEELER, The Rev. G., M.A., F.Z.S., F.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*

1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.

1920 WIGHTMAN, A. J., F.E.S., Broomfield, Pulborough, Sussex. *l.*

1930 WILKINS, C., John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W.19.

1914 WILLIAMS, B. S., "St. Genny's," 15, Kingcroft Road, Harpenden. *l, c, hem.*

1912 WILLIAMS, C. B., M.A., F.E.S., 29, Queen's Crescent, Edinburgh. *l, ec. ent.*

1925. WILLIAMS, H. B., LL.D., F.E.S., "Little dene," Claremont Lane, Esher, Surrey. *l.*

Year of Election.

1927 Witting, A. N., 6, Woolstone Road, Catford, S.E. 6.

1918 Wood, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*

1926 Wootton, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*

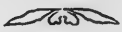
1927 deWorms, C. G. M., F.E.S., M.B.O.U., Milton Pk., Egham, Surrey. *l*, *orn.*

1930 Worsfold, L. B.,

1921 Worsley-Wood, H., F.E.S., 37, De Freville Avenue, Cambridge. *l.*

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

REPORT OF THE COUNCIL, JAN., 1931.



The Council in presenting the fifty-ninth Annual Report is pleased to be able to state that the condition of the Society is still satisfactory.

The Council much regrets that at the commencement of the year the President elect, Mr. F. B. Carr, passed away without formally accepting Office and taking the Chair at the Annual Meeting.

Your Council, in accord with Bye-Law VI Section (B), appointed Mr. C. N. Hawkins, one of the Vice-Presidents, to fill the vacancy, and subsequently Col. F. A. Labouchere was chosen from the Council to be the second Vice-President. The vacancy thus caused on the Council was filled by the appointment of Mr. C. Jarvis.

The membership is 247, made up as follows: Full Members 204, Country 37, Honorary 2, Life 4.

There have been 3 Resignations, Messrs Lowther, Lyall and Rayward.

There have been 7 deaths, which is far above the average, Messrs. Carpenter, F. B. Carr, G. T. Lyle, A. W. Mera, W. H. Miles, D. Mounsey, E. Sancean.

The Annual Exhibition was held on October 23rd, and was a great success, 240 members and friends being present, Messrs A. de B. Goodman and T. H. L. Grosvenor made the necessary arrangements and the thanks of the Society are due to them for their help. The Council view with pleasure the increased number of Exhibits.

Papers have been read before the Society by Messrs E. C. Stuart-Baker, F.Z.S., etc., Major Hingston, F.L.S., etc., H. M. Edelsten, F.E.S., Dr. H. Scott, M.A., Sc.D., F.L.S., etc., E. Step, F.L.S., and A. E. Tonge, F.E.S.

Field Meetings were arranged for Bookham, Ranmore and Picketts Hole, Brentwood, Westerham, Chalfont Road, Byfleet, Horsley, and St. Martha. The thanks of the Society are due to the Conductors, who made the necessary arrangements.

The lantern was in use on seven occasions under the kind supervision of Mr. J. H. Adkin.

Messrs R. Adkin and W. Fassnidge, were asked to be the Society's

Delegates at the Annual Congress of the S.E.U.S.S., (to which the Society is affiliated) held at Portsmouth in May 28th to 31st.

The Volume of Proceedings for the year 1929, consisted of xx.+ 82 pages with two plates.

The Hon. Curator reports—

"During the past year our 60-drawer cabinet has been disposed of, and has been replaced by the 5 cabinets containing the late Mr. J. J. Lister's, F.R.S., Collection of British and Palaearctic Lepidoptera of over 8000 specimens. Pending the making of the nesessary arrangements for accommodating these cabinets here, they were moved to Tring Museum, by the kind permission of Lord Rothschild, to whom the best thanks of the Society have been rendered. The specimens of our old collection are being incorporated with the Lister Collection. Donations have been received from the following members:—

Mr. E. J. Bunnett, 18 species of British Coleoptera and Diptera; Mr. J. L. Henderson, a pair of the rare *Procas armillatus*, F., from Brighton; Lt. Col. F. A. Labouchere, a series of *Chrysophanus rutilus* from Ireland; Mr. H. Main, British *Tipula*; Dr. W. J. Robertson, 36 species of New Zealand Lepidoptera, including several species of *Hepialus*."

The Librarian reports that three vols. of Seitz, making complete "Seitz Rhopalocera of the World," have been purchased, also Verrall's "Diptera," Vol. V., under the Ashdown Bequest. There has been an increase of books borrowed for home reading during 1930.

The average attendance at the meetings (23) has been 40, which shows an improvement on previous years.

The following is a List of the Additions to the Library.

Books.—Verrall's British Diptera, vol. V.; Seitz Rhopalocera of the world, vol V. American; vol. IX. Indo-Malay; vol. XIII. African; Spiders of Porto Rico; Manual of Abyssinian Birds: Moths of Eastbourne I. (R. Adkin): Dr. Eltringham, Microscopical Methods for Entomologists (H. W. Andrews and Hy. J. Turner): American Crabs: Birds of Kenya: Reptiles of Arabia: U.S. Liparidae (Fishes): Sketches of Country Life (E. Step).

Proceedings, Transactions, Reports of Societies, etc.—S.E. Naturalist and Antiquary: Bull. and Ann. Société ent. de France: Ann. Rep. of the Smithsonian Institute: Ann. Rep. of the Conference of Delegates to the British Association (Mr. Adkin): Trans. Ent. Soc. of London, (Dr. Fremlin): Boll. R. Scuola d'Agricoltura Portici:

Proceedings of the American Ent. Soc.: Trans. Perthshire Nat. Sci. Soc.: Rep. of the U.S. National Museum: Rep. Commons and Footpaths Preservation Soc.: Rep. Bournemouth Nat. Sci. Soc.: Rep. of the Imperial Entomologist at Pusa, India: Trans. Wisconsin Acad. of Sci.: Proc. Croydon Nat. Hist. Soc.: Trans. Leicester Lit. and Sci. Soc.: London Naturalist: Rep. of the Hampshire Ent. Soc.: Proc. I. of Wight N. H. Soc.

Separates.— American Smithsonian Institute: Chicago Field Museum: Colorado College: Lloyd Library: Folia Zool.: Diptera of Chili and Patagonia 2 (B.M.): List of authors on British Diptera (H. W. Andrews): Lectures on Ent.: Cambridge Faunal Lists: and from Capt. K. J. Hayward (11), J. Sneyd Taylor (1), Prof. Strand (6).

Periodicals and Magazines.—Entomologist: Entomologist's Record: Entomologists Monthly Magazine (by purchase): Canadian Entomologist: Phillipine Jr. of Science: Entomological News: Repertorium: Natural History: Vasculum: Revu Russe d'Ent.: Zoologiska Bidraga: Essex Naturalist: Revista Ent. Soc. Argentina.

The thanks of the Society are hereby given to the donors of the foregoing.

TREASURER'S REPORT, 1930.

I am glad to be able to report that our financial position remains as sound as ever, but I cannot say that we have had a good year, as our regular income has shrunk by about £60 as compared with 1929.

This is almost entirely due to two causes.

The absence of the Publication Fund, by which we raised £14 last year, against donations amounting to 28/6d. only this time, and the very large number of members who have not yet sent me their Subscriptions.

During 1929 I tried the experiment of sending out 3 reminders instead of two, and this brought in subscriptions amounting to £149 10s. This year, hoping to save the extra cost, I only sent out two, and the response was most disappointing, £119 5s., which clearly shows that the cost of the extra reminder was fully justified.

It would be a very great help if more members would avail themselves of the facilities offered by their bankers for the payment of subscriptions, annually direct to the Society's bank. At present only 17 members have arranged to do this, but I need hardly say I shall be pleased to supply the necessary form to any other member who desires it.

Regular expenses are fortunately less than in 1929, the difference being approximately £24. This as accounted for by the smaller and less expensive volume of Proceedings, which cost £21 12s 4d. less; but we had exceptionally heavy outgoings of a non-recurrent nature.

As foreshadowed in last years report we were obliged to give in to the claims of the Commissioners of Income Tax, and had to pay no less than £23 3s. by way of arrears since 1922.

There is also an item of £7 7s. for the cost of conveying the Lister collection from Tring Museum to the Society's rooms at London Bridge.

In addition to these items your Council decided to avail themselves of an opportunity which offered of adding to the Library 3 vols. of Seitz Lepidoptera, and 1 volume of Verrall's Diptera, at a total cost of £28 11s., which they purchased out of the money the

[*continued on p.* xx.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1930.

REVENUE ACCOUNT.

Expenditure.				*Income.*			
	£ s. d.	£ s. d.			£ s. d.	£ s. d.
To Rent of Rooms	50 0 0		By Subscriptions :—			
,, Insurance	1 16 6		Current	94 17 6		
,, Income Tax	4 12 0		Arrears	7 12 6		
,, Attendance	2 10 0		In advance	16 15 0		
,, Secretarial Expenses	7 10 0				119 5 0	
,, Treasurer's ,, ...	2 14 1		,, Dividends :—			
,, Catering & hire of tables & chairs	20 15 0		On 4% Consols	6 3 8		
		89 17 7	,, 3½% Conv. Loan	7 19 11		
Subscriptions.					14 3 7	
South-Eastern Union of S. Societies	15 0		Deposit interest		1 15 3	
Commons and Footpaths Preservation Society	10 6		,, Donations :—			
		1 5 6	To Refreshment fund		17 18 7	
Arrears of Income Tax 1922-1929		23 3 0	Balance brought from 1929		132 5 9	
Cost of transit Lister Coll.		7 7 0				
Vote to						
Publication Fund	45 0 0					
Library Fund	32 0 0					
		77 0 0				
Balance carried forward		86 15 1				
		£285 8 2			£285 8 2	

LIBRARY FUND.

	£ s. d.		£ s. d.
To Binding Books	1 18 0	By Balance brought from 1929	1 15 0
,, Books purchased	28 11 0	,, Sales	2 0
,, Sub. to Ent. Mo. Mag.	15 0	,, Vote from General Fund	32 0 0
,, Balance carried forward	2 13 0		
	£33 17 0		£33 17 0

	£	s.	d.		£	s.	d.
To Printing Proceedings	56	3	2	By Balance brought from 1929	4	14	10
,, Reprints	2	11	8	,, Donations	1	8	6
,, Half-tone Blocks	3	0	11	,, Chapman Memorial div.	15	0	0
	61	15	9	,, Sales	1	17	6
,, Postage	2	4	6	,, Vote from General Fund	45	0	0
,, Balance carried down	4	0	7				
	£68	0	10		£68	0	10

ENTRANCE FEES AND LIFE-MEMBERSHIP SUBSCRIPTIONS ACCOUNT.

	£	s.	d.		£	s.	d.
4½% Treasury Bonds exchanged for 4% Consols ..	138	2	6	By balance brought forward from 1929	15	19	2
Increased face value of Investment due to exchange	22	19	2	,, 4% Consols face value	154	14	0
To Balance carried down	27	11	6	,, Sale of old 60 drawer Cabinet	16	0	0
				,, Entrance fees	2	0	0
	£188	13	2		£188	13	2

BALANCE SHEET.

Liabilities.	£	s.	d.	By Balances— *Assets.*				£	s.	d.
To Balance, being excess of assets over liabilities ..	798	0	3	General Fund	86	15	1			
				Publication Fund	4	0	7			
				Library Fund	2	13	0			
				Suspense a/c	27	11	6			
				,, Investments at cost				121	0	2
				£300 5% War Stock reg. ..						
				£290 3½% Conversion Loan ..						
				£154 14s. 4% Consols				667	0	1
				,, Subscriptions in arrears :—						
				Good	10	0	0			
				Doubtful, or bad	12	10	0			
				say				10	0	0
	£798	0	3					£798	0	3

Examined and found correct, this 16*th January*, 1931. T. W. HALL, H. W. ANDREWS, *Auditors.*

Society obtained some years back from the Ashdown Bequest, and which it was contended would be better employed in improving the Society's library than in purchasing investments.

These transactions have resulted in a Balance Sheet showing our Surplus of Assets as £33 14s. 7d. less than in 1929, but I am glad to say that our invested capital, which stands in the accounts *at cost*, is still worth more than the figure stated, at current market prices.

During the year the £138 of 4½% Treasury Bonds we held were converted into 4% Consols of an equivalent amount, and now stand in the figures as of the face value of £154 14s. 0d.

We also disposed of the old 60 drawer Cabinet in which the Society's collection of Lepidoptera was kept, as we had no further use for it when we obtained the three handsome cabinets which housed the Lister Collection, and to which our specimens are being transferred. This was purchased by Mr. E. J. Bunnett for £16.

The Accounts and Balance Sheet attached hereto have been duly audited and certified correct by your auditors, Messrs. T. W. Hall and H. W. Andrews, to whom our best thanks are due for the time and attention they have devoted to so doing, as also to all those members who have contributed to the Refreshment and Publication Funds.—A. E. Tonge. *Hon. Treasurer.*

The British Species of Nonagria.

By H. M. Edelsten, F.E.S.—*Read October* 9th, 1930.

The genus *Nonagria* contains about twenty five species of which we have only six in Britain, *cannae*, *sparganii*, *arundinis*, *geminipuncta*, *neurica* and *dissoluta*.

They are all marsh-frequenting, the larvae feed within the stems of marsh plants and the pupae are to be found within the stems. I doubt if there is any other group of Noctuids which are so divergent from each other in their early stages, and that is why they are so interesting. Plant associations have an important bearing on their existence and some have a coastal association.

Cannae is confined to the Norfolk Broads though it was supposed to occur in Mid Sussex, but I have never found it there. It is very local and is largely dependant on plant conditions. It must have *Scirpus* and *Iris* to feed in when young and *Typha* and preferably scattered *Typha latifolia* in which to finish feeding and to pupate. I have sometimes found pupae in large *Scirpus* stems and once or twice in the hollow stems of *Cicuta virosa* and in the flower stem of *Iris pseudacorus*.

The ideal spot for *cannae* is not the thick beds of *Typha angustifolia* but in the more open places where there is a mixed growth. I remember a famous place for it in Norfolk many years ago was along the sides of a dyke, where it opened out into a series of little ponds fringed with *Scirpus*, *Iris* and scattered *Typha latifolia* growing among *Cicuta virosa* and backed by beds of *Typha angustifolia* and *Phragmites*. Every one of these *T. latifolia* stems held a pupa and sometimes two or three.

Conditions change in these places from year to year, *T. latifolia* dies out or gets swamped by other plants and *cannae* shifts further on. Sometimes the marshmen come along and mow the whole lot down at the end of July and the colony is more or less wiped out. The larvae of *cannae* do not feed so low down in the *Typha* stems as those of *arundinis* and when searching for pupae you will after a time, be able to spot the stems which hold *cannae* from those which hold *arundinis*. The withered middle leaf of the stem containing *cannae* is generally yellow-green whereas that which contains *arundinis* is very withered and brown. *Cannae* pupates head upwards

and *arundinis* head downwards, though occasionally I have found them reversed but these pupae have always been parasitised. It is extraordinary how birds and water rats destroy these pupae. They find the emergence hole and tear the stem downwards. They generally get *cannae* as the pupa is below the emergence hole but *arundinis* escapes as it is above. Sometimes 90% are pecked out. I often wonder whether they have learnt to spot an occupied stem by the withered central leaf and then search for the bruise, or whether they hear the pupa moving within the stem and are thus attracted to it. The perfect insect varies from ochreous, through red-brown to black.

Sparganii seems to have a coastal association. Its principal stations are in Kent and Sussex and a few other localities on the South West Coast and also in Ireland. It does not seem to spread inland though there are many places where it would do well. Its habits are very like those of *cannae* and it requires a similar plant association but with *Iris* replacing the *Scirpus*. The pupae are also much destroyed by birds and rats. This insect is also subject to considerable variation.

Arundinis is generally distributed throughout the country and does not seem to require a special plant association. Though commoner in marshy districts you sometimes find little colonies in isolated ponds and pit holes miles from any marshes and one wonders how they got there. *Arundinis* pupates head downwards. The structure of the head of the pupa is different from that of *cannae* and *sparganii*. It is broader and blunter and does not have such a distinct "beak" as have these two species. This insect varies also. The red-brown and black forms are local and do not occur everywhere. The black form with white markings is a beautiful insect when fresh but unfortunately it soon fades, the glistening black turning into a dull brown.

Geminipuncta though generally distributed is perhaps commoner in the reeds growing in brackish dykes near the coast than inland. If the reed has been left uncut for a number of years they occur in vast numbers. In one or two localities I have seen almost the whole reed bed brown and withered towards the end of July. J. C. F. Fryer drew my attention last year to a very curious habit of the larvae in a locality in Suffolk. Instead of dispersing to separate stems when they hatched, he found some of the reed stems contained a dozen or more small larvae all feeding together. No doubt they would ultimately have separated but it is rather curious that they should behave in this way in this one locality. It has always been a mystery to me how these larvae distribute themselves one to a stem. The eggs are laid in masses in one stem, but it is the greatest exception to find more than one larva in each stem even when small. Do these young larvae drift about on a silken

thread ? Even then one would think two or three would land on the same stem. They are not so particular when pupating. I have found as many as eight pupae in the lower part of one large reed and some of these would have stopped each other from emerging. The pupae are always head upwards. They will pupate in the lower portions of the stem they fed in if it is a big one, but they prefer to go into an old stem if there is one near by. This insect also is subject to considerable variation.

Neurica is at present confined to Sussex and Suffolk but it is quite possible that it occurs in other suitable spots around the South and East Coasts. Possibly it was spread over a larger area but the cleaning out of the dykes gives it very little chance to increase. In Sussex *neurica* occurs with *geminipuncta* and *phragmitidis* which makes hunting for the larvae rather difficult until you know how to distinguish the different methods of feeding. The larva enters the reed stem about half way up and feeds on the inner lining of the stem but does not pass up through several nodes as *geminipuncta* does. It is full fed when *geminipuncta* is quite small and this is a help in distinguishing them. When about to pupate it leaves the stem in which it has fed and enters a previous year's stem low down and pupates head downwards. This insect varies, there being both red and black forms in addition to the typical form.

Dissoluta and its variety *arundineta*, occur in many places both coastal and inland. It is curious that in some localities you get both the type and the var. *arundineta* and in others the var. *arundineta* only. It prefers the larger old reed beds rather than the open fen. My first introduction to this species was in Norfolk. We were searching for pupae of *Leucania obsoleta* in a large reed bed that had not been cut for many years, when we noticed that many reed stems were bent over about half way up the stem. There had been a strong wind the day before, but as it was rather unusual for growing reeds to be broken by the wind in June, we investigated some of them and found they had broken where a larva had entered and weakened the stem by feeding on the inner lining. We visited this spot again towards the end of July hoping that we might find the pupae in the lower part of the stem in which the larva had fed, but were disappointed. The chance finding of pupa in an old stem broken off by my foot gave me a clue as to where they pupated. This species pupates head downwards. The perfect insect varies both in size and colour.

The breeding of these Nonagrias from the egg is difficult unless one has the food plants growing close by. I was especially fortunate as on my father's property was a large lake around the edges of which all the necessary plants were growing, *geminipuncta* and *arundinis* were already there. The insects are not hard to breed if the larvae are taken full fed or the pupae are collected. The reed

feeders are best managed by standing the stems containing the larvae in tubs of damp sand with an equal number of old reed stems for the larvae to pupate in. The whole should be covered with muslin. The withered stems can be thrown away after the larvae have left them. The *Typha* feeders should be collected as pupae and the sections of stem stood up in flowerpots of damp sand. It is a good plan to open the emergence holes and to sprinkle the stems with water every evening as this prevents them shrivelling and pinching the pupae. Should the stems shrivel too much the pupae can be taken out and dropped into sections of reed or bamboo canes.

The reed Nonagrias have two kinds of flight. At dusk the males flutter up and down the reed stems seaching for the females, about 11 p.m. when pairing is over the males fly some distance from the reeds and come to light. The *Typha* species also come to light.

The egg laying of these Nonagrias is particularly interesting. The females of the three *Typha* species are each furnished with different processes and each lay their eggs in a different way. *Cannae* is furnished with a wedge-shaped process on the last segment and two hook-like processes on the last but one. A female that I watched took up a position across a *Typha* leaf and having secured a fulcrum with the two hook-like instruments drove the wedge-shaped process under the cuticle of the leaf and towards the anchor hooks, the ovipositor was then thrust into the slit and an egg placed within. The processes were then withdrawn and the cuticle closed down on the egg. This was repeated about a sixteenth of an inch lower down. Three eggs were laid while the female was under observation. It is probable that the eggs are also laid in *Scirpus* stems in a state of nature.

Sparganii is furnished on the anal segment with a pair of circular-jawed pincers, the upper jaw rather longer and more curved than the lower. The eggs are placed in a line down the edge of a *Typha* or *Iris* leaf but not quite at the extreme edge. The pincers then come into action and roll the edge of the leaf over the eggs. It is then glued into position.

Arundinis has a pair of sharp spines curved slightly downwards. When laying the female thrusts these through the cuticle of a *Typha* stem and makes a slight slit. The ovipositor is then pushed in between the spines and the eggs are placed in the cells of the stem. Three to four eggs in each cell. The spines are then withdrawn and the slit closes.

The reed-feeding Nonagrias, *geminipuncta*, *neurica* and *dissoluta* are all furnished with a wedge-shaped process, which is used to prize open the sheathing leaf of a reed stem. The ovipositor is then thrust in and the eggs are laid in large masses. The process is then withdrawn and the sheathing leaf closes on the eggs. They are all

flat, coin-shaped eggs, and are covered with a kind of varnish, which protects them from floods in winter. None of the eggs of the Nonagrias hatch until the new stems appear in the spring.

I would like to call attention to a Continental species *N. nexa* which we have not as yet found in Britain. The larva feeds on *Carex* and I am exhibiting some *Carex* stems showing where the larvae have been feeding and its puparium in the stems. Perhaps we shall one day find it in Britain. I am also exhibiting long bred series of all the Nonagrias from many British localities, also sections of the *Typha* and *Phragmites* stems, with photographs and illustrations to show the methods of pupation and egg-laying.

The Ova of British Lepidoptera.

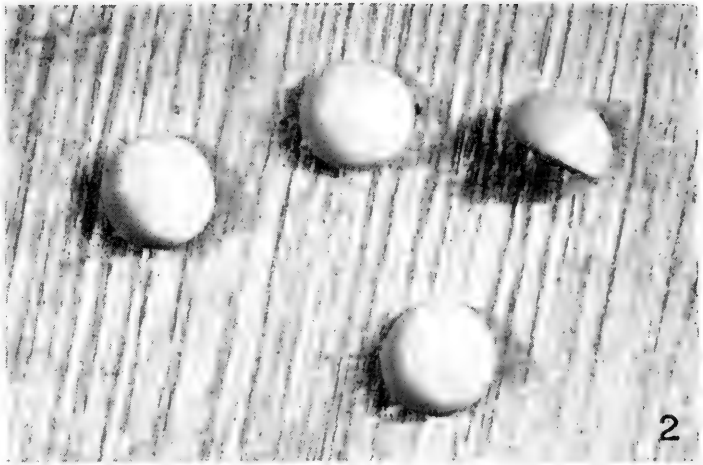
By A. E. Tonge, F.E.S.—*Read March* 27th, 1930.

I have now been photographing eggs of British Macro-Lepidoptera for over 20 years and thanks to the kind assistance, which I have received from many of my fellow entomologists I have been able so far to secure photographs of about 500 species. The remainder will, I am sure, be rather difficult to get as everybody naturally thinks I have done all the common ones and are so pleased to find eggs of something really rare, that they forget to send them on. Actually I still want the eggs of many of our common species, but they are probably insects which do not lay freely in captivity, and the trouble is to find out what treatment will induce them to do their duty.

With such a large amount of material to deal with I was a little undecided for a time how to start work, when asked to give a paper on my hobby, but after considering the matter from all angles, I decided to take some well known book on Lepidoptera and present to you tables of the special forms of ova laid by the various groups mentioned in the book, which I hope may enable those who so desire to identify some of the ova they may come across in the wild. The book I have taken as my guide in nomenclature and arrangement is the "Moths of the British Isles" by Richard South, a publication which I believe is to be found in every entomologist's library, and to-night I propose to deal with the first 12 groups *Sphingidae*, *Notodontidae*, *Thyatiridae*, *Lymantriidae*, *Lasiocampidae*, *Endromididae*, *Saturniidae*, *Drepanidae*, *Nolidae*, *Chlöephoridae*, *Arctiidae* and *Lithosiinae*.

All lepidopterous ova are either upright or flat (*i.e.*, horizontal) according to the position of the micropyle in relation to the plane of the surface on which they are laid, and within very wide limits certain shapes may be allocated to each of the larger groups of species.

I do not propose to deal with the noctuid or geometrid types in this paper but to leave them for some other occasion. They are both very well defined. The former upright, bun-shaped, with ribs from micropyle to base and colourless shell, while the latter is flat ovoid, less depressed at micropylar end, colourless, shell sculptured with hexagonal pattern all over.



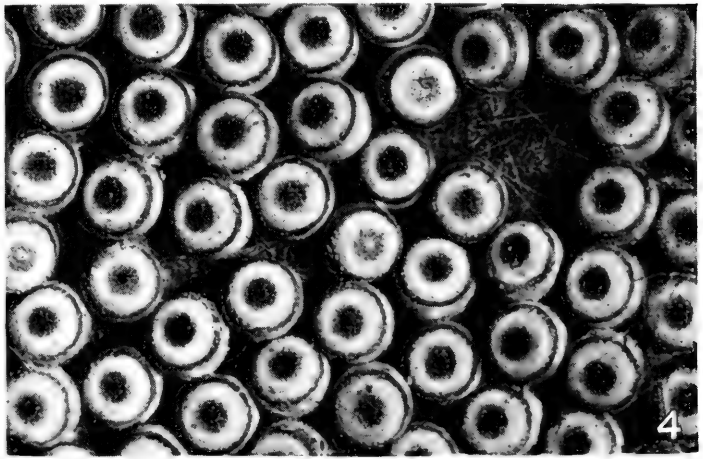


Photo: A. E. Tonge.

It is quite unusual to find eggs which have a colour pattern in the shell. There are some of course but comparatively few and these are nearly all in the Lasiocampid group. The vast majority of species have transparent shells, which allow free play for the larva inside to show through as it matures. They may be yellow or green when laid, and turn orange or red, then gray to black before hatching out, but when the larva is out the eggshells remaining are transparent and colourless.

The first group described by South is the

Sphingidae.

10 resident and 7 alien species.

Large oval green eggs with smooth shell. All are, so far as I can make out, of the "flat" type, but the micropyle is hard to find. The shell is thin with no appreciable sculpturing and no pigment, all colour being due to the contents showing through. They are usually laid singly on the underside of the leaf of the food-plant, to which they are firmly attached. None of our species pass through the winter in the egg stage.

Dilina tiliae, length 2mm., shape elongated ovoid, matte surface, colour dull green.

Smerinthus populi, 2·2mm., ovoid, matte surface, green.

S. ocellatus, 2·1mm., ovoid, matte surface, bright green.

Acherontia atropos, 2·1mm., short ovoid, finely pitted, surface dull, pale greenish yellow.

Sphinx convolvuli, 1·1mm., ovoid, shell rough but shiny, emerald green.

S. ligustri, 2mm., ovoid, dull, emerald green.

Hyloicus pinastri, 1·85mm., ovoid, dull, pale yellow.

Deilephila euphorbiae, 1·5mm., short ovoid, dull, bright green.

D. galii, 1·16mm., short ovoid, shortened, dull, bright green.

Phryxus livornica, no example.

Hippotion celerio, no example.

Daphnis nerii, no example.

Theretra (*Metopsyllus*) *porcellus*, 1·2mm., shortened ovoid, dull, bright emerald green.

Chaerocampa elpenor, 1·7mm., ovoid, dull, bright green.

Macroglossum stellatarum, ·9mm., nearly globular, smooth, green.

Hemaris fuciformis, 2·4mm., nearly globular, smooth, green.

H. tityus, 2·4mm., nearly globular, smooth, green.

The eggs of all the species in this group are very similar except in size, those of *S. convolvuli* and *M. stellatarum* being notably small, while those of *Hemaris* are notably large. *H. pinastri* is notable for its colour which is yellow instead of the prevailing green.

Notodontidae. 25 Species.

Upright, bun-shaped, usually pale blue-green, shell opaque with little or no sculpture but roughened surface. Pigmentation is present in several species (*Cerura*, *Dicranura*, *Phalera*, *Pygaera*). Usually laid singly, occasionally 2 or 3 near together, on the upper or under side of the leaf of the foodplant. None of the species pass the winter in this stage.

Cerura bicuspis, 1·1mm., rough shell, purple black.

C. bifida, 1·3mm., rough shell, brownish black.

C. furcula, 1·1mm., rough shell, black.

Dicranura vinula, 1·7mm., rough shell, red brown, paler below, upperside of leaf.

Stauropus fagi, 1·7mm., dull surface, stone white, semi-transparent.

Gluphisia crenata, no example.

Drymonia trimacula, ·85mm., dull surface, green, larva visible.

D. chaonia, 1mm., dull surface, bluish white shade over green.

Pheosia tremula, 1·1mm., dull surface, white tinged green.

P. dictaeoides, 1·2mm., roughened, shells pale blue green.

Notodonta ziczac, 1mm., matte, pale greenish blue, under sallow leaf.

N. dromedarius, 1mm., roughened, pale blue-green.

N. phoebe=(*tritophus*), no example.

N. tritophus=(*torva*), 1·2mm., matte, palest blue.

N. trepida, 1·25mm., matte, white tinged green.

Leucodonta bicoloria, ·9mm., matte, pale green.

Lophopteryx cucullа, ·95mm., almost smooth, pale green.

L. camelina, 1mm., almost smooth, micropylar darker, pale blue green, under birch leaf.

Odontosia carmelita, 1·1mm., matte, pale eggshell green.

Ptilophora plumigera, ·85mm., matte, olive brown with pale underside ring and micropylar area.

Pterostoma palpina, 1·1mm., matte, pale greenish white, under lime leaf.

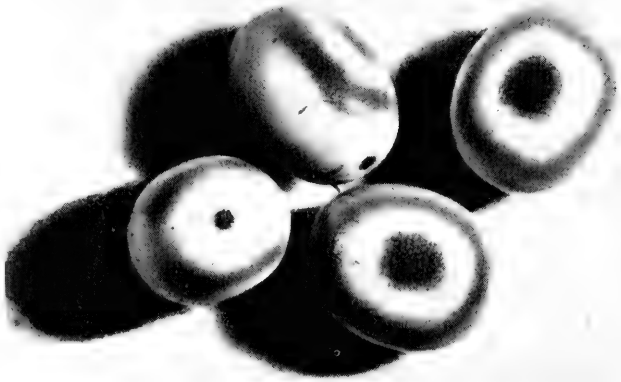
Phalera bucephala, 1mm., matte, bluish white above and bluish black below.

Pygaera curtula, ·95mm., reticulated, seagreen, on upperside of aspen leaf.

P. anachoreta, no example.

P. pigra, ·8mm., fine reticulations, purplish red.

The three species of *Cerura* are notable on account of the colour of the eggs being black and this is in the shell as they undergo no change on hatching. *S. fagi* ova are abnormal in shape being more like a much flattened globe. *P. plumigera* is different in colour and more resembles *Pygaera* than the true Notodonts. *P. bucephala* is unmistakeable as the lower half of the egg is blue black.



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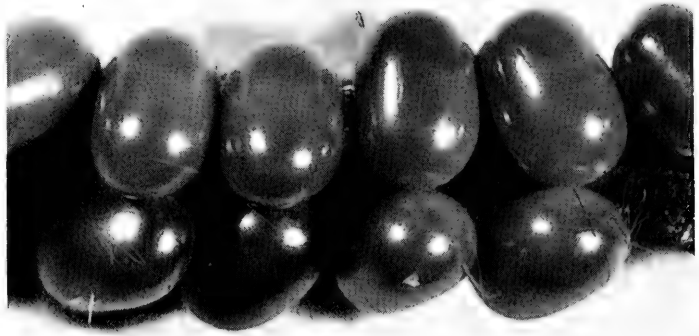

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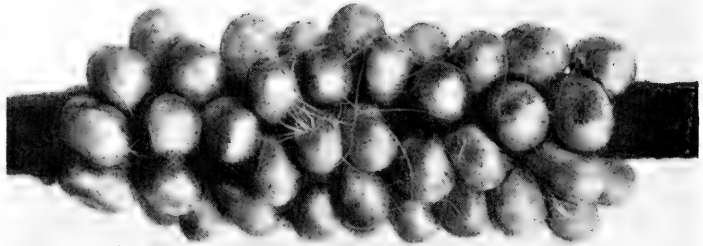

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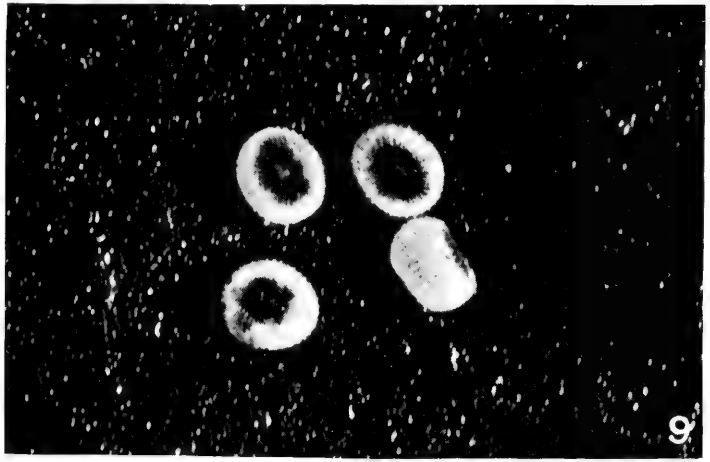
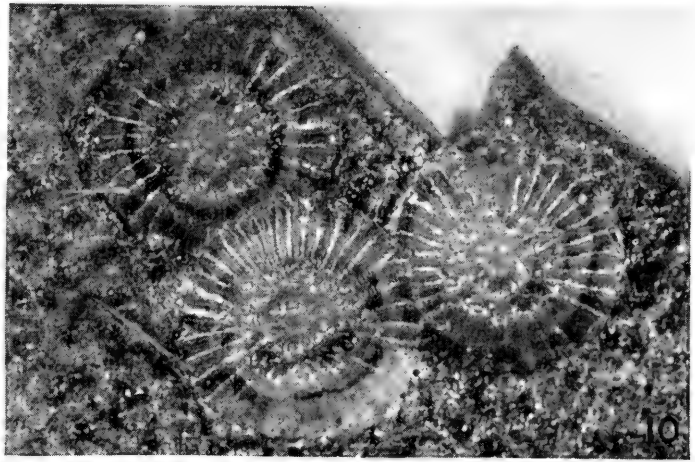
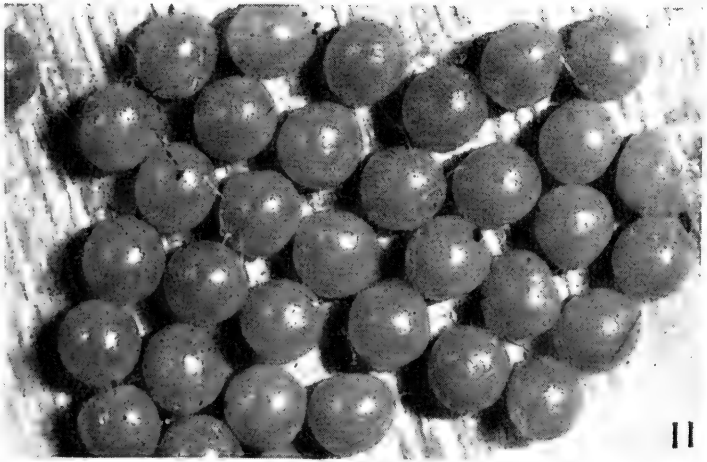
Photo: A. E. Tonge.







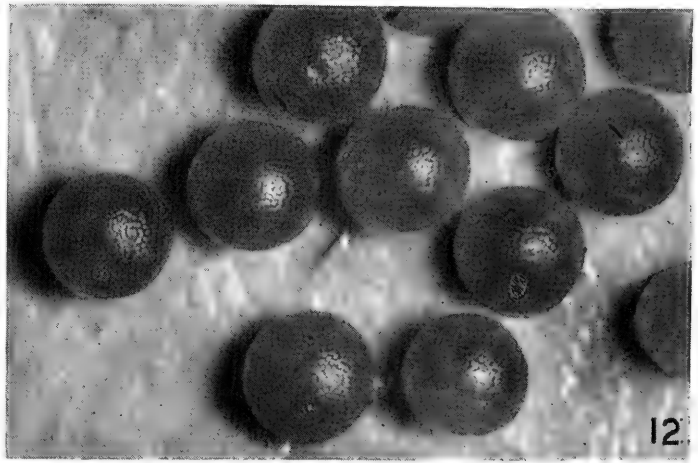


Photo: A. E. Tonge.

Thyatiridae. 9 Species.

Very specialised form, flat ovoid, with bold sculpture and bright colour showing through shell.

Habrosyne derasa, ·7mm., rather square elongated ovoid, boldly ribbed, white to red.

Thyatira batis, ·8mm., elongated ovoid, ribbed, white to red.

Palimpsestis octogesima, 1·2mm., elongated ovoid, recticulated, honey yellow.

P. or, no example.

P. duplaris, ·7mm., boldly ribbed, white.

P. fluctuosa, no example.

Asphalia diluta, 1·1mm., elongated ovoid, one end square, matte, dirty white.

Polyploca flavicornis, ·85mm., ovoid, one end tapered, reticulated, rosy red.

P. ridens, ·9mm., ovoid, one end tapered, reticulated, white.

An interesting group showing considerable differences. Eggs usually laid singly on twigs at a fork or below a bud where in one species (*A. diluta*) the winter months are passed. This latter is the only opaque-shelled egg in the group. *T. batis* oviposits on the tips of the thorns of bramble.

Lymantriidae. 10 Species.

Upright, depressed spheroid, often covered with hair by parent; laid in batches; several with darker markings on shell.

Orgyia gonostigma, .9mm., rough surface, opaque, dull white.

O. antiqua, ·9mm., rough surface, opaque, pale buff with brown centre and ring.

Dasychira fascelina, 1·3mm., rough surface, opaque, white, covered with long brown ♀ hairs.

D. pudibunda, 1·05mm., rough surface, opaque, stone white.

Euproctis chrysorrhoea, ·8mm., matte, covered with hairs by ♀, semi-transparent, honey yellow.

Porthesia similis, ·8mm., roughened slightly, hair covering, semi-transparent, golden yellow.

Laelia caenosa, no example.

Stilpnotia salicis, ·9mm., matte, covered with dried froth, semi-transparent, olive green.

Lymantria dispar, 1·3mm., covered with down, semi-transparent, pale brown with darker blotches.

L. monacha, 1·1mm., shell roughened, semi-transparent, golden brown with dark and light brown patches.

The most remarkable feature of this group is the covering of the eggs by the ♀ parent with hairs from her body, such species as *D. fascelina*, *E. chrysorrhoea* and *P. similis* having large and prominent

abdominal tufts for the purpose. *O. antiqua* lays on the outside of her cocoon and the eggs pass the winter in this situation. It appears to be the only species in this group with a pigmented egg-shell which does not therefore lose its colour when hatched.

Lasiocampidae. 11 Species.

Flat ovoid, usually smooth shell, but with pigmented markings which remain after hatching. In *Malacosoma* they are laid in an upright position.

Malacosoma neustria, 1·1mm., shell rough, pale brown with white micropylar area.

M. castrensis, 1·1mm., rather squared, shell rough, dark brown with top part nearly white.

Trichiura crataegi, 1·5mm., smooth, black covered with brown hairs.

Poecilocampa populi, 1·6mm., smooth, light brownish white, brown and dark grey markings.

Eriogaster lanestris, 1·10mm., smooth, pale brownish with dark central patch, covered with hairs.

Lasiocampa quercus, 2·3mm., smooth, pale brown marked with darker brown.

L. trifolii, 1·7mm., smooth, brownish white marked with pale brown and dark spots.

Macrothylacia rubi, 2·1mm., smooth, brownish white with darker ridges and spots.

Cosmotriche potatoria, 2mm., finely pitted, white with pale sea green markings.

Epicnaptera ilicifolia, 1·6mm., finely pitted, white with grey black markings.

Gastropacha quercifolia, 1·8mm., finely pitted, white marked with greenish black.

Noticeable chiefly for the pigmentation of the eggshells which retain their specific coloration after hatching and are easily identified. Usually laid in batches, large in the case of *M. neustria* and *M. castrensis*, small in *C. potatoria*. *M. neustria* and *M. castrensis* embed the eggs in a hard cement, so that they can sometimes be slipped off the twig on which they were laid without destroying their arrangement as a ring around it. *T. crataegi* and *E. lanestris* cover the eggs with parental hairs. A group of very large size eggs in relation to the size of the parent, particularly *P. populi* and *T. crataegi*.

Endromididae. 1 Species.

Endromis versicolor, 1·8mm., flat, elongated ovoid, transparent, smooth and shiny, purplish brown, laid in batches along birch twigs.

Saturniidae. 1 Species.

Saturnia pavonia, 1·6mm., flat, ovoid, opaque, matte, dull whitish with brown markings, laid in batches on heather, etc., differ from *M. rubi* in size (smaller) and markings, which are much less distinct. Said to resemble dead heather flowers.

Drepanidae. 6 Species.

Flat, ovoid, transparent.

Drepana falcataria, ·85mm., nearly smooth, palest greenish yellow, orange red markings at sides.

D. harpagula, no example.

D. binaria, ·75mm., looks nearly smooth, but is finely corrugated, pale yellow, blotched rosy red, much covered with scales.

D. cultraria, ·7mm., ribbed, pale yellow, blotched reddish.

D. lacertinaria, ·8mm., one end narrowed, smooth, pale lemon.

Cilix glaucata, ·7mm., one end narrowed, smooth, orange red.

D. cultraria seems to be less flattened but the other 4 species noted are very similar in shape, with *C. glaucata* rather more flattened at one end.

Nolidae. 5 species.

Upright, flattened spheroid, ribbed, usually transparent.

Nola cucullatella, ·45mm., pigmented, pale yellowish green, markings reddish.

N. strigula, ·4mm., pale yellow.

N. confusalis, ·45mm., palest green.

N. albula, ·4mm., greenish white.

N. centonalis, no example.

A distinctly specialised group, very much alike, except the first species which develops a red spot in the centre covering the micropylar area.

Chlöephoridae. 3 species.

Upright, usually flat spheroid, transparent.

Earias chlorana, ·75mm., nearly smooth, pale yellow.

Hylophila prasinana, 1·1mm., ribbed, claret and white.

H. bicolorana, 1·4mm., ribbed, red and white.

H. prasinana and *H. bicolorana* are much alike and unmistakeable, being extremely flat, and each egg being enclosed in an outer envelope of transparent and colourless material.

Sarrothripinae. 1 species.

Sarrothripus revayana, ·55mm., reticulated, pale yellow with dull purple red markings.

ARCTIIDAE SUBFAMILY ARCTIINAE. 15 Species.

Upright, spherical with flat base, colourless, thin shell, nearly smooth.

Spilosoma menthastri, ·75mm., smooth, white.

S. urticae, ·8mm., slightly pitted, white.

S. lubricipeda, ·85mm., slightly pitted, palest greenish white.

Diaphora mendica, ·9mm., slightly pitted, yellowish white.

Phragmatobia fuliginosa, ·75mm., slightly pitted, yellowish white, with a pinkish tinge.

Parasemia plantaginis, 1mm., very finely reticulated, shiny, yellowish white.

Diacrisia sannio, ·75mm., very finely reticulated, shiny, pearly white.

Arctia caja, 1mm., very fine reticulation, greenish yellow.

A. villica, ·9mm., very fine reticulation, waxy white with a brownish tinge.

Callimorpha quadripunctaria, ·8mm., very fine reticulation, pale greenish white.

C. dominula, ·9mm., very fine reticulation, pale greenish white.

Coscinia striata, ·7mm., very fine reticulation, shiny golden with dark spot.

C. cribrum, no example.

Deiopeia pulchella, no example.

Hipocrita jacobaeae, ·7mm., nearly smooth, pale yellow.

A group of great uniformity and apart from *C. striata* the species are very hard to separate without the parent or at least the food-plant to help. Usually laid in large batches on the underside of a leaf.

ARCTIIDAE SUBFAMILY LITHOSIINAE. 16 species.

Probably upright flattened spheroid; thin, transparent shell, sometimes with reticulated pattern.

Atolmis rubricollis, no example.

Nudaria mundana, ·7mm., ovoid, finely ribbed, pale green white, opalescent.

Comacla senex, no example.

Miltochrista miniata,, ·8mm., elongated ovoid, reticulated, pale lemon.

Endrosa irrorella, ·7mm., elongated ovoid, smooth, purple brown.

Cybosia mesomella, ·75mm., flattened spheroid, smooth, pale yellowish green.

Oeonestis quadra, ·7mm., flattened spheroid, reticulated, palest green.

Lithosia deplana, no example.

L. griseola, no example.

L. lurideola, no example.

L. complana, ·7mm., flattened spheroid, very fine reticulations, very pale green.

L. sericea, no example.

L. lutarella, no example.

L. caniola, no example.

L. sororcula, no example.

Pelosia muscerda, ·6mm., flattened spheroid, reticulated, pale yellowish or greenish white.

This seems to be a very interesting group, but I have as yet so little material I can hardly form an opinion of it, having only photographed 7 species out of the 16. All those done are upright, 3 ovoid, 4 spheroid, 4 are sculptured, and 3 smooth or nearly so. I should much like further help with them.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 22nd, 1931.

By C. N. Hawkins, F.E.S.

LADIES and GENTLEMEN. You have just listened to the Reports of your Council and Treasurer dealing with the activities and finances of the Society for the past year and I do not think I can usefully add much to what they say. The Treasurer is again to be congratulated on the results of his efforts, particularly in view of the fact that he had to meet an unprecedented (so far as this Society is concerned) claim for Income Tax on our investment income for several years past. These congratulations have now, fortunately for us, become so regular an event that I am not sure I ought not rather to congratulate the Society on possessing such a Treasurer.

The interest in our meetings has been well maintained, indeed it has increased judging from the average attendance, and the standard of exhibits has been good. There is however still considerable room for improvement in the number of exhibits made by the younger members.

As Mr. Andrews pointed out last year, it too often happens that it is left to the older members to provide the bulk of the exhibits. It is difficult to adduce reasons for this, probably there are many, but I would like to repeat Dr. Cockayne's words of two years ago that "to be interesting an exhibit need not be large." Although spoken in reference to the Annual Exhibition this remark applies equally well to our Ordinary Meetings, and for those occasions at any rate I would add—nor need it be of some rare or remarkable species or form. There are very many quite common species of the various Orders with which, in one stage or another, many of us are not familiar, at any rate in all their variations, and exhibits of them

would almost certainly interest some of our members and be highly suitable for Ordinary Meetings.

The Annual Exhibition was again a great success and for once was favoured by fine weather. The attendance was only just short of the record for recent years but in spite of this there was much less congestion owing to an improved arrangement of the tables, which also allowed the magnificent series of exhibits to be more easily inspected. There is, I think, but one criticism that could justly be made, and that is that there were not enough exhibits of Orders other than Lepidoptera. This is more to be regretted, as it is amongst these other Orders that some of the most interesting forms of life are found ; forms moreover of prime importance from the economic point of view.

The appeal for contributions to the fund for the provision of light refreshments at the Exhibition has, I am sorry to say, not met with quite such a good response as last year and the drain on the Society's income has been proportionately increased. Matters in this respect cannot be considered to be on a satisfactory footing until the membership and regular income of the Society has been increased to such an extent that all such expenditure can be met out of the ordinary revenue. That is the ideal we must keep ever before us.

One of the great events of the year has been the long expected arrival of the Lister Collection and cabinets in our rooms. There were certain unavoidable delays due to the redecoration of the rooms, etc., but now the Collection is here and we can still more appreciate the generosity of the late Mrs. Lister and of Col. Labouchere in presenting us with such a magnificent donation. When our own collection has been incorporated with it, we shall undoubtedly have a splendid reference collection of British and Palaearctic Lepidoptera, which should be of the very greatest value to members.

If, after the two collections have been combined, there should still be any deficiencies, I feel sure that with the assistance of members, the gaps will ere long be filled.

As you have already heard death has deprived the Society of seven members and Obituary Notices have already appeared in the Entomological Journals with regard to some of them. Where this has been the case I must acknowledge my indebtedness to them for some of the particulars I am about to give.

First and foremost, of course, on the roll of our losses comes the name of our late *President*, Mr. F. B. Carr. I think I am right in

saying, that never before has the Society suffered the loss of a President, and the event naturally could not fail to cast a shadow over our activities during the past year.

F. B. Carr had been a member of the Society for over 30 years and during that time had endeared himself to many owing to his unfailing courtesy and good nature and the readiness with which he placed his wide knowledge and experience at the service of any who asked for them. Although of late years he was not a frequent exhibitor, he attended our meetings both here and in the field whenever possible and took a keen interest in all the Society's doings. He passed away on March 10th last without having ever been able to take up the position to which he had been elected and which he had so well earned.

G. Trevor Lyle joined the Society in 1921 and died on August 14th last at the comparatively early age of 57. Although his interest in Natural History was wide, there being few branches which had not claimed his attention at one time or another, it was to Entomology and ultimately to the parasitic insects that his energies were chiefly directed. School and business brought about his residence in widely differing parts of the country. Sherborne, Devizes, Bath, Lymington, Brockenhurst, Cambridge, Wallington and Halifax at different times provided a base for his activities and enabled him to obtain at first hand a wide experience and knowledge of his subject. The New Forest district, however, was perhaps his favourite and of this area he possessed a very thorough knowledge. His scientific work was of great importance and he wrote many notes and papers particularly on the British *Braconidae* upon which he was an acknowledged authority. He became a a Fellow of the Entomological Society of London in 1912 and was also a member of the Yorkshire Naturalists' Union.

Arthur William Mera was elected a Member of this Society so long ago as 1885 and died on July 21st last year. He had thus been a member for some 45 years. Although he was 81 years of age at the time of his death, he still retained what had been an almost life long interest in Entomology and I am told that even as recently as during the winter of 1929-30 he had made some night collecting trips in Epping Forest near which he lived. He was an extensive breeder of Lepidoptera and was keenly interested in Melanism, examples of which (captured or bred by himself), he has frequently shown at meetings of this Society. Of late years his attendances at our meetings had naturally become fewer but he will

be greatly missed by all who knew him. In addition to his long membership of our own Society he was amongst the oldest members of the London Natural History Society and of the Essex Field Club.

William Henry Miles became a member of this Society in 1881 and was therefore an even older member than the late A. W. Mera in spite of the fact that he was considerably younger in years, being only 67 at the time of his death, which took place at Calcutta on September 2nd. He was a former Hon. Secretary of our Society and a son-in-law of our esteemed fellow-member Mr. Edward Step. He was interested in Microscopy and Botany, as well as in Entomology, but his long absence in India prevented us seeing much of him here, although I believe he attended our meetings whenever he happened to be in this country. In later years he was chiefly interested in Economic Entomology especially in relation to pests of the tea-shrub. I am sure you will all join with me in tendering our sincere sympathy to Mr. Step and his daughter in their sad loss.

J. H. Carpenter joined this Society in 1886 and died on June 30th, 1930. He was a very regular attendant at our Ordinary and Field Meetings for many years and concentrated his entomological energies on the British Butterflies of which, I am told, he had a very fair collection. He was a very genial companian and his death, which took place quite suddenly from heart disease, deprives our Society of yet another of its older members. He is buried in Leatherhead Parish Churchyard.

E. Sancean joined the Society in 1925 and died in May last. He was chiefly interested in Botany and was a frequent borrower of books on that subject from our Library.

Douglas James Mounsey also joined the Society in 1925. He was interested in Entomology and Ornithology but was not, unfortunately, often seen at our meetings. He died suddenly from heart disease on November 8th last, at Eaglesden Farm, Benenden, Kent, to which he had recently removed.

I will ask you to stand for a few moments in honour of the dead.

I have divided the remainder of my address into two parts. In the first I propose to make a few general remarks with regard to one of the principal objects of this Society: and in the second part, which in a sense arises out of the first, I propose briefly to call attention to certain work which has been done, and observations which have been made, in connection with the variation in the

number of moults undergone by larvae of Lepidoptera, in the hope that my doing so may lead to further experiment and research.

PART I. GENERAL REMARKS ON THE OBJECTS OF THE SOCIETY.

In the old edition of our Bye-Laws it was stated that one of the objects of this Society was "the diffusion" of Biological Science. In the new edition this has been revised to read "the *advancement* and diffusion" of Biological Science. This may seem a small point but the idea which lies behind the change is, I think you will all agree, of considerable importance.

Members of our Society have done in the past, and many are still doing, so much to advance the cause of science by observation and research that it may seem unnecessary to call special attention to this point, but with our greatly increased membership it does seem to me, and I believe others think so too, that we should be able to publish in our Proceedings more original notes of biological importance and interest than we do. Obviously however this is a matter which rests in the hands of members; if notes and observations are not made they cannot be published.

Although this Society is and has always been fortunate enough to possess amongst its members a considerable number of experts in various branches of scientific pursuit, many of us are not trained scientists and it may be contended therefore that we cannot hope to emulate the work of which the trained scientist is capable. Nevertheless, as the "Entomologist" reminds us every month on its cover, it is "By mutual confidence and mutual aid great deeds are done and great discoveries made" and even the trained scientist has often to rely for his material on the observations and notes of others. It is therefore a mistake for anyone to think it is not worth while to record observations provided they are carefully made. It may well happen that some apparently trivial fact, when correlated with other facts by a specialist may give him a clue to an important truth or law which may have far-reaching results. Probably there is no member, past, present or future, of this Society who has not, or will not, at some time or other come across some interesting item relating to a life-history, a response to environment, a protective device, a form of inheritance, or some other matter which if duly recorded, would be of value in helping to elucidate the many mysteries which still surround us, even in connection with our own British fauna and flora. We should all of us I think, endeavour, in however small a degree we may have opportunity to

do so, to assist in this way at least, the "advancement" of Biological Science.

Briefly the Science of Biology may be said to have for its objects the study of living forms in all their varied aspects of inheritance, adaptations and reactions to environment (including their inter-reactions on each other) the methods and processes of nutrition, growth, and reproduction and many other matters, so as on the one hand to obtain a fuller knowledge of the great scheme of Nature and on the other hand to apply that knowledge for the benefit of the Human Race by the control and elimination of diseases, the maintenance and improvement of our food supplies, and the maintenance, so far as lies within our power, of such a "Balance of Nature" as will enable the Human Race to continue to exist upon this Planet.

Naturally, a large part of the work involved in the pursuit of these objects must be carried out by specialists in laboratories and Research stations, but, equally naturally, it is but a part of the necessary work that can be so dealt with. It is, after all, from observations made in the field in a species' natural environment that much of the most valuable information about that species' habits and life history must be obtained and I would urge all, especially our younger members, to endeavour to ascertain all they can in that way, whenever an opportunity offers, about any species with which they come into contact.

The words of the late Dr. T. A. Chapman in one of his many papers nearly 30 years ago "The truth being that we require every scrap of knowledge that we can get, about every species," still retain their force.

Realisation of the immensity of the problem involved in that short sentence has grown enormously since then, and indeed, increase of knowledge has merely served to widen the scope of inquiry. To speak of Lepidoptera only, it is now evident that before anything approaching an adequate knowledge of a species can be obtained it may be necessary to take into consideration such factors as the temperature and humidity of the atmosphere and soil during each stage of the insect's life over a period of years; the nature, identity, life-histories and prevalence or scarcity (with the causes thereof) over that period of years, of the species' enemies (parasitic and otherwise) or friends (hosts, etc); the variations in numbers of the species over the same period of years; the food; the character of the soil; the quantity and quality of the light in the species' habitat;

the influence of other species; the nature, identity, causes and effects of diseases and the means by which they are communicated and the interdependence of all these, and many other factors, one upon another.

Even the particular part of a plant and, indeed, the particular part of the leaf or stem of a plant, and the particular time of day or night as well as the season of the year upon and at which a Lepidopterous larva feeds may be of great importance, since it has been shown that the chemical constituents and nutritional value of a food plant vary greatly according to the season, time of day, position of a leaf on the tree or plant and portion of leaf selected for food. Incidentally, the point I have just mentioned may possibly provide a clue as to why so many lepidopterous larvae are difficult to rear satisfactorily in captivity even under the best conditions of light and air. It may be that they feed, in the wild state, on a certain part of a tree or plant at a certain time of day and that neglect to supply them in captivity with food of the correct chemical composition injuriously affects them. Trees and plants of the same species grown in different soil may also differ chemically or in the proportions of their constituent chemicals and this could well be a further cause of difficulty. Uvarov's paper on "Insect Nutrition and Metabolism" in the "Transactions of the Entomological Society of London" for 1928 contains a vast amount of most valuable information on the subject of insect foods, but many of the factors mentioned above have hardly been worked upon at all and afford a great chance for useful observation and research.

Here I should like to emphasise another point and that is the necessity for co-operation. I do not now refer to co-operation between workers in the same branch of Science but to co-operation between workers in all branches. Modern conditions compel specialisation more and more every day, but as specialisation increases so must co-operation, if erroneous deductions and distorted views are to be avoided. As an example, the Entomologist requires the co-operation not only of the Botanist and the Chemist amongst others, but also of the Geologist. The necessity for the first has of course always been obvious to everyone, especially in connection with work in tropical countries: the assistance of the Chemist is becoming recognised as of more and more importance in furnishing analyses of soils, foods (vegetable or otherwise), atmospheric and other media in which insects live, the tissues and fluids of insects' bodies, and many other things of importance to insects, but it too

often happens, I fear, that the work of the Geologist is regarded as something of very little practical importance to the Entomologist, unless it be in connection with the discovery of the remains of ancient forms of insect life. I venture to suggest however that if the aid of the Geologist were sought more often than it is, many problems of insect distribution would become less baffling, not only through a better understanding of the soils of the present day, but also because he can tell us much as to the climatic conditions and land distribution of past ages.

Part II. Numerical variation in the ecdyses of Lepidopterous Larvae.

I will now turn to the subject of variation in the number of moults in the larvae of Lepidoptera, and in this connection it must be understood that when giving the numbers of moults I do *not* include the moult which takes place on pupation.

It is, of course, common knowledge that the number of moults undergone by Lepidopterous larvae varies in different species, but it may not be so generally known to what an extent that number may vary in a single species, or to what causes that variation may be attributable. I must confess that in my early days of collecting I assumed that when a larva reached a certain stage of growth and development it automatically, as it were, moulted and that it did this at definite intervals until it, again automatically, became a pupa. As time went on however I realised that this was very far from being the truth, and that many factors might operate to upset what I may call the normal course for a particular species.

One of the first difficulties one comes up against in dealing with this matter, is the apparent absence of reliable published data for the majority of species.

Out of some 830 species of British Macro-Lepidoptera (so called) and Grypocera included in Scorer's "Log Book" I have been able to obtain records of the numbers of the moults in 164 cases only, and these have been collected from various publications, from information supplied by Dr. Cockayne and others, and in a few cases from my own notes.

Amongst the Micro-Lepidoptera the position is naturally worse owing in part, no doubt, to the extreme difficulty of observation in many cases.

As a result of this lack of published information, or of easily obtainable information, it is probable that many instances of

abnormal moulting pass unnoticed or unrecorded, but nevertheless there have been a considerable number of reported cases both in this country and abroad, and it is to some of these I wish to draw your attention.

Perhaps the best known case of variation of this kind is that of *Arctia caja*, L. The late Dr. T. A. Chapman showed, "Ent. Record," IV., pp. 265 et seq. and V., pp. 33 et seq. that individuals of the same brood of this species might have any number of moults from 5 to 13 and he came to the conclusion that this was a result of mongrelisation of several races and subsidiary varieties, each with its own characteristic series of moults, but he apparently considered that the hereditary character could be modified by temperature and indeed states at one place that "It appears to be entirely a matter of temperature."

For purposes of convenience he divided his larvae, by rates of growth, into three sections which he called respectively "Forwards" "Normals" and "Laggards."

The "Forwards" which became adult in the Autumn might have had 5 or 6 moults. The "Normals" which hibernate and become adult in the following Spring, might have from 6 to 8 moults, while the "Laggards," which undergo a partial hibernation only and continue to feed very slowly throughout the winter, might have from 7 to 13 moults.

In the course of his paper Dr. Chapman states that the average number of "Forward" type in the considerable number of broods and generations he reared was "generally not far from five per cent" but he gives several instances where this did not hold good.

One of his broods was reared partly by himself at a temperature of 60°-65° and the other portion was reared by Mr. Merrifield at a temperature of 80°.

The chances certainly are that the two portions of this brood would have been constituted in the same way so far as the proportion of "Forwards," "Normals," "Laggards" and subsidiaries is concerned. Yet Dr. Chapman's portion produced 4 "Forwards," 7 "Doubtfuls," and 136 "Normals" while Mr. Merrifield's portion produced 150 "Forwards" and 50 "Normals" (the latter possibly including some "Laggards"). Another brood reared by Dr. Chapman in June which "no doubt had the benefit of a slightly higher temperature" produced 76 "Forwards" 85 "Normals" and 49 "Laggards" while a Mr. Edmonds of Windsor was in the habit of getting about 35 per cent of "Forwards" which he (Mr. Edmonds)

attributed to his method of feeding, but Dr. Chapman thought was due to a higher temperature.

In this connection it might be of interest to record the only experience I have had in breeding this species in large numbers. In the Autumn of 1913, which I see from my notes was an unusually warm one, I had some 220 larvae which had hatched on August 30th and 31st from eggs laid by a captured Norfolk female. They were reared in the earlier stages in glass jars covered with gauze and were fed as a rule twice daily with an ample supply of *Rumex*. By the beginning of November I had obtained without any deliberate forcing 83 pupae and one larva had died after spinning up. So that in this case there were 84 "Forwards" *i.e.*, larvae with but 5 or 6 moults, in a batch of 220 larvae.

Evidently, whatever may be the decisive factor governing the rate of growth in this species (whether heredity, temperature, or quantity of food) it is not size or state of internal development which dictates when a moult shall take place.

Interesting examples may also be found amongst the larvae of some other species as the following instances show.

Lasiocampa quercûs, L., normally has 5 moults, *i.e.*, 6 larval instars.

Vars. *viburni* and *meridionalis* are stated by Guénée ("Ann. Soc. Ent. France," 1868, p. 407) to have 5 moults, but var. *viburni* is said by Bacot (Tutt, "Brit. Lep." III., p. 62) to have had but 4 moults with him, although he was a little doubtful as to some extra large larvae.

Var. *sicula* is said to have "about 9" moults (Tutt, "Brit. Lep." III., p. 71).

Var. *callunae* is doubtfully recorded by Bacot (Tutt, "Brit. Lep." III. p. 75) as having 5 moults while Shipston (loc. cit. p. 76) gives 6 or 7.

Orgyia antiqua, L. was noted by Chapman ("E.M.M." XXIII., p. 224) as having 3, 4 or 5 moults and that the 3 moulter forms produced males, the 4 moulter ones both sexes, and the 5 moulters females. He considered that the 4 moulter females corresponded to the 3 moulter males while the 5 moulter females corresponded to the 4 moulter males. In America the same species was recorded by Dyar (Tutt, "Brit. Lep." II., p. 12) as having 5 moults in the male and 6 in the female.

Notolophus (*Orgyia*) *gulosa*, is stated, also by Dyar (loc. cit), to have 3 or 4 moults in the male, but always 4 in the female.

Orgyia definita, Pack. has 6 moults in the female but apparently 5 only in the male, if I read Dyar's note ("Psyche," V. p. 429 and Note 11. on p. 422) correctly.

Notolophus (*Orgyia*) *leucostigma*, was recorded by Prof. C. V. Riley as having 3 moults in the male and 4 in the female ("E.M.M." XXIII. p. 274 and see "Psyche." V. p. 28) and in connection with this he says that "there is a very general tendency in individuals to vary from the normal number of moults in the species" and that "whenever there is much discrepancy in the sizes of the sexes, the smaller (usually the male) undergoes a less number of moults and that the variation in the numbers of larval moults (except where, as in these cases, it is sexual, and presumably pre-determined in the egg) is dependent on food supply rather than hibernation." He also adds "it may be stated as a very general rule that moulting is correlated with rate of growth and nutrition, those species which have a short larval existence, generously nourished, exuviating least. A rule applying to the class is presumably applicable to the individuals."

Although in the case of the last four species the variation is partly sexual, there is evidently some other factor at work in *antiqua* and *gulosa*.

Schizura ipomeae, Doubl., is said by Dyar ("Psyche," V. p. 421) to have 4 moults, while Packard records 5 ("Proc. Bost. Soc. Nat. Hist.," 24, p. 534).

Edemia albifrons, S. & A., is given by Dyar ("loc. cit.") as having 5 moults, but Packard records 4 only ("loc. cit." p. 525).

Platysamia (*Attacus*) *cecropia*, L., has four moults according to Prof. C. V. Riley ("Amer. Entom.," Feb. 1870, 2, p. 100) but 5 moults according to Wailly ("Bull. Soc. Acclim. France," May, 1882, S. 3, Vol. 9, pp. 266-267), and Mrs. A. K. Dimmock suggested ("Psyche," V. 29) that this difference was due to climatic influences.

Cosmotriche (*Odonestis*) *potatoria*, L., larvae which Bacot had under observation appear to have had but 5 moults (Tutt "Brit. Lep." III., p. 168, et seq.) while some I reared ab. ovo in 1926-27 required 7 moults ("Entomologist," LXI., p. 98, et seq.) and others I have reared since also had 7 moults.

In the majority of British Acronictids Chapman found the normal number of moults to be 5 but that several (perhaps all) species had individual larvae with 4 moults only. He states that in *rumicis* this is fairly common "most broods presenting some examples of it" and that he had also noted it in *menyanthidis*,

auricoma, *leporina* and *aceris*. He also found "this variation had no relation to sex" nor was it an attempt "to reach the imago state more rapidly and to become double-brooded." He says "It seems to be a spontaneous variation whose meaning and use have yet to be discovered" and continues "It is an interesting circumstance to note, in connection with this that *alni* alone has 4 moults as the normal number and that in rare instances it moults 5 times like the others." The same observer also records that *Daseochaeta* (*Dipthera*) *orion*, Esp., also has extra moulter larvae, which are all much larger than normal, but that there is no tendency to divide into two races ("E.M.M.," XXXII., p. 57).

Tutt ("Brit. Lep." 2, p. 11) says "Buckler notes that *Nola centonalis*, Hb., moults nine times, the other species of the genus but six," but Dr. Cockayne informs me that larvae of *N. confusalis*, Hb., ab. *columbaria*, which he reared ab. ovo in 1907 had 4 moults only.

Smerinthus ocellatus, L., has 4 moults according to Bacot and Hellins (Tutt "Brit. Lep." III., pp. 434, 435) and also according to Lucas ("Book of British Hawk Moths," 1895, p. 125) while Clifford and Moncrief give 3 only (Tutt, "Brit. Lep." II., p. 17).

Amorpha populi, L., has 4 moults according to Buckler ("Larvae, etc."; and Tutt, "Brit. Lep." III., p. 479), Lucas ("loc. cit." p. 129) and Weismann ("Studies in the Theory of Descent," pp. 236-239), but 3 only according to Clifford and Moncrief (Tutt, "Brit. Lep." II., p. 17) and Bacot (Tutt, "Brit. Lep.," III., p. 478).

In 1923 I had a small batch of 16 larvae of this species 15 of which had 3 moults but the remaining one, which had become fixed to a honey-dewed leaf in its 1st stadium, moulted 4 times ("Entomologist," LVIII., p. 207, et seq.). In this case the extra moult appeared to be directly traceable to the accident in the 1st stadium.

Smerinthus hybr. *hybridus*, Steph. was reared by Bacot who records that some larvae had 3 moults, others 4 (Tutt, "Brit. Lep." III., p. 456).

Many larvae of Butterflies with summer and spring broods undergo one more moult in the case of the hibernating larvae than they do with the summer larvae, and this was discussed at some length in a paper by W. H. Edwards ("Psyche," III., p. 159, et seq.) who suggested the difference was due to the hibernators being obliged to get rid of the rigid skin in which the larvae passed the winter.

On the other hand there are several of our British Butterflies, *e.g.*,

Melanargia galathea, L., *Erebia epiphron*, Kn. and *E. aethiops*, Esp. —the larvae of which hibernate and have a long life but nevertheless undergo 3 moults only, while other species with a short non-hibernating larval existence such as *Pieris brassicae*, L., *P. rapae*, L. and *P. napi*, L. require 4 moults to reach maturity.

These last few examples are very puzzling and are quite an exception from the general rule stated by Prof. Riley, which I quoted just now. Why, for instance, should the larvae of *M. galathea*, which has an existence of 8 or 9 months and passes through the winter, be able to reach full growth with but 3 moults, while *P. brassicae* with a larval period of a few weeks, requires 4? Admittedly the two species are a long way apart, but to say that 3 is the hereditary number of moults in one case and 4 in the other, while being an easy way out of the difficulty, affords no real answer. It would appear in fact that the cuticle of *M. galathea* is better suited to its environment and in consequence retains its efficiency for a longer period, probably owing to chemical differences.

Variation in the number of moults has been recorded (so far as I know) in 8 species of British Butterflies, but the most remarkable are the records of *Argynnis paphia*, L. For this species Frohawk (Natural History of British Butterflies) gives the number of moults as 4, while Buckler ("Larva of British Butterflies") gives 8. Other species are.—*Colias hyale*, L., 5 (Frohawk); 4 (Morris, "Entomologist." LXIII. pp. 40, 41). *Gonepteryx rhamni*, L. 4 (Frohawk), 3 (Buckler). *Apatura iris*, L. 4 (Frohawk); 5 (Buckler). *Plebeius argus*, Hw. (*aegon*, Schiff.) 4 (Frohawk); 3 (Chapman in Tutt, "Brit. Lep." X. 219). *Cyaniris argiolus*, L. 3 (Frohawk) 4 (Buckler and Edwards in Tutt, "Brit. Lep." IX. 409-434). *Nomiades semiargus*, Rott. (*acis*, Schiff.) 5 (Frohawk); 4 (Chapman in Tutt, "Brit. Lep." X. 293) and *Augiades sylvanus*, Esp. 6 (Frohawk); 4 (Tutt, "Brit. Lep." VIII. 138, 142).

Some of these variations are almost certainly due to different conditions of rearing and go to show that even here there is no real fixity of moulting habit.

There are doubtless a vast number of other similar records scattered about in various Entomological and other works but enough have been mentioned, I think, to show that this type of variation is fairly widespread and frequent. Doubt has often been thrown on records because they do not happen to agree with some subsequent worker's observations, but it seems very probable that many of them are correct and the differences have been due to actual variation.

There does not seem to have been a great deal (or perhaps I should say I have not found many records) of experimental work on this subject, and what has been done has usually been directed to some other purpose, in the pursuit of which the phenomenon of numerical variation of moults has appeared as an incident.

Mrs. A. K. Dimmock (" Psyche." V., p. 28 et seq.) quotes a paper by Alfred Wailly in which he records that a Mr. Weniger reared larvae of *Antheraea mylitta* and of *Ceratocampa imperialis*, " in a large box, a greenhouse in miniature, heated by a kerosene lamp upon which is placed a saucer filled with water. The larvae, kept at a uniform temperature of about 25° centigrade " lived " in an atmosphere charged with the vapours of water and kerosene and instead of dying of disease " developed " with extraordinary rapidity " with the result that they had 4 moults whereas under normal conditions they have 5. Wailly goes on to say that in Ceylon where the climate is also warm and moist, *mylitta* has but 4 moults.

Chapman (" Ent. Mo. Mag." XXXII., 54-80) gives details of two experiments he carried out with larvae of *Triphaena comes*, Hb., (*orbona*, F.). In the 1st he fed some last stadium larvae on *Arbutus unedo* upon which they nearly starved. After putting them back on *Rumex*, all but two died and the survivors undertook an extra moult. One of these died very soon, the other grew to a great size and then died for no apparent reason. In the 2nd experiment, the larvae were semi-starved in their last stadium so that they were kept almost at a standstill for 5 or 6 weeks, and were then given a plentiful supply of food. Some pupated, others died, while a few moulted or attempted to moult again. Those that moulted, were, however, abnormal in several respects, having certain pupal characters. Dr. Cockayne suggests (" Trans. Ent. Soc. Lon." LXXV. p. 303) that a toxin derived from the food may have been at work here.

Uvarov (" Trans. Ent. Soc. Lond." LXXVI., p. 313) refers to a series of experiments made by Cavazza with feeding silkworms on mulberry leaves sprayed with various chemicals, and says that it was found that Hydrochloric Acid or Cobalt Chloride might result in an increase in the number of moults, but only if the concentration used was too strong.

Tutt (" Brit. Lep." II., p. 11) quotes Packard as saying that " as a rule, the greatest number of moults occurs in holometabolic insects with the longest lives, and that an excessive number of

ecdyses may, at times, be due to some physical cause such as lack of food combined with a low temperature " and that " in the winged insects, especially Lepidoptera, the number of moults is dependent on climate; insects of wide distribution, growing faster in warmer climates consequently shedding their skins oftener, *e.g.*, the same species may moult once oftener in the Southern than in the Northern (American) States as in the case of *Callosamia promethea*, Drury, which in West Virginia is double brooded."

The last quotation would seem to contradict Packard's first statement, and the opinion expressed in it would, moreover appear to be due to a misapprehension, Dyar (" Psyche," 5, pp. 420 and 421, Note 1) for New York, and Edwards (" Psyche," 3, pp. 161 and 171-174) for West Virginia both record 3 moults for this species, while Mrs. Dimmock (" Psyche," 5, p. 29) after referring to a doubtful record of 4 moults made by a Mr. Lintner, says " As Mr. Edward's specimens were reared farther south than were Mr. Lintner's it would appear that this instance, if due to climatic influence, was as would be expected, *i.e.*, that the larvae reared at the North had more moults than those reared at the South " a suggestion, however, which Dyar doubts in view of his own experience.

The great amount of variation in the number of larval moults that exists as between species and species is too well known to need any comment, except this, that there seems to be every possible gradation between no moult (which has been recorded in the case of some Micro-Lepidopterous species such as certain *Nepticulidae*) at the one extreme and the frequent moulters such as Arctiids and Lithosiids at the other extreme.

In spite of this inter-specific variation I feel almost disposed to suggest that further study would reveal that moulting is only indirectly governed by heredity and that it is really dependent on the chemical character of the larval cuticular excretions (as influenced by food, etc.) plus temperature, plus the atmosphere or other medium in which the larva lives; or rather is dependent on the reactions between all three factors.

I am afraid this is a very imperfect and unsatisfactory summary but if it serves to draw attention once again to the subject and results in further observation, and more published records, it will have carried out my intention and I wish to thank all those who have furnished me with information or references, for without their help this review would have been even less complete than it is.

With the many interesting facts correlated with variation in moulting, such as the changes and development of larval markings and plumage I cannot attempt to deal, but they are points well worth careful study and observations.

In conclusion, Ladies and Gentlemen, I wish to thank you for the honour you conferred upon me in electing me as a Vice-President and for the still greater honour your Council did me in appointing me to be your President for the greater part of the past year. At the same time no one can regret more than I do the untimely event which rendered the latter honour possible. May I also take this opportunity of thanking you and the Officers and Council for the courtesy and kindness you and they have always shown me.

My sole remaining duty, and that a very pleasant one, is to join with you in welcoming your new President and old friend Mr. K. G. Blair, and wishing him a happy and prosperous tenure of Office.

In him you have obtained a President under whose able and experienced guidance the South London Entomological and Natural History Society cannot do otherwise than grow, both in numbers and prestige.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 13th, 1930.

Mr. H. W. Andrews, Vice-President, in the Chair.

Mr. Stanley Edwards exhibited the Tsetse-fly, *Glossina morsitans*, received from the neighbourhood of Lake Nyassa.

Captain Curwen exhibited a short series of the melanic form of *Semiothisa* (*Macaria*) *liturata* ab. *nigro-fulvata*, from the Delamere district.

Mr. Hawkins exhibited a specimen of the foliage with fruits attached, which has been sold in the streets for Christmas decoration, and asked what was the name of the plant. Mr. Step said that the foliar part was butcher's broom, probably a continental European species, while the fruits, which were cleverly attached, were probably those of the "cape gooseberry."

Mr. Andrews exhibited the contents (36 ♂ ♂ and 43 ♀ ♀) of a match-box full of flies, *Musca autumnalis*, De Geer, taken from a large swarm found hibernating in the loft of a house in Bromley, Kent. This is the second consecutive year that the loft has been invaded by this fly, which usually chooses old houses, barns, or churches in the country, rather than a comparatively small modern house in a suburb.

Mr. Quilter exhibited a box of Coleoptera collected on the sandhills near Tenby, S. Wales, illustrative of shore and sandhill species, some of which are cosmopolitan in their distribution.

Mr. Jarvis exhibited a number of Coleoptera of some economic interest including specimens of *Lytta* (*Cantharis*) *vesicatoria*, L., which had been attacked in store by smaller beetles—*Anobium paniceum*, *Ptinus tectus*, and *Niptus hololeucus*, all well-known warehouse pests belonging to the coleopterous group *Teredilia*, and communicated the following note :—

L. vesicatoria (Heteromera) occurs locally in this country and commonly on the continent, where it is known as the Spanish or Blister-fly, and is imported for medical uses—*i.e.*, for the extraction

from the carcases of the beetles, of the irritant drug Cantharidin. It is perhaps of interest to reflect that, with the exception of the cochineal insect (Hemiptera) it is the only official insect survivor of the British Pharmacopoeia of 1687 *circ*, which amongst other things ordained that formic acid should be obtained from "digested" carcases of the ant *Formica rufa*.

Among the dried beetles are found larvae of the beetle *Tenebroides mauritanicus* (Clavicorn) predaceous upon larvae of the smaller pests *Ptinus* and *Anobium*. Both the larva and beetle were exhibited.

Another beetle, *Rhizopertha dominica*, Fab. infests the butter-bean of commerce and was shown, together with a pupa inside a bean. *Rhizopertha* is also subject to predations of *Tenebroides*.

FEBRUARY 27th, 1930.

Mr. H. W. Andrews, Vice-President, in the Chair.

Mr. de Worms exhibited newly emerged examples of *Phigalia pedaria* of which one was a very strongly brown-grey or ochreous-grey form ab. *ochrea*, the others were the usual greenish-grey forms, but with the transverse lines of the forewings unusually strongly developed. They were taken at road lamps near Egham. He also reported a melanic example, the first taken in the district.

Mr. E. Step delivered a lecture upon the British Decapod Crustacea, illustrated by lantern portraits of nearly all the species. Commending the study of the group to the notice of entomologists, he remarked that the Insecta and the Crustacea being parallel divisions of the Arthropoda, there are comparatively close resemblances in their anatomy and morphology, as well as in their development from ova and through larval stages to the adult forms. The families and genera were referred to in turn, and the modifications of form, as in the lobsters, the swimming-crabs, the hermit-crabs and the spider-crabs, brought about by different modes of life, pointed out on the screen.

MARCH 13th, 1930.

The decease of the recently elected President, Mr. F. B. Carr, was reported and a vote of condolence with his family was passed.

It was announced that, in accordance with the Bye-laws, the

Council had filled the vacancy thus caused, by appointing Mr. C. N. Hawkins, F.E.S., *Vice-president*, to be the President for the year.

Mr. C. N. Hawkins took the chair.

Capt. Curwen exhibited the Swiss *bryoniae* form of *Pieris napi*, the sub-sp. *polaris* of *Aglais urticae* from Bossekop, the S. European *anargyra* form of *Dryas paphia* from Corsica, the type form of *Pararge aegeria* from Cyprus, the *tigelius* form of *P. megera* from Malta, the sub-sp. *lucia* of *Polyommatus icarus* from Syria, the *eleus* form of *Rumicia phlaeas* from Corsica, the Swiss *obscura* form of *Lycaena arion*, with races of *Coenonympha pamphilus*, *Argynnis cydippe*, etc.

Mr. Robert Adkin exhibited a specimen of the Central American butterfly *Opsiphanes tamarindi* that was found in January last at Eastbourne on a bunch of bananas, attempting to expand its wings. He said there appeared to be little doubt that in this case the larva had crawled into the bunch of bananas at about the time that it was gathered and pupated among the fruit, being thus transported to this country before emergence took place, and he commented upon the probability of various tropical insects that are from time to time found in this country arriving in a similar manner, bananas apparently offering a particularly good opportunity for such transportation.

Mr. C. G. M. de Worms exhibited a series of four British and four Continental specimens of *Papilio machaon* for comparison. The British were *three* from Wicken, (*two* bred), and *one* from Ranworth (Norfolk Broads), taken from 1923 to 1926. The Continental specimens were *three* from near Tours, taken in 1923 and an exceptionally large female taken near Zurich in 1924. It was noticed that the British specimens differed appreciably from the Continental, especially from the French examples, by having the dark band of the upper wings much broader and the tint of the wings of a paler yellow. There was also less blue scaling on the bands of the lower wings of the British specimens. The darkest continental specimens were of the form *aurantiaca*.

Mr. S. N. A. Jacobs exhibited a series of *Depressaria applana*, Fabr. taken in February and March, 1930, thus apparently all being hibernated specimens, showing a considerable number of males, which must also have hibernated. The proportions do not signify much for most probably the females were sitting deeper in the bushes, and the series was taken at random. There was one melanic female, and the series showed a fair range of variation.

It is interesting to note that as with the dipterous exhibit of Mr. Andrews, some two or three meetings past, showing both male and female examples of a fly taken hibernating in the roof of a house, so in this case also both sexes had hibernated together.

Mr. C. N. Hawkins exhibited:—1. A living larva of *Perconia* (*Aspitates*) *strigillaria*, Hb., apparently in its last stadium, which had been feeding and growing slowly all through the winter on a potted plant of heather. According to Scorer these larvae should hibernate, when smaller, at the roots, but the batch of which this was the last survivor remained restless, fed at intervals in the evenings and grew slowly. Unfortunately all but this one seem to have wandered off the plant and been lost. This one moulted a few days previously, but was not yet much larger than before the moult.

2. Four living larvae of *Amathes* (*Anchocelis*, *Orthosia*) *lychnidis*, Schiff. (*pistacina*, F.). These larvae were bred ab. ovo, the parent ♀ having been taken on Wimbledon Common in October last. The ova were laid on October 24th and 25th, and the larvae began to hatch indoors on February 1st this year, since when they had been kept in a moderately warm room. The exhibitor said: "A number of foodplants have been recorded for this species, Scorer giving *Carex*, *Gramineae*, *Ranunculus*, *Rumex*, *Senecio vulgaris*, *Taraxacum* and *Salix capraea*, but I found that at first they refused dock and dandelion, and wandered about restlessly until I supplied them with some coarse grass (*Triticum repens*) when they soon began to feed. They moulted 5 times in all and after the 3rd moult I tried them again with dandelion as a food and found they now took to it readily. After this it was their principal food but they still appeared to like to have some coarse grasses mixed with the dandelion and appeared to keep in better condition when they could mix their diet in this way. I did not try the other foodplants mentioned, but think it probable they would eat any of them during their later stages. As will be seen there are two distinct colour forms, a green and a brown. So far as I am aware only the green form (variously called "apple-green" or "green inclining to yellowish") has been described, although Buckler figures both forms. Apart from colour there appears to be no marked difference between the green and the brown forms. In the most definite of the latter the colour might be described as a yellowish olive-brown with a very pale brown head."

Mr. Anderson exhibited two large ichneumons, the first bred from a larva of *Sphinx ligustri* and the second from a larva of *Lasiocampa*

quercûs form *callunae*, and also larvae of *Cossus ligniperda* in various stages of growth. The latter had been induced to nibble potatoes.

Mr. Hy. J. Turner exhibited, on behalf of Mr. Wightman, bred series of the two *Nonagria* species *N. dissoluta* and *N. neurica* and pointed out the clear distinction between them, the latter having a well-marked transverse crest, which the former does not possess but has a well-defined discoidal lunule on the underside of the hindwing, which is completely wanting in *N. neurica*. The *N. dissoluta* consisted of typical dark examples, the *arundineta* lighter form, which is the prevalent one in this country, and the ab. *rosea*. The *N. neurica*, consisted of the typical form, the red form *rufescens* and the dark form *fusca*, all from E. Sussex, which is the only locality known in this country, where the species has been obtained in the larval stage.

He also showed the following foreign forms of British species :— the white *candida* form of *Emydia cribrum* from Switzerland, a long series of various forms of *Parasemia plantaginis* ♂s from the Alps; the forms *cleodoxa*, *cleodippe*, *chlorodippe*, and *baiuvarica* of *Argynnis cydippe*, all of which are racial on the continent of Europe; the Cyprian *testaceolata* form of *Euphyia bilineata*, the very yellow males of *Ematurga atomaria* mostly from the Alps, and an almost unicolorous form of *Dasycampa rubiginea* from Vienna.

Mr. Quilter exhibited a box of Coleoptera from Pernambuco and a large ichneumon which attacks the well-known Tarantula spiders in Brazil.

Dr. Bull exhibited an early *Dasychira pudibunda* (January 13th), a very small and very pale *Phigalia pedaria* taken the first week in March, and bud galls on the birch caused by the gall-mite *Eriophyes rudi*.

Mr. Tonge reported that he had seen *Polygonia c-album* at Reigate in the first week in March.

Mr. R. Adkin said that the day's *Times* reported a "white" butterfly.

Mr. Hawkins had seen a larva of *Pieris rapae* in December.

There were reports of *Pyrameis atalanta* being seen this year in the New Forest and Mr. Step saw one at the end of November last, and on March 8th Mr. Tonge saw a specimen of *Vanessa io*.

MARCH 27th, 1930.

Mr. C. N. Hawkins, President, in the Chair.

It was announced that the Council had filled the two vacancies in the Officers and Council, by appointing Col. Labouchere as Vice-President and Mr. C. Jarvis a member of Council.

Mr. B. J. Dudbridge of Merton Park, Mr. S. Wakeley of Upper Norwood, and Mr. F. E. A. Colby of Billinghurst were elected members.

Dr. Cockayne exhibited living larvae of *Orthosia macilenta* from Torquay, which hatched on January 31st, and of *Dysstroma concinnata* from Arran, which hatched in August, 1929. The former fed on sallow; the latter on strawberry, which they had nibbled all the winter without really hibernating.

Mr. Main exhibited the house-cricket, which was now generally reported to be quite scarce, no doubt owing to the almost universal use of gas fires. The pair were taken at Woodford and shortly after capture the female made a meal of the head of the male, which was still alive.

Mr. de Worms exhibited the ova of *Alsophila aescularia* laid on March 16th, of *Apocheima hispidaria* laid on March 19th, and of *Colotois pennaria* just hatched.

Mr. Tonge then read a paper on the "Ova of Lepidoptera," illustrating his remarks by a series of lantern slides. (Page 6.)

APRIL 10th, 1930.

The President in the chair.

Mr. C. Wilkins, John Innes Horticultural Institute, Merton, was elected a member.

Mr. K. G. Blair exhibited a cockroach, *Nyctibora noctivaga*, Rehn., from Costa Rica, found alive among bananas by Mr. Rait-Smith. Though now deep brown its colour when alive was stated to have been of a bright emerald green. With it Mr. Blair showed one of the green cockroaches, *Panchlora cubensis*, Sauss., more commonly found among bananas, but which retains the green colour, more or less faded to yellow, on drying. Though *N. noctivaga* does not figure among the 3 species of the genus noted by Mr. Lucas ("British Orthopt.") as occasionally introduced into this country, it is suggested by Dr. Uvarov, who kindly named the specimen, that one or more of the names cited by Lucas might refer to this species.

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

Mr. Dodds showed an excellent photograph of the late President, Mr. F. B. Carr, resting on the stump of a tree during a collecting afternoon in 1929.

Mr. Robert Adkin showed (Lep.) Lampronid and Adelid larval and pupal cases; the moth *Lithocolletis tenella* and its larval mine in a hornbeam leaf, and Coleophorid cases *in situ* on their food-plants.

Captain Curwen exhibited a number of lantern slides to illustrate notes on the Entomostraca, minute aquatic Crustaceans, and subsequently a series of drawings of the same.

Mr. Sims also exhibited slides.

APRIL 24th, 1930.

The PRESIDENT in the Chair.

Mr. G. L. Baxter, 50, Wroughton Rd., S.W.11, was elected a member.

Mr. T. R. Eagles exhibited ova of *Ruralis betulae* and of *Miselia oxyacanthae* with larvae of *Boarmia* (*Cleora*) *lichenaria* and *B.* (*C.*) *jubata* (*glabraria*) from the New Forest.

There was a special exhibition and discussion on the genus *Miana*.

Mr. Tams, who opened the discussion, confined his remarks to substantiating his opinion that in what has hitherto been considered *M. strigilis* there are two species and illlustrated his remarks by sketches of the genitalia.

Dr. Williams exhibited various species and forms of the genus and communicated the following Note:—

Miana, St.—The insects exhibited, with one exception, have been taken in Surrey during the last few years.

Strigilis, Clerk.—Occurs in my garden, usually two or three in an evening at sugar. I have once taken a pair *in côp.* (beaten while beating for larvae).

Latruncula, Haw.—Abounds in my garden. This species again I have once taken *in côp.* in similar circumstances.

Strigilis, Clerck.—One specimen with dark outer fascia (Esher, 1929).

Two specimens, which I do not claim to identify, taken at sugar in my garden, June, 1929. They seem to agree fairly well with

aerata, Esp., but this is doubtful. I cannot place them as either *strigilis*, Clerck., or *latruncula*, Haw. They seem to me smaller than *strigilis* and a little larger than *latruncula*, and I shall be glad to have expert opinion.

Fasciuncula, Clerck.—Less common than *strigilis* in my garden and difficult to obtain in good condition.

Literosa, Haw.—Once taken in my garden.

Bicoloria, Vill.—Not very common in my experience at Esher, but my observations do not quite satisfy me on this point.

Arcuosa, Haw.—Quite common in suitable places wherever I have collected in Surrey. The only one which does not occur in my garden.

Dr. E. A. Cockayne exhibited preserved larvae of the genus *Miana* and of several allied species, and communicated the following Notes:—

"Though I have seen only some larvae of the genera *Tapinostola*, *Chortodes*, *Petilampa* and *Miana*, they have so many unusual characters in common, that I feel sure they should be placed next to one another and not separated by other genera having larvae totally unlike them, which is the arrangement found in all our books. *Apamea secalis* also belongs to this group, the imago being very like that of *strigilis* and the larva being very like that of *latruncula* (if I am right in my determination). *Apamea ophiogramma*, though in some respects dissimilar from the others has sufficient resemblance to show that it is a fairly close relative. The larva of neither species is, either in habits or structure, like any of the others such as *gemina* placed in the genus *Apamea*.

"The group of which I am speaking are internal feeders on various grasses. All have a small pointed head and taper very much towards the anal end. The anus is very minute and there is a very large hard anal flap, especially large in *fulva* and, for these larvae, unusually small in *bicoloria*. The skin is extremely thick and leathery. The common pattern is a narrow dorsal stripe of ground colour bordered by broad subdorsal stripes of dull red or purplish colour. The tubercles are small and black surrounded by a white ring.

"These peculiarities, though well adapted for the life of the larva, are probably indications of affinity rather than of convergence. The smaller *Nonagria* and *Coenobia rufa* live a very similar life, but have a different shape, a head and anal plate of different structure, and a very thin skin.

"The larvae I have actually examined are those of *Chortodes bondii*, *Tapinostola fulva* and *T. elymi*, *Miana latruncula*, *M. strigilis*, *M. bicoloria*, *A. secalis*, and *A. ophiogramma*. I cannot help feeling that if we could get the material for Mr. Tonge to examine the eggs, Mr. Hawkins the pupae and myself the larvae, we could by collaboration arrive at a much more natural arrangement.

"I have comparatively little experience of collecting these larvae, which are most difficult to obtain, but I will give it for what it is worth. *P. arcuosa* is easy to find, if you know the way. Look for a small plant of *Aira caespitosa* with many dead leaves, the more the better. Separate the leaves as far down as possible and pull out the dead ones. If *P. arcuosa* is there you will soon expose a larva. Either go on pulling out the dead leaves or take the whole crown of the plant home and either keep it intact or pull it to pieces at home. The larvae are often present in large numbers in such an infested plant. I found twenty in a small part of one this week. Larvae of *Chortodes bondii* and *Miana bicoloria* I took together in *Festuca arundinacea* by pulling out the dead leaves. When a leaf came out easily there was usually a larva of one or other species either in the part pulled out or left behind just below the break. *M. latruncula* and *A. secalis* feed in *Dactylis glomerata* and *Triticum repens*, the former preferring the *Dactylis* and the latter the *Triticum*. Look carefully for a yellow centre leaf, which can be pulled out easily. Though such a leaf does not indicate the presence of a larva in the stem, you will probably find a leaf near it, which is still green but slightly withered, and the larva will most likely be found just above the root-stock. If there are few signs of larvae in a plant it is worth while searching it on the spot, but if the signs are many, cut through the roots and take it home in a sleeve to examine at leisure. Separate it and hold the stems up to the light. Those that have or have had a larva in are easily recognised in this way. The larva is generally just above the root-stock."

Mr. Turner said that the genus *Miana* was erected by Stephens in 1829 in his *Ill. Brit. Ent.* III. and contained *literosa*, *strigilis*, *latruncula*, *aethiops*, *humeralis* = *bicoloria*, *terminalis*, *rufuncula*, *fasciuncula*, and *minima*. This genus really covered the same ground as Hübner had in the *Verz.* in 1822 with his genus *Oligia* which contained *strigilis* (*praeduncula*), *furuncula* (*bicoloria*), *latruncula*, *vinctuncula* and *erratricula*. And we find Hampson in 1908 and Warren-Seitz in 1911 adopting this latter as the genus. The former dealing

with the world places 46 species in *Oligia*, the latter dealing with the Palaearctic Region only includes 12 species 6 of which are extra-European. Thus the British species in the genus *Oligia* are *strigilis*, *fasciuncula*, *literosa*, *bicoloria*, *captiuncula* and *haworthii*, and *latruncula* (if its specific status be established). Tutt in his *Brit. Noct.* included the first 4 of these in *Miana* while Pierce from a wholly genitalic point of view put only *strigilis* and *fasciuncula* in that genus. Hampson put *ophiogramma* in *Oligia* but Warren placed it in *Parastictis*.

Mr. Tams remarked that possibly *Oligia*, Hb,, would fall to a prior name *Procus*, Latr.

Mr. Turner then discussed the form *latruncula* which was by some continental authorities considered to be a species hitherto confused with *strigilis* forms. *Strigilis* has a somewhat larger expanse than *latruncula* ; ♂ up to 26mm., ♀ 28mm., against 24mm., (*latruncula*) and has somewhat narrower and more pointed fore-wings. In typical *strigilis* the ground colour is a pure blackish grey without brown powdering, while *latruncula* is brown. The marginal area in *strigilis* has chalk white in it, replaced in *latruncula* with pale brown suffusion, although some may have impure white markings occasionally. The outer transverse line is in *strigilis* strongly bent inwards towards the inner margin, but is more straight in *latruncula*. In its upper part in *strigilis*, as a rule on the outer side there are five distinct black streaks, which in *latruncula* are very weakly developed or wholly wanting. In *latruncula* there stands almost always between the transverse line and the claviform a blacker streak-like spot, which unites with it to form a black bridge joining the two transverse lines. In *strigilis* this mark is absent or if present very obsolescent. The fact of both species having parallel series of similar variations emphasises the confusion.

He exhibited British and continental example in illustration of his remarks.

MAY 8th, 1930.

The PRESIDENT in the Chair.

Mr. T. H. L. Grosvenor exhibited the larvae of *Zygaena stoechadis* and discusssed its relationship with *Z. filipendulae* as far as he had investigated it.

Dr. Hugh Scott, M.A., F.E.S. gave a lecture "Natural History Researches in S. Africa" with lantern illustrations.

MAY 17th, 1930.

FIELD MEETING—BOOKHAM COMMON.

Leaders—Dr. E. A. COCKAYNE, M.A., F.E.S., and C. N. HAWKINS, F.E.S.

This was the first Field Meeting of the year and was favoured with reasonably fine weather.

In spite of the fact that this is an area well known to members the meeting proved attractive and 21 members and friends attended.

Unfortunately no reports of captures or observations were sent in to the Leaders but judging by what was heard at the time satisfactory bags were obtained in the various orders.

Spring larvae of Lepidoptera were not very abundant but captures included such species as *Poecilocampa populi*, *Plastenis* (*Tethea*) *retusa*, and *Bombycia* (*Epunda*) *viminalis*. Larvae of *Asphalia diluta* were not found on this occasion although further search a day or two later proved that they were present.

A very welcome tea was subsequently taken at Mrs. Holland's on the common and the majority of the party then left for home after a most enjoyable day.

MAY 22nd, 1930.

The PRESIDENT in the Chair.

Dr. Cockayne exhibited a bred series of *Triphaena comes* from near Aberdeen. Out of about 700 ova laid by a red female only 14 were fertile. One or two batches were laid every day and each had one or two fertile ova, which were as a rule near the middle. Of the 14 imagines 7 were red and 7 pale, the pale ones being of an unusual colour, sayal brown two tawny olive (Ridgeway). He considered the red form as the dominant and the pale form recessive. Part of a series bred from another red female included ordinary grey forms and grey forms with a light red suffusion and light red markings.

Mr. Barnett exhibited a bred series of *Abraxas grossulariata* from S. Croydon showing rather striking variation, and a variable series of *Biston* (*Amphidasis*) *strataria* (*prodromaria*) taken on lamps in his neighbourhood.

Mr. Hy. J. Turner exhibited series of *Zygaena* sent to him from near Barcelona, Spain, including the small *aragonensis* subsp. of

Z. achilleae, *Z. rhadamanthus*, *Z. meliloti* (rare in Spain), *Z. hilaris*, *Z. fausta*, *Z. transalpina* and a form of *Z. lonicerae*.

Dr. Hewer exhibited drawings of the genitalia of *Z. clorinda* and of *Z. trifolii* for comparison.

Mr. Grosvenor exhibited imagines of *Z. clorinda* and a long discussion took place on these species. (See "Ent. Record," XLIII., p. 23.)

Mr. G. C. M. de Worms exhibited the following Spanish Lepidoptera taken by him from April 9th to 24th—*Zerynthia* (*Thais*) *rumina* race *castiliana*, *Euchloë euphenoides*, *Anthocharis crameri* (*belia*) and *A. tagis* race *castellana*, all from Aranjuez on April 18th. There is at present only one other known locality for the last. From Montserrat on April 12th *Leptosia sinapis*, *Pararge megera* and *Fidonia plummistaria*, together with three pupae of *Melitaea aurinia* from near Barcelona found on April 14th. He reported having taken at Montserrat on April 12th the *panoptes* form of *Turanana* (*Scolitantides*) *baton*, and also two examples of the recently separated species *T. abencerragus* of the subspecies *amelia* taken at Aranjuez on April 18th. Aranjuez is an entirely new locality for this subspecies it having been recorded hitherto only from Southern Portugal, Southern Spain and from Cuenca some 100 miles west of Aranjuez. (cf. *Ent.* LXII. 27, etc.)

Mr. de Worms further exhibited the following British Lepidoptera —A full fed larva of *Hylophila bicolorana*, Bookham Common, May 17th, half grown larvae of *Apocheima hispidaria* from ova laid in March, a small larva of *Asteroscopus sphinx* (*cassinea*) from Bookham Common, full fed larvae of *Hipparchus* (*Geometra*) *papilionaria* beaten from birch on May 16th, a batch of small larvae of *Ectropis* (*Tephrosia*) *bistortata* from ova laid in April by a captured female, a batch of ova laid by a ♀ of *Ochyria* (*Coremia*) *designata* captured on May 17th, a sprig of holly with 3 ova of *Lycaenopsis argiolus*, a female of *Heliaca tenebrata* taken on May 18th, and larvae of *Zygaena trifolii* taken on May 16th.

Mr. D. L. Glegg exhibited examples of the New Zealand "vegetable caterpillars" from Wonganui, N. Island, believed to be the larvae of *Porina signata*, a species of *Hepialidae* of which there are some twenty in that country. These larvae feed on the roots of grasses and tree ferns at about 3 to 4 inches under ground. After the rains the sphaeria of a fungus, *Cordyceps robertsii*, or an allied species, get into the blood of the larvae and the extremely small gemmae are carried to all parts of the body. The fungus

soon develops and kills the larva, turning everything except the outer skin into a hard, white, pithy mycelial mass called sclerotium, like the kernel of a nut, which burns with a smell of burning hay. Subsequently a shoot from the fungus forces its way out from behind the head of the larva at the segmental suture. As the larva has usually been in a vertical position ready to pupate, although the shoot starts always at right angles to the body of the larva it turns upward until it reaches the surface of the earth continuing for several inches, sometimes as long as 12 inches, forming the spore bearing portion of the fungus. The natives call them "ahwetto" and use them, ground up, to tattoo themselves. The moth is found from December to March.

Dr. G. V. Bull exhibited an example of *Amorpha populi* very small and with scarcely any markings. It was representative of a late 2nd brood, the larva pupated on November 13th, last. He also showed a very dark example of *Notodonta camelina* possibly the form *giraffina* which is uncommon in Western Europe; a curiously marked *Boarmia punctinalis* (*consortaria*) and aspen stems which had been galled by the larvae of the beetle, *Saperda populnea*.

Mr. W. Randall Parkes exhibited an interesting cocoon of *Arctia villica*, and communicated the following note.—

"The exhibit shows a cocoon of this species which has been spun in a small cone made of brown paper, which was pinned in a corner of the cage with the opening pointing away from the light. It is an interesting fact that in practically all cases the larvae prefer to spin up in the cones in preference to any other position. It is an exceedingly useful method as the cocoons can be readily transferred from one cage to another, which is not often possible with other methods of pupation.

"I have also reared a large number of larvae of *Arctia caia*, which in nearly every case spun up in the cones when they were available. In this latter case however, the larvae are apt to spin too thick a sheet of silk over the entrance to the cone, which very effectively prevents the moths from emerging in due course. It is however a very simple matter to remove about half the silk a week or ten days before the time of emergence. In this way perfect specimens of the imagines are obtained."

Mr. C. N. Hawkins exhibited the soft galls of the branch-feeding generation of *Biorhiza terminalis* which were very plentiful on oak at Wimbledon this year. He also exhibited living larvae of *Plastenis* (*Cosmia*) *retusa* and of *Cleocera viminalis* both from Book-

ham, of *Neuronia popularis* from Tring and of *Adopaea sylvanus* from Raynes Park.

MAY 31st, 1931.

FIELD MEETING—RANMORE AND PICKETT'S HOLE.

Leader—HY. J. TURNER, F.E.S., F.R.H.S.

About a dozen members and friends took part in this meeting. Starting from Box Hill Station the nearest route to the Common was taken through the fields and woods. The trees and bushes along the northern slope and valley were searched and beaten for larvae with fair success in spite of the wet state of the foliage from the night's rain. Several *Strymon quercûs* were among the captures, but imagines of all species were practically absent. Al fresco luncheons were dealt with on the top of the common and a westerly direction was taken along the southern fringe of the wooded area until the path leading down to the southern face of the chalk ridge was struck. Pickett's Hole was closed for shooting and could not be worked for the *Zygaena*, the special quest of the afternoon, and the return along the slope was commenced. Here the afternoon contingent was met coming from Dorking, and they had taken a few examples of early emerged *Zygaena*. The rain that had threatened for some while, during tea came down quite a deluge. However the walk to the station was dry and the way down the beautiful carriage drive with views of the Holmsdale Valley and Box Hill were much appreciated.

JUNE 12th, 1930.

The PRESIDENT in the Chair.

Mr. C. N. Hawkins exhibited living larvae of *Polia flavicincta*, F. from Cambridge ova sent him by Mr. H. Worsley-Wood. From 26 ova the first larvae emerged on March 26th, the last on May 25th. The first larva went down for pupation on May 26th and the second on June 11th. They were fed throughout on plum. The larvae underwent 5 moults.

Mr. Hy. J. Turner exhibited living larvae (young) of *Saturnia pavonia*, *S. pyri* and of a crossing between *pavonia* ♂ and *pyri* ♀.

The hybrid ova hatched on May 4th and were feeding rapidly; the *pavonia* hatched on May 14th; and the *pyri* on May 26th. The last were very slow in growth and had much difficulty in changing their skin, several having died in the process. The *S. pyri* took to cherry as food while the other two species fed well on hawthorn.

Dr. Cockayne exhibited the living larvae of *Agriopis aprilina* from S. Hants. They were very bright in general colour assimilating to the light lichen-covered bark of the trees, and quite different from the form obtained in Essex, which was much darker, like the lichen of the bark in that county. He also showed the living larvae of *Ortholitha chenopodiata* (*limitata*) (*mensuraria*) feeding on broom and restharrow from Hayling Island; also seven different forms of the larvae (preserved) of *Poecilocampa populi*, none of which agreed with the figures of the larva given by Buckler in his book.

Mr. Buckstone exhibited extreme forms of the spring, summer and autumn broods of *Rumicia phlaeas*, those of the summer brood being considerably darkened.

Mr. de Worms exhibited an example of the queen Hornet, and the female of *Drepana binaria* (*hamula*) with the ova laid by it.

Remarks were made as to the abundance of the orchid *Cephalanthera grandiflora* on several parts of the Downs, and some members noted the gradual disappearance of the juniper in various places where years ago there existed a considerable number of bushes.

Mr. Grosvenor exhibited 3 families of *Zygaena* species bred by him from St. Baume and Digne, S. France. They were all for many years called *stoechadis*, but in his opinion, were nothing more than localised races of *Z. filipendulae*. They were brighter and larger and the larvae were larger and 5- and 6-spotted forms were produced indiscriminately. He had found it impossible to segregate the forms. They had produced a very partial second brood the individuals of which were smaller.

Mr. Hewer exhibited wing tracings of these *Zygaena* forms drawn to exact scale and said that they were definitely 5- *or* 6-spotted there being very few intermediates. He also showed drawings of the ♀ genitalia of the English *filipendulae* (typical), of the *stoechadis* from Digne and of *transalpina*. The character of the spines on the genitalia of the last was quite different from that of the other two which were exactly alike. The genitalia of the ♂s were practically identical. No one had an actually 5-spotted British *filipendulae*; all so-called examples had a few red scales, it might be as few as five being present.

JUNE 14th, 1930.

FIELD MEETING—WARLEY COMMON.

Leader—E. E. SYMS, F.E.S.

Warley Common is situated about one mile from Brentwood Station, L.N.E.R., and occupies an area of roughly one hundred acres. A road leading to the village of Childerditch divides the common; the southern portion is grass land, now used as a golf links the northern part is forest land with trees of oak, hornbeam and sallow, the undergrowth is thorn and bracken. The district is well known botanically; many interesting and rare plants are to be found there. A stream which rises in the northern part flows across the common and eventually enters the Thames at Purfleet. Along this stream are several marshy places. From one part of the common there is a fine view of the Thames, and looking across the river the Kentish hills can be seen.

On the occasion of our previous visit in 1929 it rained all day, but this time we were favoured with such bright sunshine that it made beating hot, dry work. The lepidopterists of the party were desirous of obtaining larvae of *Orgyia gonostigma*, but were unsuccesful; larvae at home had pupated the week before.

Larvae generally were fairly plentiful, but mostly of the common sorts, the following were some of those reported as having been taken. *Taeniocampa miniosa*, *T. munda*, *Drymonia chaonia*, *Ennomos erosaria*, and *Pachys strataria*. Many of the larvae were unfortunately parasitised. Ova of *Dicranura vinula* were found on sallow, and a cluster of ova of *Dasychira pudibunda* on oak.

The coleopterist of the party reported a good bag of common insects. In the damp parts of the wood, that evil scented green lace-wing fly *Chrysopa perla* was plentiful, also the brown lace-wing, *Boriomyia subnebulosa*. A few specimens of *Panorpa communis* and *P. germanica* were also found.

Seven members sat down to tea, and those who stayed for evening work reported that *Erastria venustula* was plentiful.

JUNE 26th, 1930.

The PRESIDENT in the Chair.

Dr. Cockayne exhibited a short series of bred examples of *Miana latruncula*. Also an orange coloured form of the larva of *Poecilocampa populi*, not figured in Buckler's "Larvae."

Mr. C. N. Hawkins exhibited two forms of the larva of *Leucoma salicis* from Leatherhead, the one having cream spots, the other white, also living larvae of *Calocalpe cervinalis* (*certata*) on barberry, of *Triphosa dubitata* on *Rhamnus* and of *Nothopteryx polycommata* on privet, all from Surrey.

Mr. E. Step exhibited bred examples of the leaf-cutting bee, *Megachile centuncularis*, and described its habit of lining its cells, dug out in pieces of decaying twigs, with portions of leaves. Remarks were made as to the method of emergence.

Mr. de Worms exhibited an unusually dark coloured male of *Cosmotriche potatoria* from Wicken.

Mr. K. G. Blair exhibited the Scolytid beetle, *Xyleborus dispar*, F., and its galleries and communicated the following note:—On the occasion of the Society's Field Meeting at Bookham on May 17th last, some small round holes with fresh wood dust at the entrance were observed in some young oaks that had been killed by fire, probably in the preceding summer. Some of these sticks were collected, and on opening up one of them at home the burrow was found to go straight into the wood to one side of the central pith round which it curved until it nearly rejoined its own course. On the far side of the pith was a short branch in an upward direction. The whole gallery was clean and showed no discoloration; its only occupant was a female beetle of this species.

On June 25th another burrow from the same trees was opened. Again it went straight across the grain of the wood for nearly three fourths of its thickness, when it turned up along the grain. Numerous other burrows were emitted from it, five in an upward direction, two in a downward. One of the former close to the entrance was very short and not discoloured and was empty, the others were all heavily blackened, and the walls covered with a close encrusting growth of fungus. All these burrows were packed with the white grubs of the beetle, large and small mixed in each burrow*.

Xyleborus, though classed with the *Scolytidae* or 'Bark-beetles,' belongs to the section sometimes called 'Ambrosia' beetles, from this habit of the larvae of feeding not on the wood but on a fungus growing on the walls of the burrow. The galleries are all carved out by the mother beetle and hence are of uniform size. In the true bark-beetles, such as *Scolytus*, *Hylesinus*, etc.,

* In all this burrow contained 26 larvae full grown or nearly so, and 19 smaller ones.

the mother beetle also carves out the original gallery along which she lays her eggs, but in this case the young larvae commence burrowing into the wood eating outwards away from the parent gallery between the bark and the wood itself. As they grow the burrows of course increase in diameter and so form the beautiful radiating patterns characteristic of these insects, that we find on the inside of the bark and traceable on the wood also after the removal of the bark.

Mr. H. W. Andrews exhibited two species of Diptera, the first a Syrphid, *Criorrhina ranunculi*, Pz. and the second a Tabanid, *Therioplectes tropicus*, Mg. var. *bisignatus*, Jaen. from North Kent District, where they appear to be very scarce though neither of them are rare species in Southern England.

Mr. D. S. Palmer exhibited some unusually blue females of the spring brood of *Polyommatus thetis* (*bellargus*) from Dorset.

Mr. Tonge exhibited photographs of the eggs of *Hyloicus pinastri*, and said that when received they were bright yellow and had now all become brown.

Mr. Robert Adkin exhibited a larval case of *Coleophora palliatella* taken within the last few days in Abbot's Wood, where the species was to be found not infrequently. He called attention to the remarkable structure of the case with its somewhat hooked or pistol-shaped form with two large, scaly side flaps, and suggested that although, as it rested in its usual position, on the upperside of an oak or other leaf, it was fully exposed to view, this very fact might possibly afford it some measure of protection. Its general appearance, when first noticed, gave the impression of some substance, such as a bird's dropping having fallen on the leaf and dried there, rather that of a living larva.

JUNE 28th, 1930.

FIELD MEETING—WESTERHAM.

Leader—STANLEY N. A. JACOBS.

The weather was sunny but there was a fresh wind blowing which made work in the open somewhat inconvenient, although the conditions in the more wooded parts were very pleasant.

The morning collecting was decidedly more productive than the afternoon, and it is to be feared that afternoon arrivals went home disappointed.

It is to be regretted that the leader made the mistake of choosing a date that was a fortnight too late for the insects sought, namely *Cepphis advenaria* and *Bomolocha fontis*, usually to be found in fair numbers here during the early weeks of June.

The cutting of the underwood in parts where the bilberry used to be most prolific, has encouraged the growth of bracken to the detriment of the bilberry. There is, however, still a fair supply of bilberry to be met with in other parts of the wood where, in later months the bilberry-feeding form of *Acrolita naevana*, Hb. is to be found in plenty.

Attendance was not particulary good, the morning party numbering two, and one member who missed the leader and worked alone until teatime; the afternoon train added one member to the party and another who came for the afternoon work and failed to find the tea garden.

A good tea was enjoyed by this limited party at the Kent Hatch Kennels, Crockham Hill, and a pleasant day's field work ended with the walk in to Westerham and the run to catch the 7 o'clock train.

The country, as is known to the majority of members, consists of beautifully wooded hills interspersed with heath-, park-, and meadow-land, the woods in various parts being oak, birch, beech, conifers, and mixed, while the soil is loam on Kentish Ragstone, which is nowhere deeply covered. The views obtainable from various points in clear weather extend to Ashdown Forest, and, we are told, even to Chanctonbury Ring on the South Downs, when visibility is at its best.

The commoner species of diptera were present in great profusion and variety, including three Tabanids, so well known to field workers.

In addition to the commoner species of Coleoptera the following were met with—*Atemeles emarginatus*, Pk.; *Elater balteatus*, L.; *Rhagonycha translucida*, Kry.; *Aphodius foetens*, F.; *Cryptocephalus parvulus*, Mull.; *Deporaus mannerheimi*, Humm.; *Magdalinus carbonaria*, L.; and *Sphaeriestes ater*, Pl.

Of the Lepidoptera, with the exception of *Epinephele jurtina* and *Coenonympha pamphilus*, the Rhopalocera were absent, but a large number of the commoner Tortrices and Tineina were taken. During the morning, the males of *Cochlidion limacodes* were seen on the wing fairly plentifully, and one female was taken at rest on a grass head. *Bupalus piniaria* was in very fine condition; although

the date was apparently late for this species, several specimens in bred condition were taken.

In conclusion it is to be hoped that this locality will again be investigated next year, but at an earlier date, when it should prove to be productive of a considerable variety of larvae owing to the great diversity of the vegetation.

With the newly inaugurated fast omnibus services, this locality is now more easily accessible, and we look forward to a more successful Westerham meeting in the coming season.

JULY 10th, 1930.

The PRESIDENT in the Chair.

Mr. Robert Adkin exhibited a short series of the Tortrix *Argyrotoxa conwayana*. He said that although he had collected in Abbot's Wood for a number of years where this species was supposed to be quite common, he had not met with it until June 15th last when he found it flying about an oak tree in considerable numbers in the morning sunshine. The larva feeds on the seeds of ash and privet, the attraction of the oak tree was possibly, therefore, no more than that it afforded shelter from the light breeze that was blowing.

JULY 12th, 1930.

FIELD MEETING—CHALFONT AND LATIMER.

Leader—K. G. BLAIR, B.Sc., F.E.S.

The route followed was along the upper edge of the woods clothing the southern slope of the Chess Valley and back along the lower side of the same. *Discoloxia blomeri* was found, but not plentifully, on the beech trunks, and *Hydrelia sylvata* in somewhat larger numbers. *Mesoleuca albicillata* was also taken, while *Campaea margaritata* was plentiful and in good condition. A number of isolated wings were observed on the foliage, including those of *H. sylvata*, *Hepialis humuli* and *Aplecta prasina*. Larvae were scarce; a few young *Demas coryli*, which mostly proved to be parasitised, and *Biston strataria* being the most noteworthy. A specimen of *Augiades sylvanus* was observed ovipositing. Among the Coleoptera several species of *Gyrophaena* were taken in fungi, and

other small staphylinids on the fresh stump of a cherry tree. *Anthobium ophthalmicum* was in numbers on a few heads of *Heracleum*, though numerous others were quite untenanted. After lunch the Chess was crossed below Latimer and the footpath along the left bank followed as far as the Mill House, Chenies, where an excellent tea was provided. Afterwards the party proceeded by Chenies village, noting by the way the prolific crop of cones on the cedars below the Church. Several freshly emerged specimens of *Xylophasia lithoxylea* were noted on the fence surrounding the church yard. Along the lane down to Chorley Wood Station a patch of Campion produced larvae of *Dianthoecia cucubali* and *D. capsincola* as well as of *Eupithecia venosata* ; the larvae of the sawfly *Rhadinoceraea micans* were observed on the Iris blades in a dried-up pond. Some cut boughs of Ash were riddled with the burrows of *Hylesinus fraxini* and in one of the burrows a single ♂ of its Chalcid parasite *Cerocephala corniyera* was discovered. Other parasites noted were the Ichneumonid *Lissonota errabunda*, the males of which were flying up and down the trunk of one particular oak tree (*cf.* Report of Field Meeting at Horsley, July 7th, 1928) and a number of Chalcid flies flying over and settling upon a stack of old ash faggots containing abandoned burrows of *Hylesinus fraxini*. On one spot a number of the Chalcids were sitting close together in the form of a ring with their heads to the centre, but no source of attraction was discovered. Though suspected of being parasitic upon the *Hylesinus* these chalcids proved to be all males of a *Torymus* sp.

The weather throughout was dull and windy, but a threat of rain fortunately did not materialise. Twelve members were present.

JULY 24th, 1930.

The President in the Chair.

Mr. Robert Adkin exhibited a series of *Gracillaria syringella* reared from larvae taken on lilac bushes growing in his garden at Eastbourne. He called attention to the unusually dark colour of some of the specimens which he thought rather remarkable considering that the bushes were growing on a chalky soil.

He also exhibited a series of *Ornix guttea* bred from larvae on apple leaves taken in his garden in the beginning of August last year, together with leaves containing living larvae, and called

attention to the invariable habit of the larvae of turning over the edge of the leaf downwards.

Mr. A. F. Common exhibited a long series of *Melitaea athalia* taken in S.E. Essex.

Mr. Step showed living flower-heads of the Woolly-headed Thistle (*Carduus eriophorus*), from the Purbeck Hills, and called attention to the distinguishing characters of the species, which he considered the noblest of our native thistles—unfortunately restricted to limestone soils. He exhibited also, heads of Crow Garlic (*Allium vineale*), from the same district. In the three examples shown the rosy flowers had all been exchanged for bulbils (var. *compactum*) most of which had emitted the cylindrical leaves. One specimen was obviously a combination of two large heads on one stem. The long, hollow leaves from the bulb have all withered before the plant comes into flower.

Mr. Hugh Main exhibited the large longicorn beetle, *Ergates faber*, bred from a pupa recently found in a pine log at Agay, S. France, and a larva of the same species found in a similar situation last September. Also the neuropteron, *Acanthaclisis boetica*, recently emerged, together with larvae, a cocoon and another opened to show the pupa inside. By rearing the larvae in an incubator at about 35°C. the insects completed their metamorphoses successfully. Previous attempts at rearing them at ordinary room temperature had always failed.

Mr. J. L. Henderson exhibited eight specimens of *Procas armillatus*, Fab., taken near Brighton between May 1st and 14th, 1930, by L. G. Cox, F.E.S. The beetle occurred in considerable numbers. He said that only three single examples have been recorded during the previous 30 or 40 years (from Dartford, Chatham, and Sherwood Forest).

Dr. E. A. Cockayne exhibited the following varietal forms of larvae of *Coenotephria derivata*:—

1. Red confined to thorax, anal flap and claspers.

2. Red on thorax, small red dots first and second abdominal somites, red transverse line on sixth abdominal interrupted on right side, red line from transverse line to anal flap, red marks on all abdominals and on claspers.

3 and 4. Larger red markings in same situations.

5. Still larger red markings with lateral row of red dots on abdominals 1 to 5 inclusive, asymmetrical on 4th.

6. Complete broad red rings on all abdominals, whole of first and second abdominal red on right side.

The asymmetry in three larvae is noteworthy, in view of its rarity in most species.

Four larvae of *Deuteronomos fuscantaria*, green with no protuberances, green with small protuberances, green with larger and darker ones, brown with large ones.

Two larvae of *Deuteronomos erosaria*, second with small protuberances on dorsum of third and larger on fourth abdominal somites in addition to the usual ones.

Two larvae of *Ennomos quercinaria* green and brown forms. Green on ash with pale red brown markings and with the usual protuberances.

Living larva of *Sphinx ligustri* with 2nd horn on the anal segment.

JULY 26th, 1930.

FIELD MEETING—BYFLEET.

Leaders—K. G. BLAIR, B.Sc., F.E.S. and C. N. HAWKINS, F.E.S.

Unfortunately the weather was not very promising and only six members were present. The route taken was along the canal bank to its junction with the Wey Navigation Canal. The time was chiefly devoted to larva-beating which produced the following species:—*P. pigra*, *C. or*, *A. alni*, *T. populeti*, *E. alniaria* and *E. erosaria*, *B. consortaria*, *L. halterata* as well as a number of commoner species. A few specimens of *L. griseola* were met with, also its var. *stramineola*, while numerous groups of ova of *M. rubi* proved all to be parasitised by the minute Scelionid, *Telenomus bombycis*, Mayr. (see Proc. subseq. p. 55). Among Coleoptera *Phyllobrotica quadrimaculata* was swept from Skullcap along the canal side and *Lina populi* was abundant in all stages on some young shoots of poplar. A ♀ *Megachile versicolor* was found in its burrow in a rotten birch stump. Of Neuroptera a single *Nothochrysa capitata* was noteworthy, while *Sisyra fuscata* was fairly plentiful. Some cocoons of *Conwentzia psociformis* yielded both sexes of an interesting little *Calliceras* sp. (Ceraphronidae). The weather was very unfavourable for dragonflies of which *Aeschna grandis* and *Ischnura elegans* were the only species noted. Of Orthoptera *Ectobia lapponica* was taken, while to judge from the sound *Acheta domestica* must have been abundant on the refuse dump. During lunch a gentle but persistent drizzle put further beating and sweeping out of the question, and an early train was taken back to town.

AUGUST 14th, 1930.

The PRESIDENT in the Chair.

Mr. C. N. Hawkins exhibited a short series of the summer brood of *Selenia bilunaria*, Esp. f. *illunaria*, Hb. all strongly marked and approaching the spring brood in colour. They were bred last June from ova laid by a ♀ taken at rest on a tree trunk on Wimbledon Common on March 31st last. The ♀ parent was shown. Thirteen ova were laid and all hatched. One larva was preserved and the remaining 12 produced the series (9 females and 3 males) shown. The larvae were fed on hawthorn.

Capt. Curwen exhibited a series of the Dorsetshire form of *Melitaea aurinia* including an aberration in which the wings were much suffused with black, the forewings having only the outer margin of the lighter ground, the hindwings with a ground colour band inside the dark submarginal band, the basal portion being suffused with black.

Mr. de Worms, on behalf of Capt. Murray, exhibited an example of *Hyloicus pinastri* found in a sand bank facing Poole Harbour on August 12th. He also showed several paintings on wood of European insects, executed many years ago.

Mr. Robert Adkin exhibited:—

A series of *Tortrix viridana* reared in July last from larvae found feeding in folded leaves of evergreen oak (*Quercus ilex*) growing in his garden at Eastbourne. He said that common oak (*Quercus robur*) did not grow within about two and a half miles in a straight line from the situation where these larvae were found.

Also series of *Phlyctaenia* (*Ebulea*) *crocealis*, and *Acrolepia granitella*, and read the following note:—

On June 15th I was collecting in a lane on the outskirts of Abbot's Wood when my attention was called to some of the plants of flea-bane (*Inula dysenterica*) that were growing along the ditch side being a good deal webbed, evidently by the larvae of a Pyralid, and from a couple of the plants that I brought home I reared the series of *P. crocealis*, the first emerging on the 7th and the last on 14th July. But what I did not notice at the time, although I subsequently discovered it, was that some of the leaves of the flea-bane were mined by a Tineid, and from these mined leaves the *A. granitella* were bred between July 9th and 26th, their emergence thus extending over a period just twice as long as that of the *crocealis*.

Mr. Hy. J. Turner exhibited the following Lepidoptera sent him recently by our fellow member Mr. Sneyd Taylor from the Transvaal, S. Africa.

1. The large and beautiful Saturniid *Nudaurelia zambesiana*, Wlkr., subsp. *ringleri*, Wchgrf., bred last November from a larva found feeding on plum in March at Barberton.

2. A series of the cotton pest *Chloridea obsoleta*, Fab. (*armigera*, Hb.) as it was called for many years. These were all bred at Barberton from larvae found feeding on the cotton "bolls." It was noted that the females are redder and darker in colour than usual. The moth occurs wherever cotton is grown. It is a local and irregular species in this country and the larva feeds on many plants and shrubs.

3. An example of the *angolanus*, Gtze. form of *Papilio pylades*, Fb., taken at verbena flowers in October last. This form occurs all across the Continent from Angola to Natal. Dr. Burr sent it from the former State and also from Northern Rhodesia.

4. Specimens of *Metarctia lateritia*, H.-S., an Amatid (Syntomid) moth of a predominant dark brick-red colour taken at light in November last. It is very far from being a typical Syntomid; as its generic name implies it much favours the Arctiid group in general appearance.

5. Another Syntomid (Amatid) *Apisa canescens*, Wlkr., taken at light in November last. The bulk of the Syntomid (Amatid) species are daylight and flower-frequenting and it is interesting to meet with species which are nocturnal in their habits. It will be noted that this species has a general resemblance to our "ghost" swift.

6. *Odontosida pusilla*, Feld., a small species of Sphingid taken at light in October last.

7. *Estigmene lemniscata*, Dist., a moth allied to our *Spilosoma* species, taken at light in January last. There are a number of very similarly marked species with longitudinal deep black lines on the forewings to be found in S. Africa.

8. *Calamistis fusca*, Hmps., bred from larvae which feed in the stems of the maize. It has somewhat the appearance of a small *Nonagria typhae* to which it is nearly related.

Mr. Step, on behalf of Miss D. G. Step, exhibited a cell of the bee, *Colletes daviesana*, Sm., from the sand-dunes at Studland, with the parasitic dipteron, *Bombylius minor*, that had emerged from it: the spiny pupa-skin of the latter was shown also, as well as a specimen of the bee taken in the same neighbourhood. It was interesting to

note that the pupa, by means of its spines and a pair of legs, had made its way through the glassy wall of the cell before the emergence of the fly.

Mr. K. G. Blair exhibited some minute parasites, *Telenomus bombycis*, Mayr., from Fox Moth eggs found on the occasion of the Field Meeting at Byfleet on July 26th. From 35 eggs collected, every one of which proved to be stung, 351 parasites emerged, 75 ♂ and 276 ♀. It was noticed that the emergence holes, usually one to each egg, were of two different sizes corresponding with the difference in size of the sexes of the parasite. Only 5 of the eggs showed the small emergence-hole of the males, thus giving an average of 15 males, or nine or ten females from a single egg. This segregation of the sexes suggests that in this sub-family, *Scelioninae*, of the *Proctotrupidae* we may have polyembryonic development as is known to be the case in the allied *Platygastriinae*. In one case a male was observed to enter an egg from which some of the ♀ inmates had emerged. Whether pairing normally takes place within the host egg-shell is not known, but no instance of pairing in the open was noticed.

Mr. Blair also stated that he had recently received from Mr. Tonge a batch of eggs of the same species every egg of which showed the emergence hole of what was evidently the same parasite.

Mr. Hugh Main exhibited about 100 eggs deposited during one night recently by a *Mantispa*, bred from its cocoon found earlier in S. France. The female had been observed to pair with a male also bred. The eggs resemble those of a Lacewing fly and are on short stalks.

Mr. Barnett exhibited an aberration of *Coenonympha pamphilus* having four black dots on both sides of the lower wing, and another very dark almost dark brown form; both from Kemsing, Kent, together with a semi-obsolete underside form of *Polyommatus icarus*. He also showed a thistle from Mitcham Common with a fasciated stem and a similar stem of a garden marigold.

AUGUST 28th, 1930.

The PRESIDENT in the Chair.

The decease of two members was reported, Mr. A. W. Mera who had been a member since 1885 and Mr. G. T. Lyle who joined the Society in 1921.

Mr. W. J. Ferrier of Dagnall Park., S. Norwood, was elected a member.

Mr. H. Main exhibited the specimen of Mantid, *Empusa egena*, previously shown and pointed out the five small egg-masses deposited in captivity since the first week of July when the female was taken in the South of France. In reply to a question he said that the egg masses of *Empusa* were always small and hatched in the autumn, whereas those of *Mantis* were large and did not produce the young until the following spring.

Mr. A. E. Tonge, on behalf of Mr. Wakeley, exhibited the larva of *Euchloris smaragdaria* from the Essex Marshes.

Mr. Robert Adkin exhibited a series of the Tineid moth *Phthorimea* (*Gelechia*) *atriplicella*, F. v. R., and read the following note.—On 19th September, 1929, I went to some waste land at the east end of Eastbourne to search the somewhat stunted plants of *Chenopodium* that were growing there fairly plentifully for a species that I did not find, but I noticed that in the seed-heads a number of small larvae were feeding and slightly webbing the heads. I brought home several of the seed-heads, placed them in a tongue- glass (*i.e.*, one of the glasses in which cooked ox tongues are sold) with a little loose earth and rubbish, covered the glass with a piece of calico secured by a rubber band, and left them for the winter. On 23rd June of the present year several moths emerged, followed by one or two more on 24th and 25th, then no more until July 1st when another lot came out, again followed by two or three on each day to 5th, then one each day on 15th, 16th, and 19th. Fischer, who described this species some ninety years ago, gives the time for the imago as from the end of June to the beginning of August, and for the larva as from the end of May to the end of June, and our English text-books seem to have followed these dates pretty closely. Bankes, however (*Ent. Mo. Mag.* 1894, p. 83) says that there are two or more broods, probably a succession ; the dates on which I found the larvae and reared the moths appear to confirm this. So far as I am aware this species has not previously been recorded for the Eastbourne district and is not included in the list of Lepidoptera published in the Victoria History of Sussex.

Mr. Adkin also exhibited a series of *Laspeyresia* (*Carpocapsa*) *pomonella* reared from apples grown in his garden at Eastbourne in 1929, and called attention to the dates on which the imagines emerged, namely, the first on June 22nd, the earliest date on which he had ever bred the species, the majority between July

1st and 12th, these being, in his experience, the normal dates of emergence, and the last on July 30th, which he believed to be unusually late.

Mr. Hy. J. Turner exhibited a long series of *Gnophos obscuraria* showing extreme response to environment, no two specimens being alike. The series included the race *calceata*, Stdgr., of dirty white coloration from chalk districts, the race *argillacearia*, Stdgr., of brown-reddish suffusion characteristic of the brown red soil of Devonshire, the race *obscuriorata*, Prout, of a very dark brown-black colour responsive to the dark heath-covered areas of the New Forest, the extreme white ground form ab. *mundata*, Prout, from Folkestone and also the banded form ab. *fasciata*, Prout, from the same place, with other named forms and discussed the lines which the variation took.

The variation of the species in size was rather more than usual in a species. The extreme variation in ground colour was probably caused by the ready tendency to respond to its surroundings, which the species encountered in the many diverse conditions of its extended distribution. The contrast of marking and ground is not so emphasised as in some species ; in the lighter forms the transverse lines and discoidals are generally clear and perfect, and partially effaced only in the darkest (black) form of the New Forest. The character of the darkening of the ground colour is by minute powdering, the same extended into striation, and still further into brown and black by multiplication and intensification. The transverse lines may be single or double and may converge or diverge as to the base and in some few only remnants are evident, and these are the emphasised points where the veins cut the lines.

The following is a list of the forms hitherto described with references to the literature concerned.

obscurata, Schiff., *Verz.* 108 (1775).

ab. *anthracinaria*, Esp., *Schm. Eur.* VI(1)., 127, plt. 25 (1794).

ab. *quadripustulata*, Don., *N.H. Br. Ins.* XIII., 63, plt. 463 (1808).

r. *argillacearia*, Stdgr., *Cat.* IIed., p. 166 (1871).

r. *calceata*, Stdgr., *Cat.* Ied. 72 (1861) [*serotinaria*, Haw., *Lep. Brit.* 311 (1806-10)].

r. *pullaria*, Haw., *Lep. Brit.* 314 (1806-10).

ab. *uniformata*, Prout, *Trans. City of L.* XIII., 37 (1903).

r. *lafauryata*, Obthr., *Ét. Lép. Comp.* VII., 307, fig. 1761 (1910).

r. *zeitunaria*, Stdgr., *Cat.* IIIed. 344 (1901).

r. *obscuriorata*, Prout, *Trans. City of L.* XIII. 38 (1903) [r. *saturata*, Prout, *Trans. City of L.* XIII., 38 (1903)].

ab. *bivinctata*, Fuchs., *Jahrb. Nass.* XIII., 53 (1900).

ab. *mundata*, Prout, *Trans. City of L.* XIII., 38 (1903).

ab. *woodiata*, Prout, *Trans. City of L.* XIII., 38 (1903).

ab. *fasciata*, Prout, *Trans. City of L.* XIII., 38 (1903).

ab. *bellieri*, Obthr., *Ét. Lép. Comp.*

ab. *pallidemarginata*, Obthr., *Ét. Lép. Comp.*

ab. *mardinaria*, Stdgr., *Cat.* IIIed., 345 (1901).

ab. *tristaria*, Culot, *Noct. & Geom.* II(2)., 110 (1913).

Mr. S. N. A. Jacobs exhibited very dark bred examples of both sexes of *Tortrix* (*Cacoecia*) *podana* and an example of *Polyommatus medon* (*astrarche*) with the forewings almost immaculate.

Dr. H. S. Fremlin exhibited a curious case of fasciation in the apple, two apples being grown on one stalk.

It was reported that *Polygonia c-album* was occurring in more fresh localities: Chiddingfold, Axminster, nr. Lyme Regis, etc., and that it had been taken fresh in August. The President added Byfleet, where he had beaten a dead pupa in July.

AUGUST 31st, 1930.

FIELD MEETING—HORSLEY.

Leader—Hy. J. TURNER, F.E.S., F.R.H.S.

Some half a dozen members attended this meeting and a pathway not usually taken or maybe not known to many was followed. The weather was quite good but the season apparently was far from being favourable for in spite of plenty of hard beating and thorough searching but little was met with worth recording. There remains only the memory of a very pleasant walk through attractive country for future exploration.

SEPTEMBER 11th, 1930.

Mr. H. W. ANDREWS, F.E.S., VICE-PRESIDENT, in the Chair.

The decease of Mr. W. H. Miles, F.E.S., a member since 1881, was announced.

Mr. Hugh Main exhibited the small larvae of a *Mantispa* hatched from the ova exhibited at a previous meeting. They were exceedingly active; their prey was small spiders for which probably they would have to wait until next spring.

Dr. Cockayne exhibited the living larvae of *Acidalia imitaria* and *Ptychopoda dilutaria* from Bristol, of *Agrotis cinerea* and a bred series of *Selidosema plumaria* (*ericetaria*) from Hayling Island.

Mr. E. J. Bunnett exhibited a living millepede, *Spirostreptus annulatipes* found in a cluster of bananas from Colombia, S. America. Length 4·8 ins. 102 pairs of legs. It was received on July 25th, 1930, and had been fed on tomatoes. He also showed British species of millipedes, and a confluent form of *Zygaena trifolii*.

Mr. S. Wakeley exhibited larvae of *Abraxas sylvata*, bred from ova laid by a female taken at the Chalfont Field Meeting, on July 12th, and a roll of corrugated paper containing pupae of *Acronicta tridens* bred from ova laid by a female taken at the same Field Meeting. A useful tip when rearing larvae of this genus, especially if sleeved out.

Captain Curwen exhibited several masses of cocoons on small larvae found by him on *Silene maritima* at Dungeness with the small hymenopterous parasites which had emerged from them.

Mr. Grosvenor exhibited the results of his mongrelisation experiments with *Zygaena filipendulae* and *Z. stoechadis*, and communicated the following table in explanation.

ZYGAENA FILIPENDULAE AND SUBSP. STOECHADIS.

filipendulae ♂ ex Bexley paired with 5-spot ♀ *stoechadis* ex St. Baume.

RESULT

1 only 5-spot——7 only 6-spot——8 only intermediate.

PAIRINGS OF THE ABOVE.

No. 1 Brood
6-spot ♂ × 6-spot ♀
8 only 6-spot
4 only 5-spot
No intermediates
92 larvae hibernating
for 2nd year

No. 2 Brood
5-spot ♂ × 6-spot ♀
1 only 2nd emergence
November 1st, 1929
intermediate

Normal emergence
6 only 6-spot
6 only 5-spot
4 intermediates
37 larvae hibernating
for second year

Subsp. stoechadis.

5-spot ♂ ex Digne × 6-spot ♀ ex Bignasco.

Result

1 only 2nd emergence — 6-spot emerged October 5th, 1929

Normal emergence

13 only 6-spot
13 only 5-spot
5 only intermediates
No larvae hibernating 2nd year.

Mr. Robert Adkin exhibited a series of the Tineid Moth *Blastobasis lignea* from Eastbourne and read the following note:—

"*Blastobasis lignea* was described by the late Lord Walsingham from specimens taken in Madeira. ("Trans. Ent. Soc. Ldn." 1894, p. 550.) It was recorded as a British insect by our fellow member, Mr. William Mansbridge, who tells us that in August 1917, Mr. A. E. Wright captured a few worn specimens at Grange-over-Sands, Lancashire, but it was not until some few years later, when specimens in better condition were obtained, that the species was identified. He further tells us that the moth appeared to be attached to the Cotoneaster (*Cotoneaster microphylla*), an ornamental shrub largely grown in that neighbourhood, but that the association was not certain ("Entom." 1922, p. 145). The species has also been taken at Witherslack where it was beaten out of yew, and is also recorded from Eastern Australia.

"With regard to the Eastbourne specimens. A year or so ago I happened to take a specimen of the Tortricid, *Pammene regiana* in my garden. Now *regiana* is not a species that occurs singly; where one is found it is pretty certain there will be more in the neighbourhood if their head-quarters can be located. On one of the upper terraces of my garden, three sycamore trees grow. They were probably planted there when the house was built, forty years ago. The bark on their stems is a good deal cracked, and round about where some of the lower branches have been removed is very rough, and it occurred to me that these trees might very probably prove to be the breeding place of the *regiana*. Accordingly, early in July last, I commenced to search the stems of these trees each morning; for *regiana* has the habit of emerging from pupa early in the day, resting on the stem until its wings are dry, usually by about 10 a.m., and then ascending to the foliage. Well, I did

not find any *regiana*, but on July 10th I found, tucked away in the cracks of the bark, a Tineid, and between that date and August 11th several more of the same species, the emergence, therefore, extending over a full month. On getting two or three of the moths off the setting boards it was not a difficult matter to place them; the somewhat peculiar shape of the wings and the strongly notched base of the antennae of the males being a good guide; and comparison with the type specimen and others in the British Museum collections proved their identity as *Blastobasis lignea*, both the type and the dark form, *adustella*, Wals., being taken.

"Although the moths are not difficult to see as they rest in the cracks of the rough bark, they are by no means easy to capture. They sit very close and are not easily disturbed, but when they do come to life they jump, more often than not disappearing through some crack that the box held for them does not completely cover; and even if one is fortunate in getting a moth into a box, it will jump several times before settling down again; one therefore needs to wait until the moth has become quiet before attempting to slip the lid on the box, or the chances are that an empty box may be the result.

"The larva of *lignea* is said, in this country, to feed on dry leaf refuse, but the association, in the present case, of the moth with the sycamore trees, appeared to be so close that I thought it might possibly have fed in the bark. There are other species of trees growing no further away from the sycamores than they are from one another, but although they have all been carefully searched, not one of these moths was ever found on any of them. Indeed, on only two occasions has the moth been found anywhere than on the sycamores, in each case after a very wet and stormy night, when one was found tucked away in a crack of the matched lining of an adjacent summer-house. I have searched the bark of the sycamores most carefully for any sign of the larva having fed in it, but without result; on the other hand, there is every opportunity for the species to feed up in leaf rubbish. Close by the sycamores grows a very large bay tree, beneath which there is an accumulation of old leaves and sticks. As a pair of hedge-hogs appropiated this spot in which to rear their family, it was wired round to keep the dog from molesting them, and so it has remained, a veritable paradise for leaf-rubbish-feeding larvae, there are also other similar accumulations not far away. I think we must therefore conclude that in this case

the association of the moths with the sycamores was no more than that the peculiar roughness of the bark afforded suitable conditions for their shelter."

SEPTEMBER 13th, 1930.

FIELD MEETING—ST. MARTHA'S CHILWORTH.

Leader—Hy. J. TURNER, F.E.S., F.R.H.S.

The only record of this field day is that the half a dozen who were present returned home with as much water as their clothes could absorb for it was the wettest outing that several of us ever remember for a South London Meeting.

SEPTEMBER 25th, 1930

The PRESIDENT in the Chair.

The decease of a member, Mr. E. Sancean, was reported.

Dr. Cockayne exhibited:—1. *Miana strigilis* and *M. latruncula.* Specimens of both bred from Surrey larvae, which were indistinguishable, dirty white with dull pale purplish markings. The *strigilis* were very heavily marked with black, but the usual white markings were present; the *latruncula* were black. The moths emerged on the same day. 2. *Strigilis* from Northamptonshire almost uniformly suffused with grey and so closely resembling some forms of *latruncula.* 3. *Apamea gemina* and *A. furva* to show the similarity of the two species. The genitalia of all the species had been examined.

Mr. E. Step exhibited a photograph of the group of parasite cocoons shown at the previous meeting by Capt. Curwen. The species was *Microgaster alvearius.*

Mr. Jacobs exhibited male examples of *Tortrix costana* obtained in late August and September 1st and contributed the following note:—

"The date of appearance of the imagines is said to be July by Meyrick and June-July by Wilkinson. My series comprises 17 males captured (4 between June 8th and 13th, remainder after 17th), 11 females (1 on June 13th and 1 on June 15th remainder after 21st), 6 males (July 1st to 8th), 10 females (July 1st to 9th), 2 males

(Aug. 29th and 31st), 1 male (Sept. 5th). Do these late males represent a delayed emergence, or are they representatives of a second brood from the early June insects ?"

Dr. Bull exhibited a specimen of *Erebia aethiops* (*blandina*) from Rannoch with forewings partially pale, apparently due to abnormal arrangements of scales; *Crocallis elinguaria*; larvae of *Cochlidion* (*Heterogenea*) *avellana* (*limacodes*); larvae of *Hylophila bicolorana* before the hibernating skin is assumed; and larvae of *Gnophos myrtillata* (*obfuscaria*) all from the same locality.

Mr. Stanley Smith exhibited larvae of *Angerona prunaria*.

Mr. Eagles exhibited larvae of *Pelurga comitata* feeding on *Chenopodium*.

The President reported three *Agrius* (*Herse*) *convolvuli* from the Isle of Wight; Mr. Adkin reported several from Eastbourne together with two larvae found in a potato-field where wild convolvulus grew abundantly. The President had found *Colias croceus* scarce in the I. of Wight and no *C. hyale*; *Pyrameis cardui* had been very rare while *P. atalanta* was very common; *Aglais urticae* was fairly common; he had seen only a few *Polyommatus coridon*, while nests of *Melitaea cinxia* were fairly common.

Mr. Tonge reported having seen a very fine albino black-bird in Sussex and in another part of the same county a partially white one.

Lantern slides were then shown by Mr. R. Adkin and Mr. A. Dennis.

Mr. R. Adkin exhibited a series of slides illustrative of the species of sea-bird frequenting the coast about Eastbourne including the Kittiwake, Black-headed Gull, Lesser Black-back Gull, Herring Gull, Common Gull, Cormorants, Guillemots and Razorbills.

Mr. Dennis exhibited a series of slides illustrating the life-history of the cabbage white-fly, *Aleyrodes*, and numerous local plants.

OCTOBER 9th, 1930.

The PRESIDENT in the Chair.

Mr. S. R. Ashby exhibited the following New Zealand Lepidoptera which had been sent to Dr. Robertson and which he has kindly placed in the Collection of the Society.

The following is a List of the species :—*Hepialus virescens*, Dbldy., *Porina enysii*, Btlr., *Porina signata*, Walk., *Ipana leptomera*, Walk.,

Declana atronivea, Walk., *Declana floccosa*, Walk., *Selidosema panagrata*, Walk., *Selidosema pelurgata*, Walk., *Selidosema productata*, Walk., *Azelina fortinata*, Gn., *Azelina ophiopa*, Mayr., *Azelina nelsonaria*, Feld., *Azelina gallaria*, Walk., *Epirranthis alectoraria*, Walk., *Tatosoma agrionata*, Walk., *Tatosoma tipulata*, Walk., *Tatosoma timora*, Meyr., *Elvia glaucata*, Walk., *Venusia verriculata*, Feld., *Hydriomena similata*, Walk., *Hydriomena subochraria*, Dbld., *Eucymatoge anguligera*, Btlr., *Xanthorhoë venipunctata*, Walk., *Xanthorhoe clarata*, Walk., *Notoreas brephos*, Walk., *Notoreas perornata*, Walk., *Notoreas niphocrena*, Meyr., *Notoreas insignis*, Btlr., *Notoreas orphnaea*, Meyr., *Pyrameis gonerilla*, Fb., *Pyrameis itea*, Fb., *Argyrophenga antipodum*, Dbldy., *Chrysophanus salustius*, Fb., *Chrysophanus feredayi*, Bates., *Chrysophanus boldenarum*, White., *Dasyuris partheniata*, Gn.

Dr. Cockayne, to aid the illustration of Mr. Edelsten's paper, exhibited preserved larvae of the British Nonagrias together with a series of sketches of the head, prolegs and other details and communicated the following short paper.

Notes on the larva of Macrogaster (Phragmataecia) arundinis, Hb.

On September 29th, Mr. H. Worsley Wood and I looked for the larva of this species in Wicken Fen and found fourteen, twelve to eighteen inches below the level of the mud or water in the lower part of the stems of reeds. There were three distinct sizes, six small, three medium, and five large, about 25, 35 and 55mm. long. The descriptions in the books I have looked at are in some respects inadequate and in others incorrect and the figures are poor. The head is very narrow for its length and the lobes are separated posteriorly more widely and for a greater distance than in any other species I have examined. The thoracic plate is remarkable. Its anterior border is smooth, shining, and dark coloured with a small notch in the middle and a larger one about the middle of each lateral portion. Posteriorly the thick part of the plate has ten shining dark coloured projections, the middle one on each side being the smallest, and the central part is pale and finely reticulated. Behind it the thinner membrane in the larva I have drawn is studded with three irregular and asymmetrical rows of rough, raised, dark brown chitinous knobs, and behind these are two more rows of much smaller ones. These are arranged much more regularly in parallel curves with the convexity posterior, and end in an irregular group external to

the first three rows. In other larvae the larger knobs are scattered fairly evenly without linear arrangement. The last pair of spiracles, light brown with a dark edge, are situated dorsally and are much larger than the others. Internally they are narrowed and curved backwards and upwards so as to project noticeably above the surface of the skin. The anal prolegs far from being aborted, as the books say, are quite well developed and have a single anterior row of crochets, eighteen in number in both medium-sized and large larvae. The other prolegs have the crochets arranged in a ring, broken both internally and externally. The ring is roughly oval and most of the hooks point forwards or backwards. In the small larvae the number of crochets varies from 26 to 32, the anterior ones being smaller and more widely spaced, in the medium sized larva there were 35, and in the large larvae 44 to 51, the usual number being 48. One small larva changed skin and the legs and thoracic plate in the new instar were scarcely any bigger than before, which suggests that growth is very slow.

Most authors say that the larva passes two winters in the reed, but from the facts I have given I think it more likely that it lives for three years. The difference in size between medium sized and large larvae is too great to be sexual and the difference in the prolegs suggests that they are in different instars. Cast skins of both sexes after pupation would settle this.

Preserved larvae of the following species, with brief notes, were also exhibited to illustrate M. Edelsten's paper.

Nonagria typhae from its pupal characters probably not congeneric with the others.

Cannae and *sparganii*, a closely related pair distinguished from the rest by their deep emerald green blood, *sparganii* with lighter head and tubercles than *cannae*.

Geminipuncta standing alone with very pale thoracic plate and distinct black tubercles.

Neurica and *dissoluta* another closely related pair, *neurica* grey with a narrow but distinct dark spiracular line, *dissoluta* pink with no spiracular line; *neurica* with much darker thoracic and anal plates.

Coenobia rufa like a *Nonagria* in many ways, but with an anal plate much larger for its size. Dorsum pinkish with white rings around tubercles. All are long slender larvae with very thin skins and very long prolegs especially *geminipuncta*, *neurica*, and *dissoluta*, the latter character most unusual in internal feeders.

Calamia phragmitidis, differing in many respects especially so in its thick skin.

Senta maritima, a thin skinned larva having no affinity with any of these. It appears to be adapted for an external life and to have taken to internal feeding comparatively recently.

Macrogaster arundinis and *Chilo pragmitellus* have the same long slender bodies as *Nonagria* because of their similar habitat, but both have microlepidopterous prolegs with a nearly complete ring of crochets. In *Macrogaster* the area within the ring is formed of transparent chitin, but in *Chilo* the transparent chitin has an oval button of dark thick chitin in the centre in the case of the abdominal prolegs, and a gap in the ring of crochets externally.

Mr. de Worms exhibited a series of *Nonagria typhae* bred this season including an intensely dark example of the form *fraterna*.

Mr. MacDonald exhibited an example of *Hyloicus pinastri* and a series of *Mimas tiliae* including rosy and ochreous forms.

Dr. Williams exhibited a long series of *N. geminipuncta* including black and ochreous forms.

Mr. Barnett exhibited *Mimas tiliae* including a very pale example.

Mr. Jacobs exhibited mines of the leaf-mining Lepidopteron, *Lithocolletis stettinensis* in alder and remarked how common he had found them this season. He noted that a large number had been attacked by birds.

Mr. Ferrier exhibited a female Cockroach *Blatta orientalis* with its egg capsule attached.

Dr. Cockayne, on behalf of Mr. A. H. Sperring, exhibited the jumping cocoons of a parasite of the larva of *Taeniocampa gracilis*, *Spudastica kriechbaumeri* from the New Forest. (See Morley *Brit. Ichn.* vol. V. p. 139.) The jumping ceases after pupation has taken place.

Mr. H. M. Edelsten then exhibited numerous details of the life-histories of the British Nonagrias and gave an account of his observations and breeding of the various species. (See page 1.)

OCTOBER 23rd, 1930.

ANNUAL EXHIBITION.

The PRESIDENT in the Chair.

There was no formal business. The exhibits were arranged as usual on the tables.

Mr. R. Adkin exhibited a drawer of *Zygaena filipendulae* including

numerous striking aberrations; a small box containing a short series of the very local micro-lepidopteron *Blastobasis lignea*; and an improved killing jar for use with ammonia.

Mr. H. W. Andrews exhibited a collection of *Syrphidae* (Dip.) of species common to both America and Britain.

Mr. C. D. Anderson exhibited a series of *Cossus cossus* bred this year and including a very dark melanic example.

Mr. S. R. Ashby exhibited his collection of the British species of *Donacia*, *Cryptocephalus* and *Chrysomela* (Col.).

Mr. T. L. Barnett exhibited a series of *Ectropis* (*Tephrosia*) *bistortata* of both spring and summer broods from various Surrey localities and a set of ab. *delamerensis* from Burnt Wood, Staffs; a long series of *E.* (*T.*) *crepuscularia*, single brooded in May-June from S. Croydon, including several of the dark grey form, corresponding to the ab. *delamerensis* in *bistortata*; and a short series of *E.* (*T.*) *punctinalis* (*consortaria*) from S. Croydon, including several blackish forms.

Mr. G. L. Barter exhibited specimens of *Zygaena* to show how the moths emerge from the pupa and also wings taken from the pupa just before emergence, showing the great difference in size of every detail compared with the details of a perfect imago.

Mr. W. N. Blair exhibited Blair's White-toothed Shrew, *Crocidura cassiteridum*, a new British shrew, and the only British representative of the genus *Crocidura*. The exhibit comprised, a perfect example in spirit, another damaged example, a skull found and cleaned by nature, also a skin. He also exhibited some British medicinal leeches and eggs clusters of the same.

Mr. A. Bliss exhibited an example of *Cupido minimus* with a striate underside of the left hindwing, from Haute Savoie, 1930.

Miss Winifred M. A. Brooke exhibited a series of drawings of insects of economic importance and also of British reptiles and amphibians.

Mr. A. A. W. Buckstone exhibited a variable series of *Bupalus piniaria* bred from Oxshott, most of the pupae having been forced, and for comparison series of the same species captured at Oxshott and in Teesdale.

Mr. S. G. Castle-Russell exhibited many fine aberrations of British butterflies captured and bred during 1930 by himself.

Dryas paphia.—New Forest. Two males with confluent spotting forming bars; a male with the androconial bars thickened, and with unusually small spots on hindwings; a white-spotted male and

several with thickened androconial bars; and ab. *valezina* with spots on upper wings coalesced.

Argynnis cydippe (*adippe*).—New Forest. Two heavily spotted examples.

Aphantopus hyperantus.—A male with the spots on underside small and indistinct and of unusual colour; a male with four spots on the left upper wing; a female ab. *lanceolata*; a female exceptionally large in size and with abnormally large lanceolate spots. A very fine example.

Pararge megera.—North Hants. A male example of var *lugens.*

Pararge aegeria.—A female with white spotting instead of the typical fulvous.

Brenthis euphrosyne.—North and West Surrey, and Hants. A series with unusually heavy spotting including—a female with the spotting on upper wings more or less obsolete and the lower wings black with fulvous rays; a white male; two light yellow females; a female with rayed hindwings; one heavily banded female (by Mrs. M. H. Russell); three melanic examples.

Brenthis selene.—North Hants. A series of aberrations including two melanic examples, two light examples, and a yellow male.

Melitaea aurinia.—North Hants. A series of upper and underside aberrations.

Melitaea cinxia.—Isle of Wight. A series of upper and underside aberrations.

Polyommatus (*Agriades*) *coridon.*—Berks, Hants and Wilts. A series of aberrations including—a very pale blue male with yellowish border (Mrs. M.H.R.), another (S.G.C.R.); a dark male—and others of unusual colouring; a male with the black border covering half the area of the upper wings; another somewhat similar (ab. *marginata*) and several heavily bordered males; a gynandromorph —right side male left side female except for a streak of blue on top of wing, underside male (Mrs. M. H. Russell); a well marked female ab. *fowleri* (Major V. Burkhardt, R.A.) and two female ab. *fowleri*; and a series of blue-marked females (not ab. *semi-syngrapha*) the marking on many being very unusual; a heavily streaked male *supra-radiata* (Major V. Burkhardt), a similar female (S.G.C.R. 1925); a male form of ab. *cinnus-obsoleta*—of unusual character; and other underside aberrations.

Dr. G. V. Bull exhibited a series of melanic *Boarmia roboraria* both bred and taken at light in East Sussex in 1930; and a series of *Biston* (*Amphidasis*) *betularia* of intermediate form bred from a

pairing of intermediate ♂ × typical ♀, from S.W. Kent and N.E. Sussex respectively.

Mr. T. L. Barnett exhibited a ♂ *Eugonia polychloros* taken at Tatsfield in August, 1930; a ♀ *Colias croceus* taken at Banstead in September, 1930; a ♀ *Herse convolvuli* from Warlingham, September 25th, 1930; and a ♂ *Erannis defoliaria* taken on October 5th in S. Croydon.

Dr. E. A. Cockayne exhibited a considerable number of abnormally marked larvae (preserved) of Lepidoptera. 1. Exhibiting dorsal and lateral loops. Abnormal larvae of *Hadena pisi* collected by Mr. C. N. Hawkins and himself on Barnes Common. The subdorsal lines unite or tend to unite on the dorsum or the subdorsal unites or tends to unite with a lateral line. In some both kinds of union occur on the same somite. In several, somites widely separated are affected. In one, two spiracles are absent on the abnormal somites. (This may be an inherited defect).

2. Two-horned larvae of *Sphinx ligustri*. The abnormality is probably inherited as a recessive.

Capt. K. Murray and Messrs. de Mornay, Palmer, Parkes, and C. G. M. de Worms made a joint exhibit of their captures of *Polyommatus* (*Agriades*) *coridon* during August and September of 1930 from one district in the S. of England, including typical forms and many aberrations of both sexes.

Mr. Alfred Common exhibited short series of *Omphaloscelis* (*Anchocelis*) *lunosa*, an aberration of *Polyommatus icarus* and *Aphantopus hyperantus* ab. *lanceolata*.

Mr. Gilbert C. Danby exhibited a large number of *Papilionidae* from Africa, India and S. America including *P. phorcas*, *P. dioxippus*, *P. laodamas and Teinopalpus imperialis* (♂ and ♀).

Dr. Lionel Higgins exhibited series of *Brenthis pales*, Schiff. to show the racial characters found in different parts of Europe.

Mr. A. W. Dennis exhibited a considerable number of lantern slides in upright frames by transmitted light.

Mr. S. W. Gadge exhibited the following items of hive-bee economy.

1. A brood frame from a bee-hive. The frame was fitted with very old foundation as a test. The bees ignored the wax foundation and built comb parallel to it in two layers, one with cells having vertical sides, the correct way according to text books, the other comb has pointed sides.

2. Case showing wax scales as dropped from the abdomen of the bee.

First deposits on a twig after swarming.

First formation of virgin comb.

Cocoon cases from which the wax had been extracted and extracted wax.

3. The making and breaking of queen cells.

Mr. A. de B. Goodman exhibited several cases of palaearctic butterflies including the following species:—

Erebia flavofasciata.—A short representative series of specimens taken on the Campo Lungo Pass near Fusio, Ticino, July 16th, 1928, found flying in abundance on a steep grassy slope near the summit of the Pass. The habitat is extremely local in the area, not exceeding about 5 acres. Careful search was made on similar slopes but without results. No difference in the grasses was noticed where found, from the surrounding slopes where species was absent. The females could not be induced to lay eggs in captivity. Life-history unknown.

Tuttia leuzeae (*Hesperiidae*).—A short representative series of specimens taken at Teniet-el-Had, Atlas Mountains, Algeria, 1st week in June, 1926. Found flying in abundance in glades and openings in Cedar Forests, settling on *Umbelliferae*. Until recently only one or two casual specimens were available and the species practically unknown. Life-history unknown.

Polyommatus hylas from Algeria.—Two male specimens taken on the isolated cedar hill, Mount Belerma, Aurès Mountains, Algeria, May 13th, 1926. As far as can be ascertained these two specimens are the only known representatives from Algeria and are an unique form. They differ from all the European races in smallness of size, paleness of colour and paucity of marking. The Moroccan form which occurs near the Straits of Gibraltar has no resemblance to this form, being in fact exactly opposite in appearance, large, bright in colour and very nicely marked and spotted on the underside with a band of large orange lunules.

Sloperia ahmed (*Hesp.*).—Four specimens taken on grassy slopes above Teniet-el-Had, Algeria. Very rare and life-history unknown.

Mr. B. S. Harwood exhibited *Pieris napi* from the Isle of Skye and from Tyrone, Ireland; aberrations of *Abraxas grossulariata* including a blue-black ab. *nigrosparsata* and two extreme ab. *gloriosa*; series of aberrations of *Coenonympha pamphilus*; four forms of *Mellinia* (*Xanthia*) *ocellaris*; very light forms of *M. gilvago*; the Shetland form of *Dianthoecia conspersa*; the Hymenopterous genus *Sirex* and the parasites on its species; injurious insects on various garden crops, etc.

Mr. T. H. L. Grosvenor exhibited races, forms and aberrations of :—

I. *Zygaena filipendulae* from the British Isles, including abnormally large forms, abnormally small forms (taken in 1929), abnormally small forms (taken previous to 1929) ; small forms from Goring and Ditchling, probably racial : hybrids and parents of *trifolii* × *filipendulae ;* ? species taken on a ground where above were taken ; Types of Tutt's *hippocrepidis* ; *filipendulae* occurring in marshy ground in June, 1923, all very small ; *filipendulae* other years from same ground ; offspring of a pairing of a yellow with a red *filipendulae* ; aberrations of British *filipendulae* :—yellow—orange—confluent—small spotted—large spotted—small 6-spot nearest approach to Continental forms—partial yellow forms—markings unequal.

II. *Zygaena filipendulae* subsp. *stoechadis* (Broods of).

Bred from 6-spotted *stoechadis*.—11 = 5-spot. 11 = 6-spot. 11 = intermediates.

Bred from 5-spot *stoechadis*.—Only 4 bred all 5-spot.

Bred from intermediate *stoechadis*.—7 = 5-spot. 1 = intermediate.

Bred from intermediate *stoechadis*.—16 = 5-spot. 16 = intermediate. 24 = 6-spot.

Bred from 6-spot *stoechadis*.—2nd emergence 14 = 5-spot. 12 = 6-spot. 3 intermediate. Normal emergence 10 = 5-spot. 6 = 6-spot. 3 intermediate.

Bred from 6-spot × 6-spot race.—2nd emergence 24 all 6-spotted. Normal emergence 32 all 6-spotted.

Digne and La St. Baume races always produce 5- and 6-spotted, and intermediates.

Bignasco race always 6-spot as in England but of notably brilliant colour.

III. Result of pairing English *filipendulae* with La St. Baume *stoechadis*.

1 only 5-spot. 7 = 6-spot. 8 = intermediates.

Pairings of above. Results as under.

6- × 6- — 8 = 6-spot. 4 = 5-spot. 0 = intermediates.

5- × 6- — Second emergence. 1 only intermediate.

Normal emergence 6 = 5-spot. 6 = 6-spot. 4 = intermediates.

IV. Result of pairing Digne 5-spot with Bignasco 6-spot.

2nd emergence = 1 only 6-spot.

Normal emergence 13 = 5-spot. 5 = intermediate. 13 = 6-spot.

Dark race of *stoechadis* from Tuscany (Italy).

Female from ditto.

Offspring of above bred in England. The females revert to

nearly normal form from South of Europe. All three forms are present.

VI. Racial forms named by Dr. Verity.—*loniceraeformis—villalatina—montivaga—siciliensis.*

Mr. C. N. Hawkins exhibited 1 ♂ and 2 ♀ *Herse convolvuli* taken in the Isle of Wight in September, 1930.

Lt. Colonel D. G. B. Hawley, D.S.O., exhibited the following Lepidoptera taken this autumn on the Hampshire Coast by the exhibitor and his wife. *Rhodometra sacraria*, *Leucania l-album*, *L. vitellina*, and *Nonagria sparganii.*

Mr. O. J. Janson exhibited a large number of the more striking exotic Orthoptera.

Mr. J. F. Johnstone exhibited aberrations of *Vanessa io* in which the centres of the hindwing ocelli were strongly metallic blue, of *Cosmotriche potatoria*, a dark ♂ with a series graduating to pale yellow male, a yellow ♀ with a series graduating to smoky.

Mr. H. B. D. Kettlewell exhibited a series of *Brenthis selene* from Wyre Forest including one with black forewings and normal hindwings; a series of *Melitaea aurinia* from Dorset; a somewhat smoky *Brenthis euphrosyne;* a series of *Senta maritima* from Cambridge including 16 ab. *bipunctata*, 3 ab. *wismariensis* and 4 ab. *nigrostriata*; and a specimen of the black form of *Nonagria typhae* ab. *fraterna.*

Mr. F. W. McDonald exhibited two cases of large and striking Exotic Lepidoptera.

Mr. H. A. Leeds exhibited aberrations of British butterflies, all captured wild during 1930.

Epinephele jurtina ♂ underside with the usually fulvous area of forewings entirely white, the borders and hindwings grey. ♀ undersides forewings, apical spots extremely large, also a strongly marked ab. *addenda.*

Melanargia galathea, ♂ underside hindwings, black spot on right wing and black spot and ring on left wing, between 2nd and 4th ocelli, this intervening division very rarely has a submedian marking.

Polyommatus (*Aricia*) *medon*, ♂ upperside lunules indistinct; ♂ underside ab. *apicoextensa.* 3 ♀ uppersides showing lunules:—pale orange, straw=ab. *flavescens*, and very large with orange coloration.

Plebeius aegon, ♀ uppersides, ab. *croceovirgatus*, and *coeruleocuneata* and others. ♀ undersides, abs. *flavescens*, *magnipuncta*, and *unipuncta.*

Photo: D. S. Palmer.

ARGYNNIS CYDIPPE (ADIPPE) VAR.
upper and underside.

Polyommatus coridon, ♂ uppersides, abs. *griseametallica*, *caerulea*, strongly tinted lavender ground, and another closely approaching ab. *sessilis*. ♂ undersides, ab. *posticofulvescens*, and many others.

Polyommatus thetis, ♂ undersides, *anticojuncta*, and *juncta*. ♀ underside ab. *radiata*.

Polyommatus icarus, ♂ undersides, abs. *I-nigrum*; ♀ uppersides outer borders broadly whitish and thinly scaled for ¾ length on forewings, and another, pathological, with a scaleless left hindwing. ♀ undersides, abs. *glomerata*, *anticojuncta*, and *radiata*, also one like *coridon* ab. *confluens*.

Cupido (*Zizera*) *minimus* undersides, abs. *crassipuncta* (*magnipuncta*), *obsoleta*, and *caeca* (Courv.).

Coenonympha pamphilus, ♂ uppersides, very pale, dark brightish brown; 4 distinct black spots internally on hindwings. ♂ underside, 3 extra spots below apical spot of forewings. ♀ underside all wings devoid of ocellated spots.

Rumicia phlaeas, ♂ uppersides, abs. *latomarginata*, and *intermedia*. ♀ uppersides, abs. *radiata*, and *anticodextro-partimalba*.

Strymon pruni ♂ underside, ground colour darker, somewhat blackish-brown, and bands darker red.

Mr. Hugh Main exhibited a number of living insects the subjects now undergoing metamorphoses in his subterraria.

Mr. H. Moore exhibited his collection of Neotropical *Danainae*.

Mr. L. W. Newman exhibited a long series of *Papilio machaon* all bred from ova of the Norfolk strain and showing great variation including the black form; series of *Dryas paphia* bred from Irish females showing considerable variation, many being dark and rich in general coloration; a long series of *Polygonia c-album* including light and dark forms and numerous aberrations, from Abingdon district; and a variable series of *Brenthis euphrosyne*.

Mr. D. L. Palmer exhibited a fine melanic aberration of *Argynnis aglaia*, from Berks, and communicated the following note:—

An Interesting Variety.

On July 6th, 1930, I captured in Berkshire the butterfly which figures in the accompanying photograph (Plt. V.). It is apparently a partially melanic ♂ variety of *Argynnis cydippe* (*adippe*), though owing to coalescence of the silvery spots and general derangement of the underside markings, separation from *A. aglaia* is difficult.

Expert opinion on the subject is somewhat divided, and, short of examination of the genitalia, a proceeding which does not seem

desirable in the case of such a remarkable and perfect "var.," identification would seem to be uncertain.

The general appearance, taking into account the small size, the characteristic slightly concave angle of the outer margin of the forewings and also the arrangement of the spots on their under surface, is undoubtedly that of *cydippe*, while the rather large amount of olive green colouring on the hindwings, coupled with a certain amount of silver spotting near the apices of the forewings is more typical of *aglaia*.

Both species were flying in about equal numbers at the time of my capture, which fact hardly simplifies the issue !

It must be rather an unusual occurrence to find any difficulty in allotting the species of a specimen taken in this country, with its rather short list of native butterflies.

Mr. J. F. Perkins exhibited the following Aculeate Hymenoptera.—

An ordinary and a giant male of *Andrena denticulata*. *Andrena proxima* and its rare parasite *Nomada conjugens*. *Odynerus* (*Leionotus*) *tomentosus*, of which until last year only a single specimen had been taken in Dorset by Mr. Malcolm Spooner, and one caught by myself at Sidmouth, whence the specimens exhibited were obtained, since Walcott collected a series about the year 1840, the locality of these last being unknown. *Andrena iacobi* (*trimmerana*, auct.) caught 14.iv.30 from which one male *Stylops aterrima* emerged 15.iv., a second 16.iv.,—both at about 10 a.m. ; also the head of a third male which had died in sitû, was extracted 17.v.30. *Eucera longicornis* with the lower part of the face covered with the pollinia of an Orchid.

Mr. Perkins also exhibited two *Zygaena filipendulae* with pollinia on the proboscis ; the *Zygaena lonicerae* and pollinia which were sent by Parfitt to Charles Darwin, as mentioned by him in his book on the "Fertilisation of Orchids" ; *Strangalia 4-fasciata* with *Strangalia aurulenta* from Devon and from Ireland for comparison.

Mr. Priest exhibited Lepidoptera from Ventnor, Isle of Wight.

Dr. E. Scott exhibited a few X-ray photographs of objects of natural history.

Rev. J. E. Tarbat exhibited underside aberrations of *Melitaea cinxia*.

Mr. S. Wakeley exhibited a case of moths taken recently in the West Wickham area, one of the most famous collecting grounds of half a century ago, showing that many species still linger on in spite

of the destruction of much of the woodland and the enclosures for building. The following is a list of the species shown :—

Theretra porcellus (1) aud *Eumorpha elpenor* (several) : all taken at sugar ; *Palimpsestis octogesima* : at sugar, 9.vii.26 ; *P. or* : a fine variety with pale margins to forewings ; *Aplecta occulta* : at sugar, 11.viii.26 ; *A. tincta* : at sugar, 28.vi.29 ; *Taeniocampa populeti* : at sallows, 1.iv.30 ; *Dyschorista iners* (*suspecta*) : common at sugar ; *Heliaca tenebrata* : 24.v.30 ; *Acasis viretata* : bred from ova ; *Lobophora halterata* : common on aspens ; *Hydriomena coerulata* (*impluviata*) and *Euchoeca nebulata* (*obliterata*) : locally common among alder ; *Boarmia punctinalis* (*consortaria*) : dark form not uncommon ; *Cochlidion avellana* (*limacodes*) : larvae fairly frequent on oak ; *Cossus cossus* : one on sugared tree.

Mr. Clifford Wells exhibited varieties of British butterflies taken in 1930.

On behalf of Mr. A. J. Wightman, Mr. Hy. J. Turner exhibited a very large number of the Kent and Sussex form of *Dianthoecia carpophaga* bred mainly from pupae found wild, and thus certainly of normal size and of fresh unworn plumage. The ground colour varied from pure white, through bone white and cream to full ochreous. The colour of the markings from the palest ochreous, rich ochreous, deep ochreous, fuscous, pale brown to deep brown and, in some specimens ashy grey is present usually as a second colour with the markings.

Dr. H. B. Williams exhibited a drawer of insects bred and captured in 1930, including :—forms of *Agriades* (*Polyommatus*) *thetis* from Folkestone with abs. *striata*, *obsoleta*, *cinnus* ; a ♀ *P. machaon*, taken August 26th, 1930, flying over clover at Dungeness ; series of *Calymnia pyralina*, bred from Oxshott district ; series of *Cosmotriche potatoria* bred from N.E. Surrey, including a yellow ♂, 3 brown ♀ ♀ and other interesting forms.

He also exhibited a drawer of *Boarmia rhomboidaria* (*gemmaria*) to illustrate recent work on the genetics of the species. This included—two wild ♀ ♀ sent from the Ayrshire Coast in 1927, from one of which ova were obtained. From these a few very light ♂ ♂ were bred in 1928, but although light these were not so remarkably pale as the original form. One of these was paired with a black ♂ ab. *rebeli* from N. Kent. In 1929 the F.1. generation was all black. In 1930 the F.2. gave 34 light forms, 129 black, proving the Ayrshire form to be recessive. Among the light recessives were a very few of the original very pale form, all ♀ ♀, and this form was exhibited

for the first time. At Esher a form of *B. rhomboidaria* occurs which is darker than the pale Ayrshire form, but is NOT *perfumaria*. In 1929 a wild ♂ of this form was mated with a black ♀ (heterozygous F.1. black × Ayrshire). In 1930 from this crossing 29 examples were bred, of which 14 were of the Esher type, and 15 black. This proportion is to be expected from mating a heterozygote with a recessive. *B. rhomboidaria* ab. *rebeli* has been recorded as recessive to the N. Kent "type," which was exhibited and is the ab. *perfumaria* of Newman.

Short series of the following were shown for comparison, *viz.*

(a) bred 1930 from Torquay ♀, a light form.

(b) bred 1930 from wild Ayrshire ♀, a dark, but quite distinct form

(c) bred 1930 from Glasgow, a very dark form.

Mr. C. H. Williams exhibited a drawer showing many extreme varieties of *Abraxas grossulariata* and another of extreme aberrations of *Polyommatus coridon*.

Mr. H. Worsley-Wood exhibited a series of *Metachrostis* (*Bryophila*) *muralis* var. *impar* from Cambridge, 1930; light and dark forms of *Dianthoecia irregularis*, from Mildenhall, Essex; typical and ab. *lineago* of *Mellinia* (*Xanthia*) *ocellaris*, a red brown ab. *lineago*, ab. *palleago*, red brown ab. *intermedia*, a form of ab. *gilvescens* ♀ and ab. *gilvescens*.

Mr. H. Candler exhibited the following species of Fungus found by him during the day. *Sparassis crispa*, *Trametes bulliardi*, *Polyporus schweinitzii*, *P. betulinus*, *Polystictus perennis*, *Geaster fimbriatus*, *Calocera viscosa*, *Lenzites betulina*, *Collybia maculata*, *Flammula sapinea*, *F. carbonaria*, *F. gummosus*, *Pleurotus ulmarius*, etc.

NOVEMBER 13th, 1930.

The PRESIDENT in the Chair.

Mr. C. N. Hawkins exhibited a series of *Xanthia fulvago* bred this year from catkins of Aspen and Sallow collected from various parts of Surrey. The series shown consisted of 3 typical examples; 1 intermediate between typical and ab. *aurantia*, Tutt; 1 ab. *cerago*, Hb.; 1 very heavily but obscurely marked on forewings; 2 ab. *aurantia*, Tutt; and 1 ab. *flavescens*.

Major Hingston then gave a Lecture "Notes of a Naturalist in Guiana" and illustrated it with a large number of lantern slides.

NOVEMBER 27th, 1930

The PRESIDENT in the Chair.

The following new members were declared elected, Miss W. M. A. Brooks of Ealing, Miss D. Aubertin of the British Museum, Messrs. J. A. Downes of Wimbledon, E. E. Johnson of Kingswood, O. A. Alexander of New Cavendish St., D. G. Marsh of Herne Bay, M. Niblett of Wallington, A. M. Morley of Folkestone, T. T. Gilliatt of Folkestone, H. G. Denvill of Coulsdon, and A. J. Merchant of Upminster.

Mr. C. N. Hawkins exhibited a short series of *Polia flavicincta*, Fb. bred September-October, 1930, from ova received in Spring from Mr. H. Worsley-Wood of Cambridge. The larvae were fed throughout on Plum (*P. domesticus*) which they selected from various food plants offered.

Mr. E. C. Stuart-Baker, J.P., F.Z.S., gave a lecture illustrated with a long series of lantern slides, "The Birds of Finland."

DECEMBER 11th, 1930.

The PRESIDENT in the Chair.

Capt. A. Pearman of Purley, Surrey, was elected a member.

Col. Labouchere exhibited examples of the Irish *Chrysophanus rutilus* from the colony established some 16 years ago by Capt. E. B. Purefoy.

Dr. Bull exhibited an asymmetical example of *Drepana falcataria* and a remarkably small (1·1in. in expanse) *Boarmia rhomboidaria* (*gemmaria*) from West Kent District.

Mr. C. G. M. de Worms exhibited several series of autumn species of moths, showing variation in types and markings, all taken in the garden at "Milton Park," Egham, Surrey, during October and November, 1930. There were 50 *Amathes lychnidis*, both sexes, very variable; 25 *Orrhodia vaccinii*, pale and dark forms; 40 *O. ligula*, pale brown to deep chocolate; a series of *Hybernia defoliaria*, pale, mottled to chocolate, taken and bred from Swinley, Berkshire; and a series of *Colotois* (*Himera*) *pennaria* (both sexes).

Mr. Robert Adkin exhibited specimens of the Tineid moth *Meessia argentimaculella* that were taken at rest on the stem of a cypress tree in his garden at Eastbourne at the end of July last,

together with specimens of the Elachistids, *E. gleichenella* and *E. luticomella* for comparison. He pointed out that although the species bore superficial resemblance to one another, the Tineid was at once separable from the others by its rough head.

Dr. Cockayne exhibited a bred series of *Ptychopoda dilutaria* (*holosericata*) the larvae having been fed on knotgrass, with photographs of the ova, preserved larvae, pupa cases and imagines. The ova were coarsely pitted and not like typical Ptychopodid (Acidaliid) ova.

Mr. K. G. Blair exhibited various insects taken on the Field Meetings of the year, including the following :—

Bookham. 17th May.

Galls of *Urophora cardui* on thistle stems, from which had emerged besides the Dipterous gall-maker the following parasitic Hymenoptera* :—*Eurytoma tristis*, Mayr., *E. robusta*, Mayr., *Torymus cyanimus*, Boh., *Habrocytus trypetae*, Ths.(?).

Bryaxis longicornis, swept in plenty.

Scymnus redtenbacheri, a single example.

Xyleborus dispar ♂ ♂ and ♀ ♀ (see p. 46 ante).

Lampyris noctiluca, larva.

Ranmore. May 31st.

Strymon (*Thecla*) *quercûs* together with its Tachinid parasite *Phryxe vulgaris*, Fln.

Lithosia complana reared from a larva found by Mrs. Blair.

Alucita lithodactyla and pupa case, from *Inula vulgaris*.

Cassida fastuosa and pupa case, from *Inula vulgaris*.

Chrysomela hyperici from *Hypericum*.

Epitrix atropae from *Atropa belladonna*.

Perispudus facialis, a large ichneumon-fly of which several specimens, all males, were observed flying about clumps of low-growing honeysuckle. Morley (*Brit. Ich.* IV. 232) notes the same habit on the part of the males of this species. The source of attraction in the present instance could not be discovered, and the host of the species appears to be unknown.

Chalfont Road. July 12th.

Hylesinus fraxini, beetles reared from Ash twigs, with a ♂ of the Chalcid *Cerocephala cornigera* found in one of the burrows.

* For the determination of these I am indebted to Mr. Ch. Ferrière.—K.G.B.

Lissonota errabunda, an ichneumon-fly of which the males were observed flying up and down the trunk of an oak tree (*cf.* note on *Perispudus facialis* above).

BYFLEET. July 26th.

Nothochrysa capitata, one of the ' red ' Lacewing flies.

Sisyra fuscata, of which the larva lives in the freshwater sponge.

Megachile versicolor, a ♀ Leaf-cutter Bee found in its burrows in an old birch stump. Saunders notes that at Woking this species burrows in the sand, but that at Bury St. Edmunds, Tuck found it in an old Broom stump. The burrow in this case was in course of construction and no cells were present, but a similar burrow in another stump contained cells made of the wood chips with no leaf walls.

Eggs of Fox Moth with their parasites *Telenomus bombycis* (see p. 55 ante).

Phyllobrotica quadrimaculata from *Scutellaria*.

Ectobia lapponica, an immature example of this little wild cockroach.

Mr. Blair also exhibited the following aberrations or varieties of Lepidoptera :—

Polyommatus thetis (*bellargus*), a ♂ from Ranmore with the tips of the forewings shaped almost as in *Gonepteryx rhamni*. The fringes were complete and the tips quite symmetrical ; the unusual shape was evidently not due to injury.

Hydriomena furcata (*elutata*) ab. *infuscata*, ♂ and ♀ reared from larvae taken on the Ramnore Field Meeting, the ♀ particularly almost uniformly dark brown.

Xanthorhoë fluctuata ab. *costovata*, Haw. from Hendon, with the central spot even smaller than in South's figure. The specimen was rather small and the scaling of the wing notably deficient, the individual scales small and narrow, with about 3 apical teeth instead of the normal 5 or 6.

Mr. H. Moore exhibited the Syntomid moth *Lymire edwardsi* from Florida a locality which is on the extreme northern verge of its range and another moth, an Hyponomeutid, *Atteva gemmata* which is only found in S. Florida.

Mr. K. G. Blair read the Reports of the Field Meetings held at Chalfont and Latimer on July 30th, 1930 (See p. 49) and at Byfleet on July 26th, (See p. 52).

Mr. L. W. Newman gave an account of his experiences with

Lepidoptera during the past season, of which the following is a short summary.

He did no sallowing in the spring.

In one of his particular localities *Eutricha quercifolia* larvae were absolutely abundant, but other species usually abundant at that time, such as *Arctia caja* and *A. villica* were practically absent.

The " whites " appeared in ones and twos in early April, then there was practically a break in the emergence, the bulk of the broods coming out in May and up to the middle of June. The second brood of *Pieris brassicae* was virtually absent; in August only one or two being seen at Royston. At Easter he saw one at Broadstairs.

Lycaenopsis argiolus. One or two were seen in March and a few in May but the bulk appeared in June up to the 15th. The second brood was very scarce and at Folkestone the species was very rare this season.

Polyommatus thetis was very abundant in the 1st brood but no variation was met with. The 2nd brood was very early and well out by August 22nd and lasted until September 5th or 6th; by the 12th nothing but rags remained.

Brenthis selene and *B. euphrosyne* were both well out by June 3rd in the Oxford district.

Colias croceus. A ♂ was seen in Bexley on June 17th. He has now seen it five years in succession in his neighbourhood in the spring. He understood that it had occurred in quantities at Bournemouth in October.

Polyommatus coridon as usual was abundant about July 15th. It was generally scarce at Royston and abundant at one remote spot only. Of aberrations he found practically none. It was met with in Wiltshire in mid September.

Both *Argynnis aglaia* and *Plebeius aegon* were abundant by July 1st.

Polygonia c-album apparently hibernated around Oxford where it occurred in early April. It was met with in gardens in the centre of Bournemouth, some even in October. The broods which he had under observation overlapped and almost every day from April 3rd until the end of the season there were emergences. The last to emerge was on Dec. 27th (indoors). A ♀ with careful feeding will lay for six or eight weeks.

Pyrameis cardui. He saw none this season and only one last.

Polyommatus icarus was extremely scarce in both broods.

Pyrameis atalanta. There was a very late immigration and he must have seen some hundreds of ♀s laying eggs on the annual nettle in a celery field at 11 a.m. but in the afternoon of the same day not one was to be seen. Subsequently he did not see another until the emergence took place, when they were in such abundance that a local journal remarked on the "Invasion of the Reds."

Hyloicus pinastri. He had been breeding this species. About 45 pupae had been sent to him from Dorset and these had emerged from May 15th, through June, July (the bulk) until August 23rd, and one as late as October 25th, 4 pupae were lying over. He found pairings were easy to get and he had about 300 ova. He found that unless the young larva eats its shell it invariably dies. He fed the young larvae at first on young pine needles. Until half grown they fed well and grew fast, then they began to wander. After that they fed on the older needles. But on account of an attack of dysentery he had obtained only 10 pupae.

Papilio machaon. He had striven to breed a black form but was very doubtful of success. At last he was able to cross a black ♀ with a typical ♂. Of the ova obtained 50% were infertile. The young larvae were very delicate and only 20 pupae resulted. From these he bred 4 in August of which 2 were black (2nd brood).

Phigalia pedaria he had seen on a Bexley lamp on December 5th.

In the discussion which ensued the President said that he saw numerous examples of *C. croceus* near Freshwater in September, that *P. coridon* was still out on September 20th when he saw a fresh ♀ at the same place; he had not seen *P. cardui* this year and only a few last year. Mr. R. Adkin said the 2nd brood of *P. brassicae* usually so abundant at Eastbourne had been exceedingly scarce; of *L. argiolus* he had seen no larvae and had only found evidence of feeding in two places, on the wall where he had always met with it in other years. As to *P. thetis*, on the contrary it had been more common than of late, and of *P. coridon* he had found one at the beginning of October in good condition; *Melanargia galathea* had also been more common than formerly. Mr. Hugh Main reported plenty of larvae of *P. brassicae* feeding on nasturtium in September. Mr. Tonge had seen three *P. c-album* in Surrey, an example of *C. croceus* at Earlswood on October 31st and in 1917 he had found a *P. pedaria* on November 29th which he thought was one of the earliest recorded. Dr. Williams said that *Dryas paphia* had occurred in a wood near St. Albans where it had not been noted

previously and that *Limenitis sibilla* had been reported from Ashtead. Dr. Bull said that "whites" had been scarce in W. Kent, *B. euphrosyne* had occurred earlier than usual, he had seen *Eugonia polychloros* and that there was no doubt that *L. sibilla* was also spreading. Mr. Grosvenor reported an *E. polychloros* from Redhill, that *L. sibilla* was certainly becoming abundant in Tilgate and that he had heard of one being met with at Ealing.

In addition it was mentioned that a brood of larvae of *E. polychloros* had been obtained in Sussex and another from Hants, *P. c-album* was reported near Farnham, and even abundant in some parts of Sussex and Surrey, the larvae of both *Eumorpha elpenor* and *Theretra porcellus* had been common in some places and both species had been found in the swampy parts of Wimbledon Common.

JANUARY 8th, 1931.

The President in the Chair.

Special Meeting.

Owing to an oversight the List of Nominations for Officers and Council were not sent out before December 6th, as required by the new bye-laws. To regularise the business of the Annual Meeting the following resolution was put to the meeting and passed *nem. con.*

"That the holding of the Annual Meeting on January 22nd, 1931 and the ordinary business transacted thereat, be hereby made valid."

Ordinary Meeting.

The President exhibited the living larvae of *Lithosia griseola*, Hb. and communicated the following note.

"The larvae exhibited were bred from ova laid by a ♀ of form *stramineola*, Dbld. taken at Byfleet on 26.vii.30.

Ova laid 26-27.vii.30. Larvae hatched 6-7.viii.30. 1st moult 12-14.viii.30. 2nd moult 20-23.viii.30. 3rd moult about 28-viii-30. 4th moult about 7.ix.30. 5th moult and subsequent moults uncertain but frequent. The total number of moults is estimated at not less than 12 or 14.

With the exception of one larva which pupated on 22.x.30, all have continued to feed steadily until the last few days, but most of them have now pupated or spun up.

The larvae fed throughout on sallow leaves (with a little *Polygonum* in the early stage) and have been kept in a closed glass-topped box. For so long as possible they were fed on freshly gathered leaves;

later and until very recently they were fed on fallen sallow leaves (many of which were still partly green) collected from the ground and now they are feeding on dry sallow leaves which are damped before being placed in the box. The fresh or partly green fallen leaves were eaten very readily but the dried leaves are evidently not so well liked. [Since the above note was written 15 imagines have been bred and were exhibited at the meeting held on April 9th, 1931. The imagines consisted of 7 *griseola* (4 ♂ ♂ and 3 ♀ ♀) and 8 *stramineola* (6 ♂ ♂ and 2 ♀ ♀, including 3 ♂ ♂ with patches of the *griseola* colour on forewings)].

Dr. H. W. Williams exhibited four examples of *Agrotis segetis* (*segetum*), ab. *nigricornis*, Villers, the form with entirely black wings from the Isle of Man; they were of a more intense black than is the dark London form.

Mr. Buckstone exhibited several extremely dark examples of *Ortholitha mucronata* (*palumbaria*) from Headley, taken in 1921. It was the ab. *nigrescens*, Ckll.

Mr. Stanley Jacobs exhibited the cocoons of a parasite found in the skin of a dead larva of a *Lithocolletis*, either *L. kleemannella* or of *L. froelichella*, from Bromley.

Mr. Ferrier exhibited a species of *Hemerobius*.

Mr. Britten (of Manchester) exhibited two living larvae of *Pieris brassicae* of which a batch was feeding in the open at the present time. At first they were on the common Nasturtium but now were feeding on Wallflower.

Mr. H. Moore exhibited *Hipparchia semele* from Coliton Raleigh in North Devon. The worn male was from high ground and quite typical, but the females taken on low down boggy ground were unusually dark.

Dr. Bull said that a *Pieris rapae* had emerged on December 13th in the warmth of a kitchen.

The remainder of the evening was devoted to the exhibition of lantern-slides. Mr. Britten showed a series of coloured slides of Lepidoptera, the wasp *Odynerus annulata*, the mayfly, a very fine series of views of a heron stalking and capturing a vole, and another series the feeding of a nestling cuckoo by its foster parent a meadow pipit. One slide showed the bird with a "white" in its beak. Mr. Sims exhibited a series of slides showing the life-history of the lace-wing fly, of *Chrysopa septempunctata*, and of the emergence of *Lestes sponsa*, calling attention to the resting period during the emergence. Mr. R. Adkin showed a slide of Blackheath in 1780, illustrations from White's Selborne (first edition), of the apple aphis and other slides.

JANUARY 22nd, 1931.

ANNUAL MEETING.

Mr. C. N. HAWKINS, F.E.S., PRESIDENT, in the Chair.

The Reports of the Treasurer and Council and the Balance Sheet were read and adopted.

The following is the List of Officers and Council elected for the year 1931 :—

President.—K. G. Blair, B.Sc., F.E.S.

Vice-Presidents.—Col. F. Labouchere, F.E.S., and E. Step, F.L.S.

Hon. Treasurer.—A. E. Tonge, F.E.S.

Hon. Librarian.—E. E. Syms, F.E.S.

Hon. Curator.—S. R. Ashby, F.E.S.

Hon. Secretaries.—S. Edwards, F.L.S., F.Z.S., F.E.S. (*Corresponding*), and Hy. J. Turner, F.E.S., F.R.H.S. (*Report*).

Hon. Lanternist.—J. H. Adkin.

Council.—E. A. Cockayne, A.M., D.M., F.R.C.P., F.E.S., H. W. Andrews, F.E.S., S. N. A. Jacobs, A. E. Stafford, O. J. Janson, F.E.S., A. de B. Goodman, F.E.S., T. R. Eagles, F.E.S., C. Jarvis, F. J. Coulson, and C. N. Hawkins, F.E.S.

The President read the Annual Address (see p. 14) and the new President Mr. K. G. Blair, then took the Chair.

Votes of Thanks were passed to the retiring President, Officers and Council and to the Auditors for their services during the past year.

ORDINARY MEETING.

Mr. K. G. BLAIR, B.Sc., F.E.S., PRESIDENT in the Chair

Mr. Hy. J. Turner exhibited (1) A series of the very variable Noctuid *Ophiodes* (*Minucia*) *lunaris* from S. of France, etc., with its forms ab. *murina*, mouse coloured throughout, and ab. *rufa*, red-brown with the markings more or less obsolete: (2) specimens of the beautiful *Dianthoecia luteago*, of which *barrettii* is said to be the British form, from Austria; and (3) an example of *Dianthoecia albimacula*, in which the stigmata, instead of white coloration, were of a distinct yellow, from Bulgaria. This last form was quite unknown to those present.

INDEX.

NEUROPTERA

ORTHOPTERA

PLANTS.

ADDENDA AND CORRIGENDA

TO THE

"Proceedings of the S. Lond. Entomological & N.H. Soc."

For 1931-32 on Cover substitute **1930-31.**

Legends of Plates II. III. IV.

PLATE II.

1. Sphinx ligustri × 10.
2. Pheosia dictaeoides × 10.
3. Polyploca flavicornis × 20.
4. Orgyia antiqua × 10.

PLATE. III.

5. Cosmotriche potatoria × 10.
6. Endromis versicolor × 10.
7. Saturnia pavonia × 5.
8. Drepana lacertinaria × 20.

PLATE IV.

9. Nola cucullatella × 25.
10. Hylophila bicolorana × 20.
11. Diacrisa mendica × 10.
12. Lithosia lurideola × 20.

[*To be inserted in copy after the Index.*

THE ABSTRACT OF PROCEEDINGS

For 1886, 1887, 1888-9 (1 Vol.),
1890-91 (1 Vol.), 1892-3 (1 Vol.),
1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901,
1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909,
1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917,
1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925,
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MEETINGS OF THE SOCIETY.

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

1931-1932.

1931:—June 11th, 25th; July 9th, 23rd; August 13th, 27th; September 10th, 24th; October 8th, 22nd; November 12th, 26th; December 10th.

1932:—January 14th, 28th; February 11th, 25th; March 10th, 24th; April 14th, 28th; May 12th, 26th; June 9th, 23rd; July 14th, 28th.

LIBRARY OPEN AT 6.30 p.m., CHAIR TAKEN AT 7 p.m.

MEMBERS exhibiting specimens at the Meetings of the Society are requested to be good enough to hand to the Secretary, at the Meeting, a note in writing of the generic and specific names of the specimens exhibited, together with the names of the localities at which such specimens were obtained, and any remarks thereon which the exhibitors have to make. In the absence of such a note in writing the Secretary cannot be responsible for any errors in connection with his report of such exhibits, or for the omission of any reference thereto in the Proceedings.

N ENT. SOC. PROCEEDINGS