Published by the Society, with the assistance of the following Gentlemen:

Messrs. H. W. ANDREWS, Robt. ADKIN, W. G. SHELDON, F. COOTE, H. MAIN, A. E. TONGE, and Hy. J. TURNER.

and the

REPORT COMMITTEE

R. ADKIN, STANLEY EDWARDS, E. STEP, A. E. TONGE, H. J. TURNER, Hon. Editor.

[illegible] & CO., [illegible]

THE SOUTH LONDON
Entomological & Natural History Society

(Established 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E. 1.

OFFICERS & COUNCIL

1926-27.

President.

T. H. L. GROSVENOR, F.E.S.

Vice-Presidents.

E. A. COCKAYNE, M.D., M.A., F.E.S.

N. D. RILEY, F.E.S., F.Z.S.

Council.

J. H. ADKIN.
H. W. ANDREWS, F.E.S.
C. CRAUFURD.
A. W. DENNIS.
S. B. HODGSON.
W. RAIT-SMITH, F.Z.S., F.E.S.
E. STEP, F.L.S.
W. H. T. TAMS, F.E.S.
H. WORSLEY-WOOD, F.E.S.

Hon. Curator.

S. R. ASHBY, F.E.S.

Hon. Librarian.

E. E. SYMS., F.E.S.

Hon. Editor.

H. J. TURNER, F.E.S., 98, Drakefell Road, New Cross, S.E. 14.

Hon. Treasurer.

A. E. TONGE, F.E.S., "Aincroft," Grammar School Hill, Reigate.

Hon. Secretaries.

S. EDWARDS, F.L.S., F.Z.S., F.E.S., etc. (*General Sec.*),
15, St. Germans Place, Blackheath, S.E. 3.

H. J. TURNER, F.E.S., 98, Drakefell Road, New Cross, S.E. 14

THE SOUTH LONDON

ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from 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.

SUBSCRIPTION.

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

All Communications to be addressed to the Hon. Gen. Secretary,
STANLEY EDWARDS, F.L.S., &c.,
15, St. Germans Place, Blackheath, S.E. 3.

PAST PRESIDENTS.

1872-4.. J. R. Wellman (dec.).
1875-6.. A. B. Farn, F.E.S. (dec.).
1877 .. J. P. Barrett, F.E.S. (dec.).
1878 .. J. T. Williams (dec.).
1879 .. R. Standen, F.E.S. (dec.).
1880 .. A. Ficklin (dec.).
1881 .. V. R. Perkins, F.E.S. (dec.).
1882 .. T. R. Billups, F.E.S. (dec.).
1883 .. J. R. Wellman (dec.).
1884 .. W. West, L.D.S. (dec.).
1885 .. R. South, F.E.S.
1886-7.. R. Adkin, F.E.S.
1888-9.. T. R. Billups, F.E.S. (dec.).
1890 .. J. T. Carrington, F.L.S. (dec.)
1891 .. W. H. Tugwell, Ph.C. (dec.)
1892 .. C. G. Barrett, F.E.S. (dec.)
1893 .. J. J. Weir, F.L.S., etc. (dec.)
1894 .. E. Step, F.L.S.
1895 .. T. W. Hall, F.E.S.
1896 .. R. South, F.E.S.
1897 .. R. Adkin, F.E.S.
1898 .. J. W. Tutt, F.E.S. (dec.).
1899 .. A. Harrison, F.L.S. (dec.).
1900 .. W. J. Lucas, B.A., F.E.S.
1901 .. H. S. Fremlin, F.E.S., etc.
1902 .. F. Noad Clark.
1903 .. E. Step, F.L.S.
1904 .. A. Sich, F.E.S.
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 .. T. H. L. Grosvenor, F.E.S.

LIST OF MEMBERS.

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

YEAR OF ELECTION.

1920 ABBOT, S., 110, Inchmery Road, Catford, S.E. 6. *l.*

1886 ADKIN, B. W., F.E.S., "Trenoweth," Hope Park, Bromley, Kent. *l, orn.*

1922 ADKIN, J. H., *Council, Hon. Lanternist*, "Ravenshoe," Furze Hill, Burgh Heath, Surrey. *l.*

1882 ADKIN, R., F.E.S., "Hodeslea," Meads, Eastbourne. *l.*

1901 ADKIN, R. A., "Hodeslea," Meads, Eastbourne. *m.*

1925 ALDER, R. C., 15, Abbottshall Road, Catford, S.E.6. *l.*

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., 6, Castelnau Gardens, Barnes, S.W. 13. *e, l.*

1895 ASHBY, S. R., F.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c, l.*

1924 ATKINSON, F., 4, Melrose Road, Wandsworth, S.E. 18.

1888 ATMORE, E. A., F.E.S., 2A, New Conduit Street, King's Lynn, Norfolk. *l.*

1923 BAKER-SLY, H., "Eden Lodge," Westcott Road, Dorking. *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.*

1921 BATES, John, 81, Birkbeck Mansions, Hornsey, N. 8. *l.*

1924 BIRD, Miss F. E., 95, Lewin Road, Streatham, S.W. 16.

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

1911 BLENKARN, S. A., F.E.S., "Rannoch Lodge," 44, Grovelands Road, Purley. *l, c, odonata.*

YEAR OF ELECTION.

1898 BLISS, M. F., Capt., M.C., M.R.C.S., L.R.C.P., F.E.S., Butlin's Hill, Braunton, near Rugby. *l.*

1925 BLYTH, S. F. P., "Cleveland," Chislehurst, Kent. *l.*

1923 BOUCH, Baron J. A., "Springfield," S. Godstone, Surrey. *l.*

1923 BOWLES, L. G., 193, Brockley Rise, Honor Oak Park, S.E.23. *l.*

1909 BOWMAN, R. T., "Rockbourne," Keswick Road, Orpington, Kent. *l.*

1919 BOX, L. A., Lieut., F.E.S., 35, Gt. James Street, W.C.1. *h.*

1909 BRIGHT, P. M., F.E.S., "Colebrook Grange," 58, Christchurch Road, Bournemouth. *l.*

1925 BROOK, R. S., "Highclere," Oakleigh Park, Whetstone, N.20. *b.*

1923 BROCKLEHURST, W. S., "Grove House," Bedford. *l.*

1924 BROOKE, Mrs. M. L., 48, Anerley Park, S.E.20. *l.*

1921 BUCKHURST, A. S., F.E.S., 9, Souldern Road, W. 14. *l.*

1909 BUCKSTONE, A. A. W., 307A, Kingston Road, West Wimbledon, S.W. 20. *l.*

1915 BUNNETT, E. J., M.A., 19, 'Silverdale,' Sydenham, S.E. 26. *mi.*

1922 BURCH, W., 35, Ansdell Road, Peckham, S.E. 15. *l.*

1922 BUSHBY, L. C., F.E.S., 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, F. B., 46, Handen Road, Lee, S.E. 12. *l.*

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

1872 CHAMPION, G. C., A.L.S., F.Z.S., F.E.S., Bromhill Road, Horsell, Woking. *c.* (*Hon. Member*).

1924 CHAPMAN, Miss E. F., "Betula," Reigate.

1924 CHAPMAN, Miss L. M., "Betula," Reigate.

1922 CHEESEMAN, C. J., 30, Clayton Road, Peckham, S.E. 15. *l.*

1879 CLODE, W. (*Life Member.*)

1915 COCKAYNE, E. A., M.A., M.D., F.R.C.P., F.E.S., *Vice-President*, 116, Westbourne Terrace, W. 2. *l.*

1920 COCKS, F. W., F.E.S., 42, Crown Street, Reading. *l.*

1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E. 22. *l, ool, orn.*

1907 COOTE, F. D., 11, Pendle Road, Streatham, S.W. 16. *l, b.*

1919 COPPEARD, H., 12, King's Avenue, Greenford, Middlesex. *l.*

YEAR OF ELECTION.

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. *l.*

1909 COULSON, F. J., 17, Birdhurst Road, Colliers Wood, Merton, S.W. 19. *l.*

1918 COURT, T. H., F.R.G.S., "Willow Cottage, Market Rasen, Lincolnshire. *l.*

1902 COWHAM, F. W., 118, Minard Road, Catford, S.E. 6. *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, *Council*, "Dennys," Bishops Stortford. *l.*

1920 CROCKER, Capt. W., "Rostellan," May Place Road, E. Bexley Heath. *l.*

1898 CROW, E. J., 70, Hepworth Road, Streatham High Road, S.W. 16. *l.*

1925 DANNATT, W., F.Z.S., "St. Lawrence," Gaibal Road, Burnt Ash, S.E. 12. *l.*

1888 DAWSON, W. G., F.E.S., Bromley Court Hill Hotel, Bromley, Kent. (*Life Member.*) *l.*

1900 DAY, F. H., F.E.S., 26, Currock Terrace, Carlisle. *l, c.*

1889 DENNIS, A. W., *Council*, 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.*

1912 DUNSTER, L. E., *Recorder of Attend.*, 44, St. John's Wood Terrace, N.W.3. *l.*

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., 3, Lancaster Place, Belsize Park, N.W.3. *c, orn.*

1920 ENEFER, F. W., "Burnham," 143, Westcombe Hill, Blackheath, S.E.3.

Year of Election.

1915 Fagg, T. A., 55, Mt. Pleasant Road, Lewisham, S.E. 13. *l.*

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

1918 Farquhar, L., 2, Darnley Road, Holland Park, W. 11. *l.*

1924 Fassnidge, Wm., m.a., 47, Tennyson Road, Portswood, Southampton. *l, n, trich, he.*

1923 Fawthrop, Rev. R. W., 4, St. Pauls Avenue, Cricklewood, N.W.2. *l.*

1923 Fisher, R. C., b.sc., ph.d., Rothamstead, Exp. Stn., Harpenden.

1887 Fletcher, W. H. B., m.a., f.e.s., Aldwick Manor, Bognor, Sussex. (*Life Member.*) *l.*

1889 Ford, A., "South View," 36, 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., White House Farm, Bedmond, by King's Langley, Herts. *l.*

1919 Frisby, G. E., f.e.s., 29, Darnley Road, Gravesend. *hym.*

1912 Frohawk, F. W., m.b.o.u., f.e.s., Romney Cottage, Park Hill, Carshalton, Surrey. *l, orn.*

1914 Fryer, J. C. F., f.e.s., "Chadsholme," Milton Road, Harpenden, Herts. *l, ec. ent.*

1911 Gahan, C. J., d.sc., m.a., f.e.s., British Museum (Natural History), South Kensington, S.W. 7. *c.*

1920 Gauntlett, H. L., f.e.s., m.r.c.s., l.r.c.p., "Van Buren," de Lisle Road, Bournemouth. *l.*

1925 Gaynor, Dr., m.a., m.r.c.p., "Old Linkfield," Redhill, Surrey. *ent.*

1920 Goodman, A. de B., 210, Goswell Road, E.C. 1. *l.*

1920 Goodman, O. R., f.z.s., f.e.s. 210, Goswell Road, E.C.1, and "Hatchgate," Massetts Road, Horley, Surrey. *l.*

1926 Gordon, D. J., b.a., e.e.s., 34, Burton Court, Sloane Square, S.W.3. *col., lep.*

1924 Grant, F. T., 37, Old Road West, Gravesend. *l.*

1925 Graves, P. P., f.e.s., 17, Manson Place, Queen's Gate, S.W.7. *l.*

Year of Election.

1923 Gray, C. J. V., School House, "B," Bradfield College, Berks. *l.*

1918 Green, E. E., F.E.S., "Ways End," Camberley, Surrey. *hem.*

1924 Greer, T., J.P., Curglasson, Stewartstown, Co. Tyrone. *l.*

1911 Grosvenor, T. H. L., F.E.S., *President*, Springvale, Linkfield Lane, Redhill. *l.*

1884 Hall, T. W., F.E.S., 61, West Smithfield, E.C. 1. *l.*

1891 Hamm, A. H., F.E.S., 22, Southfields Road, Oxford. *l.*

1906 Hammond, L. F., "Invermoriston," Green Lane, Purley. *l.*

1903 Hare, E. J., F.E.S., 4, New Square, Lincoln's Inn, W.C. 2. *l.*

1926 Harmsworth, H. A. B., 3, Marlborough Gate, Hyde Park, W.2.

1911 Harris, P. F., 130, Harrow Road, W.2. *l.*

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

1924 Hawkins, C. N. 23, Dalebury Road. Upper Tooting, S.W.17.

1913 Haynes, E. B., 82a, Lexham Gardens, W. 8. *l.*

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

1920 Hemming, A. F., F.Z.S., F.E.S., 25, Scarsdale Villas, W. 8. *l.*

1924 Henderson, J. L., 55, Wharfedale Gardens, Thornton Heath, S.E.25. *l.*

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

1919 Humphreys, J. A., c/o Eastern Telegraph Co. Ltd., P.O. Box 231, Cape Town, S. Africa. *l.*

1914 Jackson, W. H., F.E.S., "Pengama," 14, Woodcote Valley Road, Purley. *l.*

1923 Jacobs, S. N. A., 5, Exbury Road, Catford Hill, S.E.6. *l.*

1924 James, A. R., 7, Broadlands Road, Highgate, N.6. *l.*

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

1925 Jarvis, C., 12, Claylands Road, Clapham, S.W.8.

1922 Jobling, Boris, 52, Charleville Road, W. Kensington, W. 14. *med. ent.*

1923 Johnstone, J. F., "Ruxley Lodge," Claygate, Surrey. *l.*

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

1920 Joicey, J. J., F.L.S., F.E.S., F.R.G.S., etc., "The Hill," Witley, Surrey. *l.*

1920 Jump, A. C., 108, Trinity Road, Wandsworth Common, S.W.17.

1898 Kaye, W. J., F.E.S., "Caracas," Ditton Hill, Surbiton, Surrey. *l, S. American l.*

YEAR OF ELECTION.

1900 KEMP, S. W., B.A., Indian Museum, Calcutta. *l, c.*

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

1925 KIMMINS, D. E., 16, Montrose Road, Penge, S.E. 20. *l.*

1925 LABOUCHERE, Lt-Col., F. A., 15, Draycott Avenue, S.W.3.

1924 LANGHAM, Sir Chas., Bart., F.E.S., Tempo Manor, Co. Fermanagh. *l.*

1922 LEECHMAN, C. B., "Bank House," Russell Hill Road, Purley, Surrey. *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.*

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.*

1920 LINDEMAN, F., c/o Rio de Janeiro Tramway Light and Power Co., Caixa Postal 571, Rio de Janeiro, Brazil. *l.*

1924 LISTER, J. J., M.A., F.R.S., F.L.S., F.E.S., "Merton House," Grantchester, Cambridge. *l.*

1922 LOCK, A. K. (Miss), F.Z.S., 77, Grove Hill Road, Denmark Park, S.E. 5. *l.*

1926 LONG, R. M., 21, Guy Road, Beddington, Surrey. *l.*

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

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.S. *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.*

1889 MANSBRIDGE, W., F.E.S., "Dunraven," Church Rd., Wavertree, Liverpool. *l, c., etc.*

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

1916 MASON, G. W., 99, Seaford Road, Ealing, W.5. *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.*

YEAR OF ELECTION.

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.*

1911 MORICE, The Rev. F. D., M.A., F.E.S., "Brunswick," Mt. Hermon, Woking. (*Life Member.*) *h.*

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

1925 MOUNSEY, D., 40, Temple Road, Croydon. *Ent, Ornith.*

1923 MUNROE, J. W., D.SC., F.E.S., "Green Lawn," Kew Road, Richmond, Surrey.

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.*

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.*

1923 PARKER, F. A., 205, Lauderdale Mansions, Maida Vale, W.9. *l.*

1926 PEARSON, D. H., F.E.S., Chilwell House, Notts. *l.*

1915 PEARSON, G. B., Coconut Grove, P. O., nr. Miami, Florida, U.S.A. *l.*

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

1887 PORRITT, G. T., F.L.S., F.E.S., "Elm Lea," Dalton, Huddersfield. *l, n.*

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

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

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.*

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

1904 PRISKE, R. A. R., F.E.S., 9, Melbourne Avenue, 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., *Council*, "Birkby House," Bickley Park, Kent. *l.*

1925 RALFS, Miss E. M., "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.*

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

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

1919 ROBERTS, J. G., "Nantglyn," Hadley Road, New Barnet.

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.* (*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.*

1921 RUGGLES, HY., 146a, Southfield Road, Bedford Park, W. 4.

1915 RUSSELL, S. G. C., F.E.S., "The Elms," Eastrop, Basingstoke, 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.*

1922 SEABROOK, Lieut. J. C., F.E.S., 8, West Warwick Place, Belgravia, S.W. 1. *l.*

1923 SEVASTOPULO, D. G., c/o Ralli Bros., Karachi. *l.*

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

Year of Election.

1898 Sich, Alf., f.e.s., "Corney House," Chiswick, W. 4. *l.*

1925 Simmons, A., 42, Loughboro Road, W. Brideford, Nottingham. *l.*

1920 Simms, H. M., b.sc., f.e.s., "The Farlands," Stourbridge.

1903 Smallman, R. S., f.e.s., "Hethersett," 30, Leigham Court Road, Streatham, S.W.16. *l, c.*

1921 Smart, Major, H. D., r.a.m.c., m.d., d.sc., f.e.s., 172, High Road, Solway Hill, Woodford Green. *l.*

1908 Smith, B. H,, b.a., f.e.s., "Frant Court," Frant, nr. Tunbridge Wells. *l.*

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

1890 Smith, William, "Hollybank," 76, Oakshaw Street, Paisley. *l.*

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

1925 Soliman, Hamid Salem, f.e.s., 140, Holland Road, W.14. *ent.*

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., 98, Cowley Road, Mortlake, S.W. 14.

1872 Step, E., f.l.s., *Council*, 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., 15, Benson Road, Forest Hill, S.E. 23. *l.*

1923 Stolzle, R. W., 15, Benson Road, Forest Hill, S.E. 23. *c.*

1910 Stoneham, Capt. H. F., f.e.s., m.b.o.u., Charangani, Trans-Nzoia, Kenya Colony, Brit. E. Africa. *l.*

1924 Storey, W. H., 31, Burton Street, W.C. 1. *l.*

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.*

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., 24, Winchester Avenue, Brondesbury, N.W.6. *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.*

1887 TURNER, H. J., F.E.S., *Hon. Editor*, 98, Drakefell Road, New Cross, S.E. 14. *l, c, n, he, b.*

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

1921 VESTERLING, A. W., 107, Castle Street, Battersea, S.W. 11. *l.*

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

1889 WAINWRIGHT, C. J., F.E.S., "Daylesford," Handsworth Wood, Birmingham. *l, d.*

1911 WAKELY, L. D., 11, Crescent Road, Wimbledon Common, S.W. 19. *l.*

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

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

1920 WATSON, D., "Stewart House," 27, Overcliffe, Gravesend.

1922 WATSON, E. B., F.E.S., Entomological Branch, Dept. of Agriculture, Ottawa, Ontario, Canada. *l.*

1925 WATTS, L. W., 3, Holbrook Lane, Chislehurst. *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.*

1920 WIGHTMAN, A. J., F.E.S. 35, Talbot Terrace, Lewes, Sussex. *l.*

1914 WILLIAMS, B. S., "St. Genny's," Kingscroft Road, Harpenden. *l, c, hem.*

1912 WILLIAMS, C. B., M.A., F.E.S., Ministry of Agriculture, Cairo, Egypt, and 20, Slatey Road, Birkenhead. *l, ec. ent.*

1925. WILLIAMS, H. B., LL.D., F.E.S., Briar Cottage, Claygate, Surrey, *b.*

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

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

1920 WITHYCOMBE, C. L., D.SC., F.E.S., Cambridge. *l, b, n, mi, ec, ent.*

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

1921 WORSLEY-WOOD, H., F.E.S., *Council*, 31, Agate Road, Hammersmith, W. 6. *l.*

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

1925. ZOHEIRY, Mehammed Soliman El., F.E.S., 43A, Matheson Road, W. Kensington, W.14.

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, 1925.

THE Council in presenting the fifty-fourth Annual Report is pleased to state that the Society continues to be in a satisfactory condition. There is a slight increase in the membership, which now numbers 242, made up as follows:—232 Subscribing Members, 4 Honorary, and 6 Life.

The Council regrets to report the deaths of two members, Prof. Maxwell Lefroy and A. G. West.

There have been 6 resignations, and 8 names have been removed for non-payment of subscriptions.

The average attendance shows a gratifying increase on that of the previous year.

The Annual Exhibition was held on November 26th, and the attendance was the highest on record, 212 members and friends being present. A new departure in the procedure was made, all the exhibits being placed on tables, and another new feature was that of refreshments, for which the thanks of the Society are due to the President and Mr. O. R. Goodman, who made themselves responsible for the necessary arrangements. These innovations were very acceptable to the company present, and your Council hopes that in the future, it may be possible to adopt similar arrangements for the Annual Exhibition Meeting.

Mr. Dennis has again officiated as Hon. Lanternist, and it is with regret that he is resigning the duties which he has so ably filled for many years. He is succeeded by Mr. J. H. Adkin, who will no doubt, prove a very efficient Hon. Lanternist.

Papers have been read before the Society by R. Adkin, O. R. Goodman, W. J. Lucas, and Dr. A. B. Rendle, F.R.S.

Short Addresses were given by Dr. Fremlin and Mr. Urich.

There have been special exhibitions of "Other Orders," Exotic Insects, and Living Objects; and throughout the year many species of Lepidopterous larvae have been exhibited.

There are many members whose portraits do not yet fill the spaces in the Album; and the Council urge those members who have not yet contributed their portrait to do so at an early date.

The Honorary Curator reports as follows:—During the past year numerous additions were made to the Society's Collections: British

Lepidoptera from Messrs. R. Adkin and A. A. W. Buckstone, Odonata from Mr. W. J. Lucas and Coleoptera from Mr. K. G. Blair, and Captain Riley gave a drawer of Algerian Butterflies.

The Honorary Librarian, Mr. A. W. Dods, reports that the main point concerning the Library for the past year has been the very kind and thoughtful donation by Mr. Robert Adkin, of a new bookcase, giving nearly half as much again accommodation, and the consequent facility of housing those books of the "Ashdown" bequest, which the Council decided to retain. A further number of surplus and duplicate books and papers have been sold to members and the proceeds have been handed to the Treasurer. The Library is now a very comprehensive one, containing not only the usual modern standard works for consultation, but also a considerable number of the older standard works for reference, and is much used and consulted by the members. Your Council much regrets that Mr. Dods has decided to resign the honorary post, which he has held for the past 18 years, and they would wish to put on record how much the members of the Society are indebted to him for his long-continued self-denial, both in having the care of the Ashdown books for a long period and in bringing the Library to its present state of efficiency. Mr. Syms succeeds him in the office.

Field Meetings were held at Oxshott, Boxhill, Byfleet, Horsley, Witley (with the kind invitation of Mr. J. J. Joicey), Westerham in place of Ashdown Forest (which could not be arranged), and a Fungus Foray at Boxhill in the autumn, the weather for these meetings was very favourable on the whole.

Your Council elected Representatives to attend the British Association at Southampton—Mr. R. Adkin, the Congress of the S.E.U.S.S. at Folkestone—Mr. H. J. Turner, and the International Congress of Entomology at Zurich—Messrs. A. Sich and H. J. Turner. Short reports of these meetings were given by these Representatives.

The Volume of Proceedings published in May consists of xix. and 143 pages with eight plates and two text figures.

The following is a list of the additions to the Library during the year. By exchange, unless otherwise stated.

Books.—Frohawk, "Nat. Hist. of Brit. Butterflies," Mr. R. Adkin; Cameron "Brit. Phytoph. Hym." Vol. I. Mr. Blenkarn; Imms, "Text Book of Ent.," Mr. R. Adkin; Sharp, W. E., "Common Beetles," 4 vols., Mr. E. Step.; Step, E., "Trees and Flowers," 2 vols., The Author; "Spider Crabs of

America," Smith. Ins.; "Diatoms of the Phillipine Islands"; "N. American Wild-fowl,"; Wood "Palaeontology," Mr. W. J. Lucas; "Études Lep. Comp.," fasc. VI.(1) and VI.(2), Mr. R. Adkin; "Cat. of the Birds of Am.," F. Mus. Chicago; "Fauna of Folkestone," Mr. R. Adkin.

Magazines.—In addition to those reported last year. Revue Russe; Ent. Mo. Mag; Ent. Record and Jour. of Variation.

Reports.—In addition to those reported last year. Trans. Perthshire Sci. Soc.; Trans. of the Torquay Soc.: Jr. of the Lewes Soc.

Pamphlets.—Separates from Upsala Un., Smith. Ins., Chicago Field Mus., and T.D.A. Cockerell; Horniman Mus. Guide to F. W. Aquaria; Grimshaw, "Study of Flies" H. W. Andrews; Cat. Ind. Ins. and list of Ind. Publications from Pusa Inst.; Hampshire and I. of W. list of Lepidoptera; Ramblers Year Book; The Death-watch Beetle; Riley "The Water-Strider," from Hy.J.T.; "Das Prob. der Polygordius," from Uppsala.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1925.

REVENUE ACCOUNT.

Expenditure.		£ s. d.
To Rent of Rooms	50 0 0	
,, Insurance	1 6 6	
,, Attendance	2 10 0	
,, Hire of chairs	6 0	
,, Secretarial expenses	11 0 0	
,, Treasurer	1 1 0	
,, Stationery and books	2 18 10	
		69 2 4
,, Subscriptions		
South-Eastern Union of S. Societies	15 0	
Footpaths Preservation Society	10 6	
		1 5 6
,, Vote to		
Publication Fund	54 0 0	
Library Fund	5 0 0	
		59 0 0
,, Entrance fees		
Transferred to Suspense a/c		2 15 0
Balance		37 15 10
		£169 18 8

Income.		£ s. d.
By Balance brought forward		34 10 6
,, Subscriptions :—		
Current	96 15 0	
Arrears	10 12 6	
Advance	10 15 6	
		118 3 0
,, Entrance fees		2 15 0
,, Dividends		14 10 2
		£169 18 8

ENTRANCE FEES AND LIFE-MEMBERSHIP COMPOSITION ACCOUNT.

	£ s. d.
To Purchase of £250 3½% Conversion Loan (at 21/- cost), at 79¼	199 3 6
,, Balance	25 14 8
	£224 18 2

	£ s. d.
By Credit Balance brought forward	212 3 2
,, Sale of Books, etc., of the Ashdown Bequest	10 0 0
,, Entrance fees	2 15 0
	£224 18 2

LIBRARY FUND.

		£ s. d.			£ s. d.
To Binding	4 10 0		By Balance		5 11
,, Postages	1 3		,, Fines		3 4
,, Cartage of books	3 0		,, Vote from General Fund		5 0 0
		4 14 3			
,, Balance		15 0			
		£5 9 3			£5 9 3

PUBLICATION FUND.

		£ s. d.			£ s. d.
To Printing Proceedings	91 12 0		By Balance		13 4
,, Blocks for same	9 11 10		,, Donations	27 17 4	
		101 3 10	,, Dividends	15 0 0	
,, Balance		14 2			42 17 4
			,, Sales of Duplicate Proceedings		4 7 4
			,, Vote from General Fund		54 0 0
		£101 18 0			£101 18 0

BALANCE SHEET.

Liabilities.	£ s. d.	*Assets.*		£ s. d.
To Balance, being excess of assets over liabilities	710 17 9	By Balances—		
		,, General Fund	37 15 10	
		,, Suspense a/c	25 14 8	
		,, Library Fund	15 0	
		,, Publication Fund	14 2	
				64 19 8
		,, Investments at Cost :—		
		£130 of 5% National War Bonds		
		£300 5% War Loan		
		£250 3½% Conversion Loan		635 18 1
		,, Subscriptions unpaid :—		
		Good 11		
		Doubtful 22		10 0 0
	£710 17 9			£710 17 9

Audited and found correct, this 26*th January*, 1926.

T. W. HALL,
F. B. CARR, } *Auditors.*

TREASURER'S REPORT, 1925.

I am again very glad to report the completion of a satisfactory year from a financial standpoint, and that we have approached still nearer to the time, when the Society will be, as I hope to see it, self-supporting, and able to liquidate all its regular expenses each year out of its regular annual income, without requiring the assistance of donations to the Publication Fund.

The figures for 1925 show a satisfactory increase in Subscriptions received, the total increase of £3 as shown in the accounts being really much better than that, as Current Subscriptions were up by £6 14s., and arrears paid £2 10s. more, while Subscriptions paid in advance were £6 5s. less than in 1924.

We are now in receipt of regular dividends on our invested Capital amounting to £29 10s. 2d. per annum, of which £15 is earmarked for Publication fund, under the conditions of the donation made by his sisters, in memory of the late Dr. T. A. Chapman.

Entrance fees show an increase of 22% over last year.

Donations to the Publication Fund amount practically to the same figure as in 1925, but owing to the generosity of one individual member, who paid for the blocks and plates, it was not found necessary to make a general appeal in order to pay our printing bill.

Sales of Proceedings were slightly larger than last, and the sales of duplicate books from the Ashdown library bequest realised a further £10, this sum being of course added to the Society's Capital Account and not treated as an item of regular income.

On the expenditure side we find that the regular working expenses are very much the same as usual, but our printing bill was larger, and the vote to Publication fund is £11 more in consequence.

The legacy of £200 bequeathed to the Society by the late Mr. W. Lachlan Gibb, was invested in 3½% Conversion Loan and brings the Grand Total of our invested Capital at cost price up to £635 18s. 1d. This at current prices is worth slightly more.

We finish the year £16 better off than we began it.

The actual figures in detail are in the Balance Sheet, pp. xvi-xvii.

Insect Orders.

By W. J. LUCAS, B.A., F.E.S.—*Read November 12th*, 1925.

In the "Entomologist's Useful Compendium" (1824), Samouelle remarks that the insect race constitutes by far the most considerable portion of animated beings, and Packard considered that it made up four-fifths of the animal kingdom. Certainly no naturalist, who has thought about the matter, would doubt that insects form far the larger part of the animals of the world, as far as those that inhabit the land are concerned ; while, compared with the Vertebrata, the members of the class Insecta are overwhelmingly numerous. Not only is this true of the insects as individuals, but the number of species is equally enormous. Some reservation is necessary with regard to aquatic animals, for in the water the superiority of the insects numerically no longer exists.

After taking a general view over this formidable array of living things the mind might fairly have recoiled from the attempt to investigate them. To render the task possible of achievement the invention of some system of grouping soon was seen to be a necessity: but obviously the classification of such a tremendous number of forms was not an easy matter. Resemblances of various kinds and to a varying extent were noticed by the earlier naturalists, and this led to attempts at tabulation by one and another.

Though we usually look to Linnaeus as the author of the first grouping of insects into Orders, we must bear in mind that his list in the "Systema Naturae" was not due entirely to himself. This naturalist justly enjoyed great celebrity and moreover possessed "princely patronage"; but the labours of his predecessors and contemporaries, who worked under less encouraging circumstances, should be duly acknowledged. Indeed, the characters of his orders are found in several works previous to his own. De Geer, for instance, developed a system of classification based on the wings and mouth-parts.

The Linnaean Orders are :—

1. **Coleoptera** (κολεός a sheath, πτερά wings).—Insects with hard elytra, and a mid-dorsal longitudinal suture.
2. **Hemiptera** (ἡμι half, πτερά wings).—Insects with the upper wings half hard and half membranaceous, and no mid-dorsal longitudinal suture.

3. **Lepidoptera** (λεπίς a scale, πτερά wings).—Insects having four wings covered with fine scales.
4. **Neuroptera** (νεῦρον a nerve, πτερά wings).—Insects with four membranaceous, transparent, naked wings, reticulated with nerves; tail without a sting.
5. **Hymenoptera** (ὑμήν a membrane, πτερά wings).—Insects with four wings; the tail furnished with a sting.
6. **Diptera** (δίς twice or double, πτερά wings).—Insects with two wings only, and poisers or balancers.
7. **Aptera** (ἀ- without, πτερά wings).—Insects without wings.

Linnaeus thus tabulates the Orders :—

Ordines ab Alis desumsi.

Alae 4	Superiores	crustaceae totae	*Coleoptera.*	1.
		semicrustaceae	*Haemiptera.**	2.
	Omnes	imbricatae squamis	*Lepidoptera.*	3.
		membranaceae ano mutico	*Neuroptera.*	4.
		membranaceae ano aculeato	*Hymenoptera.*	5.
Alae 2.	Halteres loco posticarum		*Diptera.*	6.
Alae 0.	s. absque Alis et Elytris		*Aptera.*	7.

Unfortunately, Nature did not see fit to fall in with so simple an arrangement.

In this scheme of insect orders Linnaeus gave students of the Insecta something to go upon in classifying those examples that came under their notice, and for that he deserves the highest thanks of entomologists. But, as he practically used the wings only as a means of differentiating the orders, we need not be surprised that they turned out to be not altogether natural groups. That limitation, however, had one advantage, in that it provided a consistent nomenclature—the name of each order ending in *-ptera*, just as now families are made to end in *-idae* and subfamilies in *-inae*. As natural groups the least satisfactory are the Neuroptera and the Aptera, the former being made to include such insects as the dragonflies and mayflies as well as caddis-flies and lace-wings, the latter *all* insects without wings, as well as spiders, crustacea, myriapods, etc. Linnaeus did not recognise the orders Orthoptera (ὀρθός straight, πτερά wings) and Thysanoptera (θύσανος fringe, and πτερά wings), the cockroaches, crickets, grasshoppers, and thrips, therefore, going into the Hemiptera, and the earwigs into the Coleoptera.†

---

* *Haemiptera* is apparently a printer's error, for *ae* is not used afterwards. —*W.J.L.*

†Fabricius devised a system of classes (really orders), based to a great extent on the maxillae, whose names he made to end in *-ta* (one in *-tha*)—Eleutherata, Ulonata, Synistata, Piezata, Odonata, Mitosata, Unogata, Polygnata, Kleistagnatha, Exochnata, Glossata, Rhyngota, and Antliata.

We need not further discuss the early systematists, but will turn at once to the moderns, one of the first of whom in this matter was Friedrich Brauer.

Brauer in 1885 proposed the following grouping of insects into seventeen orders :—

I. **Apterygogenea.**

1. Synaptera (ancestrally wingless insects).

II. **Pterygogenea** (all other insects).

2. Dermaptera.
3. Ephemeridae.
4. Odonata.
5. Plecoptera.
6. Orthoptera.
7. Corrodentia.
8. Thysanoptera.
9. Rhynchota.
10. Neuroptera.
11. Panorpatae.
12. Trichoptera.
13. Lepidoptera.
14. Diptera.
15. Siphonaptera.
16. Coleoptera.
17. Hymenoptera.

This is a great advance on Linnaeus' system, but the sixteen orders specially classed as winged contain a number of whole groups of insects that are never winged. No attempt was made to employ an ordinal ending as both Linnaeus and Fabricius did. His method of classification (much as is now done) is based on :—

1. The presence or absence of wings, and their nature.
2. The amount of metamorphosis.
3. The type and changes of the mouth-parts.
4. The number of malpighian tubules.

It should be noted that Brauer's Orthoptera contained the Embioptera; and that the Corrodentia consisted of the Isoptera, Psocoptera, and Mallophaga.

Comstock in 1886 brought forward a system in which he established sixteen orders not greatly different from those of Brauer.

In 1898 David Sharp published in the Proceedings of the International Congress of Zoology held at Cambridge a scheme of the natural orders of insects, as follows :—

I. **Apterygota** (wingless insects, whose ancestors are supposed to have been wingless).

1. Thysanura.
2. Collembola.

II. **Anapterygota** (wingless insects, whose ancestors were probably winged).

3. Mallophaga.
4. Anopleura.
5. Siphonaptera.

III. **Exopterygota** (winged insects, whose wings develop outside the body).

6. Orthoptera.	11. Ephemeridae.
7. Perlidae.	12. Odonata.
8. Psocidae.	13. Thysanoptera.
9. Termitidae.	14. Hemiptera.
10. Embiidae.	

IV. **Endopterygota** (winged insects, whose wings for a time project within the body).

15. Neuroptera.	19. Strepsiptera.
16. Trichoptera.	20. Diptera.
17. Lepidoptera.	21. Hymenoptera.
18. Coleoptera.	

Judging by remarks let fall in conversation, Sharp was much concerned over the fact that the publishers did not see their way to bring out a new edition of his "Insecta" in the Cambridge Natural History. They, of course, looked at it from a monetary point of view, and, while the volumes sold so freely, were content to leave well alone. One of the points Sharp seriously wished to revise, was the classification on the lines just given. In this scheme it should be noted that the Anapterygota is not a division of the same type as the other three, but is constituted chiefly for the sake of convenience. If the history of the orders within it were fully known, presumably they would fall into one or the other of the two divisions that follow.

For some of the orders the names at first employed were unfortunate ones, especially those having the family ending *-idae.* Consequently in 1904, Sir Arthur Shipley ("Zool. Anz.," XXVII., 1904) modified the scheme slightly, going back to Linnaeus' method of making all the orders end in *-ptera*, which has the sanction of priority and at the same time does away with the family names. This change had Sharp's full approval.

Shipley's scheme is as follows:—

I. **Apterygota.**

1. Aptera.	2. Apontoptera.

II. **Anapterygota.**

3. Lipoptera.	5. Aphaniptera.
4. Ellipoptera.	

III. **Exopterygota.**

6. Orthoptera.
7. Plecoptera.
8. Psocoptera.
9. Isoptera.
10. Embioptera.
11. Ephemeroptera.
12. Paraneuroptera.
13. Thysanoptera.
14. Hemiptera.

IV. **Endopterygota.**

15. Neuroptera.
16. Mecaptera.
17. Trichoptera.
18. Lepidoptera.
19. Coleoptera.
20. Strepsiptera.
21. Diptera.
22. Hymenoptera.

For the wingless orders the terms ending in *-ptera* do not seem to be freely taken up, and possibly there is a certain amount of reason in making those orders in which the members are winged, or usually so, end in *-ptera*, and the wingless ones in some other way. The term Paraneuroptera is perhaps a trifle unfortunate, as it seems to suggest that the dragonflies have something to do with the Neuroptera, whereas it would be more correct genealogically to class the beetles amongst the Lepidoptera than the dragonflies amongst the Neuroptera.*

Since Shipley published his scheme of natural orders two new ones have been discovered—Protura and Zoraptera—the former belonging to the Apterygota, the latter coming near the Psocoptera.

A few years ago, Sharp wrote to say that he should adopt the order Campodeioidea from Handlirsch for *Campodea staphylinus*, Westw. and one or two other closely related insects. They occupy so unique a position in the insect world that this decision seems reasonable enough, although the members of it are so few in species.

From the Orthoptera some wish to separate the earwigs as Dermaptera, and some again would cut off from the Neuroptera the alder-flies, snake-flies, etc. from one end as Megaloptera, and the scorpion-flies, etc. from the other as Mecoptera. Whether this is necessary seems somewhat doubtful; and if these separations are not adopted the names of the orders, developed on the lines considered, appear to be :—

I. **Apterygota.**

1. Protura.
2. Collembola.
3. Campodeioidea.
4. Thysanura.

---

* Börner's scheme (1904) and Handlirsch's (1908), I have not considered, as they seem to have been but little accepted, scarcely at all in this country.

II. **Anapterygota.**

5. Mallophaga.
6. Anoplura.
7. Siphonaptera.

III. **Exopterygota.**

8. Orthoptera.
9. Plecoptera.
10. Psocoptera.
11. Zoraptera.
12. Isoptera.
13. Embioptera.
14. Ephemeroptera.
15. Paraneuroptera.
16. Thysanoptera.
17. Hemiptera.

IV. **Endopterygota.**

18. Neuroptera.
19. Trichoptera.
20. Lepidoptera.
21. Coleoptera.
22. Strepsiptera.
23. Diptera.
24. Hymenoptera

Distribution of *A. betularia*

In the Counties and Vice-Counties of the British Isles.

ENGLAND AND WALES

Channel Isles

PENINSULA
1 Cornwall W.
2 Cornwall E.
3 Devon S.
4 Devon N.
5 Somerset S.
6 Somerset N.

CHANNEL
7 Wilts N.
8 Wilts S.
9 Dorset
10 Isle of Wight
11 Hants S.
12 Hants N.
13 Sussex W.
14 Sussex E.

THAMES
15 Kent E.
16 Kent W.
17 Surrey
18 Essex S.
19 Essex N.
20 Herts
21 Middlesex
22 Berks.
23 Oxford
24 Bucks.

ANGLIA
25 Suffolk E.
26 Suffolk W.
27 Norfolk E.
28 Norfolk W.
29 Cambridge
30 Bedford
31 Hunts
32 Northampton

SEVERN
33 Gloucester E.
34 Gloucester W.
35 Monmouth
36 Hereford
37 Worcester
38 Warwick
39 Stafford
40 Salop

SOUTH WALES
41 Glamorgan
42 Brecon
43 Radnor
44 Carmarthen
45 Pembroke
46 Cardigan

NORTH WALES
47 Montgomery
48 Merioneth
49 Carnarvon
50 Denbigh
51 Flint
52 Anglesey

TRENT
53 Lincoln S.
54 Lincoln N.
55 Leic. & Rutld.
56 Notts
57 Derby

MERSEY
58 Cheshire
59 Lancashire S.
60 Lan'shire Mid

HUMBER
61 S.E. York
62 N.E. York
63 S.W. York
64 Mid W. York
65 N.W. York

TYNE
66 Durham
67 Northumb. S.
68 Cheviotland

LAKES
69 Westmorland and L. Lancs.
70 Cumberland
71 Isle of Man

SCOTLAND.

W. LOWLANDS
72 Dumfries
73 Kirkcudbright
74 Wigtown
75 Ayr
76 Renfrew
77 Lanark

E. LOWLANDS
78 Peebles
79 Selkirk
80 Roxburgh
81 Berwick
82 Haddington
83 Edinburgh
84 Linlithgow

E. HIGHLANDS
85 Fife & Kinross
86 Stirling
87 Pth. S. & Clkn
88 Mid Perth
89 Perth N.
90 Forfar
91 Kincardine
92 Aberdeen S.
93 Aberdeen N.
94 Banff
95 Elgin
96 Easterness

W. HIGHLANDS
97 Westerness
98 Main Argyle
99 Dumbarton
100 Clyde Isles
101 Cantire
102 Ebudes S.
103 Ebudes Mid
104 Ebudes N.

N. HIGHLANDS
105 Ross W.
106 Ross E.
107 Sutherland E.
108 Sutherland W.
109 Caithness

NORTH ISLES
110 Hebrides
111 Orkneys
112 Shetlands

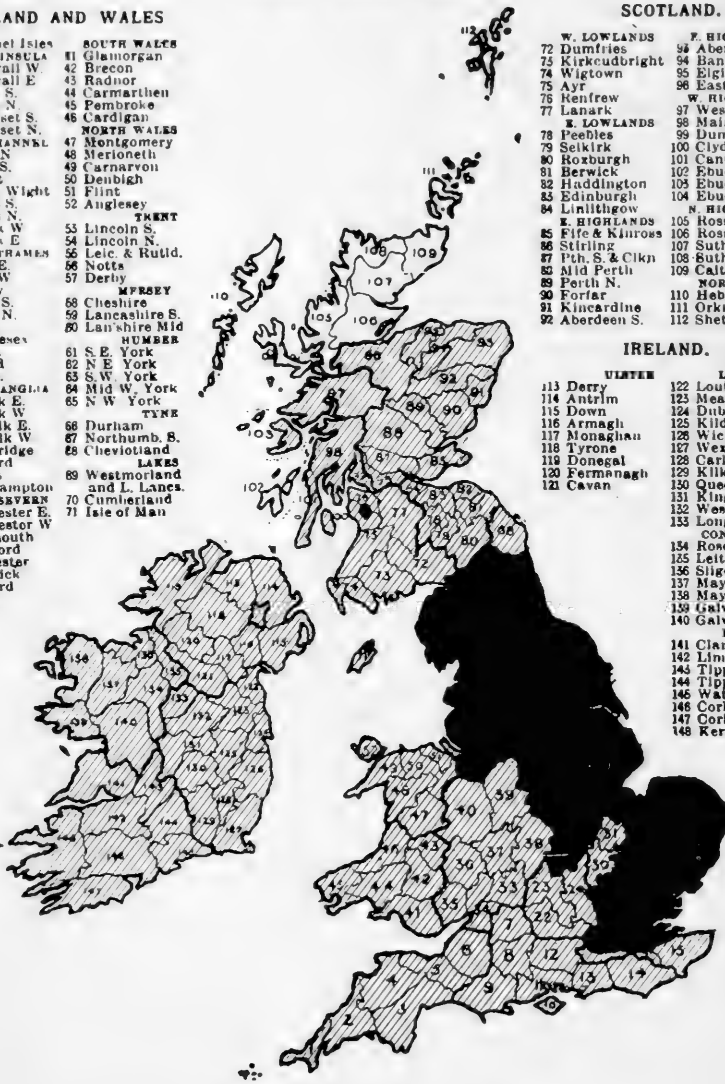
IRELAND.

ULSTER
113 Derry
114 Antrim
115 Down
116 Armagh
117 Monaghan
118 Tyrone
119 Donegal
120 Fermanagh
121 Cavan

LEINSTER
122 Louth
123 Meath
124 Dublin
125 Kildare
126 Wicklow
127 Wexford
128 Carlow
129 Kilkenny
130 Queen's Co.
131 King's Co.
132 Westmeath
133 Longford

CONNAUGHT
134 Roscommon
135 Leitrim
136 Sligo
137 Mayo E.
138 Mayo W.
139 Galway W.
140 Galway E.

MUNSTER
141 Clare
142 Limerick
143 Tipperary N.
144 Tipperary S.
145 Waterford
146 Cork N.
147 Cork S.
148 Kerry



Probable Range. *of Betularia s.*

Recorded Distribution. *of var. Doubledayaria*

~~Distribution verified by the Author.~~

~~Geological Distribution.~~

Melanism in the Lepidoptera.

Some Theories and Some Examples.

By Robert Adkin, F.E.S.—*Read March 26th*, 1925.

Melanism, we are told, is a term that has been applied as the converse of Albinism. It is perhaps best described as an unusual development of black or nearly black colour in the skin, or in the plumage or pelage of animals. It occurs throughout animate nature, and perhaps in no group is it more frequently met with than in the Lepidoptera, where, of course, it is the wing scales that are affected. In the British Isles many species exhibit Melanism ; in some of them apparently as a quite recently acquired character, while in others, where it is known to be of long standing, it has, even within the memory of living man, increased enormously. For experimental purposes the Lepidoptera offer many advantages; they are, as a rule, short-lived creatures, some species producing two or even three generations in a year. They are generally very prolific, and often there is little difficulty in rearing many successive generations of a given species. Little wonder, then, that British entomologists should, during the past half century or so, have given the matter much attention, and many and various have been the theories put forward to account for the many cases of melanism that are undoubtedly of frequent and continuous occurrence.

Often, no doubt, such theories have been propounded from a much too localised view-point. Cases of melanism may be prevalent in a great number of species in some particular locality, and anyone living there, who gives his attention to the matter, very naturally looks first to local conditions, and possibly, seeing in them what appears to be obvious, is content to found a theory on what he sees; and this may account for some of the suggestions that have been put forward.

It is not my present intention to propound any theory of my own, but simply to mention some of those that have been advanced by others, to relate what we know about some of the species that have melanic forms, to endeavour to see what support or otherwise such knowledge lends to those theories, and possibly to suggest certain lines of further research.

I am not aware that any great amount of attention had been paid to the matter before about the middle of the last century;

then it was noticed that a good many melanic forms were occurring. Parts of England were becoming more densely populated ; industries were increasing, certain districts of the country were becoming more and more smoky and it was in such places that collectors were finding melanic forms most freely. The matter was discussed during succeeding years, and we were told that here we had a splendid example of "Natural selection." By reason of the smokiness of the neighbourhoods, the stems of the trees, walls, fences and so forth on which the moths rested, had become darker than they formerly had been, the typical light-coloured individuals resting upon them would be rendered conspicuous, and so become an easy prey to their natural enemies, whereas the darker, melanic individuals would be protected and thus preserved to continue the race. But these smoky localities were not the only places where melanic forms were found, and further investigation therefore became necessary.

In 1876 Edwin Birchall took up the question from a wider view-point and having set out his case at some length, that melanic forms occur chiefly where the species exists under unfavourable conditions, concludes: "As it thus appears certain that greater strength of constitution, and more powerful and acute perceptive faculties are, from some yet unknown cause, associated with dark colours in the Vertebrata, may we not presume that insects are subject to the same law, and that dark varieties of Lepidoptera are able to spread and increase under adverse conditions, whilst the lighter coloured types fail to do so, and are consequently eliminated in the struggle for life, and that the occurrence of melanic forms may be thus reasonably explained as a simple case of the survival of the fittest? (1)." This brought a prompt rejoinder from Buchanan White who had made a close study of the Scotch Lepidoptera in which many melanic and melanochroic (2) forms occur; in which, although admitting that natural selection might play its part, he believed that there must be some exciting cause, probably meteorological. (3)

A step further in this same line of thought was made by Cockerell in a paper on 'Variation' that he read to the members of the South London Entomological and Natural History Society in 1887. Speaking of Melanism he says, "It seems possible, though I am not sufficiently a meteorologist to say whether it is so, that a moist atmosphere might hold in solution gases which a dry atmosphere would destroy or not absorb. If this is so, is it not conceivable that something of this kind may have a hand in the production of

(1) "Ent. Mo. Mag." Vol. XIII., p. 130.

(2) Melanochroic forms are those in which the colour is darkened although not necessarily black, as an example var. *curtisii* of *Triphaena comes*.

(3) "Ent. Mo. Mag." Vol. XIII., p. 145.

melanism?" To explain his meaning he mentions the case of headaches contracted by human beings in a crowded room as being due possibly to some undetected exhalations, the amount of carbonic acid gas given off in breathing not being in sufficient quantity to account for it, and then says, "It is possible that some analogous phenomenon is the cause of Melanism—or should we attribute it to the direct effects of moisture alone, or to some other cause?"(4)

This suggestion, that moisture might be the exciting cause in the production of melanic forms, received a great deal of attention, and the idea was exploited by a great number of entomologists and others, chiefly with a view to making it fit in with numerous observed cases of melanism; the term "humidity" frequently being used by them as the equivalent of "moisture." In the course of these arguments, many side issues were introduced, such as high altitude, the rainfall on mountain sides being assumed to be excessive; and dense forests, where humidity would be high and sunlight scanty.

In 1891 Tutt took the matter in hand, and in a book of some 66 octavo pages went over the whole subject as it presented itself at the time.(5) He carefully weighed the evidence that had been brought forward in support of the various theories that had been advanced, but, so far as I can follow him, came to no very definite conclusions, nor did he appear to advance any new theory.

More recently the suggestion has been put forward that it is the feeding of the caterpillar that produces melanism in the Lepidoptera, that, in fact, a deposit occurs on the foliage near large towns and near the sea, which, being eaten by the caterpillars with their food produces the darkening in the imago. This suggestion is important, and is at the present time receiving a good deal of attention. Carrying the same idea a little further, some of our field entomologists, working in South West Yorkshire, a district where melanism is unusually prevalent, have come to the conclusion that melanism may be a condition antecedent to the extinction of a species. The case, so far as that particular neighbourhood is concerned, is put thus:—"Smoke and chemical gases in ever-increasing quantities are being thrown into the atmosphere and the impurities are being continually precipitated upon the vegetation. A foggy day is sufficient to cover everything with a black slime, even in the country districts. In the dry summer-time the honey-dew secreted by the aphids on the foliage of various trees drops off almost inky black. This poisonous filth the larvae are bound to consume with their food, and from this cause it may be that sufficiently disturbing conditions may arise as to bring about the extirpation of some species without interfering with their colour, while in others the darkening processes are but stages in the same fatal process."(6)

---

(4) "Proc. Sth. Lond. Ent. and Nat. Hist. Soc." 1887, p. 103.

(5) "Melanism and Melanochroism," by J. W. Tutt. Swan Sonnenschein and Co., London, 1891.

(6) "Entom.," Vol. LVII., p. 109. (1924).

It will be gathered from the foregoing that on the question of Melanism there are two distinct lines of thought. Those favouring 'Natural selection' presuppose the existence of the melanic forms and are doing no more than suggesting a cause for their increase. Whereas the other school goes further by seeking the stimulus that actually causes melanism to appear, as well as the reason for its increase.

Having thus mentioned some of the theories that have been put forward, let us now examine some of the species in which melanism is known to have occurred, among them being some often quoted in illustration of some of the theories.

Amphidasis betularia, one of the much quoted species, has a range extending throughout the greater portion of the palaearctic area, except the extreme northern and southern regions: it is common in Britain as far north as Ross and in northern and eastern Ireland. The black form was named *doubledayaria** by Millière, a Frenchman, from specimens, he tells us, sent to him by Henry Doubleday; so there is no doubt that they were English specimens and probably came from Lancashire or S.W. Yorkshire. The first mention of it in Staudinger's Catalogue is in the 1871 edition, where it is noted only as occurring in England, but in the 1901 edition Holland and Germany are added as localities where it had been found. But although no great amount of attention appears to have been given to this black form until Millière named it in 1869, it had certainly been known in Lancashire for some years before that date, for Edelsten, writing from that neighbourhood in 1864 says, "Some sixteen years ago (*i.e.*, 1848) the 'negro' aberration of this common species was almost unknown; more recently it has been had by several parties." He then goes on to tell us that he took a female *betularia* paired with a male *doubledayaria* and from eggs thus obtained reared a brood; and then goes on to say, "I placed some of the virgin females in my garden, in order to attract the males, and was not a little surprised to find that most of the visitors were the 'Negro' aberration: if this goes on for a few years the original type of *A. betularia* will be extinct in this locality."(7) This prophecy has not yet, I believe, been fulfilled, for, so far as I can gather, typical *A. betularia* are still to be found even in Lancashire and Yorkshire, but are becoming increasingly scarcer.(8)

My own experience, as a London collector, extends well over half a century, and during the earlier part of it the *doubledayaria* form was unknown to me. Several notes in the 'seventies' show that from wild larvae and from eggs obtained from captured females only typical *A. betularia* were reared. But in 1902 I heard of the black form from Bexley Woods and in 1908 I captured a pair in my

---

(7) "Entom.," Vol. II. (1864-5), p. 150.
(8) "Entom.," Vol. LXII. (1924), p. 110.

* *carbonaria*, Jord.—Hy.J.T.

garden at Lewisham, the male being *doubledayaria* and the female typical *betularia*. The eggs obtained from this pair were reared to maturity and produced practically equal numbers of the black form and the type.

The distribution of the black form in Britain is interesting. There is little doubt that it originated in the Lancashire-Yorkshire district, a notoriously smoky one; it has become common about London, and there are records covering practically the whole of the intervening district, although in parts of it, it does not appear to be met with at all commonly. Southward it has been noted as far as Surrey, but I have no records for Sussex* or Hampshire, nor for any of the South West Counties. Northward it occurs in Durham and Westmoreland but is uncommon in Cumberland; it has been taken in Northumberland; there is a single record for the Isle of Man and one for Paisley in South West Scotland, but nothing further North so far as I have been able to trace, nor do I find any records for Wales or Ireland.

Whether this black form originated in one district and thence spread over the whole area that it now inhabits, or whether it had several centres of origin, is an important question, but one that is very difficult to answer. I think, however, that the weight of evidence suggests that it might have originated in more than one place.

Eupithecia rectangulata is another species in which the increase in the melanic form has been phenomenal during recent years, although over a much more restricted area. It is a common British species having much the same range as *A. betularia*. In 1803, Haworth named its black form *nigrosericeata*, but tells us that he had seen only two specimens, so it cannot have been very common at that date. Wood (1839) tells us that it is "found about London, but rare"(9); and my own experience of some twenty years later agreed with his statement. But in recent years the black form began to be taken more and more frequently, and for some years before I left the London district early in 1914, I had not met with an example of the typical green form, although I had frequently taken the black form from walls, fences, etc. In the Lancashire-Yorkshire-Cheshire district the species is not particularly common, but I hear from correspondents that specimens taken in the neighbourhoods of Hull, Liverpool, and Delamere during the last twenty years or so, have all been of the black form. Yet just outside this area the species appears to be in a transition stage. From Grange over Sands on the Lancashire Coast, but towards the Westmorland

---

* Since the above was in type a specimen of *doubledayaria* has been bred from a larva taken in the woods near Hailsham.

(9) "Index Entomologicus," No. 654.

district we hear that the species, which is there fairly common, is represented by about 25% typical green specimens, 25% melanic and 50% intermediate. Probably on the outskirts of the London district we may find similar conditions, whereas quite recent captures on the coasts of Sussex and Kent, in the South Western Counties and in Ireland, have all been of the typical green form.

Boarmia gemmaria also is a common British species, very abundant in London gardens, but somewhat rare in North England, Scotland, and Ireland. It varies somewhat in tone of colour through various shades of brown. I have reared them many times from ova obtained from moths taken in Lewisham, but always found them very constant, never obtaining anything approaching a melanic form. About twenty years ago a black female was taken in some private grounds at Dartford and several have been taken since. The place where it was taken being private property, it may be thought that the form might have occurred there for a long time and not been noticed, but it so happened that the north-east side of the property is or was enclosed by a fence, well-known for the rich harvest of moths that might be gathered from it during a south-westerly breeze, and which was searched by practically every collector who visited the once famous Dartford Heath.(10) Yet no capture of such an insect seems to have been made from it. In 1908, I received a large batch of larvae reared from eggs laid by one of these captured black females and kept the stock going. At first the moths produced were type and black in practically equal numbers, but when black was paired with black, a typical moth was seldom seen in the brood by the time the third generation was reached, whereas cross-pairing produced approximately equal numbers of the two forms. I know of no record of the black form being taken in any other part of this country ; but Aigner records what appears to be a similar form from Kassan in Turkistan, and gives it the name of *rebeli*.(11) I mention this occurrence although I do not regard it as having any bearing upon our Dartford examples. This reference and others may possibly be useful to other workers, who may be prepared to go into the question more thoroughly than I am at present.

Boarmia repandata, a species closely allied to the last mentioned, has a range similar to it, but is met with more commonly than it in Ireland and Scotland and extends to the Outer Hebrides. Unlike *gemmaria*, it is a variable species both in pattern and colour through various shades of soft greys and browns. In 1894 I reared a large brood from ova received from Co. Cork, Ireland, and among the specimens were two showing strong melanic tendencies; unfor-

---

(10) See Shield's "Practical Hints," 1856, p. 54 ; also Stainton's "Entomologist's Companion," 1854, p. 96.

(11) "Rovartani Lapok," 1906, p. 73.

tunately, they were not bred from. At Penmaen, S. Wales, a similar form was taken and appears to some extent to have reproduced. Even stronger melanic tendencies are shown in specimens taken in the Huddersfield district of Yorkshire, and in the neighbourhood of Knowsley in Lancashire, practically black examples have been obtained and in both these latter cases breed true. Abroad the only record that I know of comes from Oberursel in the Taunus, Prussia, where Fuchs tells us that he took two females and bred one male and gave this form the name of var. *nigricata*. (12)

Other closely allied species that I have met with in which melanic forms have occurred include practically black *Boarmia roboraria* (var. *melania*, Schulze.) from the neighbourhood of Coventry. *B. consortaria* and *Tephrosia consonaria* (var. *nigra*, Bankes) (13) both practically black and both from Wateringbury in Kent; and *T. biundularia* from Yorkshire and Cheshire (var. *delamerensis*, White), and South Wales (var. *nigra*, Th.-Meig.), *Gonodontis bidentata* has developed a black form (var. *nigra*, Prout), in Yorkshire and Lancashire, and specimens very closely approaching it have been taken in Westmorland. *Phigalia pedaria* also has produced a melanic form (var. *monacharia*, Stgr.) in Yorkshire.

Practically all of these melanic forms were unknown half a century ago.

Acidalia virgularia has a melanic form (var. *cubicularia*, Peyer) which appears to be tolerably well-known as occurring in Germany and Austria-Hungary; it is said also to occur in the North of England but I fail to find any record of it from that district, although some Durham specimens show some approach towards it. But in 1911 two specimens were taken in S.E. London; they were bred from, and the progeny, I believe, followed Mendelian lines.

Acidalia marginepunctata is a somewhat variable species through various shades of grey, and is sufficiently common in England, Ireland, and various parts of Europe to allow of its being well studied. It was very abundant in Eastbourne from about 1887 to 1896, reaching its climax in the latter year. During that period I examined very large numbers and among them I found a few having a curious black mark at the base of the forewings which suggested a tendency towards melanism, and then in 1896 I took three completely melanic specimens. Although I have carefully followed the species ever since that time I have never found it in anything like the abundance that it was then, nor have I found anything even approaching to those three specimens. But in 1906 G. B. Oliver took an exactly similar specimen in North Cornwall (14)

---

(12) "Stett. ent. Zg.," 1875, p. 231.
(13) "Ent. Mo. Mag.," 1903, p. 200, and 1905, p. 89.
(14) "Entom.," 1907, p. 1., fig. 2.

and var. *orphnaeata* described by Fuchs from the Taunus district of Austria-Hungary appears to approach these forms very closely. At the same time that the North Cornwall specimen was taken, Oliver took one of *A. subsericeata* that exactly agreed with it in regard to melanism, and I believe this specimen is unique.

Camptogramma bilineata, one of the commonest British species, has a fully melanic form (race *isolata*, Kane), which occurs, so far as we know, only on a small island off the South West Coast of Ireland.

Gnophos obscurata is a species that appears to be susceptible to change in tone of colour in response to its surroundings. Resting largely on the bare ground, it will be easily comprehended that the more nearly its colour assimulates with the surface on which it rests, the better will it be protected. On the limestone and chalk its general colour tone is grey, even to almost white in the extreme form var. *calceata*, Stgr., from Lewes on the South Downs. On the sandstones, the shade is brownish, while on peat the colour becomes deeper until melanic forms, known as var. *obscuriorata*, Prout, are reached.

Perhaps nowhere are these black forms so pronounced as on the New Forest peat, but forms closely approaching them have been found on the Continent, notably in Germany.

So far my examples have been taken from the Geometrae, and perhaps it may be difficult to find more illuminating illustrations, but in practically all groups there are species that show melanic tendencies, and I propose now to mention a few of them, as to whose history we have some information, although perhaps not always very complete.

In 1789 Borkhausen described a melanic form of *Zygaena filipendulae* under the name of *chrysanthemi*, and he tells us that it occurred for several successive years in the neighbourhood of Stralsund(15)—a place situated on a peninsula on the Southern Coast of the Baltic. What happened to this particular race we are not told but it appears to have died out. In more recent years one or two odd specimens have been reported, including one by H. Goss on July 15th, 1890, in the New Forest(16). In the meantime three specimens of *chrysanthemi* were bred from pupae taken in the neighbourhood of Fleetwood on the coast of Lancashire, where the form appears to be now established; specimens having been met with, among the typical forms, during succeeding years.

Zygaena trifolii, a closely related species, also has a melanic form, but as will be seen, it occurs under very different circumstances. So far as I am aware, the black form of *Z. trifolii* was unknown until the late Dr. Hodgson took three specimens, among a colony of the

---

(15) Bork. "Eur. Schmett.," II., p. 166.
(16) "Ent. Mo. Mag.," 1890, p. 247.

species, in a somewhat swampy locality on the northern borders of Sussex in 1907 ([17]). Since that time, in successive years, Mr. Grosvenor tells me, black specimens have occurred; but the locality having become densely overgrown, and thus rendered unsuitable for the species, the colony has shifted its quarters to an adjacent dry bank, where it appears to have settled down quite comfortably, and still produces a proportion of melanic specimens. These have been bred from and produce the 25% Mendelian proportion.

Miana strigilis is a very common species; it has a geographical range extending over a large portion of the palaearctic area, and is to be found in Britain from the South Coast to as far north as Sutherland; it is also common in Ireland. The melanic form was named *aethiops* by Haworth, a Londoner, so long ago as 1803, and he tells us that it was then to be found frequently. Probably *aethiops* may be found wherever *strigilis* occurs, but whereas in many parts it is seldom met with, in the Lancashire-Yorkshire districts and in and around London it has, during the last half century, become so increasingly abundant as to almost supersede the type. In 1866-8, I frequently ' sugared " in my father's garden at Lewisham where *strigilis* was one of the most abundant moths on the sugared trees in June. We then regarded the black form (*aethiops*) as better worth taking than the type, but from my notes I gather that it was almost as common. I did not again "sugar" in Lewisham until 1890, and a record of the numbers that then came to the trees gives exactly ten *aethiops* to one *strigilis*, so that in little more than twenty years the black form had increased from about 40% to over 90%. My Lancashire and Yorkshire friends tell me that their experience exactly agrees with my own; in their younger days, typical *strigilis* were quite common, but of recent years they seldom see anything but the black form. I have collected on the Sussex Coast a good deal for many years past and have from time to time picked up a good many specimens of *strigilis*, always of the typical form, but as I knew that the *aethiops* form was not uncommon a few miles inland, thought it well to test it here. I accordingly 'sugared' my garden, which is situate practically on the coast, during the whole season while *strigilis* was on the wing, and the result is interesting. Of the total number of the species taken, 54% were typical *strigilis*, 30% var. *aethiops*, and 16% intermediate forms, chiefly referrable to Haworth's *latruncula*. It therefore appears that the percentage of melanic forms on the Sussex Coast now, is very much what it was in the London area half a century ago. Or, to put it in another way, the black form may probably have been just holding its own on the coast of Sussex, while it has been increasing so enormously in the smoky

---

([17]) "Proc. Sth. Lon. Ent. Soc." 1907. p. 91.

London area some fifty miles away. It may be convenient to mention another species here; not as an example of increasing melanic tendencies, but as it may be useful for later reference. *Apamea secalis* is not very far removed from *M. strigilis*, indeed some of our more recent authors place them in the same genus. *Secalis* like *strigilis* has a melanic form which Haworth named *lugens*; he tells us that he knew of only three specimens, but as other authors of his date and earlier had met with it also, it cannot have been so very rare, a hundred or more years ago. *Secalis* is a very common species throughout Britain and Ireland and in any lengthy series that I have seen from any district there has usually been a specimen or two of the melanic form. In my own experience of collecting, both in the London area and on the Sussex Coast, I have always met with a few of the melanic specimens but I have not noticed any increase in their proportionate numbers throughout the whole of my experience. It is true that Porritt mentions this species among those that he considers to be of a darker form in South West Yorkshire than elsewhere, but although he specially mentions two of Haworth's vars. as occurring there, *lugens* is not among them, though it may be included in his remark "and probably all the named varieties."

Nonagria dissoluta is a local species occurring in Britain chiefly in the Eastern and Southern counties, and has recently developed a melanic form in the neighbourhood of Herne Bay on the Kentish Coast. Whether this is similar to a dark form that used, in olden times, to occur at Yaxley, Hunts., but died out, or not, I am unable to say, but an almost black form still occurs in West Suffolk. Very dark forms of the closely allied species *N. neurica*, *N. geminipuncta* and *N. arundinis* have also been met with on the coast of Sussex.

The darkest form of *Bombycia viminalis*, named by Tutt var. *unicolor*, (18) is the prevailing one in Yorkshire, and is also met with in other parts of northern England and Scotland but does not appear to have been observed elsewhere.

Xylophasia monoglypha also has a melanic form, named var. *aethiops* (19). It occurs frequently with the type in various parts of Ireland, the Hebrides, several places on the Scottish main-land, Yorkshire and Lancashire, and I have recently seen a specimen closely resembling it from Wimbledon.

Aplecta nebulosa is normally a pale grey insect varying somewhat in tone of colour; some Scottish specimens being almost white. Irish, too, are very pale, while in most parts of England the specimens range through the various tones of the paler greys. Just over thirty years ago a few specimens which showed strong melanic

---

(18) Tutt. "Brit. Noct.," III., p. 51.
(19) Tutt. "Brit. Noct.," I., p. 74.

tendencies were reared from larvae taken in Delamere Forest and were named var. *robsoni*(20). Such a form does not appear to have been known previously, but it, or one very closely approaching it, is now the prevailing form in the Cheshire-Lancashire-Yorkshire district. More recently Delamere Forest has produced a completely melanic form of the species known as var. *thompsoni*(21). It is not a common form even in Delamere, and so far as we know has not yet spread to other districts. It would, perhaps, be difficult to find a better illustration of progressive melanism, in a comparatively short space of time, than is shown by this species.

Palimpsestis (*Cymatophora*) *or*, has, within the last few years, developed a remarkable melanic form which Warnecke has named *albingenis*(22). It has been reared from larvae found, I believe, only in the neighbourhood of Sunderland. *P. duplaris* var. *obscura*(23), a melanic form, occurs at Rannoch in Perthshire, Scotland.

Among a number of specimens of *Acronicta rumicis* received from Glengariff, Co. Cork, were several showing strong melanic tendencies. This form is widely distributed in Yorkshire, and is there probably as common as the type. *A. menyanthidis* from Yorkshire also shows strong melanic tendencies.

Demas coryli has, apparently, only quite recently produced a melanic form on the Chilterns; it has been taken more than once, and when bred from has always reproduced its kind. The foregoing by no means exhaust the whole range of species showing pronounced melanic tendencies; indeed Porritt, in the preface to his list of Yorkshire Lepidoptera(24), mentions over thirty species in which Melanism has become so strongly developed that in various districts black or nearly black specimens are now regularly obtained; and some twenty other species of which specimens so much darker than the typical forms are so frequently taken, as to indicate that they too are gradually being influenced towards the same end. Several of the species that I have mentioned are not included in either of his lists, so it will be gathered that quite a large number of species show decided melanic tendencies, but I have given quite enough examples for present purposes; let us examine them more closely; do their life-histories help us?

A. betularia has a larva that feeds on the leaves of trees—oak, birch, lime, and so forth—during July, August, September, and sometimes even into October; just the period when any sooty

---

20 Collins, "Ent. Record," 1891, p. 264.

21 Arkle, "Ent. Mo. Mag.," 1904, p. 180. See also "Proc. Sth. Lond. Ent. Soc.," 1911, p. 33, etc.

(22) Warnecke, "Entom. Zeitsch. Frankf.," XXII., p. 8.

(23) Tutt, "Brit. Noct.," I., p. 5.

(24) G. T. Porritt, "List of Yorkshire Lepidoptera." Entomological Transactions of the Yorkshire Naturalists Union. Vol. 2, 1904.

deposits that there might be would be densest upon the leaves, and the larva would consequently get the full dose of it. The imago rests by day on the stems of trees, fences, and the like situations. We have already seen that the black form, *doubledayaria*, has arisen, so far as we can trace, in smoky districts, and that its origin and great increase coincides with the period in which they became smoky. We must admit that, on the face of it, this looks very like cause and effect, but let us look a little further.

The increase in the black form of *E. rectangulata* also, we have seen, has followed almost exactly the same course as that of *A. betularia.* But its larva instead of feeding on the leaves of trees in the summer and autumn, feeds, in common with most of the Eupithecias, on flowers, its favourite food being the flowers of apple and pear, which could not, by reason of their short duration, be affected to anything like the same extent as the leaves eaten by the *betularia* larvae; but the imago, whose resting habits are much the same as those of *betularia*, might possibly derive some benefit from its surroundings in the smoky districts where the dark form is known to occur.

The black form of *B. gemmaria* appears to have arisen within the London area, but we have no record of it from anywhere else in this country. But that of its near relative, *B. repandata* has occurred in places as wide apart and different in their qualities as Southern Ireland, North Wales, Lancashire and Yorkshire and in the two last named has increased greatly during recent years, but it appears to be unknown in the London district. Unfortunately I have no knowledge of the conditions prevailing in the districts where these forms of these species have occurred abroad, but I think we may assume that neither Turkistan nor the Taunus are smoky.

So do we find that the black forms of our other examples have been produced under very varied conditions of environment. Coventry, where the melanic *B. roboraria* occurs, may be perhaps regarded as within the midland smoky area, but Wateringbury in Kent, where those of *B. consortaria* and *T. consonaria* come from, certainly cannot, nor can it, I imagine, be regarded as coming under the influence of the sea coast, but, it has been suggested that the proximity of lime-kilns may have been the cause. Whereas our melanic *T. biundularia*, *G. bidentata* and *P. pedaria* have all developed well in the admittedly smoky midland area; *biundularia* has also been found in South Wales and *bidentata* in Westmorland in situations that may be regarded as possibly coming under sea coastal influences.

The melanic *A. virgularia* were found in London, in a district that I can vouch is smoky enough, but on the South Coast the species shows no sign of darkening; whereas the only melanic *A. marginipunctata* which we know to have occurred in this country were taken on the sea coasts of Cornwall and Sussex, where it is doubtful whether their darker colour would be any protection to them.

We have already seen that the melanic *C. bilineata* occurs on an island, presumably with a humid atmosphere; but in the Scilly Isles, where the general conditions as to proximity of the sea and humidity must be very similar, we find no tendency to melanism. Even in the Hebrides and the Shetlands, where also the species is quite common, we find nothing to compare with it.

G. obscurata is perhaps hardly on all fours with the foregoing as its colour is apparently sensitive to the geological formations on which it occurs, the blackest forms being associated with the New Forest peat. Is the colour of the peaty surface a sufficient factor or is it possible that some emanation from the peat favours melanism ?

The only positions in which the *chrysanthemi* form of *Z. filipendulae* persisted for any length of time are largely surrounded by the sea, but the colony of *Z. trifolii* that has for some years produced the black form is not on the coast, nor does its migration from the swampy and presumably humid locality to higher and drier ground appear to have affected its melanic tendencies.

The Noctuae seem to follow much the same lines as the Geometrae. The *aethiops* form of *M. strigilis*, it is true, has been known longer than the *doubledayaria* form of *A. betularia*, but, like it, has increased greatly in numbers of late years in the smoky areas, while elsewhere it also appears to have maintained approximately its original proportions. But there is this difference between the two species, that whereas *betularia* larvae feed on the leaves of trees, those of *strigilis* spend most of their existence in the stems or rootstocks of grasses, where they would presumably be less exposed to the effects of the sooty deposits. Then again, the allied species *A. secalis*, which has a life history almost identical with that of *strigilis*, although we are told that it shows some general darkening in colour in the Lancashire-Yorkshire district, does not appear to have shown any increase in the proportionate numbers of its truly melanic form, *lugens*. While *N. dissoluta*, of which species the larva spends the whole of its life inside the stems of reeds, has produced a melanic form at Herne Bay on the Kentish Coast, as well as at an inland station in West Suffolk.

The melanic form of *B. viminalis* is the prevailing one in the midland smoky area, but it also occurs in other parts of Northern England and Scotland; while that of *X. monoglypha* is also found in Ireland, the Hebrides, Scottish Mainland and so forth. Yet, when we come to *A. nebulosa*, which we have seen has developed an extreme melanic form in a spot within the Midland smoky area, we find that the Scottish form is exceedingly pale. It is difficult to reconcile such happenings. Then again the melanic form of *P. or* seems to be confined to Sunderland; that of *P. duplaris* to Rannoch; and those of *A. menyanthidis* and several of its near relatives, to Yorkshire, while *A. rumicis*, also a near relation of

A. menyanthidis, has developed a form in Southern Ireland fully as dark as any of the Yorkshire specimens. Yet, so far as we know, Irish specimens of the other three species show no tendency in that direction, indeed the Irish form of *P. duplaris* is notably pale. Why should whatever circumstances they may be that effect the one species not similarly affect the others? Why should *Demas coryli* produce a melanic form on the Chiltern Hills, of all places? We need to look further than any of the theories advanced so far take us, to find an answer to such questions.

It has long been believed that some of the pigmentary colours of the lepidopterous wing are of the nature of urates; that is, of excretory matter of the kind that usually passes from the body by direct channels, and in the case of the lepidopterous larva, by the Malpighian tubes. While we lepidopterists have been propounding theories and vainly trying to make them fit in with known facts, this line of research has been further investigated and it has now been ascertained that the white, yellow, and red pigments of the *Pieridae* are uric acid or derivatives therefrom. It has further been suggested that the organic pigments will be found to be of two kinds, urates and melanins, the urates being derivatives from nitrogenous, and melanins from carbonaceous matters. ([25])

Dr. Heslop Harrison has for some years been studying the melanic question and carrying through a series of experiments, and, although he has not yet published the details, I shall, I trust, be doing him no injustice by quoting a short paragraph from an article by Prof. MacBride on "The Theory of Evolution since Darwin" in which he refers to them. He says, "Dr. Harrison has observed that a certain melanic variety of moth is found where the food plants are infected with manganese salts derived from the smoke of adjacent factories. He fed the pale variety of this moth on food impregnated with the salts of manganese, and after several generations succeeded in obtaining melanic specimens, and from these he obtained a melanic progeny which bred true." ([26])

In "The Times" of February 12th, 1925, Prof. H. E. Armstrong, F.R.S., in an article on "Preservatives in Food" discusses, among many other matters, the effect of alcohol on plant tissues. He was spending a week-end with me recently and performed a very simple experiment on the above lines. He placed a yellow banana skin in a glass jar, added a few drops of benzine (chloroform or alcohol and several similar agents would do just as well), and closed it up so that the fumes of the benzine enveloped the banana skin. In the course of a few hours the yellow banana skin had become quite black, in fact it had become melanic. Now, I daresay you will ask what has all this to do with our subject and I must confess that at

---

([25]) **"Camb. Nat. Hist.," Vol. VI., pp. 334 and 357.**
([26]) **"Nature," Vol. 115, p. 91.**

first sight it does not appear to be very closely connected with it, but the explanation he gives me of what takes place shows that it may have some not very distant application to it; it is briefly as follows. He says, as to the blackening due to the formation of melanin in animals and plants, this is an oxidation product of tyrosine, one of the digestion products of many proteins. There is a specific oxidising agent at work called tyrosinase which he suspects contains manganese and that this is the real agent, and that the blackening that we see, in the skin of the banana for instance, is due to a disturbance in the cells which brings things together that are normally kept apart.

To connect this more closely with our subject I may mention that, "In 1901 Otto. V. Furth and Hugo Schneider showed that a tyrosinase could be obtained from the blood of certain insects, and acting upon a chromogen present in the blood, converted it into a pigmentary substance of melanin-like nature," also that "from the blood of *Bombyx mori*, V. von Ducceshi has obtained a tyrosinase." (27)

It thus appears that the lepidopterous larva is capable of secreting matter which will ultimately form the pigment of the imaginal scales, such matter no doubt being obtained from the food consumed by the larva. That the blood of insects contains certain elements that may produce a melanin-like substance, and that, in the case of plants at any rate, melanism may be produced by an external stimulus.

It appears to me that this is the most hopeful line of research to follow. The average entomologist may not have the necessary knowledge and training to undertake such intricate work single handed, but with the cooperation of others more competent he may do a good deal. He can observe the exact conditions under which the melanic forms of one species and another do actually occur and carefully record his observations. He may breed from the melanic specimens to see whether the melanic tendency in them is so fixed that it will in the course of a few generations become the prevailing, and ultimately the only form, as in the case of *B. gemmaria*, or whether it decreases as generation succeeds generation; also by rearing larvae, especially those of species in which melanism is not known to exist, on food so treated as to be likely to introduce into their systems elements thought likely to induce melanic tendencies, and if, as appears to be probable, that an external stimulus is needed to bring into play the undeveloped elements existing in the organism; there is ample work with which he may busy himself.

Theorising may be an excellent incentive to investigation, but it alone is not likely to carry us much further than we are at present, and I would suggest that it is to carefully conducted research that we must look, if we are ever to solve the much debated cause of melanism in the Lepidoptera.

---

(27) "Ency. Brit.," Vol. 1. p. 507.

Corsica
or
"The Isle of Rest."

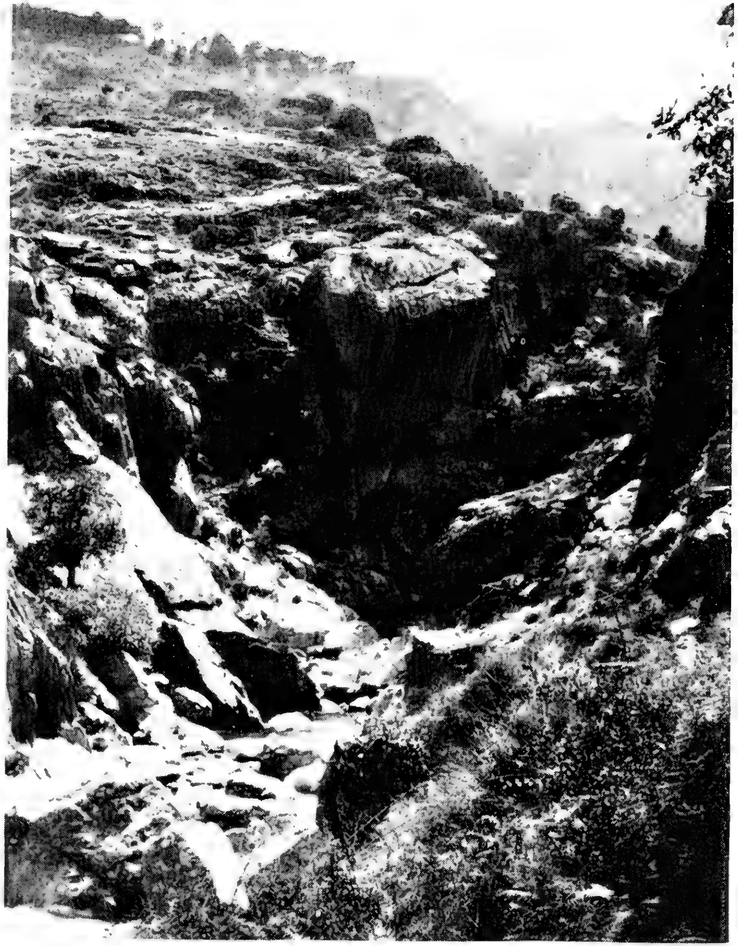
By O. R. Goodman, F.Z.S., F.E.S.—*Read April 23rd*, 1925.

I will make no apology for the general and varied nature of this paper: I do not intend, nor am I able, to confine myself to scientific subjects, but rather to endeavour to give a fair and interesting account of one of the most delightful and enjoyable holidays we have ever had the pleasure of taking. I also feel that as our beloved Society is the bond of union between all nature lovers, whatever their particular interest may be, that a general description of all facts and experiences will not be considered tedious, or to put the matter shortly, this is an account of a nice holiday and nothing more.

Even then the difficulty is chiefly that of having to decide what to omit, rather than that of what to insert, where all is of interest and fresh to our insular perception.

By the title of this paper it will be seen that I have approached the subject from an entirely opposite point of view to that of writers of all ages. From the earliest historical times Corsica has been the "Isle of Unrest" to all; with its constant changes of ownership, rebellions, civil wars, vendettas, and other cheery occupations. However, to the nature lover, artist, and poet, who regard the island from an entirely different perspective, it can be nothing but the "Isle of Rest"; for where else in Europe can you find a province or state which has remained uncultivated and unchanged since geological times, and having nine-tenths of its entire area composed, either of unclimbed mountains, impenetrable macchie, or sombre forest.

It is difficult to understand why the island should have been the bone of contention between so many races, and that they should have striven for the ownership of this delightful wilderness, but it has been successively held (before the Christian era), in 556 B.C. by the Phocaeans, Etruscans, Carthaginians and Romans, and afterwards it has been tributary to the Vandals, Ostrogoths, Byzantines, Franks, Saracens, Pisans (1070 A.D.), Genoese (1300 A.D.) and finally to its present owners the French, but for the short period of two years, when it was taken by ourselves under Hood and Paoli,



EVISA. SPELUNCA GORGE.

Photo. A. de B. Goodman.

PIANA. LES CALANCHES.

EVISA.

Photo. O. R. Goodman.

CORTE. THE CITADEL.

the patriot, in 1794; even its present masters, the French, consider it should be entered on the debit side of the ledger, as the loss on the island in 1914 was thirteen million francs. Apart from the cork, bruyère ("briar") for pipes, and charcoal, there appear to be no exports, if one may except goats and timber, and yet the French expend large sums annually on roads and other public undertakings.

To the naturalist its very wildness affords constant delight, as geologically the island is of immense interest, being with its sister island, Sardinia, of the greatest antiquity; it is considered that it has been separated from the mainland for a longer geological period than any other island in the Mediterranean Sea, and consequently is of the utmost interest to the naturalist, as where else in Europe can he study so well the evolution of species from local races. It is a notable fact that in addition to six perfectly distinct species and races of butterflies occurring nowhere else in the world but in Corsica and Sardinia, there are many transitional recurrent forms which, although not yet given specific rank, are clearly on the verge of arriving at that condition, and authors, even now, differ as to where the line should be drawn. The mammals are also represented in the same respect. The Moufflon (*Ovis musimon*), a mountain sheep frequenting the recesses of the higher massifs in this island and Sardinia, has been given specific rank from the allied species existing on the Atlas and other mountains of North Africa. I also understand that there are several birds in the same state of transition. My botanist friends inform me that the same principle is applicable to the plants of these two islands.

From the foregoing remarks it will be evident why Corsica is of such intense interest. This can hardly be said of the inhabitants, who were originally of Spanish stock, but have been under so many masters, especially the Genoese, that the original outward characteristics have been nearly obliterated. They have, however, two thoroughly Spanish traits, firstly their intense dislike to any form of work (at any rate in the men), and their excessive, insular pride; however, judging from the names, the Italian blood must predominate, but the Corsicans hold the Italians in supreme contempt, although quite willing to make use of them for manual labour. There is a Corsican proverb that they tell the Corsican girl, who lacks good looks, "Whatever you may lack you'll never be at a loss for a Lucca (Italian) man."

Whilst the majority of the Corsicans are of Spanish descent, with some admixture of Italian blood, there are two villages which are inhabited by entirely different people. In the Niolo, a high pasturage near Mte. Cinto, the inhabitants are over 6 ft., and in some cases 7 ft. in height, of immense strength, and are said to be descendants of the ancient Goths and to have blue eyes. The other instance is the population of Cargese on the west coast; they are the practically pure descendants of a Greek fugitive expedition from the oppression of the Turks in 1676, their physiognomy is Hellenic, modern Greek is spoken and the architecture of their churches is classic.

Corsica with its constant conquests, rebellions, and change of tyrants, has had of course many men of note. Its most ancient hero is Cyrnos whose head is on many of the coats of arms. He was a black man, or probably a Moor. Corsica has also produced a Pope, Formose, in the 9th century; many brigands; a Patriot, Paoli, who was defeated by the French and retired to London; and as you all know, the greatest general of the age, Napoleon Bonaparte, born in Ajaccio.

Although Corsica is only 64 miles from Leghorn, 95 miles from Nice, and 178 miles from Marseilles, it has not until recent years attracted the attention of travellers as it deserves. It is now served by a good line of steamers, run by a company (Fraissinet), an excellent automobile transport system, and a narrow gauge railway from Ajaccio to Bastia with branch lines to Calvi on the west coast, and Ghisonaccia in the east. There is also an aeroplane service from Antibes in the Riviera to Ajaccio.

The island itself is only 115 miles long by 50 wide in the form of a rough oval, with the peninsula of Cape Corse at the Northern extremity. It is entirely mountainous with the exception of a very narrow strip of coast-line on the eastern side; this strip is the unhealthy zone and contains the salt lagoons or "etangs," which doubtless are the breeding grounds of mosquitoes and the hot-beds of malaria. The population spend the hotter months in the mountain districts and thus largely avoid "distemperie" as it is called in Sardinia. For the size of the island the mountains attain great altitude, as instanced by Mte. Cinto (over 8880 feet), Mte. d'Oro (over 7845 feet), Mte. Rotundo (over 8610 feet). The mountains are divided by ravines, surpassing in grandeur many of the Alpine gorges of Switzerland, and high passes, in some cases attaining an altitude of 6,000 ft. The zones of vegetation consist of an impenetrable jungle (or "maquis"), as it is called, composed of aromatic herbs as juniper, *Arbutus unedo* (the foodplant of *Charaxes jasius*), thymes, myrtles, bracken, cistus, rosemary, and the giant heath (*Erica arborea*), which attains a height of over 12 feet and bears pink flowers of a large size. This zone finishes at about 1500 to 2000 feet above sea level, and is surmounted by a forest belt containing Spanish chestnuts of much beauty and great age, from which the natives obtain the chestnut flour forming their principal diet; and above that, pine forests up to about 3000 feet, above which is bare rock with scanty vegetation and grasses.

These great heights would seem ideal for the genus *Parnassius* and for the *Erebiae*, especially as the foodplants, saxifrages and mountain airas, are in quantities. It is, however, authoritatively stated that no example of either genus has survived the period of isolation. However, as but a very few of the principal mountains have been at all explored, doubtless very few entomologists have had sufficient experience to make a definite statement on this subject.

The climate is so "douce" in winter that palms and cacti thrive everywhere, and the orange, cédrat, vine, and lemon are cultivated, where any immigrant has sufficient energy to prepare his little vineyard. Tobacco is also produced in the lower land near Ajaccio, but very sparsely.

Of the animals, I have already referred to the moufflon, and although there are no wolves, many foxes, wild boars and deer occur in some quantity, where they get the shelter of the "maquis," and partridges, duck and seafowl abound along the east coast amongst the lagoons. The flamingo does not, I believe, come here, although occurring in Sardinia, and as Mr. Glegg showed us by means of his delightful slides the other evening, also in the Carmange, that dreary waste near the mouth of the Rhone.

The insects, as previously stated, are of chief interest to us entomologists. Of the butterflies those entirely or almost entirely confined to the island and to Sardinia are as follow :—*Papilio hospiton*, *Euchloë tagis* race *insularis*, *Plebeius argus* (*aegon*) race *corsica*, *Aglais urticae* race *ichnusa*, *Argynnis elisa*, *Dryas paphia* var. *anargyra*, *Satyrus neomiris* (also in Elba), *Pararge megera* var. *tigelius*, *Satyrus semele* var. *aristaeus*, and perhaps *Epinephele nurag* in the southern part of the island only, *Coenonympha corinna*, and *Syrichthus therapne*.

Other interesting species are :—*Plebeius argyrognomon*, *P. medon* (*astrarche*) race *calida*, *Leptosia sinapis*, *Dryas pandora*, *Limenitis camilla*, *Polygonia egea* and *P. c-album*, *Satyrus circe*, *Epinephele ida* and *E. tithonus*, *Lycaenopsis argiolus* and many others.

Of other orders I have little knowledge, but they were under the able observation of Mr. Main.

Having thus dealt generally with the description of the island, I will proceed with our personal exploits.

My son, Albert, and I had planned this expedition for over a year, my desire to see more of this delightful island being whetted by a short visit to Bastia in the May of 1915. I cannot say that that trip was eminently a success as I was greeted with intense cold, hail, and heavy clouds. In spite of this, I was much attracted and further encouraged by the excellent accounts in the "Entomologist" by Miss Fountain, Mr. Sheldon, and the late Mr. A. E. Gibbs. We concluded that if we spent the month of July in the higher parts of the Island, we should not be unduly inconvenienced by heat or cold. We certainly did not have to complain of the latter, but thirteen days out of a fortnight under a blazing tropical sun without a cloud and hardly a breeze, would doubtless have given us some opportunity to grumble, if it had not been for the, to us, comforting news that you in England were revelling in an ultra-typical British summer.

We left Victoria, where we picked up Mr. Main, on Friday, June 27th, 1924, arriving in Paris about 8 o'clock, and proceeded down south to Marseilles the same night. Mr. Main being princely by nature, retired to his wagon-lit, leaving us commoners to snatch a few hours uncomfortable sleep in our carriage. Upon arrival at Marseilles, the boat was found to be retarded so that a day was put in sightseeing in this busy city. It is supposed to be the thing to wander down the Cannabière, the main street, where Turks, Arabs, negro troops, Russians, Chinese, Yanks, and every nation under the sun can be seen with native costumes and weapons, and indulge (sic) in the Provençal dish of "Bouillabaise," but after a reconnoitre by Mr. Main, in which he reported that the chief delight of Marseilles was to buy from the stalls small octopi to eat, and other dredgings of the harbour, we "Ha a douts" and wisely refrained.

A visit to the Zoological Gardens and the hill upon which the Church of Notre Dame de la Gard stands produced *Papilio podalirius*, *Satyrus circe*, and a pupa of the seven spotted Ladybird (*Coccinella septempunctata*). It was interesting to note that upon emergence of the imago, the pigmentation was a uniform bright yellow, which later developed into red with the black spots.

The markets are full of the most curious fish, mackerel, and others striped in yellow, blue, red, and purple. Also octopi 1ft. 6ins. long, and shell-fish galore. A sailor was trying to dispose of a living seahorse (*Hippocampus antiquorum*) at 10 francs.

Next morning we boarded the Fraissinet Company's Steamer for Bastia, and passing out of the harbour we met a troop ship, "General Gaffori," bringing over African negro troops. The heat was great, but the sea quite smooth. We steamed past the island of Chateau d'If, noted in the romance of "Monte Cristo," and along the Riviera coast all day, and after dinner retired to our bunks and slept the sleep of the just until six o'clock, when we entered Bastia's new large harbour, in which quantities of beautiful jelly-fish were floating. We were apparently greeted by half the population, and Mr. Main from his learned appearance was singled out as the head of the Board of Examining Professors, who were visiting Corsica for the annual examinations held throughout the island. We landed, and having had dèjeûner at the Hotel, obtained a motor-car to convey us on our 100 kilometere trip to Evisa.

Bastia is the largest town on the Island and its commercial centre. It was at one time its capital until the seat of government was changed to Ajaccio in the South. The chief excursion from here is the tour of Cape Corse which is a peninsula extending north 25 miles long and only 10 miles wide; the central mountain chain rises in places to over 4,000 feet, and culminates in Cima della Follice (4,200 feet). On a previous occasion I had made this excursion, and it then being May, was of great interest. The road follows the coast about 500 feet above sea level, and in the valley the white squill (*Scilla alba*), yellow iris, and flowering rushes abound. Near the villages are little mausoleums, old and new, with gates and walls all round and surrounded with the dark cypress trees. The whole of the Cape is clothed, except just round each hamlet, with almost impenetrable macchie (or maquis), chiefly composed of the giant heath (*Erica arborea*), and a small rhododendron, with scented lavender and the pink flowers of rosemary. In some stony parts I came across a few plants of that lovely white scented lily (*Pancratium maritimum*).

A few miles north of Bastia the Grotto of Brando is to be seen. It is a dry cavern 100 yards long by 12 feet wide, approached by many steps through a derelict Italian garden. The guide preceeding you will fit tallow dips in niches in the walls revealing beautiful stalactites and stalagmites of white and rose-white transparent frills like curtains. The peninsula is crossed some miles from its northern end and as we mount towards the pass Col de la Serra (1186 ft.) we can note examples of the old square watch towers erected by the Genoese and Pisans for coast protection. The islands of Elba, Monte Cristo and Caprera can be seen in the offing, but perfectly distinct in clear weather. From the crest the islet of La Giraglia can be seen with the lighthouse marking the extreme northern end of Cape Corse. The village of Pino has a thoroughly typical church, and is near the tower in which Seneca spent several years banishment, during which he spoke of the inhabitants of the island in no complimentary terms. From Pino the road skirts the west coast southwards and the village of Nonza is passed perched high up on a rock above the sea, the sides being covered with numerous cacti and the whole overshadowed by a ruined town. The rocks onward present a curious phenomenon as being of varying stratified texture, the erosion has carved long shallow caves and grottos in which flocks of goats seek shelter. St. Florent is a very dirty town on a beautiful Bay, distant about five miles west of Bastia, which is approached by a high pass called the Col de Teghime, the grassy slopes of which were studded with quantities of the little pink cyclamen (*Cyclamen europaeum*) at this time of the year (May). Bastia is reached after a sharp descent.

But to return to last year's tour. After having arranged for our heavy luggage to be forwarded, we started in a Citroen car about half-past nine from the Square, which is ornamented by palms and decorated by a statue of Napoleon I. We traversed the town passing the Cathedral and the old harbour to the Southern gate erected by Louis XVIII., close to which is the citadel overlooking the harbour. The taking of a photo involved me in various troubles, as a sergeant politely accosted me and intimated I must come before the Commandant and explain my action in photographing in a prohibited area. I was, however, honourably acquitted with a caution and dismissed accompanied by many civilities. After passing the gates the road skirts the coast and from this point can be seen the long chain of lagoons previously referred to; the largest of these is called the Etang de Biguglia, and is separated from the sea by a shingle bank. Our car pulled up at the level crossing of the railway for a wait of 15 minutes, much to the annoyance of our chauffeur, but enabling us to do a little collecting amongst this burnt up stony waste. Several *Coenonympha pamphilus* of very large size and worn specimens of *P. megera* var. *tigelius* were taken, together with a spider and beetle by Mr. Main. The country hereabout is arid in the extreme and any cultivation, which may have existed, has long been discontinued and the land is choked with *Verbascum* and chicory; the road was lined with hedges of cacti now covered with lemon yellow flowers contrasting with the dark green of the tall agaves and interspersed with mimosa trees, one of which was in flower, and high eucalyptus trees said to be planted to check the malarious nature of the atmosphere. We were interested to see several Hoopoes (*Upupa epops*) with striking black, white and fawn plumage. Further along the road there were quantities of cork oak (*Quercus suber*) from the trunks of which the cork had been stripped as high as the lower branches; one would have thought this practice would have endangered the life of the tree, but I understand that the cork is only an outer bark and its removal does not interfere with the functioning of the inner layer. After leaving Pont Nuovo where we crossed a very narrow Gothic bridge, encountering a string of mules laden with cork and disturbing a drove of very lean pigs and black and white sheep with enormous noses, we arrived at Ponte Leccia where the railway crosses the ravine of the river Golo. At this place Paoli the patriot was decisively defeated by the French under the Comte de Vaux in 1768; this defeat sealed the cause of Corsican nationality.

Shortly after leaving the railroad we entered the splendid Gorge called Scala di Santa Regina, which is one of the seven wonders of Corsica, surpassing in wild grandeur the Devil's Gorge in Switzerland. The river tumbles over fantastic rocks in rushing cascades, the sides of the roads are barren except for mountain ferns and saxifrages. A lonely inn and monument mark the spot where a severe rock slide caused the death of several people in 1888. In respect to this defile the stories of bandits and vendetta are rife. It is reported that a bandit was cornered at night by his cousin a gendarme, and finding escape impossible he called out from his hiding place asking his cousin to carry out his last request, and after receiving this assurance he said "Now shoot me." The gendarme, however, could not see his whereabouts, but when the moon rose high above the mountains it revealed the bandit high above him on a rock and having wished each other Good-bye, he raised his rifle and shot the bandit dead. The only birds seen here were hawks and buzzards wheeling over the rocks. On leaving the ravine we entered the high mountain pasturage of the "Niolo," which lies at the South-east foot of Mte. Cinto over 8800 feet high and the highest mountain in Corsica. Lunch was taken at the village of Calacuccia at the homely Hotel des Touristes, where the dining room was decorated with a fine Moufflon (*Ovis musimon*) head incongruously draped with pink ribbons. The animal is hunted in the fastnesses around Mte. Cinto, but is strictly preserved.

A stroll after lunch produced for Mr. Main the first specimens of the smaller *Scarabaeus* beetle and life in consequence assumed to him a rosy hue. The road after passing the "Niolo" begins to mount sharply through the wild forest of Valdoniello composed of immense larches; it is here that lumbering is in progress, and after negotiating many lancets, the Col de Vergio is reached, the height being over 4400 feet. On the descent the forest of Aitone is passed and we were interested to observe that the pine branches were in many cases covered with great bunches of mistletoe. The descent is even sharper than the ascent, and Evisa is reached after about an hour. This village, our first stopping place, is worthy of description. It is situated at an altitude of over 2000 feet in the centre of great Spanish chestnut groves, surrounded on three sides by high mountains and on the fourth side is open to the sea, which can be seen in the distance below a terrifying rocky gorge of great depth. The village itself is a pile of stone buildings, many almost in ruins and built quite without plan or arrangement, the so-called streets are quite impassable to anything but mules or humans and act as the family dustbin. The Hotel Gigli, our home for a few days, was not in any way palatial, but somewhat cleaner than most Corsican Hotels; but what can be expected for 5s. per day all found. The food was plentiful if coarse, and the proprietor accommodating. A stroll after our arrival was entomologically somewhat of a disappointment, but our forebodings were dispelled during the next few days as the insects began to emerge thick and fast, each day producing new rarities. Mr. Main, camera on back, accompanied by my son as labourer, provided with digger and boxes, arose each morning at the ungodly hour of 5.30 and climbed on to a sandy waste above the village in search of his beloved *Scarabaeus sacer*. He was rewarded (greatly to my relief as I had almost promised him success), by finding them, not in dozens, but in hundreds. I fear to think of the result if none had been forthcoming as it would have strained our friendship for life. This sandy plateau provided the necessary food of the beetles; this food is politely described by the French as "Les ordures excrementelles des mulets," which if translated into vigorous Anglo-Saxon becomes "mule dung." Many and varied were the photos of the life-history that he obtained by his inimitable perseverance, and I have the pleasure of exhibiting one of his delightful studies showing the beetle in the act of ball-rolling. I must not, however, poach on his preserves as we all hope this will form the subject of a paper before us at a later date. His zeal, however, had one unfortunate result, inasmuch as it provoked the poetic muse within me, and the consternation in the *Scarabaeus* camp may be described in the following doggerel :—

An early bird is Mr. Main,
It's six o'clock, he's here again,
Said Pa to Mamma Scarabaeus
We'll have to run or else he'll see us.

to which Mr. Main may be described as replying as follows :—

" It's no use to run,
I'll soon find you out,
If you leave the remains
Of your breakfast about."

I have already referred to the menu so I need not repeat it.

The Hotel overlooked the village and the picturesque belfry of the Church. After one day's collecting we were surprised on our return to the Hotel to hear rifle discharges and much shouting in the village; visions of vendetta and bandits loomed large in our minds and we approached with diffidence. However, we soon perceived that the demonstration was in honour of a new arrival, no other than the Governor General of Corsica, General Maurel. After lunch Mr. Main's suspicious early morning exploits came to his ears and we were arraigned before him. However, "a soft answer turneth away wrath" and we were greeted as brothers and allies, although I fear our sanity was under suspicion. We took our first Corsican Argynnid, *Argynnis elisa*, in the clearings in the Forest of Aitone. It has a quick flight over the bracken, searching between the stems for the females, which however were rarely seen. The nearest related species on the mainland is *Argynnis niobe* (type), there is no variety corresponding to *niobe* var. *eris*, all specimens of *elisa* having the silver spotting on the underside hindwing. *Coenonympha corinna* was also in evidence; this little butterfly is allied to *C. dorus*, but is quite distinct and is confined to these two islands and Elba. The males of that most beautiful Corsican Satyrid (*Satyrus neomiris*) were just emerging: in habits it much resembles our old friend *S. semele*, flying over the grey granitic rocks in a similar manner and when settled entirely disappears; the grey mottled underside of the hindwings as it lies sideways in the sun making it entirely invisible. The Corsican race of *Satyrus semele* called var. *aristaeus* was flying with its congener; it differs from the typical *semele* in having the entire area of the upper hindwing a uniform russet brown. Whilst collecting these two species on the edge of the gorge above referred to, we were startled by the appearance of a huge dark butterfly, which we immediately recognised as a belated specimen of the first brood of *Charaxes jasius*, the only European member of this genus, called popularly " The Pasha of many tails."

This apparition induced the search for the larvae on the bushes of *Arbutus unedo*, but either the insect was in the pupal stage or the larvae were securely hidden as we did not find a specimen during our whole stay in the island. We had hoped to take many larvae of *Aglais urticae* race *ichnusa* a very local race of our common *A. urticae*, but lacking the two black spots in the middle area of the forewings; the shape of the wings is also distinct. Our hope was not rewarded, but two imagines only fell to our lot.

Our allotted time at Evisa having expired, we enquired how we should proceed to our next stop, Piana, on the coast, and were dismayed by finding there was no diligence or conveyance. However, after some delay the patron overcame the difficulty in a way which may be described by the following limerick.

There was an old man of Evisa,
Who said if you leave it to me, Sir,
I've got a nice cart, and I'm ready to start,
If you'll find me the £ s. d., Sir.

The distance to the Gulf of Porto, as the crow flies, is about six miles, but the road by its windings doubles this distance. The scenery is superb as we descend the gorge, on the other side of which is the village of Ota. The slopes here, are strewn with rocks showing pronounced glacial action, and remind one of the flat worn rocks in our own Lake District, and starts one thinking as to whether the whole earth was ice-coated during any of the Glacial epochs. After a short rest at the bridge of Porto, the long ascent to Piana is commenced, through thick maquis; the horse being small we trudged it, picking up worn specimens of the wall butterfly, *Pararge megera* all the way. The race in Corsica is named *tigelius* and the hind wings are without dark markings. In sand pockets Mr. Main pointed out the ant-lion larvae (*Myrmeleon*). The last two miles of the road is considered to be the most delightful of all the sights of Corsica. The whole roadside is cut through a perfect chaos of the most wonderfully grotesque-shaped rocks, but this is enhanced by their brilliant brick-red colour, set off against the intense ultra-marine blue of the Mediterranean Sea; that of course cannot be reproduced by the camera, but the slides shown will give a fair idea of this beautiful prospect. The granite in the Calanches, as they are called, is pitted into holes in which the nests of the Alpine Swifts and of hawks abound.

Piana has a palatial hotel situated 1500 feet above the sea. The evening was enlivened by the sound of the mole-crickets amongst the rocks and the cicadas in the trees. A stroll with an electric torch, however, produced no captures. In the gullies running down to the sea butterflies abounded. Another *Charaxes jasius* was noted, but the catch of the day was *Epinephile ida*, nearly all females, flying on the gullies' slopes. The Corsican race of *Dryas paphia* was here common; it has been named *anargyra* and is devoid of silver on the underside. An interesting fact was here noted. The weather being intensely hot at mid-day, it was found that in the shade of the trees great numbers of *Plebius medon* (*astrarche*) var. *calida* were at rest, it would seem as if the heat was too great for their comfort. It will be recollected that both sexes of *medon* have not reflective blue scales as is the case in most male Lycaenids, and therefore, doubtless, this species is more sensitive to heat than its blue relatives. A new species of *Cicada* was here tracked on a grass stem and duly photo'ed, whilst the operator was also "Hoist with his own petard."

Next day an early start by motor diligence for Ajaccio was made and the coast skirted most of the way across burnt-up plains in a simmering atmosphere, the hot breeze being laden with the smell of aromatic flowers and herbs. At Cargèse, the Greek settlement before mentioned, a short stop was made; and in the irrigation fountains were numbers of the green edible frogs (*Rana esculenta*) with distended bladder on each cheek, which is deflated when croaking. The Greek colony is evidently more industrious than the Corsicans, as the country here is under cultivation, maize, tobacco, and corn being grown. Hoopoes (*Upupa epops*), hawks, finches and some sea-gulls occur here, and a brilliantly coloured bird of the starling tribe, with bright chocolate-coloured back, the name of which I have been unable to ascertain. As one approaches Ajaccio, the road rises until the Col de Sebastiano is reached, about 1500 feet high, and shortly afterwards the valley in which Ajaccio lies, appears in sight, and the gulf and town approached. We were unable to spend long here, but took the narrow gauge railway to Vizzavona, which gradually ascends the valley in a North-east direction. The high mountains here show small patches of snow at the higher levels and the valley is green with *Arbutus* and chestnuts. Just before Vizzavona was reached, we passed through a very long tunnel which has been pierced just under the Col. The station and small village are situated at the northern entrance of this tunnel at a height of 2800 feet. We had decided to stay at the Hotel du Mte. d'Oro on the top of the pass (Col de la Foce); this hotel is about half-an-hour's walk from the station, but the surroundings well repay that inconvenience. Vizzavona is situated in a larch and pine forest surrounded by some of the highest mountains in Corsica, close to the Mte. d'Oro rivalling Mte. Cinto itself. On leaving the Hotel the next morning, we found ourselves at once among the butterflies, the lime avenues swarming with *Lycaenopsis argiolus* and *Dryas paphia* var. *anargyra* in both sexes. The road to the pass, crowned by the ruined fort, is bordered with stony slopes, covered with bracken over which many *Argynnis elisa* careered at great speed; but the most interesting butterfly here was the Corsican race of *Plebius argus* (*aegon*) named var. *corsica*; the form is not of large size, but the chief interest is the constant presence of blue scaling in the ♀s; one knows how rarely this occurs in England, and it is startling to find this is the only form at this high altitude. The undersides differ also somewhat from that of the other races; the insect was flying in great numbers in company with some *Plebius argyrognomon*. *Satyrus neomiris* here began to emerge thick and fast, but hardly a ♀ was to be seen. *Issoria lathonia* and *Epinephile jurtina* (type) were fresh, as well as a few ♂s and ♀s of *Gonepteryx rhamni*.

Several excursions were made to the next station to the north, Tattone, where *Papilio hospiton* has been reported. This spot is at a lower level and is very favoured in number of species. Our first *Satyrus circe* was taken here and this magnificent butterfly simply swarmed in the dry fields; a single ♂ *Gonepteryx cleopatra* was seen; that superb insect *Dryas pandora* was in numbers, but by its power of flight often eluded our combined efforts. A much needed lunch was disturbed by the appearance of a *Papilio hospiton*, which was secured but proved worn—this was a sorry disappointment. An afternoon walk home to Vizzavona, however, brought its reward in the shape of five half fed larvae close to the level crossing of the railway. The foodplant is a very local fennel, very aromatic in smell but differing from the common fennel in its habit of growth; each plant is more spherical in shape and it does not throw up the flowering shoots, at any rate at this period; the larvae were usually found singly, but in one or two instances two were on one plant. The drawing by my son exhibited shows enlarged several of the instars, and the pupa. On this and subsequent occasions we secured thirteen or more larvae, but only in two localities, as the foodplant was very local. We could not breed through more than about eight pupae as the larvae would not touch any of the allied species of *Umbelliferae*. Two imagos emerged in August at home most unexpectedly, but both were cripples. This seems to point to a second emergence. Another item of interest on this excursion were the quantities of Cicadas screeching in the trees. Mr. Main informed us that the ♀s produced no sound and quoted the poetic professor:

"Happy the Cicada lives
For they all have voiceless wives."

The Reptilia seen in Corsica were not abundant and consisted of one blackish coloured snake about 4 feet long (*Coluber*), and two species of lizard, one our old friend *Lacerta muralis*, the wall lizard, and a somewhat larger species having numerous bluish spots on a grey ground colour, probably of the rare genus *Algiroides*.

Mr. Main unfortunately had to leave us here, being called home on business.

An excursion to Vivario proved a great success, large forms of *Leptosia sinapis* var. *erysimi* being taken and one *Dryas paphia* var. ♀ *valezina*. *Epinephele tithonus* put in its first appearance and several fresh *Scolitantides baton*, and a worn *Lampides boeticus*. An expedition to Bocognano produced many large *Longicorn* beetles on a dead beech tree trunk. The deserted nests of the Processionary larvae were very numerous on the branches of the smaller pines.

A visit to Col de Sorba revealed much aromatic fennel and two *hospiton* and two *machaon* larvae were found thereon. The granite rocks here are white and some maidenhair fern was noted.

On July 16th we proceeded to the garrison town of Corte at a much lower level, and therefore proportionately hotter. We stayed at the excellent Hotel du Parc situated in a garden. The town is most strikingly grouped around a bare rock upon which the citadel is built, the slopes covered with cacti, but the open valley here produces vines, tomatoes and olives, while the mountains are barren and burnt up, The population seem to divide their energy between tailoring and hairdressing. The town is indescribably dirty, and bronze-coloured, fork-tailed Kites (*Milvus ictinus*) hover about, constantly looking for dainty morsels amongst the refuse. In the upper town is situated the Square flanked by the house formerly belonging to General Gaffori, whose statue graces the Square. It is said that Mde. Gaffori when assaulted by the Genoese during the absence of her husband in 1750, defended the house until his return, with a barrel of powder and a slow match ready to light if an entry had been effected. The marks of the cannon balls are still visible. Joseph Buonaparte, King of Spain, was born in this house.

The two excursions taken from here were to the valleys of the Restonica and the Tavignano, both carrying mountain streams of blue limpid water. All the usual insects again occurred here except the *Lycaenidae*, but *Papilio machaon* was abundant on the citadel slopes where the common fennel abounded. We were, however, favoured in taking *Hesperia therapne*, thus completing all the list of Corsican insects, except *Anthocharis belia* var. *insularis* and *Epinephele nurag.* Two other species new to us consisted of *Limenitis camilla* and *Syrichtus alveus* or perhaps *armoricanus.*

Alfresco breakfast in the Hotel garden was interrupted to catch *Dryas pandora*, a large *L. sinapis* and a very large form of *Coenonympha pamphilus.*

July 19th found us on rail for Ajaccio, where we took boat in the evening for Marseilles, with a cargo of goats, mules, and cattle.

Our delightful holiday was, however, destined to have an unpleasant close, for the crossing was exceptionally rough and we had not recovered from the evil effects until we landed at Marseilles in the early morning, en route for the delightful hills of Digne.

I cannot close without thanking our honorary lanternist (Mr. Dennis), not only for the able assistance to-night, but also for his skill in producing the beautiful slides shown from a very inferior set of Kodak films which I was able to hand him.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 28th, 1926.

By T. H. L. Grosvenor, F.E.S.

LADIES and GENTLEMEN. You have just heard the reports of the Council and of the Hon. Treasurer, dealing with the affairs of the Society. Both are gratifying as showing the advances made during the past twelve months. We hear from the former that the membership has increased, from the latter we learn that we have nearly reached the point where both ends meet. Both reports are admirable and prove the virility of the Society. It is particularly satisfactory to hear that records have again been broken; but with the South London Entomological and Natural History Society, this state of affairs is becoming monotonous, as every year that passes, shows that in some way or other we have surpassed all previous successes. To briefly summarise the events of the past year, particularly those affecting the welfare of the Society. The membership, perhaps the most important factor in the welfare of any Society, has again increased; the roll now standing at 242 against 237 last year. 6 members have resigned and death has removed one more name. But we must not rest on our laurels; no efforts must be spared to attract new members, as it is only by a large membership that we can hope to put the finances of the Society on a firm basis. It is satisfactory to note that for the first time it has not been necessary to pass the hat round in aid of the publication fund. The average attendance at the meetings has materially increased, and the papers and discussions were of the standard that we now take as a matter of course. In the Presidential Address last year the lack of accommodation for the rapidly increasing library was commented upon; this year, through the generosity of Mr. Robert Adkin, we have a very handsome addition affording ample space for the whole of the library, including the Ashdown bequest, and further space has been made by the sale of duplicate books and by giving away a large number of separata useless to the needs of the Society. The Proceedings published this year are worthy to rank with previous efforts and the reading matter contained extends to nearly 150 pages. The Annual Exhibition was once more the most popular fixture of the year. Following the suggestion made the previous year, practically all formal proceedings were eliminated, and the meeting was in the form of a conversazione, and light refreshments were provided. This arrangement apparently met with the approval of the members, as it afforded more time for the examination of the exhibits, and also gave a guarantee to exhibitors that their exhibits, often of very considerable value, would not be damaged by accidents in being passed round. The number of members and friends signing the attendance book was 212, which is far in excess of any previous meeting. Another alteration that passed unnoticed was in the title; this year the notice read "Annual Exhibition," the reason for this being, that the old title tended to limit the variety of exhibits. The wisdom of this course was shown in the greater number of Coleoptera and of other orders that were exhibited. It may not be out of place to draw attention to the latter part of the name of the Society, viz., "Natural History," consequently all orders are welcomed and we would appeal for a greater variety. Reading through the Proceedings for 1924-5 we find the following exhibits were made:—Lepidoptera, 105; Coleoptera, 22; all other orders of the insecta, 23; Botany, 14; Reptilia, 2; Mollusca, 1; Birds, 1; Paleontology, 1. From this list it will be seen that exhibits of Lepidoptera nearly double all other orders of Natural History. We do not wish to say anything that will in any way reduce the number of exhibits of Lepidoptera, in fact, we would copy the policy of Oliver Twist and ask for more. Particularly does this apply to the younger members whom we would urge to show something; there is still plenty of work to be done with even the commonest species. When we look at the above list and find that Lepidoptera and Coleoptera account for 127 exhibits and all other orders of Natural History including botany only total 42, many others being conspicuous by their absence, we see there is ample scope for more variety, which will tend to make the meetings of wider interest, and thus attract to the Society greater numbers of members who are interested in other orders.

As you have already learned from the Council's Report, we have lost only one member this year by death.

Professor MAXWELL LEFROY, whose tragic death occurred on October 14th, only joined the Society on January 22nd, 1925, and since that date did not attend a meeting. On May 9th, he promised to read a paper on "The Balance of Nature;" unfortunately this had to be cancelled owing to an accidental exposure to a poisonous gas with which he was experimenting. A similar accident in October resulted in his untimely death. Maxwell Lefroy was born in 1877, and educated at Marlborough and King's College, Cambridge, where he took first class honours in the Natural Science Tripos. Whilst here he was chiefly interested in the Diptera and Hemiptera-homoptera, and such was his retiring disposition, that it was only with the greatest difficulty that he was persuaded to read a paper before the Cambridge Natural History Society. After taking his degree, he could not obtain a suitable appointment and became a master in a private school at Dover; whilst holding this position the Colonial Office wrote to Dr. Sharp, stating that they wanted a man to go out to the West Indies as Government Entomologist to investigate the pests of the sugar plantations, which at that time were threatening the very existence of the industry. Professor Lefroy was recommended and duly appointed. After three years at Barbadoes he obtained the post of Imperial Entomologist to the India Office. Whilst at Pusa he wrote and published "Indian Insect Pests," and later "Indian Insect Life." During the War he did much good work in Mesopotamia with the insects, which in these parts of the World make a soldier's life a misery. Whilst working there he was badly wanting assistants and to this end wrote to General Headquarters asking for entomologists. I always regret that a Frontier campaign prevented my being sent to serve under him. He was also employed by the Australian Government to deal with grain pests. In 1910 he came to England and commenced lecturing at the Imperial College of Science, where he was Professor of Entomology until his untimely death at the early age of 48. Thus the South London, in common with Entomologists in all parts of the World, grieves for an outstanding figure, and another name is added to the long list of Scientists, who do not hesitate to give everything, even life, for the well-being of their fellow men.

Another death occurred on August 14th, 1924, in the person of Mr. A. B. West who joined the Society in 1922; this should have been recorded last year, but the occurrence was not known until quite recently. Outside of our Society there are several deaths among entomologists. Nelson Moore Richardson, died on June 11th, 1925. Although little known to many entomologists, he was well known during the earlier part of his life, chiefly as a micro-lepidopterist. He discovered a Pyrale new to science, *Epischnia bankesiella*. Dr. A. G. Butler, whose death occurred at Beckenham, on May 28th, was well known in the insect rooms of the Natural History Museum. Dr. Butler's first occupation was a complete reorganization of the Lepidoptera in the National Collection, a task which occupied him 8 years; one cannot help wondering how long a similar task would occupy today. He was the author of very numerous papers. Henry Stevens; a survey of the entomological events of the year would not be complete without a record of Henry Stevens whose death occurred on the same day as that of Mr. Richardson. Although not interested in entomology, during the latter part of his life, he collected butterflies as a school-boy hobby, and was connected with the well-known entomological family. This early love was shown in the interest he displayed in the sales at Covent Garden, and it was rarely that he was absent from the rostrum, when an entomological sale was in progress.

Among the chief events of the year was the International Congress of Entomology at Zurich held on July 19th-26th. The South London Society was represented by Messrs. Sich and Turner. During the year a Committee for the protection of British Lepidoptera has been appointed by the Council of the Entomological Society at the request of the British Correlating Committee for the protection of Nature. This is a very controversial matter and much has been said for and against. Whilst wishing them every success for a laudable attempt at protecting our disappearing fauna, one cannot but feel that the transplanting of a species to an apparently suitable locality is doomed to failure, as we have to find out a great deal more about the conditions, which go to make an ideal habitat. A locality undoubtedly has a fauna such that it can support, and if for any reason an apparently suitable environment has not already got the species, there must be some condition which makes it unsuitable and consequently it will immediately die out. It is a matter of the greatest difficulty to induce a species to thrive in a locality from which it has disappeared. In the case of *Melitaea aurinia*, the late Dr. Hodgson liberated many thousands over a number of years in a locality where 20 years previously the species had been abundant.

But in no case was a solitary example seen the following year. Whether it is possible to protect a species that has by reason of a limited habitat and consequent interbreeding become decadent, or whether over-collecting really influences the numbers, remains to be seen. If species that are in danger of extinction can be induced to increase and multiply, a very highly commendable object will have been attained, yet one cannot but think that natural enemies play a far more important part in the balance of nature. Another matter, that seems to have a bearing on the subject, is that certain species, which feed on the most abundant foodplants, are often of the greatest rarity, such as certain of the grass feeders, while others that require comparatively rare or local plants are often common and widely distributed. I do not mean to infer that over-collecting cannot influence the number of the species; one case that comes to mind is that of *Zygaena meliloti*, which has a precarious existence in the New Forest; it is of sluggish habit and easy to see, consequently a single collector intent on taking the species in large numbers could easily exterminate it. Altogether it seems only possible to protect a species by protecting the locality in which it lives; this would be a very costly process, possibly far beyond the power of the most willing.

Another activity that has come to the fore is the British National Committee on Entomological Nomenclature, which was started as a result of the Entomological Congress held at Oxford in 1912. If anything can be done to straighten out our nomenclatorial difficulties, entomologists will owe a deep debt of gratitude to the Committee. If this and the protection of rare species be accomplished, 1925 will be looked back upon by posterity as an *annus mirabilis* in the annals of British Entomology.

Variation.

When, twelve months ago, you honoured me by electing me your President, I was warned by our Hon. Secretaries that of course an Annual Address was a dominant factor. This, viewed from a distance of twelve months, did not seem a very terrifying prospect, but as the months crept by, and January 28th was becoming a matter of weeks, the outlook became more ominous, and one began to realise one's limitations, especially after reviewing the efforts of one's predecessors. Having committed one's self the only thing to do is to make the best of circumstances, so with this object in view I propose to endeavour to speak on perhaps the most important subject, *viz.*, Variation. I do not propose to speak on any one section, which I should be quite incapable of doing justice to, but to talk in a general way on some of the causes and effects. The study of variation is perhaps the most important subject of scientific interest to-day, not only affecting Entomology, but throughout every branch of Science, and does not stop with the description of a minute divergence from an accepted type of say *Arctia caja* or *Abraxas grossulariata*, and the manufacture of a name to fit, which will in all probability be speedily forgotten. The subject taken in its wider sense is one of vital importance to the human race, and may even be a deciding factor in ages to come as to whether man is to survive, or to disappear from the earth. In the past it has only been possible for man to survive by the power of variation in bodily structure to meet the requirements of a changed environment, but more particularly has this been so in the case of the brain, else how could man, with little or no defensive power, have defied and resisted the attacks of the tremendous odds as presented by such formidable enemies that existed on the earth at the dawn of man's history, of which the cave bear and sabre-toothed tiger may be taken as types? Armed only with his muscles, what chance would he have had against such adversaries? It was only an intelligence capable of variation that enabled him to supplement his feeble structure by the use of arms. Without the power to vary man must of necessity have remained in a condition little removed from animals, or what is more reasonable to suppose, quickly become extinct. Perhaps the lowest race of man inhabiting the earth to-day is that of the Australian aborigines; and even they, low as they are, would be comparativly highly civilized, when compared with the type of man as exemplified by the Piltdown or Neanderthal remains. For at least, they have a knowledge of the use of fire and weapons for attack and defence far in advance of Eolithic man with his rudely worked flints, and even in the most inaccessible regions, they have had a slight intercourse with some of the refinements of civilization, through the intermediary of explorers and traders. The other extreme is our present day civilization, with its wonders of medical science and engineering, all of which can only be attributed to accumulative knowledge and the inherent power of variation. This we see every day and pass without a second thought. We see one man an extremely clever surgeon, performing operations that are little short of miracles, or another inventing some machine that may at the most produce a paragraph in the Daily Press. Had these two men had their positions reversed, and thus not doing work specially suited to their particular class of brain, we should probably have seen the one a medical man, the other an engineer, neither showing any outstanding merit, simply doing the work they have to do through the result of the good education, which had been imparted to them, made possible through accumulative knowledge. But to carry on with a calling in an ordinary way, calls for a very marked variation in brain power over that of, say the Australian Bushman, who even given every advantage of modern education would be unable to assimulate the requisite knowledge to enable him to do the work of the most menial nature required of a civilized man, who is called to work in any other sphere than actual manual labour. But to get to a subject more in keeping with the objects of a Natural History Society, and to variation as studied in the Lepidoptera. There is a paragraph in Darwin's "Origin of Species," which perhaps laid the foundation of the study of variation to-day, and which I will take the liberty of reading as it so admirably sums up the situation.

"Any variation which is not inherited is unimportant for us. But the number and diversity of inheritable deviations of structure, both those of slight and those of considerable physiological importance, are endless . . . . No breeder doubts how strong is the tendency to inheritance; that like produces like is his fundamental belief; doubts have been thrown on this principle only by theoretical writers. When any deviation of structure often appears and we see it in the father and child, we cannot tell whether it may not be due to the same cause having acted on both; but when among individuals, apparently exposed to the same conditions, any very rare deviation, due to some extraordinary combination of circumstances, appears in the parent—say, once among several million individuals—and it reappears in the child, the mere doctrine of chances almost compels us to attribute its reappearance to inheritance . . . . The laws governing inheritance are for the most part unknown. No one can say why the same peculiarity in different individuals of the same species, or in different species, is sometimes inherited and sometimes not so; why the child often reverts in certain characters to its grandfather or grandmother or more remote ancestor; why a peculiarity is often transmitted, from one sex to both sexes, or to one sex alone, more commonly but not exclusively to the like sex. It is a fact of some little importance to us, that peculiarities appearing in the males of our domestic breeds are often transmitted, either exclusively, or in a much greater degree, to the males alone" ["Orig. Sp.," Ed. VI., pp. 9-10.]. Since Darwin wrote these lines, we have progressed considerably, and to-day the remark, "The laws governing inheritance are for the most part unknown" is no longer correct, even at the time when Darwin was writing this, Gregor Mendel was experimenting with tall and dwarf peas which was, many years after, to give the clue to modern scientists, and enable them to present to the world the phenomena known to-day as, the Mendelian Laws of Heredity. Although Darwin and Mendel were contemporaries, it seems hardly possible that they were aware of each other's work; had this been so, it seems hardly conceivable that Darwin could possibly have overlooked the far-reaching results of these experiments, otherwise he would not have written the paragraph just read. In reading "The Origin of Species," the clue afforded by these experiments is a point that constantly evaded Darwin, and although on many occasions he came very near to the truth, this was the goal for which he was striving. It is also very certain, that had Darwin known of these experiments, "The Origin of Species" would have been a very different work, and also it would not have taken fifty years to discover the value of the material lying idle. Among writers of the present day there is a tendency to underrate "The Origin of Species," but I venture to assert that the hypotheses Response to Environment, Survival of the Fittest, etc., have never been successfully refuted, and to-day we see the same theories disguised as Mimicry, Mullerian Associations, etc., which are only other ways of saying that a certain species has a superficial resemblance to another object, or in these cases to distasteful species, and thereby receives, a certain amount of protection, which it would possibly equally obtain by closely resembling its surroundings, although the former may be a fuller disguise inasmuch as it would be protected not only when resting, but also when in flight. Mimicry is also another variant of the "Survival of the Fittest," for it is quite obvious that if any protection is gained by resemblance, the individual most closely resembling the model is the individual most likely to survive, and as we now know that most variations are capable of reproduction in Mendelian proportions, it would not be a long or difficult matter for the new type to oust the old and less suitable pattern.

In certain species we see a very wide range of variation, in others aberrant forms are practically nil. As an example of the latter, *Pyrameis cardui* immediately comes to mind; it has a range practically world wide, and except for casual aberrations, it presents a very similar facies wherever found. Of the former we may take *Polyommatus coridon*, a species entirely attached to the cretaceous formations of the Palaearctic region, which produces a very wide range of races or sub-species. Royston is a locality so famed for aberrant forms of this species, that as many as thirty or forty collectors are attracted there annually. On this, the point that arises is the following: does *P. coridon* vary to a greater degree at Royston than in any other locality producing the species in equal numbers? Or to express this in a clearer manner: Is the percentage of variation greater in this locality than in any other? In the endeavour to find a reply to these questions there are several factors to be taken into consideration. The pattern of the Lycaenids with their heavily spotted undersides is one that readily lends itself to conspicuous variations, consequently the family is particularly prone to variation and the formation of local races. Of the British species of Lycaenids perhaps the least variable is *Plebeius argus* (*aegon*) in this country, but if we follow this species through the whole of its range, we find that it produces very marked local races. A curious fact in regard to this species is that, although it has an extremely well-marked underside, extremes of striation or obsolescence are exceedingly rare.

Another form of variation very common in the Lycaenids, particularly so in *P. icarus*, is the loss of the two proximal spots; this form is known as ab. or race *persica*, and is perhaps, as its name implies, commonest in its Eastern localities, but although common in Persia and the Western Himalayas it is by no means constant, and in Western Europe the late Dr. Chapman discovered a closely allied species, *viz.*, *P. thersites*, in which these two spots are always completely absent. To return to *P. aegon*. It is one of the rarest occurrences to find an aberration in this species. In fact, speaking from memory, I can only remember ever having seen but one perfect example, taken by the late Dr. Hodgson at East Grinstead. At Royston there occur two common aberrant forms of *P. coridon*, one a female with intersexual characters, *viz.*, with male coloured scales scattered over one or more wings in varying quantities and with the wings on one side decreased in size. This form is known as *roystonensis* (Dr. Cockayne reports a similar race in *P. aegon* from a Berkshire locality). The other form is the female with blue hindwings known as ab. *semisyngrapha*. Curiously there is a form of *P. aegon* of a similar character found on the Lancashire Moors known as ab. *masseyi*. These aberrations of *coridon* are, of course, found elsewhere, but only as rarities, but at Royston they may, comparatively speaking, be always taken abundantly. Interesting as this may be, we will leave them out of consideration as they are in this locality well marked local races. We hear every year that very extreme forms of confluence or obsolescence, and at rarer intervals very extreme aberrations of other characters, have been taken. What is the underlying cause of this? We do not know any more to-day than when Darwin wrote "The laws governing inheritance are for the most part unknown." Consequently, until our knowledge of the underlying causes of variation are more complete, the most we can do is to speculate on possible causes. On the Downs at Royston *P. coridon* is in countless thousands, the foodplant is also very abundant, but a very large area is covered by long grass and as we know quite unsuitable to the species as a breeding ground. Thus the site always selected by this species when ovipositing is a situation where the grass or other vegetation is short, enabling the foodplant *Hippocrepis comosa*, which is of a prostrate growth, to produce the thick clumps sought after by this species. Consequently the emerging grounds are comparatively limited and these are regularly frequented by all the collectors on the ground at the time of emergence, that is, between the hours of 9 a.m. till noon, who examine practically every insect as soon as it emerges, the result being that any deviation from the type is immediately noted. No other locality is so consistently worked, consequently we do not hear of such an abnormal quantity of extreme forms. If, for the sake of argument, we say that extreme variation is more abundant at Royston than elsewhere, we have to ask ourselves the following question. What is the cause of this? One factor that may have a slight bearing on this question is the following: it is well known that heat, cold, etc., have a very marked effect on certain species of Lepidoptera. At Royston *P. coridon* occurs on a northern slope, whereas all the other localities, that I have visited for this species, have a southern aspect. This is only a suggestion and at least a doubtful one, for one cannot say with any degree of confidence that the difference in atmospheric conditions prevailing on a northern or southern slope would be sufficient to adversely affect the species. Another pecularity of Royston is the inequality in the number of the sexes, which average at least three females to one male. Does this denote a decadent or dying race? and the extreme variation, if such is the case, an effort on the part of nature to establish a race more suited to the requirements of the species in the locality? How are we to consider this variation? Are the extremes suddenly produced or are they the result of a gradual process? In the extremes of confluence and obsolescence there seems little doubt that it is the latter, for we see on the ground all grades of confluence beginning with one minute extra spot, until we arrive at the very extreme form with thick black marks right across all the wings. Naturally these most extreme forms are of considerable rarity, and the inverse applies to obsolescence.

In 1920-21 *P. thetis* was extremely abundant in a certain very restricted area on the Reigate Hills, and in these two years both broods were characterised by a very marked tendency to confluence in the vernal emergence, and to obsolescence in the autumnal. What happened here between the years of 1914 and 1920 I do not know, as during that period I was unable to visit the locality. Prior to 1914, the species was not extremely numerous and certainly not unduly variable. In 1920 I find, on referring to notes made at the time, that *P. thetis* was very abundant, as many as 300 being examined in an evening, and the whole locality was a small chalk pit not exceeding an acre in extent. This was systematically worked, there being not more than six evenings omitted during the whole vernal brood, and as many as 20 specimens or approximately 15% were found on one evening showing confluence in some degree. In some of these there were only small extra spots, and the most extreme were nothing remarkable. In the autumnal emergence, which normally is only partial, the numbers were less; and I find the greatest number examined was about 180 on any one evening, and the greatest number of specimens showing some degree of obsolescence found on any one visit was 6 or approximately 3%, no tendency to confluence was observed unless accompanied by some degree of obsolescence. The same occurred in 1921. In 1922, *P. thetis* was very rare in this chalk pit although normal numbers were seen on other parts of the Reigate Hills. The greatest number observed on any one visit was 22. In 1924 the most seen on any one evening was 4. In 1925, not a single specimen was observed. It may be argued that 1921, being an abnormally dry year, the species was eliminated through the lack of food supply. But this theory, which might apply to species feeding on *Cruciferae*, etc., which under the influence of prolonged drought would be liable to ripen early with the consequent starvation of any larvae that might require the leaves for their existence, will not apply to *P. thetis* as the foodplant *Hippocrepis comosa* suffers little or no inconvenience from lack of surface moisture, owing to the extreme length of roots which enable the plant to obtain sufficient moisture for its needs in even the dryest seasons. In regard to the upperside of the females in 1920/21, these were characterized by extreme blueness, towards the end of the vernal brood at least 90% were most abnormal in this respect, some of the most extreme forms were at least equal in blueness to the continental ab. *ceronus*. In fact it was extremely difficult to find a normal female. This blueness is probably due to another cause and has nothing to do with the other phases of variation, as it is generally conceded that this is caused by excess of moisture, which in the early spring of 1920/21, was the case at the time of pupation, which is most probably the critical period in the life-history of the insect. This chalk pit is extremely interesting for purposes of investigation, owing to its isolated position. During and since the war the trees on all sides have grown thick and high. In the old times it was open to the Downs on two sides, consequently the insects were being constantly renewed by migrations, whereas to-day these incursions are entirely cut off by the surrounding growth. To sum up, do these species start to vary considerably when a race becomes decadent, and thus strive to create a race better suited to their environment? But with a dying race this cannot help a species already doomed to extinction. If this be so we have variation which serves a useful purpose, and variation that runs riot with no definite purpose in an endeavour to preserve itself from extinction.

In the Oriental Regions we have an extremely common and wide spread butterfly, *Papilio polytes*, which presents an example of variation, which is apparently highly beneficial to the species, judging by its wide range and great abundance. The male is black with a white band across the hindwings, and is constant throughout its entire range from the Sino-Tibetan Region, right across greater India and through the Malayan and Polynesian Archipelagoes. In spite of the constancy of the males, from a general view of the colour and pattern, in certain parts of their range the males become tailless. The females on the other hand, show very marked polymorphism. In some regions there are produced females identical with the males, particularly in the races from certain parts of China and in the Andaman Islands, two widely separated habitats. In the former this form only occurs; in the Andamans it predominates, but *aristolochiae*-like forms also occur. In Ceylon and India this is by far the rarest form. In fact, after five years collecting in widely different parts of the Indian Peninsula, I only saw one female of this form. Professor Poulton has dealt very fully with the variation of this species in an article written in defence of Darwinism, in "Bedrock," October, 1913, under the title "Mimicry and the inheritance of small variations." Granted that these forms have been evolved on the models of *Papilio hector* and *P. aristolochiae*, two very common insects, the former particularly so in South India and Ceylon and the latter in the Central Provinces, the question arises, What benefit does a species gain by a far wider range of polymorphism? In *Papilio memnon* we have at least a dozen well-marked forms of the female. The male is a black insect sprinkled with blue scales and is one of the tailless group of Papilios. The females on the other hand may be tailed or tailless; when the former it always conforms to a fixed type closely resembling the female of *Papilio mayo*, a very local species inhabiting the Andaman Islands. On the other hand the tailless female runs riot, not as in *P. coridon*, with a vast number of casual aberrations, but with well-marked local races. It cannot be said that this is a dying species, as it is particularly virile and flourishes wherever it occurs. To dogmatise is a dangerous practise, but since we have here a species frequenting both mainland and insular habitats with its forms so completely segregated, we seem to have a case of the evolution of new species actually in the course of formation.

In the *Ornithoptera* we have an even better example. In the Island of Amboyna *O. priamus* is to be found, a large black and green species. In other neighbouring islands in the Pacific Group we have others of similar pattern and colouration, such as *O. arruana* from the Aru Islands, *O. hecuba* from the Kei Islands, and in others there is a very marked change in the male coloration. In *O. croesus* and *O. lydius* the green is changed to orange, and in *O. urvilleanus*, to blue. The females in each case show marked divergence, particularly so in *O. croesus* and *O. lydius*, where the males are very similar. In the males this divergence of colour is entirely due to the refraction of light. If we take a male of *O. priamus* and look at it in an ordinary way, the colour is definitely green, but if we get the light to fall on the insect from a different direction the colour changes to approaching that of *O. croesus*, or looked at from a different angle the colour again changes in the direction of *O.*

urvilleanus. Thus it seems reasonable to suppose that *O. croesus* and *O. urvilleanus* have been evolved through a different arrangement of the scales, reflecting light at a different angle; what advantage this would be to the species it is difficult to understand, yet in their various insular habitats they breed true. Whether these various races would pair and produce offspring has yet to be tried. But in the remote islands inhabited by these races, with only the most primitive means of intercommunication, this would be a matter of great difficulty, still the experiment would be one of great interest, both from a Mendelian and an Evolutionary point of view.

In certain species of Lepidoptera that produce two or more emergences annually, there is another phase of variation known as Seasonal Dimorphism. In this country we have a few species that present a different facies in each emergence, but this divergence is comparatively slight, and is confined in a far greater degree to the females. This is perhaps most noticeable in the Pierids. *Pieris napi* in the vernal brood produces a female more or less suffused on upperside with blackish scales, and on the underside the nervures are heavily outlined with greenish. In the aestival emergence the suffusion of the upperside is absent, but the apical and discal markings are intensified, while the neural markings of the underside are greatly reduced, or in extreme examples the markings may be almost deleted. It is a difficult matter to make any theory to account for this divergence, as this species is not entirely double-brooded in this country, although in favourable seasons, such as 1911 and 1921, three emergences may be forthcoming. The females of the vernal emergence, produce ova, pupation taking place in the early summer; these even under the most favourable circumstances only produce a partial emergence, the remaining pupae lie over until the following spring, and when imagines are produced they can in no manner be distinguished from the offspring of the aestival emergence. The same applies when a very hot and prolonged summer allows the species to produce three emergences. The spring emergence produces offspring, which emerge in July, a percentage remaining over until the following spring as pupae. These summer emergences produce offspring in early September, which in every way resemble the normal summer emergence, and the three emergences all produce offspring in the following spring, of the true vernal type. This is a very remarkable phase of variation and leaves one without any theory as to the reason. It is a very difficult matter to say that a species is in any way benefited by these seasonal forms, and yet it is only reasonable to assume that some degree of protection is obtained, else why should the species have evolved the two very distinct forms, and produce them with such unfailing regularity, each in their proper season.

Striking as this instance of seasonal dimorphism may be, it is only very slight when compared with that in some species in the tropics, which not only entirely change in colour but also in shape. In not a few species this change is so remarkable that the two forms have in the past received specific rank, and in some instances it was only breeding that proved them to be one and the same species. In *Melanitis ismene* we have a species inhabiting a large part of the Palaearctic, African and Indo-Australian Regions, which shows this seasonal dimorphism in a very marked degree. The tropics differ from the more temperate climates, inasmuch that they have only two marked seasons, the dry when it is an extremely rare event for any rain to fall, this period lasting for eight or nine months, and the monsoons or wet season for the remainder of the year, when rain is more or less continuous. This latter period is a vital necessity to the welfare of the country, and the failure of the monsoon has disastrous effects on the populace, who have to rely on the rains to store up water for irrigation during the dry periods. These extremes of climate have a very marked effect on the lepidopterous fauna. Generally speaking a country with a very heavy rainfall is more productive of insect life than a district where the rainfall is limited. Probably this is due to the effect of the wetter climate sustaining a far larger and more varied flora. Those regions having a very heavy rainfall are generally covered with a large forest area, and thus not only is the rainfall heavy but the rainfall is attracted and the moisture conserved, thus allowing a large and more varied undergrowth to sustain a large lepidopterous fauna. To revert to *Melanitis ismene*. This, in common with several other species, produces a wet season form with an ocellated underside, which varies comparatively slightly; but in the dry season the variation is extraordinary on the underside, the upperside remaining constant. So extensive is this variation that it is a matter of great difficulty to find two specimens alike, with the wet season form occurring only as a rare aberration. Can any reason be given for this divergence? The habits of the insect are such that one would expect some form of cryptic coloration, but why no two specimens should be alike is a difficult problem to solve. The insect is crepuscular in habit, and has a strong objection to sunlight. The habitat is in the rice fields, where in some localities it is a pest. During the daytime it spends its time resting in the deepest shade to be obtained, a very favoured spot being under the dense growth of a mango or banyan tree, where it rests on the ground, not sitting upright, but lying on its side, so much so, that the side nearest the earth is usually quite wet. It flies readily when disturbed, but only for a short distance, always taking a direct line to the nearest shade, where it immediately settles and falls over on its side; in this manner it is afforded considerable protection from its similarity to the wet brown earth. However some of the forms, equally abundant, are quite conspicuous, not from a distance, for the surrounding rice interferes with the line of sight, but immediately one looks at them from above, they are quite easy to discern, especially the lighter coloured ones. Thus they would be readily visible to a bird or other enemy in the tree above where they are resting. This species raises another question, Why should the wet and dry season forms vary at all? The Junonias, which produce similar ocellated undersides in the wet season, may arise through the very different climatic conditions during the larval state as they live on the driest plains, but with *M. ismene* the circumstances are different; the foodplant is rice which is a swamp plant, consequently for its well-being the ground is constantly irrigated and kept under water, so much so that it is only with the greatest difficulty that one can cross from one field to another. This procedure is kept up until the monsoon breaks, when irrigation is no longer necessary as the ground is kept sufficiently wet by the heavy and continuous rains. Consequently the insect is subjected to similar conditions during the larval state in each of its several broods. This species, in common with most of the butterflies with permanent crepuscular habits, with which I do not include such insects as the Vanessas which occasionally fly at night, is of dull coloration and is extremely difficult to see when flying after dark. This characteristic brings to one's notice the fact that many insects, which live in secluded habitats, are similarly dark coloured, and this is very noticeable in the females of many species the males of which are of brilliant coloration. The Pierids will serve as an example of the darkening of the females. This sex lead a very retiring life, so much so that in many cases the females are of the greatest rarity in collections or have not even been described. From this darkening one is led to suppose that in the dim light the darker coloration is not so visible and consequently the expectation of life is far greater than would be the case, if the insect were of a brilliant coloration. Another suggestion is, that greater energy is required of the females in the reproduction of the species, the brighter colour of the males reflecting the sun's rays, and the duller colour of the females tending to absorb these rays, and thus acquire the extra physical energy necessary for the continuation of the race. A third reason may be that the brighter colour of the males and their more open manner of life may serve to distract the attention of their enemies from the females, which in the economy of nature are the more valuable sex, inasmuch as the early death of a female means the loss of the entire brood, whereas the value of the life of a male ceases within an hour or two after emergence. It is only reasonable to suppose that the sexes are produced in more or less even numbers, else a large preponderance of males in course of time would tend to reduce the numbers of the species, whereas equal numbers being produced would tend to keep the balance of nature. The apparent scarcity of the females of many species is probably only occasioned by their more harmonious coloration and effective means of hiding. It is a noteworthy fact that if a species receives any protection, either by response to environment, mimicry, or other means, it is always the females that receive this protection in a greater degree than do the males. In many instances it is the females alone that are protected in this manner. To refer again to that most useful species *Papilio polytes*. In any of its habitats the males may be seen flying in hundreds in all situations, but particularly is it attracted by water, and a small shallow stream with well-wooded banks is a situation where it may be expected to be found in the greatest profusion. The scarcity of the females is however most noticeable, and one may collect in the most favourable localities, where the males are flying in the greatest profusion without seeing a single specimen, but if one knows their habits they may be found in numbers, their mode of life is so entirely different, that they might very well be different species. They rarely fly, and if by any chance they are forced to do so, it is only for a very short distance, usually only as far as the nearest bush, where they immediately seek the thickest part. To find the females in any numbers it is necessary to search for them in the thickest bushes where the foodplant grows. When located they are by no means easy to capture owing to the thickness of the bushes in which they are hidden. It thus seems possible that the males, flying around the bushes wherein the females are secreted, will tend to distract the attention of birds or other enemies; if this be the case, it seems difficult to explain the extraordinary likeness of the females to *Papilio hector* and *P. aristolochiae*, whose habits are very different. as both males and females of these species fly quite fearlessly in the open. In spite of their warning colours and apparent immunity from attack, as suggested by their open manner of existence, they are not so well fitted for the struggle for existence, as they are considerably scarcer than *P. polytes*, whose method of protection, whatever it may be, is apparently of the greatest utility to the species, which one can only surmise from its wide range and extreme abundance.

The last phase of variation to be considered is that of Melanism, which is undoubtedly on the increase in this country. It is apparently an endeavour on the part of a species to suit itself to a changed type of environment. These black forms breed true in Mendelian proportions. The only case that has come under my direct notice is the melanic form of *Zygaena trifolii*, which in its apparent strength and weakness presents rather a paradox. The black form has a greater sexual attraction than the type. If a typical male is enclosed with a number of typical females and a siugle black one, it is the latter that will invariably be found to have paired. In nature the black forms rarely fly, in fact, I can only recall a single instance of this happening. The resting habit also is changed, the insect resting with its wings spread out giving it somewhat the appearance of a large black *Eupithecia*. The ova produced from these pairings are invariably fertile and the larvae, if anything, have a greater stamina than those of a normal pairing, the resulting imagines in the second generation being 25% black. If however a pairing takes place between a black and a type carrying the 50% black strain the result will be in the next generation 50% black and 50% type. The larvae however in this strain show a marked loss of virility, and it is a matter of great difficulty to get even a small percentage to stand the strain of hibernation, or rather successful emergence from hibernation. In all Zygaenas the great danger period is the ecdysis immediately following hibernation. In every species of this genus there is a change of skin immediately preceding, and another immediately after hibernation without feeding, consequently any weakening of constitution immediately shows. In the last stage, if two blacks are put together, they show little or no sexual desire although a black male will pair readily with a typical female. Only on three occasions have I succeeded in getting pairings between two blacks, and in each instance the ova have proved infertile. Thus in this instance it would be quite impossible for the typical form to be eradicated and an entirely black local race evolved. Although it is possible for the recessive form to increase, in the event of the variation becoming predominant it would necessitate pairings between them, and by the infertility of these pairings, would allow the type once more to gain numerical superiority. Thus showing that this form is not beneficial to the race and that the typical form is better fitted for the struggle for existence. In other species this state of affairs does not prevail. In the case of *Pachys betularia* the insect follows Mendelian proportions, but in this instance the blacks are quite fertile *inter se* and in many districts rapidly ousting the type. Thus we may assume that here we have two types, one of which is beneficial and the other detrimental, consequently nature has derived a means of eliminating a type, that does not tend to the survival of a form beneficial to the species. To sum up, variation may or may not serve a useful purpose, where a local race has been evolved providing a beneficial type especially: so when this is an insular form in the course of time, a new species is produced. When however a form is evolved that is not suited to its environment the race dies out, and thus only the best aud most suitable types are perpetuated.

In conclusion having taken up your time with these various types of variation, I must record one instance of invariability, and that is the kindness and forbearance of the members of the South London Entomological and Natural History Society, which makes it a pleasure to serve them in any capacity. Finally I should like to express my appreciation of the honour you offer me in again electing me as your President for the coming year, and to most heartily thank the Officers and Council of the Society for their unvarying kindness and assistance at all times, which turns an office that might be an onerous duty, into one of real pleasure. May this year be one of renewed prosperity to the Society and the future continue the progress that has been shown in the past.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 12th, 1925.

Mr. T. H. L. Grosvenor, F.E.S., President, in the chair.

Mr. R. D. Cox, of Streatham, and Mr. S. F. P. Blyth, of Chislehurst, were elected members.

Exhibition of Exotic Insects.

Mr. H. Moore exhibited the following Coleoptera:—1. *Chiasognathus grantii*, ♂ and ♀, the "scissor-jawed beetle," from Chili. 2. *Neolucanus lama*, Oliv., from Victoria Point, Lower Burmah. 3. *Dorcus niponensis*, Voll., Japan, a series of 3 pairs, showing gradation in development of secondary sexual characters. 4. *Ceratorhina* sp., a brilliant species from near Stanley Pool, Lower Congo, with its large forked head-process.

Mr. C. J. Cheeseman exhibited pairs of *Ornithoptera urvillianus* and of *O. darsius*.

Mr. A. E. Tonge exhibited a large Psychid case from the salt-lake area near Calcutta, possibly that of *Mahasena graminivora* (?) which does considerable damage to thatching grass.

Mr. Stanley Edwards exhibited a box of numerous large species of S. American Coleoptera to show the varied and fantastic shapes of the head appendages of the males.

Mr. Blenkarn exhibited a number of Longicorn beetles mainly from West Africa; and specimens of *Trechus micros* from Charmouth, April, 1924, a species new to Britain last year.

Mr. Hy. J. Turner exhibited a box containing a number of species of Heterocera, mainly from India, including the brilliant *Erasmia pulchella*, *Amesia sanguiflua*, *Callamesia midama*, *Celerina andamana*, *Campylotes histrionicus*, etc.

Mr. H. W. Andrews exhibited two *Saturnia pyri*, taken in Palestine.

Mr. O. R. Goodman exhibited three cases of Palaearctic Parnassiids with examples of five out of the six groups into which this genus has been divided.

1. *Mnemosyne* group, showing *mnemosyne* and *stubbendorfi*. 2. *Clarius* group, showing *clarius*. 3. *Apollo* group, showing *bremeri apollonius*, *sibiricus*, *nomion*, *actius*, *tibetanus*, *actinobolus*, *himalyensis*, *sikkimensis*, and *romanovi*. 4. *Hardwickii* group showing *albulus*, *delphius*, *styx*, *satanus*, *caeca*, *staudingeri* and *hardwickii*. 5. *Acco* group, no examples. 6. *Charltonius* group, showing *imperator* and *charltonius*.

Mr. Enefer exhibited the female of the black-bellied tarantula spider (*Lycosa narbonensis*), which Mr. Main had brought from the South of France, together with her brood of some 80 young, which were usually carried on her back. He had constructed a handsome ingenious cage in which to keep them and observe their habits. The mother had fed fairly well until the beginning of November when she ceased eating, and could in no way be tempted with food (flies, gnats, etc.). She had not yet resumed her meals.

He also showed two stick-insects, one golden-brown and the other green, the former feeding on golden privet, the latter on ordinary green privet.

Mr. Dannatt exhibited a large case of *Morpho* species, including females of *M. sulkowskyi*, *M. cypris*, etc.: with the silver butterfly *Argyrophorus argenteus*, and the golden *Argopteron aureipennis*, both from the southern part of S. America; and the very rare New Zealand butterfly *Dodonidia helmsi*.

Mr. T. H. L. Grosvenor exhibited numerous species of butterflies from India, and called attention to their varied shapes and structure: those with very heavy thorax and small wings were powerful in flight, those with very slight thorax and large wings were slow fliers, while the *Leptocircus* sps. were among the swiftest flying insects in the world.

Mr. Riley had asked collectors and they said that *Leptocircus* much resembled dragonflies. It was remarked that many Papilios with long tails held their hindwings down in flight and did not use them. This was what *Leptocircus* was also reported to do.

Dr. Cockayne, who had seen *Leptocircus* alive, said that it did not look like a dragon-fly in life, although it acted like one in its habit of hovering over water.

Mr. Ashby showed bred specimens of the large Saturniid moth, *Samia cecropia*, from North America.

Mr. Robert Adkin exhibited examples of insects taken at "sugar" in his garden at Eastbourne during the past summer, and read the following notes:—

A fairly well-kept garden (save the expression), surrounded by similar plots or roads; half a mile from the unbuilt-over part of the South Downs and a few hundred yards from the sea, is perhaps hardly an ideal spot for "sugar"; especially when available tree-trunks are scanty and their absence has to be made up by a few garden stakes. Such were the conditions in which I undertook a season's sugaring and, although nothing that could be regarded as a variety was taken, the result of my exertions was by no means without interest.

My primary object was to ascertain the proportionate numbers of *Miana strigilis* and its var. *aethiops* that occurred on the Sussex coast. Accordingly, I commenced operations on June 7th, but as this species did not show up until the 14th, I think I may claim to have covered its whole season. Sugaring was continued almost nightly until October 27th, when the weather became so bad and the insects attracted so few, that it was given up.

Just sixty different species of lepidoptera were taken, without counting *Pyrameis atalanta*, which was a frequent visitor to the sugared posts during the daytime in autumn; while among other creatures, that made an evening meal at the sweets, were hosts of earwigs, spiders, slugs and snails, and a few mice.

The following is a list of the species of Heterocera taken:—

Habrosyne derasa, came more freely than I had ever before met with it; possibly the larva may feed upon the cultivated brambles that are grown in gardens in the neighbourhood.

Bryophila muralis, once only, July 20th.

B. perla, was taken on three separate occasions between July 22nd and August 10th. Both species are common locally.

Acronicta tridens (or *psi*), not common. I have taken *tridens* larvae in the garden, but have so far not met with that of *psi*.

A. aceris, once only, although the species is fairly common in the neighbourhood.

Leucania lithargyria and *L. pallens* were each represented by single specimens.

Xylophasia lithoxylea, a species that I have often found commonly on the coast, was also represented by a single specimen.

X. monoglypha, very common from the middle of June to the end of August, when it suddenly disappeared.

Neuria reticulata, only one.

Cerigo matura, also only one.

Mamestra furva, two specimens.

M. brassicae, was commonly met with from the middle of June until nearly the end of September.

M. persicariae, only one was seen. In London gardens I have generally found this species almost as common as the preceding.

Apamea basilinea, not at all common.

A. secalis came in numbers, practically all the usual forms being represented.

Miana strigilis was also very common, and its variation was represented by 54% typical, 30% var. *aethiops* and 16% intermediate, chiefly referable to var. *latruncula*, Haw.

M. bicoloria, only one was seen. The species is quite common in sheltered spots on the Downs.

Grammesia trigrammica occurred sparingly.

Agrotis puta, *A. segetum* and *A. exclamationis* were none of them at all common.

A. saucia, a worn specimen was taken on June 18th, but the species was not seen again until September 19th, when it became an every night capture.

A. suffusa proved to be the commonest of the Agrotids.

Triphaena pronuba was perhaps the most in evidence of all the species and showed the usual variation, yet of *T. comes* only some seven or eight specimens were met with during the whole season.

Amphipyra tragopogonis was represented by three or four specimens only.

Mania maura was quite common over a very short period.

Anthocelis pistacina and *A. lunosa* were each represented by two or three specimens.

Xanthia circellaris was not infrequently seen.

Calymnia affinis, one specimen was the only representative of the genus.

Dianthoecia cucubali, two examples; had possibly found a living on our garden pinks.

Euplexia lucipara was very common; the numbers of ferns growing on rockeries and in odd corners affording good opportunities for its larvae.

Phlogophora meticulosa came on the scene as *X. monoglypha* died out and was equally abundant.

Hadena genistae was represented by a single worn specimen; and *H. oleracea* was not at all common.

Calocampa vetusta, Gonoptera libatrix and *Plusia gamma* were each represented by single examples; the two latter being unusual visitors to "sugar."

Boarmia gemmaria; *Halia vauaria*; *Abraxas grossulariata*; *Eupithecia vulgata*; *E. pumilata*; *Acidalia dilutaria* and *A. aversata* each came once; *A. virgularia* frequently and *Camptogramma bilineata* on two occasions.

Endotricha flammealis and *Scopula ferrugalis* were each attracted two or three times.

Aciptilia pentadactyla visited the "sugar" on August 8th; surely a late date for the species.

Tortrix podana and *T. unifasciana* were frequent visitors and *T. heparana, T. ribeana, T. forsterana, Peronea variegana* and *Spilonota trimaculana*, each put in an appearance once.

Depressaria costosa was twice met with.

FEBRUARY 26th, 1925.

The PRESIDENT in the chair.

Mr. Walter Dannatt, Gaibal Rd., Burnt Ash, S.E.12, was elected a member.

There was an exhibition of Lantern-slides.

Mr. Lucas exhibited a series of slides showing sexual and structural differences in Grasshoppers, and the female Earwig with her eggs.

Mr. Tonge, a slide showing the eggs of *Hibernia aurantiaria*, laid inside the empty egg-shells of *Himera pennaria*, which had been found by Mr. Parker. He also showed slides of the eggs of *Xanthia lutea* (*silago*), and of the larvae of *Cidaria sagittata.*

Mr. Glegg, a series of slides of Bird-life.

Mr. Dennis, slides illustrating details of Plant-life and of Ferns.

Mr. Cheeseman gave the Society a number of lantern-slides.

MARCH 12th, 1925.

The PRESIDENT in the Chair.

Mr. A. Simmons of 42, Loughborough Rd., W. Bridgeford, Nottingham; and Mr. J. S. Taylor, 24, Winchester Avenue, Brondesbury, N.W., were elected members.

Mr. A. A. W. Buckstone exhibited a remarkable *Xanthorhoë fluctuata*, taken at Herne Bay in 1922, in which the whole surface was very uniformly mottled, to a great extent suppressing the usual prominent banding and markings.

Mr. Hy. J. Turner exhibited two species of *Zygaena* from the Mediterranean area: the race *junceae* of *Z. fausta* from Vernet-les-Bains, characterised by the deeper tone of red coloration; and race *felix* of *Z. hilaris* from Tripolitana; also a few striking Rhopalocera sent over by our fellow-member, Mr. F. Lindeman, from Rio de Janeiro, including the very large race *brasiliensis* of *Papilio thoas* of an unusually golden yellow, the strikingly marked *P. hectorides* with its very differently patterned female, the tailless *P. polystictus*, the delicate transparent pale sulphur-flushed *Pteronymia euritea*, a form of *Thecla marsyas* with very blunt apices to the fore-wings and the Syntomid *Isanthrene crabroniformis*; also a box of *Noctuidae* from Tripolitana, containing *Plusia ni*, the typical form of *Hecatera serena* of which our British form should be a named race, a *Caradrina* (*Athetis*) probably *superstes* a species at one time reported as British and found on the island of Guernsey, and an Agrotid not unlike some forms of *tritici*.

Mr. T. H. L. Grosvenor exhibited females of the Indian *Papilio polytes* and *P. memnon* with examples of the Aristolochia-*Papilio* species, which they mimic; also the rare *P. mayo*.

Mr. E. J. Bunnett exhibited stems of the cow-parsnip (*Heracleum sphondylium*), from which he had bred the imagines of *Depressaria heracleana*. The larvae pupated in the hollow stem, and seemed to make use of a common opening for emergence. He remarked upon the length of time that the imagines remained alive. It was pointed out that most species of the genus *Depressaria* hibernated, and many laid up in thatch, which in some places was a fertile field for collecting them. He also showed the fungus beetle *Cis bilamellatus* from Chislehurst and Keston, a species which Fowler says only occurs in W. Wickham Woods; and portions of the life-histories of *Cionus scrophulariae* and *Saperda populnea;* together with a large bag-like "nest," $8\frac{1}{2}'' \times 4\frac{1}{2}''$, or social chamber of the larvae of a species of *Anaphe* (*Arctiidae*), from South Africa.

Mr. Dannatt exhibited a specimen of *Heliothis peltigera*, found in a house at Blackheath; silvery forms of *Plusia chrysitis* from Wicken; the rare form of *Pyrameis* (*Vanessa*) *tammeana* from the mountains of Hawaii; and two pupal chambers of *Dicranura bicuspis* on birch.

Mr. C. N. Hawkins exhibited a short series of *Amorpha populi* consisting of 12 specimens, the first 8 of which showed the ♀ parent (wild), and 7 individuals bred from ova obtained from her. The ♀ parent was taken at Upper Tooting on June 30th, 1923, and the offspring emerged on various dates between June 1st and July 17th, 1924, inclusive. One of the latter is an asymmetrical ♀, whose larva had 4 moults and 5 larval stages, whereas all the rest of the brood had 3 moults and 4 stadia. Another one is mainly ♀, but with the hinder portion of the body showing traces of ♂ coloration, etc. Another is a gynandromorph, right side ♂, left side mainly ♀ and two others are very pale ♀s (ab. *pallida* Tutt). Others shown included fairly normal specimens; an ab. *pallida* ♀ bred from a Herne Bay larva; a dark ♀ from Upper Tooting; a very small pinkish ♂ from Norfolk; and lastly a small pinkish-ochreous ♀, also from Norfolk.

Mr. Robert Adkin exhibited some artificially produced varieties of butterflies. He said the very remarkable *Melitaea aurinia*, in which the whole of the paler markings were of a delicate grey-blue colour was, he understood, not the result of temperature treatment of the pupa, but of some special treatment of the larva, but in what respect he had been unable to ascertain. The *Pyrameis atalanta*, in which the red band on forewings was distorted, and the *Vanessa io* with "blind" eye-spots on the hindwings were forms now produced artificially quite commonly, both abroad and in this country. The rearing of such forms by way of experiment was quite legitimate, but the present craze for wonderful varieties had apparently induced some unscrupulous persons, for their own gain, to endeavour to supply the demand. Their *modus operandi* appears to be: having produced the "variety," to attach a label to it bearing place name, date, and "bred from wild larva"; then to select some small dealer such as some working-man, who occasionally sells any of his captures to make a pound or two, and get him to sell them on a more or less liberal commission as genuine, which he, quite unsuspectingly, endeavours to do.

MARCH 26th, 1925.

The President in the Chair.

Mr. H. Main exhibited an adult Coleopteron *Drilus flavescens*, of which the larva was found in a snail-shell in September, 1924. It had moulted before the winter inside the shell, where it subsequently pupated, emerging recently.

Several members brought exhibits of melanic forms to assist in illustrating Mr. R. Adkin's paper read subsequently. They were;—

Mr. A. A. W. Buckstone, including aberrations of *Dysstroma citrata* (*immanata*).

Mr. Tonge, some fine bred melanic forms.

Mr. Grosvenor, a number of melanic Zygaenids.

Mr. Abbot, a long series of melanic *Boarmia repandata*.

Mr. Goodman, striking melanic forms of *Parnassius mnemosyne*, *Argynnis aglaia* (6,000-7,000 ft.), *Dryas paphia*, *Brenthis pales* (6,000-7,000 ft.), *B. amathusia*, *Melitaea pseudo-athalia* ab. *navarina*, *Papilio machaon* race *hippocrates* (Japan), and the race *polaris* of *Aglais urticae*, with a series of melanic forms which had been manufactured by temperature treatment.

Mr. R. Adkin read a paper on "Melanism," which he illustrated with a number of lantern-slides (see page 7).

The President in opening the discussion which followed, remarked that Melanism is probably connected with either constitutional weakness, or possibly in a few instances, with excessive strength; in the former, this may be consequent on continual feeding on unhealthy or contaminated food, in the latter it is difficult or impossible, with our present knowledge, to assign a reason. Melanism, to outward appearance, is a very striking form of variation, but possibly a very slight physical change is needed to produce it, involving very little effort, it may be, far less than that required to induce the presence or absence of a marking, or other deviation from a type. In regard to the presence of melanine it seems difficult to reconcile this theory, otherwise why should it only affect one stage in the life-history of the species; if melanine acts directly on the pigment why should not the ova, larva, pupa, and imagines all be melanic? Furthermore, how could a chemical acting on the pigment be passed on in Mendelian proportions, to future generations.

Dr. Cockayne said it was quite conceivable that treatment of the larval food might produce melanism in the immediately succeeding imago, but it was difficult to understand how that could effect future generations; for that to be the case the germ plasm would have to be altered. The experiment of injecting ground-up lenses into an animal, and so causing the offspring to have eyes without lenses or with very defective ones, showing that the germ plasm could be affected, but the defect was not transmitted to future generations, and so was not comparable with Dr. Harrison's experiments.

Mr. B. W. Adkin emphasised the importance of records by collectors when a question such as melanism had to be dealt with. Mr. Adkin, he said, had given a review of localities in which melanism had occurred; but, without doubt, many of those present, and many collectors who were not present, would be able to make considerable additions to the list. Even he, with his own limited opportunities, could mention several cases of melanism, outside the more smoky areas of England, in addition to those mentioned by Mr. Adkin, such as the well known race of melanic *Boarmia abietaria* at Box Hill, Surrey; and of *Asthena sylvata* in mid-Kent; a number of melanic *Stauropus fagi*, bred 1906 from ova from a female taken at Box Hill, Surrey; melanic *B. gemmaria* captured at Hastings, 1906; a melanic *Ematurga atomaria* captured in Tilgate Forest, Sussex, 1902; melanic *Xylophasia monoglypha* common at Sutton-on-Sea, Lincolnshire, 1907, and one specimen at Hythe, Kent, 1895. Even this small list of addenda to Mr. Adkin's list of localities was sufficient to indicate the importance of more extensive records, and he urged the members to record the capture of melanic species, especially when captured or bred from districts not generally producing them.

Mr. Farmer said that as there appeared to be no doubt that a plant on which the larva was fed could be affected externally through the adhesion of foreign matter, or internally by the absorption of mineral substances, he suggested that experiments should be carried out in both directions. Research, to be of any real use, should be conducted on organised lines, a certain number of workers concentrating on external treatment of the food plant, and others on the internal; each experimentor thus undertaking a specified task, so that the results might ultimately be compared.

Mr. O. R. Goodman said, Mr. Adkin had confined his remarks to the British Isles and therefore the extremes of temperature are not very pronounced as contrasted with the entire palaearctic and nearctic regions; should we not more readily seek the explanation for the assumption of melanic pigment if we extended our range of investigation from the polar regions to the tropics? It has occurred to me that perhaps a line of investigation may be suggested by the undoubted fact, that in many species the melanic pigment is more pronounced in the cold conditions occasioned by altitude and latitude. May not this be due to the increased necessity of heat absorption to sustain the requisite energy for reproduction? Again, as the President has ably remarked, melanism is intimately connected with constitutional weakness; may not that also be an attempt to revive the requisite stamina in the same way? In this latter respect, it is suggestive that it is generally admitted that there is a very close affinity between melanism and albinism, both of which indicate constitutional weakness; I merely suggest this theory as another and additional line of investigation.

APRIL 9th, 1925.

The PRESIDENT in the Chair.

Mr. D. H. Kimmins, 16, Montrave Road, Penge, was elected a member.

Mr. A. A. W. Buckstone exhibited a series of a small race of *Urbicola comma*, from the southern face of the North Downs, at Shere, Surrey, having the darker markings less prominent than in the type. These were compared with the race, which occurred on the Downs at Mickleham, and which are more normal in size with darker and more prominent markings than in typical forms. Some small, extremely pale specimens from Horsley and Betchworth were shown, and considered as probably seasonal forms, which occurred only when the season was very dry. A series of the typical form was shown for comparison.

Mr. O. R. Goodman exhibited long series of *Polyommatus* (*Agriades*) *thersites*, from Digne, S. France.

Mr. K. G. Blair exhibited a specimen of *Prodenia litura*, F. (*littoralis*, Bdv.), reared from a larva found on purchased tomatoes.

Mr. H. Moore exhibited specimens of *Eumaeus atala*, sent to him by his correspondent, Mr. Blatchley, who, while collecting them, met a member of the Society, Mr. Pearson, who had recently taken up his residence in Florida.

Mr. Grosvenor made remarks on various species of *Papilio*, as observed by him in India. While most females of the genus *Papilio*, as well as of the *Pieridae*, were very little apparent at any time, hiding away in thick bushes, etc., for the most part, the females of the *Ornithoptera* were very common where they occurred, while the males were very scarce owing to the habit of soaring at considerable heights. He exhibited nearly twenty Indian species of *Papilio*.

APRIL 18th, 1925.

FIELD MEETING—OXSHOTT.

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

This was an early date for a Field Meeting, and very little was expected, and very little was noted. The 20 members and friends who were present enjoyed the walk after the long winter " hibernation " from active entomological pursuits. The larvae of *Ellopia prosapiaria*, *Thera firmata* and *Bacotia sepium* were beaten from the pines as well as imagines of *Panolis piniperda* and *Thera obeliscata.* Tree trunks afforded imagines of *Tephrosia bistortata*, *Diurnea fagella*, and *Semioscopus avellanella.* One or two early *Eupithecia nanata* were disturbed from the heather, and several species of *Micropteryx* were swarming around the budding birches. Oxshott records have appeared in the " Proceedings " on numerous occasions. In April, 1916; in May, 1900, 1901, 1910; in June, 1893; in September, 1902; and in October, 1907 and 1912, meetings were held at Oxshott and reports were presented.

April 23rd, 1925.

The PRESIDENT in the Chair.

Miss E. M. Ralphs, of Redhill, and Major P. P. Graves, F.E.S., of Queen's Gate, S.W.7, were elected members.

Mr. O. R. Goodman exhibited a collection of the species and races of Rhopalocera peculiar to the Island of Corsica, in illustration of his paper " Collecting in Corsica." He also showed the continental species nearest related to the island species or race.

The exhibit included *Papilio hospiton*, with drawings (by Mr. A. de B. Goodman) of the young and full fed larvae; *P. machaon*, with short tails; *Aglais urticae* race *ichnusa* and Spanish *A. urticae; Dryas paphia* form *anargyra* (without the silver below), which form predominated; *A. elisa*, compared with *A. niobe* its nearest mainland congener; the race *aristaeus* of *Hipparchia semele; Satyrus neomiris*; *Coenonympha corinna*; race *tigelius* of *Pararge megera*; the race of *Plebeius argus* (*aegon*) which so closely resembles *P. argyrognomon* of the continent by its want of the marginal black shading on the forewings of the male; and *Hesperia therapne* compared with *Powellia sao*, etc.

Mr. Step exhibited the aethalium of *Reticularia lycoperdon*, one of the Mycetozoa. It was obtained in the plasmodium stage during the Field meeting at Oxshott, when it had just issued from the root of an overturned beech. It was then pure white, and of a creamy consistency. The next day, it formed the silvery crust, which darkened gradually to its present tint of greyish brown.

Mr. Mera exhibited an old specimen of the "Dartford Blue" (*Polyommatus thetis*), apropos of an article in the *Entomologist's Record* on Grimaldi the clown as an Entomologist; also one of the old specimens of the so-called "Weaver's Fritillary," obviously an example of *Brenthis dia*.

Mr. O. R. Goodman read a Paper illustrated with lantern slides entitled, "Collecting in Corsica." (See page 22).

MAY 9th, 1925.

FIELD MEETING—BOX HILL.

Conductors, Messrs. E. STEP and HY. J. TURNER.

The weather was very fine, the attendance good, and an extremely pleasant outing was spent. No reports were sent in but verbal reports were characteristic of the season that insects were very scarce, although the botanists found some interesting plants. In past "Proceedings" various full reports of meetings at Box Hill have been published.

MAY 14th, 1925.

The PRESIDENT in the Chair.

Mr. S. A. Blenkarn exhibited the Coleoptera, *Haliplus mucronatus*, Wicken Fen, May 11th and 12th, 1921; *Laccophilus variegatus*, Lewes, May 10th, 1925 (taken by Mr. L. G. Cox), and *Gyrinus edwardsi*, Hull, April 18th, 1925 (taken by Mr. G. B. Walsh).

Mr. O. R. Goodman exhibited a remarkable melanic specimen of *Pieris brassicae*, bred by the late Dr. Chapman at Reigate in May 1907, in which the undersides of the fore-wings were extremely blotched with black, and comparable with the race *cheiranthi* from the Canaries.

Dr. Cockayne exhibited a series of preserved larvae of *Eupithecia sobrinata*, from Box Hill, to show the various colour forms.

Mr. Hy. J. Turner exhibited a series of *Thera varieta* race *britannica*, bred from larvae found on spruce near Southampton, in the early spring of this year; compared with last year's series from the same place they were somewhat darker. Not one favoured *T. obeliscata*, all having shades of grey and not of brown as a basal colour. He also showed a short series of a newly described form of *Sarrothripus revayana*, from Central France; race *columbana*, so called from the general, uniform dove colour of the specimens. Some 21 examples of the form were taken by our fellow member, Mr. Wm. Fassnidge, while only four other examples were met with in the district. It was probably attached to beech, as no oak was to be found in the district.

Mr. Enefer exhibited three species of Millepedes from Blackheath, and read an extract from a Board of Agriculture and Fisheries leaflet on the genera *Julus* and *Polydesmus*.

Mr. Dannatt exhibited a series of Temperature-produced forms of various species of the *Vanessa* group : *Pyrameis cardui*, *P. atalanta*, *Aglais urticae*, *Vanessa io*, *Euvanessa antiopa*, *Polygonia c-album* and *Eugonia polychloros*.

Mr. Farmer exhibited *Thera obeliscata*, bred from Oxshott larvae.

Mr. Step exhibited the corky fungus, *Fomes ferruginosus* (Schrad.), which Mr. Blair had found growing on a dead beech, on the occasion of the Society's visit to Box Hill on May 9th. It was pointed out that the fungus spreads over the bark with the openings of the tubes on the exposed surface, and that the tubes are renewed in successive seasons : a section of the specimen showing about seven strata of the tubes, which were of a cinnamon tint.

He showed, also, a small group of the mycetozoan, *Lycogala epidendrum*, Fr., from a colony several feet in extent on a prostrate beech trunk, where could be seen the white and rose-coloured plasmodium and the newly formed pinky-grey aethalia, which have become duller in tint on drying. The beech appeared to have been killed by the deadly agaric, *Armillaria mellea*, for between the bark and the spongy wood was a complete network of the black rhizomorphs of that species. Taken at Box Hill, May 9th.

May 24th, 1925.

FIELD MEETING—Witley.

Conductor, Mr. G. TALBOT, F.E.S.

This was a meeting held at a somewhat more distant area than usual. Nearly twenty members and friends were present in all, although only about half that number went down by train. Added to the attraction of the meeting was a very kind invitation from J. J. Joicey, Esq., to visit the "Hill Museum" in the afternoon. The portion of the party who came by train were set down at Milford, and they enjoyed a delightful and not unproductive ramble through bye-paths and woods on a beautiful sunny morning after a very wet night. The rest of the party were met near Hambledon and, under the guidance of Mr. G. Talbot and one of Mr. Joicey's game-keepers, a devious path through woods and fields was taken until the curious conical hill known as "Hydon Ball" was reached. Here on this beautiful view point with its pleasant broken woodland surroundings, now a national preserve and open to all for ever, the visitors dispersed and partook of lunch. Very soon the weather and wind changed, it turned cold and wet, and a return was made towards Witley. After a long walk back in the drenching rain the Museum was reached and an hour or two was spent looking over the entomological treasures therein contained, particularly the valuable collections made for Mr. Joicey in Central Africa and New Guinea by the Messrs. Barnes and Pratt. Tea was taken at a hostelry near the station, and all felt that in spite of the inclemency of the weather during the latter part of the day, the visit to the Museum had been a very pleasing and instructive substitute for the afternoon's collecting.

May 28th, 1925.

The PRESIDENT in the chair.

Mr. C. N. Hawkins exhibited aberrations of the "winter moths," from Wimbledon Common, including three forms of *Hybernia leucophaearia*; a very remarkable aberration of *H. marginaria* in which the outer half of the forewings was unusually dark in colour, while the rest of the area was quite light, with the total suppression of the usually dark base; a dark-banded *Cheimatobia brumata*, and a very dwarf example of *C. boreata*.

Mr. Turner exhibited specimens of *Pholus labruscae*, a Sphingid of varied shades of bright green, and of *Papilio hellanichus* from the Chaco Forest region, Argentine, sent to him by our fellow-member, Capt. K. J. Hayward.

Mr. Main exhibited examples of the jumping larvae of the "pear midge," of which a full account was given in the leaflet of the Board of Agriculture (53). The pears are attacked when quite small and fail to develop, but swelling irregularly, are hollowed out and become a mass of pulp and excreta. The larvae jump very actively at times, and pupate in the soil. He also showed a bred (May 25th) specimen of *Anthocharis belia* = *eupheno*, from Agay, and a pupa of the glowworm, which was luminous.

Dr. Fremlin described the life-history of the malaria parasite, and a short discussion took place.

JUNE 11th, 1925.

The President in the Chair.

Exhibition of Living Objects of Natural History.

Dr. E. A. Cockayne exhibited living larvae of *Cleora jubata* (*glabraria*), *C. lichenaria*, a green form of *Noctua castanea* race *neglecta* and *Psilura monacha*, all from the New Forest; and of *Calymnia pyralina* from Surrey.

Mr. H. Worsley-Wood exhibited living larvae of Lepidoptera from the New Forest, including *Limenitis sibilla*.

Mr. Hy. J. Turner exhibited living larvae of *Boarmia ribeata* (*abietaria*) feeding on yew, and of *Tephrosia biundularia* (*crepuscularia*, Hb.), feeding on nut. He also showed living imagines of *Aegeria andrenaeformis*, ♂ and ♀, from Chesham, Bucks, and pointed out the sexual difference of the amount of white scaling on the underside; *Pachys betularia*, ab. *carbonaria* (*doubledayaria*), *Cabera pusaria* and ab. *rotundaria*, *Ephyra linearia*, with obsolescent transverse lines, and *Acronicta leporina*, all from Westerham; with *Melitaea aurinia* from Eastleigh, Hants, all the imagines having emerged in his cages during the day.

Mr. C. N. Hawkins exhibited living larvae (1) *Miselia oxyacanthae*: a velvety black form with yellowish head and legs and the double tubercles on the dorsum of the tenth abdominal segment red, all the other markings being obscured; it was feeding on blackthorn. (2) *Geometra papilionaria:* a nearly full-fed larva, which was suffused almost entirely with purplish brown; feeding on birch. (5) Three larvae of *Brephos parthenias* on birch. All three were from Wimbledom. He also showed the beetle, *Tiresias serra*, a specimen fully formed, but still in the pupal skin, which had split to allow escape.

Mr. Nash exhibited the living larvae of *Dasycampa rubiginea*.

Mr. K. G. Blair exhibited two species of *Isosoma*, a genus of gall-making *Chalcididae*, with their galls on grass stems, from Hendon. They feed in the autumn, and emerge from the base of the gall in May.

Mr. Stanley Edwards, for Mr. G. H. Henshaw, exhibited the immature stage of a predaceous "bug," Hemipteron, which had attacked and killed a larva of *Hybernia defoliaria*. It was presumably the young of the Pentatomid, *Tropicoris rufipes*, L. The larva was swinging from a twig, and several of the Hemipterons were attacking it. When captured and given another larva of *H. defoliaria* they took no notice of it.

Mr. Urich, of Trinidad, gave an address upon Entomology in that island. He said that the climate was characterised by no winter; four months of the year were dry and eight months were wet, with a short interval of "Indian summer." There was no twilight. The commencement of the rainy season was the time for larvae, as then the foliage was young and growing; probably the ridges of the hills were the best grounds for collecting. There was a wealth of material year in and year out, and many species were quite familiar, although at present still remaining undescribed. *Papilio thoas* is a species of which the larva feeds on species of *Citrus*. But full-fed larvae are very rare because a species of *Polistes* (Hym.) kills them. On the other hand, the larva of *P. anchises*, which also feeds on *Citrus*, has no enemies and is common in all stages, being gregarious on the under surface of the leaves. They wander in a body and rest together on the stems, and only separate when ready for pupation. The butterfly *Brassolis sophorae* in the larval stage is the great pest of the coco-nut. The adults are rarely obtained as they are crepuscular and fly high. The larvae construct a bag into which they retreat when not feeding. The eggs are laid in clusters anywhere, on leaves, on fences, on the ground; the larvae feed on the older coco-nut leaves, and even on the shell of the nut. They unite two leaves for a nest at night when young, marching out two by two to feed. When the larva gets bigger the nest is lined with silk. Only for pupation do they distribute themselves, low down on the ground, among old coco-nut shells. The eggs are parasitized by Trachiogamids and Tachinids, but the larvae appear to be immune from parasitic attacks, and are quite common. The larva of a species of *Caligo* feeds on the sugar-cane, and during the day hides low down among the stem leaves. It feeds at dusk and dark, and the imago is attracted by rotting fruit. There are about 150 species of ants identified up to the present. They are much attracted by honeydew and some are very destructive. The leaf-cutting ant (*Atta cephalotes*) is a native. He called attention to the writings of Wallace, Bates and Belt, respecting this ant, especially referring to the very accurate observations of the last named. The harlequin beetle (*Acrocinus longimanus*) is a native; its larva feeds in the stems of *Ficus*, and it is quite easy to hear the gnawing and rasping when a plant is attacked by one.

In the discussion the President remarked on the apparent paucity in numbers of the larva of any one species in some tropical countries. Of the genus *Papilio* he had only found one species in India, which was really abundant in all stages, *viz.*, *P. demoleus*, which was attached to *Citrus* bushes.

In reply, Mr. Urich made remarks on the vigilance necessary to frustrate the introduction of foreign pests, and the effectiveness of introduced parasites, but an attempt to naturalise a Mexican parasite had utterly failed. He was very doubtful as to the efficacy of spraying, which was very difficult in tropical countries, where growth was so rapid and luxuriant. He considered dusting as much more effectual. He preferred the encouragement of the "balance of nature" rather than drastic measures, which often erred on the other side. Of course, very dry years were inimical to this "balance."

JUNE 20th, 1925.

Field Meeting—Byfleet.

Conductor, Mr. Stanley Edwards, F.L.S., F.Z.S., F.E.S.

There was a good attendance at this meeting and the weather was quite satisfactory all day. The number of species of Lepidoptera in one stage or another was almost up to the normal for this locality at this time of the year. A considerable amount of larva-beating and searching was carried on and the following species were reported. As larvae, *Gonepteryx rhamni*, *Pararge megera*, *Epinephele jurtina*, *Brenthis selene* and *Augiades sylvanus*, *Malacosoma neustria*, *Saturnia pavonia*, *Dicranura vinula*, *Notodonta ziczac*, *Lophopteryx camelina*, *Drepana falcataria* and *D. lacertinaria*. *Gonoptera libatrix*, *Asphalia ridens*, *Xylocampa areola*, and *Sarrothripus revayana*, with *Taeniocampa gracilis*, *T. incerta*, *T. stabilis* and *T. gothica*. Among the Geometers were *Ennomos erosaria*, *E. alniaria*, *Pachys strataria*, *Tephrosia punctulata*, *Ephyra pendularia*, *Hybernia marginata*, *Epione apiciaria* and *Selenia bilunaria*. The ova of *Macrothylacia rubi* were in great abundance, in bunches on the dried grass and rush stems of last year about a foot from the ground. Imagines noted were *Cabera pusaria*, *Ematurga atomaria*, *Mesoleuca albicillata*, *Euchaeca obliterata* (*heparata*), *Acronicta psi*, *Aplecta tincta* and *Erastria fasciana* (*fuscula*). The Society has visited Byfleet on several previous occasions and more or less full reports were published of visits in June, 1901; July, 1902; July 1904; June, 1907; July, 1908; and June, 1912.

JUNE 25th, 1925.

The PRESIDENT in the Chair.

Communications were read from several members of the Society who were investigating the entomology of "The Deserts of Southern France," at various places near Le Rozier on the River Tarn, Lozère.

Mr. Priest exhibited a very dark suffused aberration of *Acronicta aceris* from Wimbledon.

The President exhibited the larvae of *Zygaena carniolica* and pupae of the same. He also showed short series of the various species or forms of the *carniolica* group of the genus *Zygaena* from a large portion of the area of its distribution.

Mr. Enefer exhibited living imagines of *Aegeria tipuliformis*, enclosed in an admirable home-made observation cage.

Various remarks were communicated as to the present season. *Zygaena trifolii* was very common on the North Downs—contrary to the usual occurrence the red spots of the males were unusually confluent, while those of the female showed but little confluence. *Ematurga atomaria*, at Chipstead, were said to be very dark chocolate colour, with scarcely any markings.

JULY 9th, 1925.

The PRESIDENT in the Chair.

Mehammed Soliman El Zoheiry, and Hamid Salem Soliman, of W. Kensington, were elected members.

Mr. Step exhibited a living example of the Heath Dodder (*Cuscuta epithymum*), growing on Heather (*Calluna vulgaris*), from Studland. He reported that, owing probably to the long drought, insect life appeared to be very scarce in Purbeck; though *Augiades sylvanus* and *Plebeius argus* (*aegon*) were plentiful. He saw a number of *Dryas paphia* in the previous week, and *M. galathea* was beginning to appear. A single specimen of *Coscinia cribrum* was captured on the coast downs beyond Durlston lighthouse; and a *Leucania conigera*. Otherwise, there was little beyond *E. jurtina* to be seen.

Mr. Hugh Main remarked on his visit to the Tarn district of Southern France. While butterflies were abundant, ant-lions and field-crickets, etc., were not so numerous as he had seen in other parts. The nightingale was common, and he had seen both the hoopoe and the golden oriole. Flowers were particularly abundant. He exhibited ♂ and ♀ of a large field-cricket, the large earwig *Labidura riparia*, small toads found under stones, some brilliant beetles, *Gnorimus nobilis*, found in the heads of various flowers, glow-worms, the ♂s of which came in the bedroom to the electric light, and the eggs of a lizard, which had been attacked by a Dipteron.

Mr. Farmer exhibited the dark *Ematurga atomaria*, from Chipstead, reported at the last meeting, and various insects entangled in gum from near Calcutta.

Dr. Cockayne exhibited living larvae of *Polyommatus* (*Agriades*) *coridon*, *Venilia macularia*, *Ennomos alniaria*, *E. erosaria*, and *Epione apiciaria*.

Mr. Vredenburg exhibited a box of butterflies from N. India.

Mr. Enefer exhibited a female of the "Great Horntail" sawfly, *Sirex gigas*, from Greenwich, and read notes on its economy.

Photos. H. Main & E. Step.

Zygaena filipendulae ab. x 2.

VIPERINE SNAKE (*Tropidonotus viperinus*).

Mr. H. Moore exhibited a bred example of *Pyrameis gonerilla* from Wellington, N.Z. The President remarked that this species was now getting rare from the general destruction of its foodplant, nettle, throughout the colony. Mr. Moore also exhibited the large Myriapod, *Scolopendra coeruleo-viridis* from E. Africa.

Mr. Jacobs exhibited a remarkable teratological example of *Zygaena filipendulae*. The specimen was a male with the right anterior wing reduplicated twice. The first wing is normal; The second about $\frac{3}{5}$ the size of the first, and is inverted, so that the costa is towards the dorsum: the third wing is about $\frac{1}{2}$ the size of the first and has the costa in normal position. It was taken July 1st, 1925, at Ditchling, Sussex, by Mr. Fred F. Wood, and sent to him on that date. (See plate IV.)

He also exhibited forms of the male of *Hydrocampa nymphealis* taken at Pickhurst Pond, on June 21st, which had few markings, but those markings were strongly emphasised.

Of the *Z. filipendulae*, Dr. Cockayne remarked that the double reversion was quite what one would expect to see in such aberration. That, probably, by crushing, the growing point had separated into two, of which one grew normally and the other was produced double, one of which was reversed.

JULY 12th, 1925.

Field Meeting—Abbots Wood, Sussex.

Conductor, Robert Adkin, F.E.S.

Members travelling from London reached Polegate about 11.30, where they were met by the Conductor and others, and at once proceeded by way of the Hailsham Road to the White Fields, thence wandering through the woods to Robin Post Lane; returning later by the same route. The day was all that could be desired so far as concerned weather, the bright sunshine being tempered by a light south-westerly breeze, and most of the species usual in the locality at the time of the year, including *Dryas paphia* and *Limenitis sibilla*, were met with more or less commonly, but nothing calling for special comment was taken. As the afternoon was drawing to a close the party retraced their steps to Polegate, where a substantial tea awaited them at the "Riversleigh" Tea Rooms adjoining the station approach, to which they did ample justice, and then left for

London by the 6.50 train. The conductor was ably assisted throughout the day by Messrs. A. L. Rayward and E. P. Sharp, whose services were much appreciated, few being better acquainted with the district than they.

JULY 23rd, 1925.

The President in the Chair.

Dr. Cockayne exhibited living larvae of *Thera variata* on spruce, *Anaitis efformata* on *Hypericum perforatum* and *Phytometra viridaria* (*aenea*) on *Polygala vulgaris*, all being reared from the egg.

Mr. Grosvenor exhibited *Zygaena carniolica* from Le Rozier in the Cevennes.

Mr. R. Adkin exhibited specimens of a second generation of *Diacrisia mendica* var. *bimista*, many of them having a well defined marking similar to the characteristic "question mark" found in *D. lutea* var. *fasciata*.

Messrs. H. Candler and O. R. Goodman made remarks on their recent holiday in the region of the Cevennes, known as the "Deserts of Southern France."

Mr. Hugh Main exhibited the large case with a living larva of a Psychid moth from Uganda.

Mr. A. de B. Goodman exhibited living scorpions, *Myrmeleon* cocoons and species of *Ascalaphus*, all taken at Pont du Gard, S. France.

Mr. Step showed a photograph of a monstrous (fasciated) flower-head of the Spear Thistle (*Carduus lanceolatus*), which he found in a large colony of the plant at the foot of Nine Barrow Down, in Purbeck. The monstrosity appeared to be an aggregation of three or four heads on the terminal shoot of the stem; and instead of the florets issuing from the apex of the head, they formed a circular line which doubled upon itself. The long spines of the involucre protruded from each side of the compound head and between the double line of florets. The diameter of the monstrosity was four and a half inches. A somewhat similar aberration of the same species had been met with on the day before, in the same district; but as this head was not much more than the normal size, little attention was paid to it.

On behalf of the Messrs. Goodman, Mr. Step exhibited a living Viperine Snake (*Tropidonotus viperinus*), which they caught in the

Cevennes. The specimen is about two feet in length; the species is said but rarely to measure as much as three feet. It is closely related to our Grass Snake; and its bite is harmless. In coloration and markings, it presents a very close rosemblance to the Adder, including the V-mark behind the head and the zigzag dorsal line; apparently a case of mimicry. Boulenger, in his "Snakes of Europe," mentions that experienced herpetologists on the Continent have been deceived both in taking this for the Adder and the Adder for this. Such deception of experts is rather difficult to understand for the head by itself furnishes distinctive characters; that of the Adder being clad in small scales, and that of *viperinus* covered with a few large plates. Boulenger describes it as feeding chiefly upon fishes, frogs, newts, and large worms. Mr. Goodman enclosed with it, for its sustenance on the journey, two lizards (*Acanthodactylus vulgaris*), but these were disregarded. "On this evidence, assuming that it was not a lizard-eater, I introduced a specimen of the Wall Lizard (*Lacerta muralis*) to its house, which sat placidly on the back of the snake; but half an hour later, it had disappeared. A partial increase of the snake's diameter explained its present location." Mr. Step said that he had found this snake to be a very clever climber up flat, vertical surfaces, clinging solely by the edges of the abdominal plates. Using the tip of its very slender tail as a fulcrum, it throws itself backwards rapidly when alarmed; and by a similar forward movement can strike with great force. (Plate IV.).

JULY 25th, 1925.

Field Meeting.—Horsley.

Conductor, H. Worsley-Wood.

Fourteen members were present. The day was warm and sunny. *Augiades comma* was flying in unusally large numbers, but other insects were scarce. *Argynnis aglaia*, *Polyommatus* (*Agriades*) *coridon*, *Malenydris didymata* and *Hydriomena furcata* were seen. Larvae of *Bapta bimaculata*, *B. temerata*, *Cosymbia linearia*, *Pachys betularia*, *Demas coryli* and *Hylophila prasinana* were beaten out, and searching produced larvae of *Acronicta alni*, *Nola confusalis*, *Eupithecia centaureata* and *Anaitis plagiata*. A few nymphs of *Ledra aurita* (Hem.) were beaten from hawthorn.

A striking feature of part of the beechwoods was the abundance of the ordinarily rare Yellow Birds-nest (*Monotropa hypopitys*). Mr. Crawfurd conducted us to a perfect example of a "Witches broom," on Scots Pine (Plate V.). Fine specimens of *Campanula glomerata* were found in the chalk-pit.

AUGUST 13th, 1925.

The President in the Chair.

Mr. Stanley Edwards exhibited a very large specimen of a Myriapod from South America, *Scolopendra gigantea*, which was nearly a foot in length.

Mr. Step exhibited a fresh plant of the Yellow Bird's nest (*Monotropa hypopitys*), which was very abundant at Horsley on the occasion of the Society's visit in July. He called attention to the fact that the plant is leafless, devoid of chlorophyll, and its fleshy roots without the food-gathering hairs usual in green plants; instead, the roots and the earth about them are matted by fungal threads, which draw nutriment from the humus and impart it to the "Bird's-nest."

Mr. Blenkarn exhibited three very local species of Coleoptera: *Chlaenius nigricornis* and its var. *melanocornis* from Killarney, July, 1925; *Bembidion lunatum* from the banks of the River Tees at Middlesbro, July, 1925; and *Patrobus excavatus*, from Washington, near Worthing, on August 11th, 1925.

Mr. Cheeseman exhibited specimens of *Aphantopus hyperantus* ab. *caeca* in which the underside ocelli are represented by white dots only, from Sussex.

Mr. Storey exhibited larvae of *Eutricha quercifolia* from Surrey, of *Stauropus fagi* from Essex, of *Cucullia gnaphalii* and of *Cucullia asteris* both from Surrey.

Mr. O. R. de B. Goodman exhibited a large living lizard from Pont du Gard, S. France.

Mr. Robert Adkin exhibited larvae of the saw-fly, *Eriocampa limacina*, commonly known as the slug-worm or pear-slug, in its various stages, from the recently hatched and penultimate slug-like, greenish-black stages to the full-fed yellow stage which it assumes just before pupation. He said that for the past month this larva had been a serious menace to pear and cherry trees in the Eastbourne district; it eats away the upper cuticle of the leaf, causing the

Photo. E. Step.

WITCH'S BROOM ON SCOTS' PINE.

remainder to turn brown, dry up and ultimately to fall, thus impoverishing the tree, reducing its fruiting capability for the succeeding year. It did not appear to attack the fruit. A very full account of the depredations sometimes caused by this species is given by Edward Newman in the "Entomologist" for 1875 (Vol. VIII., p. 258) and the species is described by Cameron in "Phytophagous Hymenoptera," Vol. I., p. 224, where he says that the egg is laid on the underside of the leaf. I have carefully examined many leaves of the pear on which were young larvae, and had no difficulty in finding the positions in the leaf from which they had emerged. On examining these under the microscope, it was very evident that the egg had rested between the upper and lower cuticles of the leaf, and that the larva had eaten its way through the upper cuticle, having apparently made its first meal on the soft matter between the two cuticles before doing so; but I failed to find any abrasion on the lower cuticle beneath the spot where the egg had rested, which leads me to think that the fly must deposit its eggs by piercing the upper cuticle. I have unfortunately not been able to watch the parent fly in the act of depositing; perhaps someone may be able to do so, and thus settle the question. The larva appears to complete its feeding while still in its slug-like form, and on shedding its skin to assume the yellow stage to at once wander or fall to the ground, which it enters for pupation.

Mr. Step said that a saw-fly (*Cladius viminalis*) which was attached to poplar, laid its eggs in the stalk of the leaf.

Mr. Blair said that a great many species of saw-fly did lay their eggs on the undersides of leaves below the cuticle, and that as a general rule the final stage of saw-fly larvae was one in which the larva assumed a quite different colour and did not feed.

Mr. F. B. Carr exhibited a number of species of larvae he had just taken and remarked that larvae appeared to be more forward this year than usual.

The Third International Congress of Entomology.

Zurich. July 19th-25th, 1925.

Delegates: Messrs. Alfred Sich, F.E.S., and Hy. J. Turner, F.E.S.

The Second Congress was held in 1912, and was to have been succeeded by the Third in 1915 in Vienna. World events prevented this; and it was not until the present year, 1925, that it was found practicable to continue these International Congresses. To Dr. Jordan of Tring is due our thanks for the strenuous enthusiasm with which he left nothing undone which could further the success of the meeting, so far as the English-speaking contingents were concerned. For the arrangements at Zurich, and all details as to the Meetings and Excursion, we were indebted to the splendid services of the Swiss Entomological Society.

The opening meeting, the Reception, held on the Sunday evening, July 19th, at the rooms of the Swiss Entomological Society, was of such a hearty and enthusiastic nature that from that time the success of the Congress was fully assured. There your delegates met (Mr. Sich having been out of England for some years) and renewed their old friendship. There men, well-known by correspondence or by their magazine contributions, were met for the first time, and new associations formed. More than twenty nations, from America to Japan, were represented; and sorrow was felt, though not openly expressed, that two nations, at least, abstained from sending delegates.

It was an easy matter to know one's fellow, for each wore a number which referred to a list of the delegates provided for each. The simple but artistic medal worn was a charm, which bore us well all the days of our stay, gave us certain advantages and entrances wherever we went, and many an opportunity for the Swiss to show to us those small acts of hospitality for which that people are noted.

The programme was a very full one; but I do not intend to dilate upon the many items of interest discussed in English, German and French speech, mainly. Insect Morphology, Anatomy, Physiology, Systematics, Nomenclature, Bibliography, Biology and Geography were the main headings under which the papers were classed. Many, I may say most, were so well illustrated by diagrams and lantern slides, often by specimens, that it was easy to understand a great deal of a discourse in a non-English speech. From 9 a.m. till late afternoon was spent in the various rooms allotted to the sections, so that all were kept very busy with little time to wander away, if one wanted to keep in touch with what was going on. Even then, we were not left to ourselves, for each evening some visit or other was planned; there was no time to get tired. On Monday there was a Café Meeting over the waters of the Limnat; Tuesday evening was a visit to the Uetliberg by mountain railway;

Wednesday saw us meet at the great Concert-hall of the City; Thursday took us for a long round on the Lake of Zurich; and on Friday was the official banquet.

The meetings were held in the University Buildings high above the old city, a new pile of architecture typical of the strength of the mountain; and probably as convenient for such a gathering as was possible in any city of Europe. Another advantage was the elevated situation, for with the daily temperature of over 90° one wanted to be above the level of the work-a-day streets of a busy population. The weather was fine and propitious the whole week, when it broke up, and those who had intended various more distant excursions were more or less disappointed.

One can truly say that, although many nationalities were present, not at any time did one see or experience any of that distasteful petty nationalism, which years ago forced itself upon one at such gatherings as these. Each one looked forward, three years ahead, to the fourth International Congress; which may be perhaps in Vienna or maybe in the United States.

AUGUST 27th, 1925.

The President in the chair.

Mr. O. R. Goodman exhibited photographs by his son, Mr. A de B. Goodman, (1) of *Palpares libelluloides*, preparing for flight and at rest, taken at Pont du Gard, S. France. (2) Of *Zygaena carniolica*, showing 3 stages, the larva practically full-fed, when it is well covered with long hairs; the larva just before pupation, when these have disappeared and the pupa, on the *Dorycnium* on which it pupates, in a whitish-brown oval cocoon; from Le Rozier, Cevennes.

Mr. Dennis exhibited specimens of the small-leaved lime, *Tilia parviflora*, from Essex; and pointed out that the stems, when young were red, the leaves small and leathery; he also showed examples of the stems of the bull's-horn Acacia, the thorns on which are in pairs below the leaf stalk; these thorns become hollow and are occupied by ants, who obtain access to them through the leaf-scar. These trees are chiefly native of S. America.

Mr. Grosvenor exhibited a short series of the Indian Morphid, *Stichophthalma camadeva* ab. *camadevoides*, a somewhat rare local race.

SEPTEMBER 6th, 1925.

FIELD MEETING—LEITH HILL.

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

It was many years since the Society had visited this famous Surrey locality. About a dozen members and friends attended, and a very pleasant day was spent after the heavy rain of the previous night. Again the meeting was characteristic of the year, for insects were practically absent in all stages. The return home was somewhat marred by the wrong road being taken, which resulted in losing the train and a wait of much over an hour before the next one.

In the Proceedings for 1906, there is a full report of a meeting held at Leith Hill in June, Mr. E. Step being the conductor.

SEPTEMBER 10th, 1925

The PRESIDENT in the Chair.

Mr. Chas. Jarvis, 12, Claylands Road, Clapham, was elected a member.

Mr. R. Adkin exhibited the living larvae of *Tortrix pronubana*, of *Lycaenopsis argiolus*, the two forms, and of *Pachetra leucophaea;* he remarked that *T. pronubana* had, during the last two or three years, taken to the *Coronilla* shrubs growing in his garden at Eastbourne, the larvae damaging them by eating out the shoots, thus reducing their late autumn and winter flowering.

Mr. O. R. Goodman exhibited a series of *Aglais urticae*, bred from larvae taken at Lewes on the occasion of the field meeting held there on August 10th, 1924; and called attention to two very dark pigmented specimens in contrast with the remainder, which were all very light in general coloration.

Mr. Enefer exhibited the predaceous Dipteron, *Asilus crabroniformis*, ♂ and ♀, from Carisbrooke, August, 1925; the dragon-fly, *Aeschna cyanea*, from a swamp near Bembridge, August, 1925; and a very large aquatic Hemipteron, *Belostoma grisea* (*americana*) from Fox Lake, N. Illinois. U.S.A.

Mr. Hy. J. Turner exhibited a plate, containing 93 figures of five-spotted *Zygaena*-forms, which was about to be published in the "Entomologist's Record."

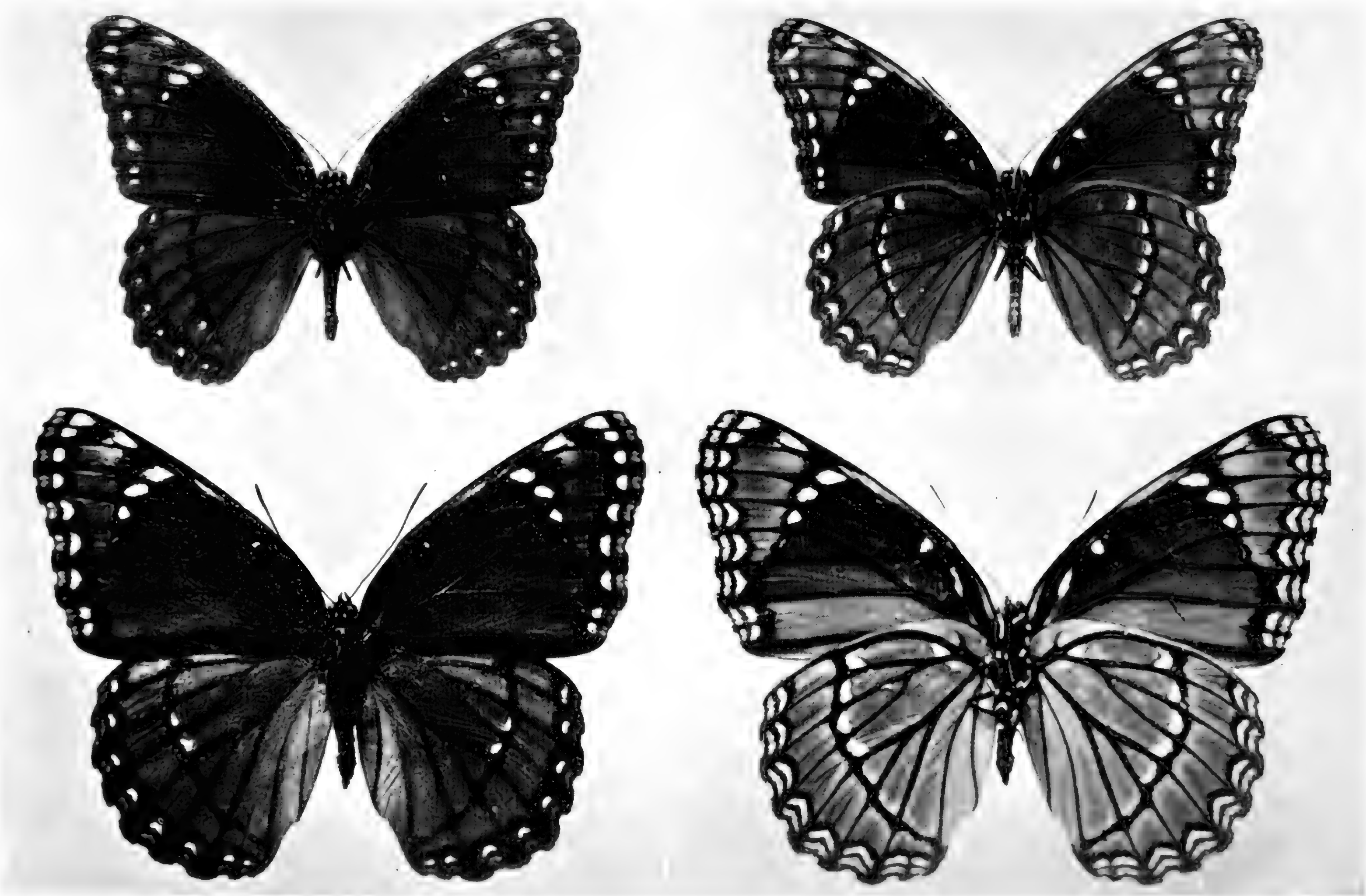


Photo. A. E. Tonge.

PLATE VI.

Limenitis (*Basilarchia*) *archippus*, Cr., (*dicippe*, Godt.), race *floridensis*, Streck.

♂ Upperside	♂ Underside
♀ Upperside	♀ Underside

Plate VII.

Limenitis (*Basilarchia*)
archippus, Cr. (*disippe*, Godt.)
underside

Danaida (*Anosia*)
archippus, Fb. (*plexippus*, Auth.)

ditto
upperside

Danaida
berenice, Cr.
underside.

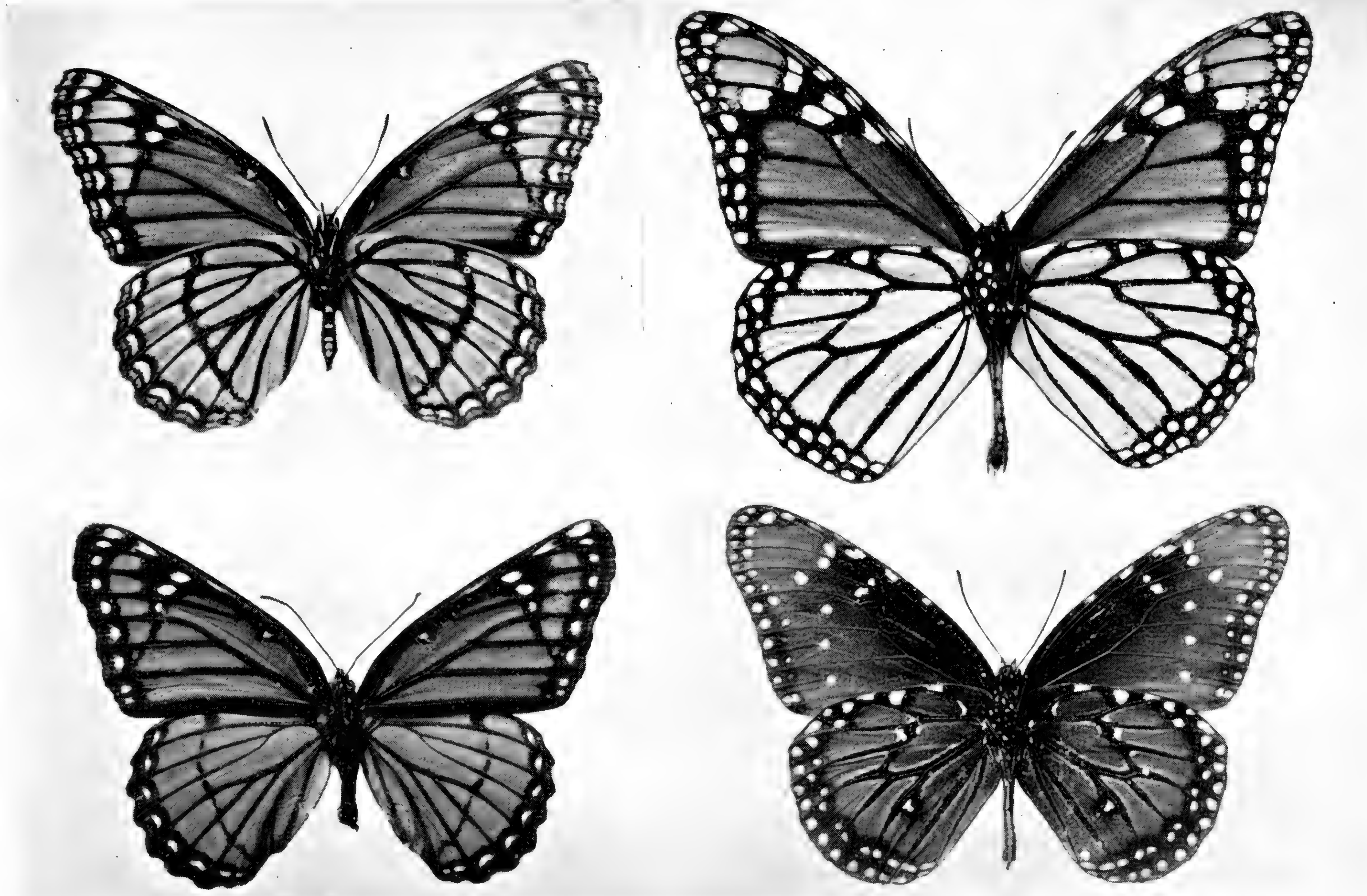


Photo. A. E. Tonge.

Mr. Vredenburg exhibited a box of Orthoptera from Zululand, mostly beautiful and bizarre forms.

Mr. Priest exhibited a box of his 1925 captures of Lepidoptera, including several *Toxocampa pastinum* from Box Hill, and some very variable dark *Ematurga atomaria*.

Mr. Farmer reported *Polyommatus* (*Agriades*) *thetis*, at Eastbourne on August 18th, when some were quite fresh, while others were much worn.

Mr. Moore exhibited a series of *Limenitis archippus*, Cr. = *misippus*, F. (perhaps better known as *Basilarchia disippus*), from various parts of N. America, and a short series of *L. floridensis*, Strecker = *eros*, Edw., from S.E. Florida; and explained that, while *L. archippus* is found from the Atlantic to the Pacific, *L. floridensis* is restricted to Florida and some parts of the Mississippi valley. Attention was drawn to the views of Prof. Poulton that *L. archippus* was originally a white-banded species that had been influenced by the Danaid *Anosia plexippus*, L. (*archippus*, F.); that *L. floridensis* was a modification of *L. archippus* that had been further influenced by the southern *Danaida berenice*, Craw., chiefly evidenced by the undersides; *L. archippus* resembling *A. plexippus*, *L. floridensis* the much darker *D. berenice*.

In size *L. floridensis* averages larger than *L. archippus*, is much darker in colour, has some white spots in the middle of the hind-wing above, and a more or less complete row beneath, probably vestigial indications of a former white band so characteristic of most species of *Limenitis*.

Unlike the widespread *archippus*, *floridensis* is much rarer, Dr. Blatchley having taken but 3 specimens in the localities worked by him during the past 10 years; others perhaps were mistaken for the "common brown"—*D. berenice*. (See plates VI. VII.).

Mr. R. Adkin gave the following account of the Meeting of the British Association at Southampton, and also of the Meeting of the Delegates from its Corresponding Societies.

British Association.

Report of the Delegate to the Conference of Corresponding Societies.

The meeting of the Association held at Southampton from August 26th to September 2nd last was well attended. In section

D (Zoology) many subjects of great interest were discusssed; the Address by the sectional President, Mr. C. Tate Regan, F.R.S., on "Organic Evolution" being an enlightening document. It is printed in full on page 21 of "The Advancement of Science, 1925," which I am now handing to our Librarian; and will, I hope, be read by many of our members. Mr. Regan also read a paper on "Oceanic Angler-Fishes." Perhaps no one is better acquainted with this extraordinary group of fishes than he; and he brought out many points of outstanding importance in the course of his remarks.

But perhaps the majority of our members will be more particularly interested in entomological subjects. Under this head many papers deserving close study were introduced; among them—Dr. F. A. Dixey, gave an account of his further researches "On the Development of the Androconia (Scent Organs) in the Small Garden White Butterfly (*Ganoris rapae*)," in which he showed that the androconia were derived from special cells in the embryonic wing, and that their development in and attachment to the wings were also highly specialized. The paper was illustrated by a number of lantern-slides from sections and drawings prepared by Dr. Eltringham.

Mr. John F. Marshall discussed the Coastal Mosquitos and their Control. He dealt chiefly with the mosquitos infesting Hayling Island—a district which a few years ago was rendered almost uninhabitable by them, but which, owing to measures taken to combat them, consisting largely of the abolition of stagnant water by drainage, filling in, and so forth, is now practically free of the nuisance.

Mr. F. W. Edwards introduced "A Marine Chironomid Fly from Samoa." The females are worm-like, but the males have well-developed legs, antennae and mouth-parts; they also possess wings of a peculiar form, which seems to indicate a definite adaptation to life under water; and it is highly probable that the whole life of the species is passed actually in the sea, which is not known to be the case with any other insect.

Dr. J. Davidson's paper, "The Parthenogenetic and Sexual Phases in the Life-Cycle of *Aphis rumicis*, L.," dealt with an experiment carried out through the years 1920-24 continuously, during which time about eighty parthenogenetic generations were produced, although in September each year sexual forms were produced by the viviparous females.

At the meetings of the Conference of Delegates of Corresponding Societies the President, Sir Daniel Hall, in the course of his address, appealed for the help of the delegates in studying the antiquities of the land and of farming, and made many suggestions, as to the way in which such help might be forthcoming. (See "Nature," September 12th, 1925, p. 406). The present position of the negotiations with H.M. Treasury and the Board of Inland Revenue with regard to the Taxation of the Income of Scientific Societies was reported. A report was also submitted on Kent's Cavern. A discussion was opened by Dr. A. Scott (North Staffordshire Field Club) on the Effect of Broadcasting on the Work and Membership of the Corresponding Societies, and many delegates having expressed their views, the general consensus of opinion appeared to be that it would have little, if any effect, and that fears which had been expressed that their membership might suffer were groundless. A motion was tabled by Prof. Poulton to call the attention of the Association to the apparent possible extinction of certain species of our rarer Lepidoptera and to suggest means for their protection. In the unavoidable absence of Prof. Poulton the motion was introduced by Dr. F. A. Dixey, and, having been duly seconded by your delegate, was carried unanimosly. It was thereupon sent to the Committee of Recommendations, in order that the attention of the Association might be called to it.

Two excursions, in which Entomology figured more or less prominently, were held and well attended. One was to the New Forest; the other to Hayling Island, for the purpose of opening the new "British Mosquito Control Institute." The building occupies two stories, and includes a demonstration museum, a laboratory, drawing and record offices, photographic rooms, a library, a mechanical workshop and numerous other rooms designed for research students, and it already contains much material for mosquito study. The Institution was founded and equipped by Mr. J. F. Marshall, and stands in his own grounds. The inaugural meeting was presided over by Sir Richard Gregory, and the opening ceremony performed by Sir Ronald Ross.

The next meeting of the Association is to be held at Oxford from August 4th to 11th, 1926, when the Prince of Wales will be President. Prof. E. B. Poulton figures among the vice-presidents and Dr. F. A. Dixey is to be one of the local secretaries.

I hope, in due course, to have the pleasure of presenting to the

Society the official report of the Transactions and Proceedings at the Southampton meeting; our members will thus have the opportunity of studying in detail the many interesting subjects that space has compelled me to touch upon so briefly here.

SEPTEMBER 24th, 1925.

The PRESIDENT in the Chair.

THE EXHIBITION OF ORDERS OTHER THAN LEPIDOPTERA.

Mr. H. W. Andrews exhibited the rarest of the British species of *Chrysops* (Dip.), *C. sepulchralis*, F., a specimen taken by Miss E. K. Pearce at Wareham; and a short series of the very rare *Neottiophilum praeustum*, Mg., bred by Mr. A. H. Hamm from pupae found in an old Thrush's nest at Oxford.

Mr. S. R. Ashby exhibited his collection of British Heteroptera and called particular attention to the "shield bugs" (*Pentatomidae*) and the "water-bugs," *Naucoridae*, *Nepidae*, *Notonectidae* and *Corixidae*. A specimen of the scarce *Pygolampis bidentata*, from the New Forest, was in the collection, of which only one British example was known when Saunders' book was written in 1892.

Mr. Step exhibited the large Indian water-bug, *Belostoma indica*, which had been caught by his son, Mr. George Step, in his bedroom at Calcutta. He showed for the sake of comparison, a specimen of the much larger South American species, *Belostoma grandis*, which he had received from Trinidad years ago. These Bugs are included in the section of Hemiptera known as Cryptocerata, from the fact that their antennae are concealed ordinarily in slits between the eyes: they are used, probably, when the insect is in the air. Owing to the attraction that light has for it, *B. indica* becomes a nuisance to persons travelling by river boats at night: and *B. grandis* is known at Trinidad as the "Electric Cockroach," from its habit of flying around the electric lights. *Belostoma* is allied to *Nepa*, our Water-scorpion; and like it has the first pair of legs modified to serve for capturing its prey. The thigh has a deep slit along its fore-edge, into which the shank and very short foot close down as a knife-blade closes into the haft. The other legs are broad, flat and fringed, working horizontally for swimming purposes. They are said to attack fishes and batrachians larger than themselves: clasping with the forelegs and tarsal hooks, and plunging in the powerful beak. The females attach their eggs to the male. In the specimen *B. indica*, a few dried ova are still attached to the thorax and scutellum.

Mr. Priske exhibited a series of the shells of the snail, *Helix hortensis*, with many aberrational forms, from High Wycombe.

Mr. S. A. Blenkarn exhibited the "ground beetles," (Geodephaga) and "water beetles" (Hydradephaga) from his collection, and called attention to the following more or less local or rare species: *Sphodrus leucophthalmus*, Woolwich grain shop; *Laemostenus terricola*, Wallington; *Agonum* (*Anchomenus*) *6-punctatum*, Oxshott and Crowthorne; *A. livens*, Wicken Fen; *Masoreus wetterhalli*, Deal; *Lebia cyanocephala*, Box Hill; *L. chlorocephala*, Oxford, and *Dromius agilis*, Box Hill among the Geodephaga. The Hydradephaga were represented by *Ilybius guttiger*, Hayton Moss, Lancs; *Hydaticus seminiger*, Greenford 1894; *H. transversalis*, Wicken Fen; *Acilius sulcatus* var. *scoticus*, Arran; *Dytiscus dimidiatus*, Wicken Fen; *D. lapponicus*, Arran; *D. circumcinctus*, Wicken Fen, from which it was supposed to have disappeared; *Gyrinus urinator*, Padstow and Reading; *G. bicolor*, Wicken Fen; *Helophorus tuberculatus*, Coatbridge; *H. laticollis*, New Forest; and *Hydrochus brevis*, Catfield, Norfolk.

He also showed the following species of the Longicornia: *Haplocnemia nebulosa* (*nubila*), Colchester; *Agapanthia villosoviridescens* (*lineatocollis*), Wicken Fen; *Saperda carcharias*, Wicken Fen; *Stenostola ferrea*, Hartlebury, Worcester, and *Oberea oculata*, Wicken Fen. Of the Phytophaga, there were: *Donacia dentata*, Wicken Fen; *D. sparganii*, Beccles; *D. vulgaris*, Deal; *D. cinerea*, Byfleet; *D. braccata*, St. Osyth; *Orsodacna cerasi*, Scarborough; *Cryptocephalus coryli*, Box Hill; *C. sexpunctatus*, Darenth; and *C. bipunctatus*, Reigate.

Mr. Enefer exhibited a box of Indian Cicadas and stated that these larger Homopterons are tree-feeders. The males are remarkable for the loud shrilling noise which they produce by means of an apparatus placed on the underside of the thorax and covered with a vibratory horny plate. Their wings are generally translucent but many are spotted with brown at the junction of the nervures.

Messrs. Moore, Goodman and Grosvenor all testified to the persistent buzzing of the Cicadas, and that in tropical countries the noise from them was most persistently irritating and annoying.

Mr. A. S. Buckhurst exhibited the following Diptera: *Volucella inanis* from St. Gennys, N. Cornwall; a male and female of the

Oestrid, *Gastrophilus equi*, male from top of Rough Tor, Cornwall (1296 ft.), female from St. Gennys; and a variety of *Pyrophaena granditarsa*, taken by Mr. Stenton, at Shaldon, S. Devon.

Mr. Main exhibited a species of "trap-door spider" from Hyéres and described the action of the double-door arrangement, which he was able to exhibit by a sectional preparation of the tube. He at the same time referred to the famous work by Moggridge on these Rivieran spiders. Among the other exhibits by Mr. Main from the South of France were the field cricket, *Gryllus campestris*; the Myriapod, *Scutigera coleoptrata*, an exceedingly active species not uncommon in S. France; *Mantis religiosa*, which becomes mature in the autumn, deposits its ova and then dies; another French Mantid, *Empusa pauperata*, which lives through the winter; the shore earwig, *Labidura riparia*, which was not uncommon under old sacking refuse in all its stages; the usual species of *Scaraboeus*, and the household cricket, *Gryllus domesticus*.

Dr. Cockayne exhibited larvae of *Eupithecia helveticaria*, from near Braemar, feeding on juniper.

Mr. Clutton exhibited series of a few species of Tortrices, including some very melanic examples of *Tortrix costana*, which had been bred near Burnley from dock. The race, which also occurred in isolated colonies near Blackpool, had as much as 7% melanic forms.

OCTOBER 3rd, 1925.

Fungus Foray—Box Hill.

Leaders, Messrs. H. Candler and E. Step, F.L.S.

On this occasion, the members, on their arrival at the railway-station, were reinforced by a large contingent of members of the Holmesdale Natural History Club. The route followed was by the bridle-path through the beechwood, where among other species we obtained *Lachnea stercorea* and the Earth-stars *Geaster lageniformis* (Plate VIII.) and *G. umbilicatus*. Crossing Juniper Bottom, we worked up the slopes on the eastern side to the summit of the Hill, thence to the fort for tea. The list of finds followed largely that given in the "Proceedings" for 1924-5, p.111, but both species and specimens were less numerous, owing to the drier season.

Some entomological work was done also, but no lists have been received. Those who worked for larvae found them to be extremely scarce. The Coccinellid beetle, *Chilocorus renipustulatus*, was in unusual numbers basking in the sun on the young growths of the ash, every stem having several specimens on it.

OCTOBER 8th, 1925.

The President in the Chair.

Mr. H. B. Williams, LL.D., F.E.S., Briar Cottage, Claygate; Mr. John Portsmouth and Mr. Gerald Portsmouth, of 15, Victoria Street, S.W.1., were elected members.

A special donation was recorded from Mr. R. Adkin: a new book-case to contain the Ashdown books and recent additions to the Library.

Mr. W. J. Lucas exhibited the two Earwigs, *Forficula lesnei* and *F. auricularia*, and pointed out the differences, the former being of much smaller size, generally of a rich sienna-red colouring; and in the male the shape and colour of the callipers, which look conspicuonsly pale. Closer examination shows that there are no wings in either sex in *F. lesnei.*

Mr. Sperring exhibited a varied series of *Plebeius argus* (*aegon*) from Godstone, Surrey, some with striate undersides, some with the chevrons on the underside larger and deep in colour, and a female with the red marginal spots above replaced by yellow ones; and of *Hesperia malvae* from Polegate, including several ab. *taras.*

Mr. F. B. Carr exhibited the living larvae of *Pheosia dictaeoides*, and of *Boarmia roboraria.*

Captain Crocker exhibited a long series of *Coenonympha pamphilus* from Market Rasen, where it had occurred during the past season in tens of thousands. The variation and aberration shown were very considerable. A number of examples had irregular blotches of xanthic coloration, several were of the form *obsoleta* but without the light ground colour of the apical spot, others were *obsoleta* with the light ground patch remaining of various emphasis, an example with very dark undersides of the hindwings, and three examples of homoeosis.

Mr. Blenkarn exhibited the beautiful and variously coloured beetle, *Byctiscus populi*, from Bricket Wood.

Mr. Enefer exhibited a case of Butterflies from North India; a large fungus, *Polyporus squamosus*, taken from an elm tree at

Charlton, from which he had obtained about 40 examples of the beetle, *Mycetophagus quadripustulatus*; and a small branch of an apple-tree from Morden showing the damage caused by the larva of *Zeuzera pyrina*, the "Wood Leopard Moth."

The remainder of the evening was taken up by the exhibition of Lantern-slides.

Mr. Tonge showed a series of slides illustrating the resting-attitudes of British Moths.

Mr. R. Adkin showed a series presenting the life-history and depredations of the "pear-slug" larva of the sawfly, *Eriocampa limacina.*

Mr. Dods showed a series of flower studies.

Mr. Dannatt showed a series illustrating a holiday in the French Alps.

Mr. Lucas showed coloured slides of common British fungi.

Mr. Dennis showed a number of slides of rare and local plants.

OCTOBER 22nd, 1925.

The President in the Chair.

The death of Professor Lefroy by misadventure was announced. He had recently joined the Society.

Mr. Edwards exhibited the twig of a horse-chestnut tree, which showed the "horse-shoe" marked suture in a more perfect representation than is customary, even in the case of the leaf-scar.

Dr. Cockayne exhibited a box of Lepidoptera, taken near Buchan, Aberdeen, in late summer, including *Dysstroma citrata* (*immanata*), *Thera obeliscata*, *T. firmata*, a series of *Lygris populata*, showing gradations to an extreme dark form; *L. testata*, a purple form; *Hydriomena furcata* (*elutata*), the bilberry form mainly females; one female *Ochyria munitata*, the only one seen; *Entephria caesiata*, only 3 observed; and *Cidaria pyraliata.*

Mr. O. R. Goodman exhibited three species of *Pieris* taken at Pont-du-Gard, S. France, flying together, which showed a remarkable detailed resemblance to each other: *P. rapae*, *P. napi* and *P. manni*, all of the summer generation.

Mr. Enefer exhibited a remarkable aberrant egg of the duck. It consisted of two complete shells one within the other; the larger shell measured $3\frac{1}{2}$ in. by $2\frac{3}{8}$ in. and the smaller $2\frac{1}{2}$ in. by $1\frac{7}{8}$ in.

Mr. Buckstone exhibited a "double" flower of the Bramble, found near Bognor, Sussex, with the stamens all developed into petals.

Mr. Turner exhibited the mite, which is occasionally found in excessive abundance in old furniture: *Glaucopsyche domesticus*. It was stated that to eradicate the pest the furniture should be subjected to great heat.

Mr. Vredenberg exhibited some smoky examples of *Abraxas sylvata* (*ulmata*).

Mr. Rait-Smith exhibited some remarkable aberrations of British butterflies: *Aglais urticae*, a beautiful specimen in which the whole of the usually black areas were of a rich mahogany brown; *Eugonia polychloros*, with much of the brown coloration covered by deep black; and another of the latter species with the hindwings of a rich brown in place of the usual black.

Mr. R. Adkin exhibited the *Hyponomeuta* species feeding on apple and hawthorn, and discussed their identification.

He said that in June last a number of apple trees growing in his garden at Eastbourne had webs of a *Hyponomeuta* on them. The webs were all of small size, generally enclosing not more than three or four leaves, and containing from six to a dozen larvae each. He destroyed large numbers of the webs with the larvae in them, but from three that he kept he reared seventeen moths; these he exhibited. The whole series were practically white in colour, some of them even to the fringes, while others showed only the faintest tinge of grey towards the margins of the wings; none of them being so dark in this respect as the lightest of those that he had reared from larvae feeding on whitethorn, of which he also exhibited a series. Their method of feeding in small colonies; so different from the large webs generally made by the hawthorn species; and their very white colour inclined him at first to refer them to *malinellus* of Zeller, who uses the word "niveis" in his description; and indeed on comparing them with Zeller's type specimens he was unable to detect any actual difference. Linnaeus described the species to which he gave the name *padella* as "*lividis*," which agrees with the colour of our hawthorn species; but he tells us that it occurs among apple trees. We have frequently bred from larvae feeding on apple, specimens quite as dark as any bred from hawthorn and therefore agreeing with Linnaeus's description. Mr. A. L. Rayward has very kindly made preparations of the genitalia of the light and dark specimens of the apple-feeding insects and of those reared from Hawthorn, and they all agree to the smallest detail. The conclusion that he came to was that these white specimens that he had bred from apple must be referred to *padella*, L., but that whether Zeller's *malinellus* is entitled to specific rank is open to considerable doubt. He should mention, however, that with this Mr. Durrant, to whom he had submitted the whole of the specimens, is not in agreement ; he being of opinion that there is a species, found only on old crab-apple trees, and in appearance like a small *H. cagnagellus*, which is the *malinellus* of Zeller. Mr. Adkin asked those members who had access to old crab-apple trees to make diligent search for this species, in the hope that by their efforts the question might be cleared up.

Mr. Hawkins exhibited a very black specimen of *Miselia oxyacanthae* bred from the very black coloured larva previously exhibited ; an *Arctia caja* in which the usual cream-coloured areas of the forewing were of a light brown coloration, the hindwings having black lined fringes; *Gonoptera libatrix* with the outer marginal areas very pale and of uniform tint, and a white form of *Hepialus lupulina.*

NOVEMBER 12th, 1925.

The President in the Chair.

Mr. Step exhibited a specimen of *Manduca strix*, captured indoors by his son at Calcutta. Though near to our *atropos*, it differs in having a third black band on the hindwing, in the minuteness of the central spot on the forewing, and in the mark on the thorax, which has more resemblance to the face of a bloodhound than to a human skull.

He showed, also. a fine example of *Geaster triplex*, the largest of our Earth-stars, taken at Box Hill, on November 8th. The exoperidium, here split into six pointed segments, is 5mm. thick, with the points recurved, with the result that the central attachment to the ground has been severed completely, and the plant is free to bowl before the wind and puff out its microscopic spores as it goes. These are contained in the soft inner bag, or endoperidium.

Dr. Cockayne exhibited further species of Lepidoptera obtained by him in East Aberdeen, a purely agricultural area some twenty miles midway between sea and hills. There were only a few small heath-covered spots. *Amoebe olivata*, small and dark ; *Mesoleuca*

Photo. E. Step.

THE THREE-COATED EARTH-STAR. (*Geaster triplex*).

From The Entomologist's Record. *Photo. E. A. Cockayne.*

HYLOICUS PINASTRI.

Male and two females of typical *pinastri*.

Male and two females of ab. *albescens*.

Male and female of ab *unicolor*, Tutt. Male slightly damaged. Male ab. *albicolor*.

bicolorata, including one banded specimen and two smoky only; *Crocallis elinguaria*, a dark orange female; *Stilbia anomala*, only one ♀ taken; a varied series of *Charaeas graminis*; very dark forms of *Celaena haworthii* taken on a marsh; dark *Miana literosa*; and very dark *Caradrina quadripunctata*.

Mr. Blenkarn exhibited two very local species of Coleoptera from Otford, Kent: *Lebia cyanocephala* and *Callistus lunatus*; and the exceedingly local *Agabus melanarius* from Middlesborough, a species rare on the Continent.

Mr. Lucas gave an address on "The Orders of British Insects," with lantern illustrations. (See page 1.)

NOVEMBER 26th, 1925.

ANNUAL EXHIBITION.

The PRESIDENT in the Chair.

Lord Rothschild exhibited 45 gynandromorphic and intersexual butterflies and moths, together with normal specimens of both sexes. The most interesting examples were *Ornithoptera heliphron*, left ♀, right ♂; *Daptonoura peruviana*, left ♂, right ♀; *Anthocharis cardamines* left ♀, right ♂; *Archonias pharnakia*, left ♀, right ♂ with traces of ♀ coloration; *Hebomoia glaucippe*, left ♂, right ♀; *Charaxes castor*, left ♀, right ♂; *Melitaea didyma*, left ♀, right ♂; *Chrysophanus rutilus*, left ♀, right ♂; *Orgyia antiqua*, left ♀, right ♂; *Sciapteron dispar*, left ♀, right ♂.

Dr. Karl Jordan showed a selection of *Anthribidae*. This family of Coleoptera, represented in Great Britain by only 8 species, is essentially tropical, about 2000 species being known, which is probably less than one third of the species actually existing. The larvae feed in wood, seeds and fungi, and some prey on Coccids. The species are very varied in general aspect: the largest have the size of a *Carabus*, and the smallest are less than 1mm. long; some are very compact, others have the graceful build of a Cerambycid. As is usual in wood-feeders, individual variation in size is frequently pronounced. Sexual dimorphism in structure is commonly met with, and many species exhibit strong geographical differentiation.

Mr. J. M. Jacques exhibited, on behalf of Mr. M. Mactaggart, a series of *Hyloicus pinastri*, bred from Suffolk larvae; and contributed the following Notes. (Plate IX.)

"Between August 1st and 16th, I took sixteen specimens of *H. pinastri* in the Saxmundham district, Suffolk. I found them by searching pine trunks, on which they show up quite clearly, even when seen from some way off. The greatest height at which I noticed the insect was rather less than five feet up a trunk; the average height was between two or three feet; in several cases the moths were almost on the ground. They could, without exception have been seen by viewing the trees from the S.E. direction; sun and wind do not seem to affect them; the north side failed to produce even a single specimen. It is unnecessary to search the trunks closely, for *H. pinastri* can be seen at a glance (if there be one to be seen). Its occurrence seemed to be very patchy; where one is detected it is probable there will be others." ("Ent." 1922., p. 226., M. Mactaggart.)

The further history of the specimens exhibited is as follows:—

August 1st, 1922. Pair of *H. pinastri* found (female an unusually pale specimen, the male typical).

August 2nd-6th, 1922. Eggs laid (about 30 a night). Altogether about 130 were deposited. Of these nearly half were infertile, which was the case also with the other batches of eggs.

August 11th, 1922. Fertile ova changed from bright yellow to a reddish brown colour, gradually becoming darker; two days before hatching they were nearly black.

August 17th, 1922. Hatching commenced.

October 3rd, 1922. First larva pupated. Altogether 17 pupae were obtained.

June 25th, 1923. First moth emerged. Three pupae hung over till the following year, remaining alive through the winter, but ultimately failing to produce moths.

July, 1923. I obtained a pairing early in July (two typical specimens), and over 100 eggs were laid of which about 70 were fertile. These resulted in some 60 pupae, the whole metamorphosis being a month early, and frost consequently causing no casualties. Two of the pupae hung over, both producing typical moths in May, 1925.

May, 1924. Again I obtained a pairing of two typical *H. pinastri*, but no eggs were laid.

The exhibit consisted of a series of typical specimens with a row of the very black form, and another row of the "white" form hitherto unknown. It was of a very pale whitish brown, and presented a great contrast to the black form. There is no specimen in the British Museum like it. The light var. *brunnea* is not the same form, nor is it known to occur in the Black Forest of Germany, where *H. pinastri* is common. All the black examples emerged in 1924. (See "Ent. Record," XXXVIII., p. 65).

Mr. and Mrs. Castle Russell exhibited *Polyommatus* (*Agriades*) *coridon*.—The albino male figured in Tutt and Frohawk. The ab. *lacticolor*, Pearce ; I. of W. Male striated on forewings ; Andover, 1925. Female heavily striated on all four wings ; extreme form, Andover, 1922. Female *striata-obsoleta ;* Andover, 1925, and various underside forms ; Andover, 1925.

Epinephele jurtina.—Three aberrations ; New Forest, 1925.

Epinephele hyperantus.—Male ab. *lanceolata* ; New Forest, 1925. An uncommon aberration of the female ; spots on upper wings minus buff rings, and spots on under wings obscured by buff washing.

Epinephele tithonus.—A male with melanic markings on upper forewing ; New Forest, 1925.

Coenonympha pamphilus.—A light fawn-colored male ; Wilts, 1925.

Messrs. O. R. and A. de B. Goodman exhibited five cases representing the Rhopalocera of the Cevennes, Mont Aigoual, the Pont du Gard and Digne, France. The exhibit included the southern form *orientalis* of *Argynnis niobe*, the more recently differentiated *Melitaea*, *M. pseudo-athalia*, five examples of the southern race *gordius* of *Heodes alciphron*, the very local Theclid *Laeosopis roboris*, var. *cerri* of *Strymon* (*Thecla*) *ilicis*, *Polyommatus icarus* ab. *icarinus*, *Melanargia lachesis*, the summer form *rossi* of *Pieris manni*, the southern race of *Melitaea didyma* in which the female closely resembles the male var. *occidentalis*, the dark Mediterranean form *eleus* of *Rumicia phlaeas*, the summer form with very rich red underside *calida* of the southern race of *Plebeius* (*Aricia*) *medon*, the ab. *cleodoxa* (without silver markings) of *A. cydippe* (*adippe*) almost racial in some localities but so rare in Britain, the race *provencialis* of *Parnassius apollo*, *Leptosia duponcheli*, the race *ripartii* of the all brown "blue" *Polyommatus admetus*, etc., etc.

Mr. H. A. Leeds exhibited colour-aberrations of the following species of Rhopalocera all of which had been captured during 1925. —*Plebeius argus* (*aegon*) ; *P. medon ; Rumicia phlaeas* ; *Adopaea flava* ; *Coenonympha pamphilus ; Epinephele jurtina* ; *Aphantopus hyperantus* ; *Agriades* (*Polyommatus*) *coridon*, including ab. *fowleri* and undersides showing extreme variation in tone of colour and in marking. The specimens were named by the cumulative method introduced by the late J. W. Tutt in his "British Butterflies," to which were added the descriptive terms suggested to supplant this cumbrous nomenclature by Dr. Courvoisier.

Mr. A.W. Sperring exhibited underside aberration of *Plebeius argus* (*aegon*), from the Maidstone district, July, 1925, including an extremely striated female; and of *Hesperia malvae*, from Polegate, June, 1925: typical, intermediate and ab. *taras*.

Col. R. H. Rattray exhibited *Plebeius argus* (*aegon*) (heather form). A series of eight ♀♀ with heavy blue scalings; two gynandromorphic specimens, heavily marked on both wings with blue fringes, where blue runs to edges; white androconia very numerous; ab. *costapuncta* + *unipuncta*; one with spots very small, almost obsolete; one with very small spots; two with spots very large and oval, and large extra costal spots.

Mr. C. G. Priest exhibited *Arctia caja*, *A. villica*, *Parasemia plantaginis*, *Callimorpha dominula*, *C. quadripunctaria* (*hera*), *Diacrisia sannio* (*russula*), *Cerura bicuspis*, *Lophopteryx carmelita*, *L. cuculla*, *Stauropus fagi*, etc.

Mr. Rait-Smith exhibited a long series of *Ematurga atomaria*, bred from five ♀♀, taken at Folkestone in May, 1924; to show the great range of variation in this species from one locality.

Mr. W. J. Lucas exhibited four paintings from life, natural size, of scarce flowering plants: *Ludwigia palustris*, Elliot, New Forest; *Asarum europaeum*, Linn., Wiltshire; *Gentiana pneumonanthe*, Linn., New Forest; *Liparis loeselii*, Rich., Norfolk.

Mr. W. J. Kaye exhibited a collection of the Butterflies of Jamaica. (See "Trans. Ent. Soc. Lond.," 1925, p. 455).

Mr. T. A. M. Nash exhibited the following Lepidoptera:—*Pieris rapae*, yellow form. *Melitaea cinxia*, with bleached right hindwing; one with median line suppressed; and one with blackish suffusion of median line. *Brenthis selene*, with black suffusion on basal area of wings; dwarf of 2nd brood (28mm. across). *Hydriomena furcata*, with broad white band on forewings. *Polyommatus coridon*, ♀ with khaki streak on right forewing; ab. *semisyngrapha*, with right wings smaller than left; ♀ with *right* side normal, *left* side *obsoleta* on underside, with smaller wings, antenna, palpi and eye. *Dasycampa rubiginea*, 24 specimens bred from a ♀, taken at sallows, in the spring.

Mr. W. Gifford Nash exhibited a series of the Royston forms of female *P. coridon* and a bred series of *Diacrisia mendica* var. *rustica*.

Mr. H. Moore exhibited the American *Limenitis* (*Basilarchia*) *archippus*, Cr., and its southern form *floridensis*, Strecker, with their Danaine models *Anosia plexippus* (*archippus*, Fab.), and *Danaida berenice*, Cram. (Plates VI., VII.)

Mr. H. M. Edelsten exhibited short series of the British Paraneuroptera, or Dragonflies, *Libellula depressa*, *L. fulva*, *L. quadrimaculata*, *Aeschna grandis*, *A. isosceles*.

Mr. C. N. Hawkins exhibited:—*Amorpha populi*: a short series comprising a very pale ♀ bred from a Herne Bay larva, a dark ♀ and a reddish ochreous ♀ caught at Upper Tooting; a greenish grey ♀ bred from an egg laid by ♀ caught at Upper Tooting; a strongly marked dark grey ♂ caught at the same place and a small pinkish ♂ bred from a Norfolk larva. *Lasiocampa quercûs*: gynandromorph bred from egg laid by a wild Suffolk ♀. *Scoliopteryx libatrix*: ♀ with pale outer areas to forewings, caught at Potter Heigham, Norfolk. *Arctia caia*: a ♂ with clouded forewings and brown margins, *pale* fringes and dull brown spots on hindwings; a ♀ with darkened body, crimson hindwings and *dark* fringes; both bred from eggs laid by a wild Norfolk ♀; a ♀ with orange hindwings and submarginal spots showing tendency to forming a continuous band, bred from a Herne Bay larva. *Ennomos quercinaria* (*angularia*): ♀ from Bonchurch, Isle of Wight, with very brown veining. *Hybernia marginaria*: ♂ caught on Wimbledon Common, with very dark outer areas to forewings.

Mr. F. T. Grant exhibited a series of *Ennomos autumnaria* bred from eggs obtained from a wild female captured on a street lamp in Gravesend, 1923. Also a species new to the British fauna: *Cidaria luctuata* (*Larentia lugubrata*) captured at light in the North Kent Marshes, June 2nd, 1923 (see *Entomologist's Record*, January. 1925, p. 12).

Mr. T. H. L. Grosvenor exhibited a series of extreme examples of sexual dimorphism as exemplified in the Indo-Malayan *Papilionidae*, including *Ornithoptera priamus*, ♀, form *lydius*, and ♀, form *croesus*; *Papilio mayo*, *P. polytes*, *P. memnon*, and *Teinopalpus imperialis*.

Mr. Walter Dannatt, F.Z.S., exhibited some items illustrating the well-known book "The Moths of the Limberlost," including photographs of the late Mrs. Gene Stratton-Porter and of her work. She spent the last 20 years of her life making friends with birds. She was desirous of publishing a book on Moths, and her publishers told her the general public would not buy it, but that if she could write a story introducing the moths it might sell. This was how

" A Girl of the Limberlost " came to be written ; and thousands of copies were sold.

He also showed examples of the transfer of butterfly scales to paper in their natural positions.

Mr. Cuzner, F.R.M.S., exhibited various forms of Marine Life under the microscope, and a number of stereo-transparencies of the same.

Miss. Winifred M. A. Brooks, exhibited drawings of insects, chiefly those of economic importance.

Mr. C. J. Brooks exhibited a male, and forms of the polymorphic female, of *Papilio memnon* from Sumatra.

Mr. E. J. Bedford exhibited a very fine confluent form of *Zygaena trifolii*, in which the five spots of the forewings had coalesced into one large blotch ; *Brenthis selene* with absence of markings on the discal part of the forewings, and the hindwing three parts black ; and *Aglais urticae* with margins of different dark shades.

Miss V. L. Andersson exhibited Fossil Leaf impressions from the Miocene beds at Bournemouth.

Mr. Robert Adkin exhibited a case of butterflies forming a comparative study of natural and artificially produced varieties in the Vanessids, etc.

Mr. H. W. Andrews exhibited a series of British *Eristalinae*, a sub-family of the *Syrphidae* (Diptera).

Mr. S. Ashby exhibited his collection of British Coleoptera in the families *Scarabaeidae*, *Buprestidae*, *Elateridae* and *Chrysomelidae*.

Mr. L. W. Newman, on behalf of Mr. Percy Bright, exhibited the whole of the aberrations of the British Lepidoptera which had been in the collection of the late Charles Oberthür, including a black and a white *Melanargia galathea*, an *Argynnis adippe* with a sulphur coloured upperside, a golden form of *A. aglaia*, an *Issoria lathonia* captured in 1834, but in perfect condition, a white and brown *Epinephele jurtina*, etc.

Mr. Hugh Main showed his arenarium in which was a living *Labidura riparia*, the great shore-earwig, digging in the sand.

Mr. Stanley Edwards exhibited the exotic Lepidoptera, *Nyctalemon* and *Chrysiridia* ; with a number of exotic Coleoptera notable for the development of huge frontal horns, also brilliant species of *Buprestidae*.

Dr. W. Bateson exhibited examples of the *Drosophila* flies which have recently been the subject of experiments in heredity. He also brought microscopes.

The Rev. G. Wheeler exhibited a number of species of European Butterflies, illustrating various stages of melanism, both racial and aberrational; there were about 35 species, a typical example being shown for comparison in each case. It was noticeable that the specimens showing melanism were almost exclusively female, the exceptions being found among the Satyrids.

Mr. Blenkarn exhibited long series of British Coleoptera.

Mr. Harold B. Williams exhibited:—*Xanthorhoë fluctuata*, two distinct melanic forms from Claygate, ♂ and ♀; with a male of the Shetland form and a melanic female from Belfast for comparison. Also a light male from Salisbury Plain, and a curious asymmetrical form from Claygate.

Aphantopus hyperantus:—A selected series to illustrate local variation in the underside coloration, including rich brown forms from Somerset, lighter brown from Bucks, grey-brown from Belfast and pale grey-brown from Aberdeen.

Mr. L. T. Ford exhibited *Sarrothripus revayana*:—Four broods bred from wild caught females. The members of each brood are almost identical with their female parent. This series suggests that each ♀ only reproduces its own form of variation.

Mr. C. H. Williams exhibited the aberrations of *Polyommatus coridon* and *Abraxas grossulariata* he had bred this year, including a completely black example of the latter species.

The Rev. J. E. Tarbat exhibited a specimen of *Epione apiciaria* with a xanthic left hindwing, from the New Forest; and a very dark example of *Hadena* (*Mamestra*) *dissimilis*.

Mr. H. Worsley Wood exhibited the following Lepidoptera:—*Pieris napi*, five creamy yellow; colour due to twisted and hair-like scales; underside, yellow scales overlying black are hair-like; 1920-1925. *Gortyna ochracea*, two ♂s from wild pupae, Wimbledon, 1925, measuring 29mm. *Acidalia immutata*, ♂ with dark marginal band. *Xanthorhoë fluctuata*, with dark-grey ground to forewings and leaden hindwings. *Brephos parthenias*, showing homoeosis:—patch of orange of hindwing on right forewing. *Erebia aethiops*, ♂ with fulvous band replaced by violaceous and sub-violaceous due to alteration of pigment; twisted and hair-like scales; Scotland, 1921, 1924, and 1925; ♂ showing similar characteristics on right forewing only; Westmoreland, 1923. *Argynnis selene*, three short series typical of aberrant second broods from East Sussex in 1920, 1921, and 1925, very small examples only present in 1921. *Cidaria* *sagittata*, series bred in 1925 with preserved larvae and photograph of larvae on food-plant, *Thalictrum flavum*. (A. E. Tonge).

Mr. H. B. Williams, LL.D., on behalf of Capt. Robt. D. R. Troup, a long series of *Colias croceus* (*edusa*), including gen. I. *vernalis* ♂ and ♀, gen. II. *ampla* ♂, gen. III. *croceus* ♀ with ab. *faillae* and ab. *aubuissoni*, gen. IV. *autumnalis* with ab. *pallida* ♀, ab. *velata* ♂, ab. *subobsoleta* ♀, ab. *obsoleta* ♀, ab. *aubuissoni* ♀, and ab. *helice* ♀; also four females of *Hamearis lucina*, including a pale straw-coloured form.

Mr. A. E. Tonge exhibited ab. *obsoleta* of *Polyommatus icarus*, a striate underside hindwings form of *Cyclopides palaemon* (*paniscus*), and obsolete and striate forms of *P. coridon*.

DECEMBER 10th, 1925.

The PRESIDENT in the Chair.

Mr. D. Maundsey, 40, Temple Road, Croydon, was elected a member.

Mr. A. de B. Goodman exhibited a specimen of *Melitaea casta* from Lieristan, a very rare species, unknown to Seitz. Staudinger in his "Catalog" 1901, placed this form between *M. sibina* and *M. saxatilis*. It is stated to occur in Persia with *M. didyma* race *persea* and *M. phoebe*. He also showed *Polyommatus superba* from Anterior Asia and *Lycaena* (?) *diana* from Kagysman.

Mr. Enefer exhibited the ova of the Great Green Grasshopper, *Phasgonura viridissima*, from a female captured in the I. of Wight in August last.

Mr. Blenkarn exhibited specimens of the very local beetle *Catops* (*Cholera*) *nigricans*, taken at Ditchling, Sussex, March 23rd, 1916; and *Philonthus varius* var. *bimaculatus* from Reigate, taken in July last, the latter having a double claw on the R. posterior leg.

Mr. Main exhibited the pupae of a Dipteron, *Digonochaeta* sp. all of which were parasitised.

Mr. K. G. Blair exhibited a living Cockroach nymph, *Nyctibora noctivaga*, Rehn., received from Mr. C. Cheeseman. It was found in a box of bananas in the Walworth Road about 3 months earlier. According to Blatchley, "Orthoptera of N. America," this species has frequently been recorded in America as *N. holosericea*, and probably some, or all, of our British records of the latter species should apply to this insect.

Mr. W. Rait-Smith exhibited some remarkable forms of *Polyommatus* (*Agriades*) *coridon* he had taken this year in the Isle of Wight: (1) a beautiful gynandromorph; (2) an asymmetrically marked underside with absence of ocelli on the forewings; (3) an asymmetrically marked underside with the basal spots and marginal spots almost absent, or quite absent, or reduced to a few dots, with the R. hindwing white wedge-cloud united with the discal spot into a long blotch; (4) an underside with the eye-spots united into a remarkably conspicuous streak; (5) an underside with the forewing devoid of spots and the hindwing almost devoid, the discal spot being elongated as well as the wedge, and very distinct; (6) an underside forewing with the spots absent and the discal mark much enlarged.

Captain Crocker exhibited a specimen of *Melitaea cinxia* showing homoeosis similar to his exhibit of last year, with white scales on the underside of the forewing.

Mr. A. de B. Goodman showed some lantern slides of species of *Ascalaphus*, especially of *A. corsicus* from the Cevennes.

Dr. Rendle F.R.S., then gave a lecture on "Pitcher Plants" illustrated with a large number of lantern slides. The following is a summary of his remarks.

Pitcher-plants.

The ordinary green leaf consists of a stalk bearing a flattened expanded blade, which may be simple or branched in the same plane. The leaf-base is often extended below the attachment of the stalk, and if the two edges join up, a shield-like blade is produced, as in *Tropaeolum*, Waterlily, or the Penny-wort; in the last-named the centre is depressed, the leaf-blade forming a hollow saucer in the centre of which dew or rain may be held for a short time. An exaggeration of this to form a deeper receptacle gives rise to a "pitcher," which is a very frequent malformation, appearing in many species of plants, such as the large-leaved *Saxifraga ligulata*, the garden Pelargonium (*Pelargonium zonale*), the cabbage, and others. A very remarkable example is the species of fig named *Ficus krishna* (known as a single tree in a Calcutta garden), where all the leaves on the tree are cornet-like in shape.

In the leaf of many insectivorous plants, the pitcher-character has become fixed and adapted for the special function of obtaining nitrogenous nourishment from the bodies of insects, which are caught and drowned in the water excreted into the interior, as in the Side-Saddle flower (*Sarracenia*) of the Atlantic States of North America. These pitcher-plants grow in marshy ground, which is poor in nitrogenous food-stuffs, and are thus able to supplement their needed supply of nitrogen from the bodies of insects.

In some cases of malformation, a portion only, or a branch of a leaf, becomes pitcher-like—a cabbage-leaf may bear a stalked pitcher arising from its upper or lower face. This may be compared with the common pitcher-plant, *Nepenthes*, where a pitcher arises normally from the leaf-apex. The species of *Nepenthes* are familiar in cultivation, and are admirably adapted for the attraction of insects, both by their coloration and the presence of nectar around the mouth of the pitcher. The structure of the internal surface of the pitcher prevents the escape of an insect, which has fallen into the liquid excreted into the lower half. This liquid contains a digestive ferment, which renders soluble the proteids of the insect's body, and these are then absorbed by special glands on the inner surface of the pitcher. The genus *Nepenthes* contains many species in Indo-Malaya; the plants climb over shrubs, along the margins of streams, by means of a tendril-like portion of the leaf between the blade and the pitcher, which is sensitive to contact.

Very careful investigation has shown that the pitchers of *Sarracenia* and *Nepenthes* are really insectivorous plants. But we cannot assume that the presence of water-holding cups in which insects are drowned and become putrefied, necessarily implies an insectivorous habit.

Our common teasel has been quoted as an insectivorous plant, but there is at present no proof that the water, which is contained in the cups formed by the joined bases of the leaf-pairs, contains a digestive principle, nor that products of putrefaction or digestion are absorbed by the leaf-cups.

The pitcher-plants belong to three families (1) Sarraceniaceae, an American family, contains besides *Sarracenia*, two other genera, *Darlingtonia* with a single species in North California, and *Heliamphora*, with one species on Mt. Roraima in equatorial South America. (2) Nepenthaceae, an Old World family has about 60 species in the Indo-Malayan region, extending to Madagascar and North Australia. (3) Cephalotaceae with a single species in a small area in South-West Australia. Assuming that these closely related families had a common origin, their present-day distribution on the earth's surface supplies an interesting problem in plant-geography.

JANUARY 14th, 1926.

The PRESIDENT in the Chair.

Five new members were elected: Miss F. P. Tomlinson, of Croydon; Dr. Gayner, of Redhill; Messrs. C. MacCullum, of Ealing, R. C. Allder, of Catford, and R. S. Brock, of Whetstone.

There was an exhibition of insects other than European.

The President exhibited about 80 species and sub-species of the Nymphalid genera *Athyma*, *Procris*, *Limenitis* and *Neptis*, from the Indo-Australian Region; and pointed out the difficulty of defining the species in the genus *Neptis*.

Mr. A. de B. Goodman exhibited the Palaearctic species of *Neptis* from China and Japan, including *Neptis alwina* from Siao Lou, and *N. dejeani* from Yunnan.

Mr. H. Moore exhibited the larva of *Diaphone eumela*, on flowers of Chinkerinchee (Star of Bethlehem), from Table Mountain, S. Africa. They would feed on narcissus, but that appeared to be a too succulent food, for of the three dozen larvae most had died before pupation. The two exhibited were now full-fed and seemed healthy, and he was in hopes of rearing the imagines.

He also showed, two beetles from Fiji; which when sent to him were green, and were now blue, but turning to bronze; an exceptionally large harlequin beetle (*Acrocinus longimanus*), from Brazil with a small one from Dominica; and a box of beetles with large and conspicuous growths upon the head and thorax.

Dr. Cockayne exhibited living larvae of *Stilbia anomala* from Scotland. Eggs were laid on August 22nd, 1925. Hatching took place on September 24th, 1925. The eggs are rather large, and are laid singly on blades of grass.

Mr. Hy. J. Turner showed Western Australian Coleoptera, Hymenoptera and Neuroptera.

Mr. Edwards exhibited Exotic Papilios and moth mimics.

Mr. Farmer showed Cicads from Australia.

JANUARY 28th, 1926.

ANNUAL MEETING.

The PRESIDENT in the Chair.

The Reports of the Council and Treasurer and the Balance Sheet (page xiii) were read and adopted. The following is the List of Officers and Council declared elected for the year 1926 :—

President, T. H. L. Grosvenor, F.E.S. *Vice-Presidents*, E. A. Cockayne, M.D., M.A., F.E.S., F.R.C.P., N. D. Riley, F.E.S., F.Z.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. *Council*, J. H. Adkin, H. W. Andrews F.E.S., C. Craufurd, W. Crocker, A. W. Dennis, S. B. Hodgson, W. Rait-Smith, F.Z.S., F.E.S., etc., E. Step, F.L.S., W. H. T. Tams, F.E.S., and H. Worsley-Wood, F.E.S.

The President, Mr. T. H. L. Grosvenor, read the Annual Address (page 35).

Votes of thanks were passed to the retiring Officers, Council and Auditors for their services during the past year.

A special vote of thanks was passed to Mr. A. W. Dods on his retirement from the office of Librarian which he had filled for the past eighteen years.

Ordinary Meeting.

Mr. Enefer exhibited specimens of the wood-beetle, *Rhagium mordax* (*indagator*), from the New Forest; also the larvae of *Scolytus destructor*, the pest of the elm.

Mr. Sperring exhibited long and comparative series of *Epinephele jurtina*, *Hipparchia semele*, and *Polyommatus icarus*.

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, and 1924.

Are still in print, and may be had on application to the Librarian.

1886, price 1/6; 1887, price 2/6; 1888-9 and
1890-91, price 3/6 each; 1892-3, price 3/-;
1894, price 2/6; 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/-;
1902, price 2/6; 1903, price 2/-; 1904, price 2/-;
1905, price 2/6; 1906, price 2/6; 1907, price 2/6;
1908, price 2/6; 1909, price 5/-; 1910, price 4/6;
1911, price 4/6; 1912, price 4/-; 1913, price 4/-;
1914, price 4/-; 1915, price 5/-; 1916, price 3/6;
1917, price 3/6; 1918, price 4/-; 1919, price 5/-;
1920, price 5/-; 1921, price 5/-; 1922, price 10/6;
1923, price 10/6; and 1924, price 12/6.

N.B.—MEMBERS are allowed a discount of one third off the above prices, and some years at half price.

PROCEEDINGS

OF

THE SOUTH LONDON

ENTOMOLOGICAL & NATURAL HISTORY

SOCIETY

1926-27

WITH ELEVEN PLATES

SMITHSONIAN INSTITUTION
JUN 25 1927
274759
NATIONAL MUSEUM

PUBLISHED AT THE SOCIETY'S ROOMS
HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

PRICE FIFTEEN SHILLINGS

Published by the Society, with the assistance of the following Gentlemen:

Messrs. Robt. ADKIN, E. J. BUNNETT, O. R. GOODMAN, A. E. TONGE, and Hy. J. TURNER.

and the

REPORT COMMITTEE,

R. ADKIN, STANLEY EDWARDS, E. STEP, A. E. TONGE, and H. J. TURNER, Hon. Editor.

ARCHER & CO., [illegible]

THE SOUTH LONDON
Entomological & Natural History Society

(Established 1872)

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E. 1.

OFFICERS & COUNCIL

1927-28.

President.

E. A. COCKAYNE, M.D., M.A., F.E.S.

SMITHSONIAN INSTITUTION
JUN 25 1927
274759
NATIONAL MUSEUM

Vice-Presidents.

H. W. ANDREWS, F.E.S.
T. H. L. GROSVENOR, F.E.S.

Council.

C. CRAUFURD.
A. W. DODS.
O. R. GOODMAN, F.Z.S., F.E.S.
C. N. HAWKINS, F.E.S.
S. B. HODGSON.
W. RAIT-SMITH, F.Z.S., F.E.S.
E. STEP, F.L.S.
W. H. T. TAMS, F.E.S.
H. WORSLEY-WOOD, F.E.S.

Hon. Curator.

S. R. ASHBY, F.E.S.

Hon. Librarian.

E. E. SYMS., F.E.S.

Hon. Editor.

H. J. TURNER, F.E.S., 98, Drakefell Road, New Cross, S.E. 14.

Hon. Treasurer.

A. E. TONGE, F.E.S., "Aincroft," Grammar School Hill, Reigate.

Hon. Secretaries.

S. EDWARDS, F.L.S., F.Z.S., F.E.S., etc. (*General Sec.*),
15, St. Germans Place, Blackheath, S.E. 3.
H. J. TURNER, F.E.S., 98, Drakefell Road, New Cross, S.E. 14

THE SOUTH LONDON

ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from 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.

SUBSCRIPTION.

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

All Communications to be addressed to the Hon. Gen. Secretary,
STANLEY EDWARDS, F.L.S., &c.,
15, St. Germans Place, Blackheath, S.E. 3.

PAST PRESIDENTS.

1872-4.. J. R. Wellman (dec.).
1875-6.. A. B. Farn, F.E.S. (dec.).
1877 .. J. P. Barrett, F.E.S. (dec.).
1878 .. J. T. Williams (dec.).
1879 .. R. Standen, F.E.S. (dec.).
1880 .. A. Ficklin (dec.).
1881 .. V. R. Perkins, F.E.S. (dec.).
1882 .. T. R. Billups, F.E.S. (dec.).
1883 .. J. R. Wellman (dec.).
1884 .. W. West, L.D.S. (dec.).
1885 .. R. South, F.E.S.
1886-7.. R. Adkin, F.E.S.
1888-9.. T. R. Billups, F.E.S. (dec.).
1890 .. J. T. Carrington, F.L.S. (dec.)
1891 .. W. H. Tugwell, Ph.C. (dec.)
1892 .. C. G. Barrett, F.E.S. (dec.)
1893 .. J. J. Weir, F.L.S., etc. (dec.)
1894 .. E. Step, F.L.S.
1895 .. T. W. Hall, F.E.S.
1896 .. R. South, F.E.S.
1897 .. R. Adkin, F.E.S.
1898 .. J. W. Tutt, F.E.S. (dec.).
1899 .. A. Harrison, F.L.S. (dec.).
1900 .. W. J. Lucas, B.A., F.E.S.
1901 .. H. S. Fremlin, F.E.S., etc.
1902 .. F. Noad Clark.
1903 .. E. Step, F.L.S.
1904 .. A. Sich, F.E.S.
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.

LIST OF MEMBERS.

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

YEAR OF
ELECTION.

1920 ABBOT, S., 110, Inchmery Road, Catford, S.E. 6. *l.*

1886 ADKIN, B. W., F.E.S., "Trenoweth," Hope Park, Bromley, Kent. *l, orn.*

1922 ADKIN, J. H., *Hon. Lanternist*, "Ravenshoe," Furze Hill, Burgh Heath, Surrey. *l.*

1882 ADKIN, R., F.E.S., "Hodeslea," Meads, Eastbourne. *l.*

1901 ADKIN, R. A., "Hodeslea," Meads, Eastbourne. *m.*

1925 ALDER, R. C., 15, Abbottshall Road, Catford, S.E.6. *l.*

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., 6, Castelnau Gardens, Barnes, S.W. 13. *e, l.*

1895 ASHBY, S. R., F.E.S., *Hon. Curator*, 37, Hide Road, Headstone, Harrow. *c, l.*

1924 ATKINSON, F., 4, Melrose Road, Wandsworth, S.W. 18.

1923 BAKER-SLY, H., "Eden Lodge," Westcott Road, Dorking. *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.*

1927 BEDWELL, E. C., F.E.S., 54, Brighton Rd., Coulsdon, Surrey. *c.*

1924 BIRD, Miss F. E., Willow Dene, Cromwell Avenue, Billericay, Essex.

1927 BLACK, L. P. M., 12, Wontner Road, Balham, S.W.17.

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

1911 BLENKARN, S. A., F.E.S., "Rannoch Lodge," 44, Grovelands Road, Purley. *l, c, odonata.*

YEAR OF
ELECTION.

1898 BLISS, M. F., Capt., 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.*

1923 BOWLES, L. G., 193, Brockley Rise, Honor Oak Park, S.E.23. *l.*

1909 BOWMAN, R. T., "Rockbourne," Keswick Road, Orpington, Kent. *l.*

1919 BOX, L. A., Lieut., F.E.S., 35, Gt. James Street, W.C.1. *h.*

1909 BRIGHT, P. M., F.E.S., "Colebrook Grange," 58, Christchurch Road, Bournemouth. *l.*

1925 BROCK, R. S., "Highclere," Oakleigh Park, Whetstone, N.20. *b.*

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., 307A, Kingston Road, West Wimbledon, S.W. 20. *l.*

1927 BULL, G. V., B.A., F.E.S., M.B., "White Gables," Sandhurst, Kent.

1915 BUNNETT, E. J., M.A., 19, Silverdale, Sydenham, S.E. 26. *m.*

1922 BURCH, W., 35, Ansdell Road, Peckham, S.E. 15. *l.*

1922 BUSHBY, L. C., F.E.S., 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, F. B., 46, Handen Road, Lee, S.E. 12. *l.*

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

1872 CHAMPION, G. C., A.L.S., F.Z.S., F.E.S., Bromhall Road, Horsell, Woking. *c.* (*Hon. Member*).

1924 CHAPMAN, Miss E. F., "Betula," Reigate.

1924 CHAPMAN, Miss L. M., "Betula," Reigate.

1922 CHEESEMAN, C. J., 30, Clayton Road, Peckham, S.E. 15. *l.*

1879 CLODE, W. (*Life Member.*)

1915 COCKAYNE, E. A., M.A., M.D., F.R.C.P., F.E.S., *President,* 116, Westbourne Terrace, W. 2. *l.*

1920 COCKS, F. W., F.E.S., 42, Crown Street, Reading. *l.*

Year of
Election.

1899 Colthrup, C. W., 68, Dovercourt Road, E. Dulwich, S.E. 22. *l, ool, orn.*

1907 Coote, F. D., f.e.s., 11, Pendle Road, Streatham, S.W. 16. *l, b.*

1919 Coppeard, H., 12, 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. *l.*

1909 Coulson, F. J., 17, Birdhurst Road, Colliers Wood, Merton, S.W. 19. *l.*

1918 Court, T. H., f.r.g.s., "Willow Cottage, Market Rasen, Lincolnshire. *l.*

1902 Cowham, F. W., 118, Minard Road, Catford, S.E. 6. *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, *Council*, "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.*

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.*

1888 Dawson, W. G., f.e.s., "Bushwood," Oaklands Road, Bromley. (*Life Member.*) *l.*

1900 Day, F. H., f.e.s., 26, Currock Terrace, Carlisle. *l, c.*

1889 Dennis, A. W., 56, Romney Buildings, Millbank, S.W.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.*

1921 Dolton, H. L., 36, Chester Street, Oxford Road, Reading. *l.*

1912 Dunster, L. E., *Recorder of Attend.*, 44, St. John's Wood Terrace, N.W.3. *l.*

YEAR OF ELECTION.

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.

1915 FAGG, T. A., 55, Mt. Pleasant Road, Lewisham, S.E. 13. *l.*

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.*

1923 FAWTHROP, R. W., 49b, Kings Road, Willesden, N.W.10. *l.*

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

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

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.

1889 FORD, A., "South View," 36, 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., Romney Cottage, Park Hill, Carshalton, Surrey. *l, orn.*

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

1916 FULLYLOVE, Miss M. H., 10, Officer's Quarters, Heathfield Road, Wandsworth Com., S.W.18.

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

Year of Election.

1920 Gauntlett, H. L., f.e.s., m.r.c.s., l.r.c.p., 37, Howards Lane, Putney, S.W.15. *l.*

1925 Gaynor, Dr., m.a., m.r.c.p., "Old Linkfield," Redhill, Surrey. *ent.*

1927 Gibbins, F. J. 51, f.l.a.a., f.l.a.g., Weldon Crescent, Harrow, Middlesex.

1920 Goodman, A. de B., 210, Goswell Road, E.C. 1. *l.*

1920 Goodman, O. R., f.z.s., f.e.s. *Council,* 210, Goswell Road, E.C.1, and "Hatchgate," Massetts Road, Horley, Surrey. *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.*

1926 Grey, Olive, Mrs., f.z.s., 90, Charing Cross Road, W.C.2.

1918 Green, E. E., f.e.s., "Ways End," Camberley, Surrey. *hem.*

1924 Greer, T., j.p., Curglasson, Stewartstown, Co. Tyrone. *l.*

1911 Grosvenor, T. H. L., f.e.s., *Vice-President,* 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., f.e.s., 22, Southfields Road, Oxford. *l.*

1906 Hammond, L. F., "Invermoriston," Green Lane, Purley. *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.

1911 Harris, P. F., 130, Harrow Road, 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.

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

1913 Haynes, E. B., 82a, Lexham Gardens, W. 8. *l.*

1923 Hayward, Capt. K. J., f.e.s., Villa Ana, F.C.S.F., Argentine. *l.*

1920 Hemming, A. F., f.z.s., f.e.s., 25, Scarsdale Villas, W. 8. *l.*

YEAR OF ELECTION.

1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *col.*

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

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

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

1923 JACOBS, S. N. A., 5, Exbury Road, Catford Hill, S.E.6. *l.*

1924 JAMES, A. R., 7, Broadlands Road, Highgate, N.6. *l.*

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

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

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

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

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

1920 JOICEY, J. J., F.L.S., F.E.S., F.R.G.S., etc., "The Hill," Witley, Surrey. *l.*

1920 JUMP, A. C., 108, Trinity Road, Wandsworth Common, S.W.17.

1898 KAYE, W. J., F.E.S., "Caracas," Ditton Hill, Surbiton, Surrey. *l, S. American l.*

1900 KEMP, S. W., B.A., Indian Museum, Calcutta. *l, c.*

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., 15, Draycott Avenue, S.W.3.

1924 LANGHAM, Sir Chas., Bart., F.E.S., Tempo Manor, Co. Fermanagh. *l.*

1927 LAWSON, H. B., "Brookhill," Horsell, Woking.

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.*

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.*

1920 LINDEMAN, F., c/o Rio de Janeiro Tramway Light and Power Co., Caixa Postal 571, Rio de Janeiro, Brazil. *l.*

1922 LOCK, A. K. (Miss), F.Z.S., 77, Grove Hill Road, Denmark Park, S.E. 5. *l.*

1926 LONG, R. M., 21, Guy Road, Beddington, Surrey. *l.*

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

Year of Election.

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.S. *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.*

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.

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

1927 Murray, Capt. K. F. M., 11, Eccleston Place, S.W.1.

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.*

1926 Pearson, D. H., f.e.s., Chilwell House, Notts. *l.*

1915 Pearson, G. B., Coconut Grove, P. O., nr. Miami, Florida, U.S.A. *l.*

YEAR OF ELECTION.

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.*

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., 1 and 2, Chiswell Street, E.C. 1. *l.*

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

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

1904 PRISKE, R. A. R., F.E.S., 9, Melbourne Avenue, 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.*

1919 ROBERTS, J. G., "Nantglyn," Hadley Road, New Barnet.

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.*

YEAR OF ELECTION.

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

1915 RUSSELL, S. G. C., F.E.S., "The Elms," Eastrop, Basingstoke, 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.

1922 SEABROOK, Lieut. J. C., F.E.S., South Court, Lower Ham Road, Kingston on Thames. *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.

1903 SMALLMAN, R. S., F.E.S., "Hethersett," 30, Leigham Court Road, Streatham, S.W.16. *l, c.*

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

1908 SMITH, B. H,, B.A., F.E.S., 20, 3rd Avenue, Hove, Sussex. *l.*

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

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

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

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.*

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

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

1872 STEP, E., F.L.S., *Council*, 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.*

Year of
Election.

1923 Stolzle, G. A. W., 15, Benson Road, Forest Hill, S.E. 23. *l.*

1923 Stolzle, R. W., 15, Benson Road, Forest Hill, S.E. 23. *c.*

1910 Stoneham, Capt. H. F., f.e.s., m.b.o.u., Charangani, Trans-Nzoia, Kenya Colony, Brit. E. Africa. *l.*

1924 Storey, W. H., 63, Lincolns Inn Fields, W.C.2.

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.*

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.*

1887 Turner, H. J., f.e.s., *Hon. Editor*, 98, Drakefell Road, New Cross, S.E. 14. *l, c, n, he, b.*

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

1921 Vesterling, A. W., 107, Castle Street, Battersea, S.W. 11. *l.*

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

1889 Wainwright, C. J., f.e.s., "Daylesford," Handsworth Wood, Birmingham. *l, d.*

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

1911 Wakely, L. D., 11, Crescent Road, Wimbledon Common, S.W. 19. *l.*

1880 Walker, Comm. J. J., m.a., f.l.s., f.e.s., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*

1925 Ward, J. Davis, f.e.s., "Limehurst," Grange-over-Sands. *l.*

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

1926 Watts, W. J., 37, Goddard Road, Elmers End, Beckenham.

1925 Watts, L. W., 3, Holbrook Lane, Chislehurst. *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.

YEAR OF
ELECTION.

1920 WIGHTMAN, A. J., F.E.S., "Aurago," W. Chiltington Com., Pulborough, Sussex. *l.*

1914 WILLIAMS, B. S., "St. Genny's," Kingscroft Road, Harpenden. *l, c, hem.*

1912 WILLIAMS, C. B., M.A., F.E.S., Ministry of Agriculture, Cairo, Egypt, and 20, Slatey Road, Birkenhead. *l, ec. ent.*

1925. WILLIAMS, H. B., LL.D., F.E.S., Briar Cottage, Claygate, Surrey, *l.*

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

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

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*, 31, Agate Road, Hammersmith, W. 6. *l.*

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

1925. ZOHEIRY, Mehammed Soliman El., F.E.S., 207, North End Rd., W. Kensington, W.14.

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, 1926.

THE Council, in presenting the fifty-fifth 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 256, made up as follows, 250 ordinary members, 3 honorary and 3 life-members.

The Council regrets to report the death of four members, *viz.*, Dr. Wm. Bateson, F.R.S., Rev. F. D. Morice, Dr. C. L. Withycombe and Mr. F. M. Enefer.

There have been three resignations and four names have been removed from the list for non-payment of subscriptions.

The average Attendance at meetings shows a gratifying increase on that of any previous year.

The Annual Exhibition was held on November 25th, and in spite of a very dense fog, 169 members and friends were present; there were between 30 and 40 exhibitors. The precedent of last year was followed in having the exhibits laid on tables and no formal proceedings. The provision of light refreshments as last year was again adopted and much appreciated by those present. The Council wish to express the gratitude of the Society to Mr. O. R. Goodman for again having made all the necessary arrangements and to those other members who rendered other very material assistance, which did so much to make the meeting a success.

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

Papers have been read before the Society by Messrs. R. Adkin (2), K. G. Blair, E. J. Bunnett, Miss E. Cheesman, Dr. Cockayne, O. R. Goodman, Dr. A. D. Imms, Hy. J. Turner (2), and H. B. Williams, LL.D.

The Curator reports "During the year we have again received numerous Additions to the Society's Collections, the following gentlemen being the donors. Mr. R. Adkin very generously presented four boxes of British Lepidoptera. Mr. A. A. W. Buckstone, a box of British Lepidoptera and a specimen of *Sirex gigas*. Through Capt. N. D. Riley, the Society received a box of Palaearctic

Lepidoptera. Mr. S. A. Blenkarn gave sixty-seven specimens of Coleoptera. Mr. D. J. Gordon a specimen of the rare beetle *Agabus arcticus*, and Mr. H. Worsley-Wood presented numerous Coleoptera and Hemiptera.

The Hon. Librarian, Mr. E. E. Syms, reports the gift of a card-index cabinet and cards, from Mr. J. H. Adkin, for the purpose of a new library catalogue. It is hoped to have this ready for reference in the Spring. He adds that, of the books borrowed during the past year, a large percentage have been on orders other than lepidoptera.

The Field Meetings were somewhat curtailed owing to the "General Strike" and those that were held were not well attended, no doubt on account of the unsettled conditions prevailing throughout the summer. The Meetings were on April 17th to Oxshott, on July 29th to Clandon, on September 11th to Ranmore. The Fungus Foray was deferred and finally abandoned, owing to unsatisfactory weather conditions.

Your Council appointed Mr. R. Adkin to represent the Society at the British Association Meetings at Oxford in August; and Messrs. R. Adkin and Hy. J. Turner as representatives to the Congress of the South-Eastern Union of Scientific Societies held at Colchester in June.

The volume of Proceedings for 1925 was published in June and consists of xviii + 112 pp. with 9 plates.

The following additions have been made to the Library during the year; by exchange unless otherwise stated.

Books.—Marine Fishes of Panama; Catalogue of American Birds.

Magazines and Periodicals.—"Entomologist"; "Entomologist's Monthly Magazine" (by purchase); "Entomologist's Record"; "Entomological News"; "Canadian Entomologist"; "Philippine Journal of Science"; "Entomologische Mitteillungen"; "Vasculum"; "Essex Naturalist"; "Entomologiska Tidskrift"; "Notula Entomologica"; "Zoologiska Bidraga"; "List of additions to the National Herbarium, U.S.A."; "Revue Russe."

Reports and Transactions of Societies.—Report of British Association (R. Adkin); Report of the Meeting of Delegates of Corresponding Societies of the B.A.; List of Scientific Papers (B.A.); Annual Report of the Smithsonian Institute; Bulletin and Annales of the Société entomologique de France; Trans. of the Perthshire Natural Science Society; Report of the Hastings and St. Leonard's Nat. Hist. Socy.; Report of the Bournemouth Nat.

Science Socy.; Trans. Connecticut Academy of Arts and Sciences; The London Naturalist; Report of the U.S. National Museum; Bolletino R. Scuola d'Agricultura, Portici, Italy; The South Eastern Naturalist; Transactions of the Ent. Soc. Lond. (Dr. Fremlin); Trans. of the Leicester Literary and Philosophical Society: Proceedings of the I. of Wight Nat. Hist. Society.

Pamphlets and Separates.—Separates from the Chicago Field Museum; Separates from Prof. T. D. A. Cockerell: Defences of Animals (Horniman Museum); Separates from the U.S.A National Museum; Bulletins from the Lloyd Library, N.Y.; Address to the Ent. Soc. London 1926 (Prof. Poulton); Mosquitoes (B.M. Publication); Meteorites (B.M. Publication); Mimicry in S. African Butterflies (Prof. Poulton); Defences of Butterflies (Prof. Poulton); Breeding of *C. etheocles* (Prof. Poulton); Protective Resemblance in African Insects (Prof. Poulton); Separates from Uppsala University; List of British Geometers and their named varieties (Hy. J. Turner); Catalogue of Indian Insects.

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

TREASURER'S REPORT 1926.

The financial position of your Society continues to improve, and I am glad to say that we have at last reached a position of definite stability; we can meet our normal expenditure out of income.

The Subscription Income for the year shows an increase of about £8, which is largely due to the recovery of arrears. Income from investments is about the same as last year, while the amount received for entrance fees is rather less than last year. The cost of the Plates and of two of the "Papers" was contributed by Mr. Robert Adkin; no general appeal for the Publication Fund was therefore necessary. Sales of Proceedings were not quite so large as in 1925, while the receipts from the Sales of Duplicate Books from the Ashdown bequest, naturally get smaller as the number of books for sale is reduced. Expenditure has been very much on the usual lines, and shows no great differences, excepting that the cost of printing the Proceedings was about £12 less than last year. Our Investments have been increased by the purchase of £40 worth of 3½% Conversion Loan, and now stand at the very satisfactory total of £667 0s. 1d. that is to say they cost this amount. Their market value to-day is somewhat higher. The figures in detail appear in the Accounts and Balance Sheet, which have been audited by Messrs. Carr and Worsley Wood.

I should like to take this opportunity of thanking both these gentlemen for the very kind and considerate manner in which they carried out their duties; also Mr. T. W. Hall for so kindly allowing his office to be used for the Audit.

The Balance Sheet shows that the Society now holds assets of the total value of £742 3s. 6d., or about £32 more than a year ago.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1926.

REVENUE ACCOUNT.

Expenditure.		£ s. d.
To Rent of Rooms	50 0 0	
,, Insurance	1 6 6	
,, Attendance	2 10 0	
,, Secretarial expenses	9 10 0	
,, Treasurer	1 8 6	
,, Catering	15 0 0	
,, Hire of chairs and tables	4 14 6	
,, Subscriptions		84 9 6
South-Eastern Union of S. Societies	15 0	
Footpaths Preservation Society ..	10 6	
,, Vote to		1 5 6
Publication Fund	40 0 0	
Library Fund	6 0 0	
		46 0 0
Balance		62 15 1
		£194 10 1

Income.		£ s. d.
By Balance brought forward		37 15 10
,, Subscriptions :—		
Current	99 7 6	
Advance	10 7 6	
Arrears	16 15 0	
,, Dividends :—		126 10 0
3½% Conversion Loan	8 2 6	
5% War Bonds	5 0 0	
,, ,, ,, ...	1 10 0	
deposit interest	11 9	
,, Donations :—		15 4 3
Tea fund..	10 15 6	
,, balance..	4 4 6	
per Mr. Goodman		15 0 0
		£194 10 1

ENTRANCE FEES AND LIFE-MEMBERSHIP SUBSCRIPTIONS ACCOUNT.

	£ s. d.
To Purchase of £40 3½% Conversion Loan at 76 7/16 and cost. Regd. stock	31 2 0
,, Balance	2
	£31 2 2

	£ s. d.
By balance brought forward	25 14 8
,, Entrance fees	2 7 6
,, Sale of single books, ex Ashdown Bequest ..	3 0 0
	£31 2 2

LIBRARY FUND.

		£ s. d.
Subscriptions	2 5 0	
To Binding Books	4 5 0	
		6 10 0
,, Balance		6 4
		£6 16 4

	£ s. d.
By Balance brought forward	15 0
,, Sale of odd volume	1 0
,, Fines	4
,, Vote from General Fund	6 0 0
	£6 16 4

PUBLICATION FUND.

		£ s. d.
To Printing Proceedings	70 6 0	
,, Halftone Blocks	19 4 6	
		89 10 6
,, Balance		1 10
		£89 12 4

		£ s. d.
By Balance brought forward		14 2
,, Donations	3 14 6	
½ tone blocks, etc., paid for by Contbrs.	26 14 6	
,, Dividends on Chapman memorial.	15 0 0	
,, Sales of Duplicate Proceedings	3 9 2	
Vote from General Fund	40 0 0	88 18 2
		£89 12 4

BALANCE SHEET.

Liabilities.	£ s. d.
To Balance, being excess of assets over liabilities	742 3 6
	£742 3 6

Assets.		£ s. d.
By Balances—		
,, General Fund	62 15 1	
,, Suspense a/c	2	
,, Library Fund	6 4	
,, Publication Fund	1 10	
		63 3 5
,, Investments at Cost:—		
National War Bonds £130		
5% War Loan £300		
3½% Conversion Loan £290		667 0 1
,, Subscriptions unpaid:—		
Good 14		
Doubtful 20		12 0 0
		£742 3 6

Audited and found correct, this 22*nd January*, 1927.

F. B. CARR,
H. WORSLEY WOOD, } *Auditors.*

Some Notes on the Flora of Manitoba.

By E. J. Bunnett, M.A.—*Read February 11th*, 1926.

In my Paper read as the Annual Address to this Society, January, **1923**, on the Natural History of Manitoba, the Botanical Notes were omitted with a promise to offer them separately, later on, if desired. I have the pleasure to redeem that promise this evening.

It need hardly be said that no attempt has been made in these brief notes to give a comprehensive survey of the Flora of the Province. Reference is made to some of the more attractive or interesting specimens from among those of my collection.

During the four days railway journey halfway across the Continent from Halifax to Winnipeg, the absence of trees in general and of large ones in particular forms a striking contrast to the landscape that may be viewed on any long railway journey in the British Isles.

In Manitoba, green hedges and grassy meadows are conspicuous by their absence. In fact, almost the only grassy areas to be seen in the Province, are the lawns about public buildings and in the Parks; or the boulevards which, in most of the city streets, divide the side-walks from the roads. This lack of herbage, together with and owing to the fact that the ground is everywhere snow-covered for five months of the year, naturally renders sheep-keeping impossible, and incidentally fresh mutton unattainable.

Among the largest trees native to the Province, is the Tamarac (*Larix americana*), the height of which varies from thirty to seventy feet with girth of from one to three feet in the States. In Manitoba I seldom met with any kind of native tree with a trunk much exceeding 18 inches in diameter. The wood of this tree is said to be very durable in contact with the soil, and on this account is largely used for railway sleepers, building of shacks and all kinds of outdoor purposes.

Another, also a Conifer, is the Hemlock (*Tsuga canadensis*). This is usually rather taller and of greater girth than the Tamarac, and may grow to a height of 80 feet. Its wood is soft and brittle. Of oaks North America numbers over 50 species, many of which are met with in Manitoba. Some however, are mere shrubs, *e.g.*, *Quercus prinoides* which does not exceed 4 feet in height.

The Paper Birch (*Betula papyrifera*) is considered to be only a variety of the Silver Birch (*B. alba*), our only British species.

This useful tree is abundant throughout the Province. The bark peels easily, often in large paper-like sheets, which are separable like talc into many thin layers. It is much sought after by visitors in the woods for use as letter-paper, picture frames and other souvenir articles, as well as for the well-known purposes of making canoes and wigwams by the N. American Indians.

In the Old Country the blossoms of our fruit trees in Spring constitute one of the most charming features in our Island landscapes. In the Prairie Provinces, where orchards do not exist, nature compensates for their omission by the number and variety of wild fruits such as the strawberry, raspberry, cranberry and many excellent nuts.

The Choke-Cherry (*Prunus virginiana*) and the Red Cherry (*P. pennsylvanica*) are in evidence wherever trees grow at all. The fruit of the former is small, at first red, then becoming black; and is extremely astringent. The fruit of the latter is also small, about the size of red-currants, and is very sour and unpalatable. Other trees of the 'bush' include viburnum, willows, maples, etc. Low shrubs of several kinds of Dogwood are frequent, and my delight was great on finding in a damp wood large patches of the curious little Bunch-berry (*Cornus canadensis*). This humble representative of the genus does not grow beyond five or six inches in height. It is closely allied to the Dwarf Cornel (*C. suecica*) of Scottish mountains, the description of which in Bentham and Hooker's British Flora, so far as here quoted, applies also to its Canadian relative:—"Flowers very small, in a terminal umbel, surrounded by 4 large petal-like bracts, so as to give the whole umbel the appearance of a single flower with 4 petals. The real petals are minute."

Unless otherwise stated all the specimens were gathered in Ethelbert from the middle of April to the end of July, or in Winnipeg from August to the following June.

Ethelbert is a little township about 300 miles N.W. of Winnipeg, situated in a somewhat swampy and bushy district between Lakes Dauphin and Winnepegosis. As stated in my previous paper, the snow on my arrival there was still deep though the thaw had set in. The first wild flower to show its cheerful face above the snow to welcome the Spring was the Prairie Anemone (*Anemone patens* var. *nuttalliana*). As may be seen, it is extremely like our Pasque-flower (*A. pulsatilla*).

From May onwards through the summer, flowers sprang up in ever increasing numbers, speedily becoming far too numerous for me to be able to gather more than a fraction of the species as they appeared. Consequently, I determined to collect chiefly such as did not occur in the British flora, or were new to me. This plan, unfortunately, led me in several instances to discard plants which I afterwards found to be not of the same species as our own, though often very similar. For example *Anemone quinquefolia*, which is by some botanists (*e.g.*, Green) considered to be only a variety of *A. nemorosa.*

Other Anemones are *A. canadensis*, a plant almost as bushy as the Pæony; *A. multifida*, its leaf segments almost linear, with fine red flowers, and the head of carpels spherical; and a closely allied species *A. hudsoniana.* In *A. cylindrica* the sepals are greenish white, with long leafless peduncles, usually in threes springing from the same internode, and the cylindrical head of carpels extending to as much as an inch in length, and very like that of *Ranunculus flabellatus* of the Channel Islands. *Ranunculus pennsylvanicus* is a particularly hairy species, and another Crowfoot—*Oxygraphis cymbalaria*—is interesting as representing a genus not included in the British flora. Its popular name 'The Seaside Crowfoot' is misleading, since this specimen was plucked over 2000 miles from either Ocean.

Of the Meadow Rues, *Thalictrum purpurascens*, with purplish flowers, resembles our *T. flavum*, but for its looser panicles, and *T. venulosum* is not unlike our *T. minus.*

I was pleased to come across the Baneberry (*Actaea spicata* var. *argenta*) of which the type occurs with us though it is very rare. A Columbine (*Aquilegia canadensis*) is also similar to our native species *A. vulgaris*, but the size of the leaves of the former is alone sufficient to distinguish one form from another.

The Order Cruciferae, is represented among this evening's exhibits by the Golden Whitlow-Grass (*Draba aurea*); the pretty little Western Wall-flower (*Erysimum aspersum*) and *Neslia paniculata*, with yellow flowers on panicles often 8 or 9 inches long. This last has the reputation of being one of the troublesome weeds of the Dominion. Some of these are known as 'tumble-weeds,' being more or less globular as a whole, and breaking off entire when fully grown. They are capable of being blown over the prairie lands for many miles, dropping seeds as they travel. Among such are several species of Pepper-grass (*Lepidium*), the Hog-weed (*Amarantus*), and the Cockle-Bur (*Xanthium*).

Unfortunately, weed-pests of rapid growth are occasionally introduced with imported seeds, etc., and in a few years many become established over vast areas just as the Canadian Water-Thyme (*Elodea canadensis*) has done in these Islands; or as the so-called Russian Thistle, a variety of Saltwort, has spread as a tumble-weed in the States. This last may attain a height of 3 feet with a diameter of 6 feet, and carry not less than two hundred thousand seeds. First introduced into S. Dakota in flax-seed from Russia, and planted in 1874, in 20 years the plant had become one of the most formidable weeds known, over an area of about twenty-five thousand square miles. The Departments of Agriculture employ inspectors, who visit farms in all localities of the Dominion, compelling negligent farmers by fines and penalties to clear their land of such weeds as might be the cause of heavy loss, not only on their own holdings, but also on those of their neighbours, or even to crops of far distant agriculturists.

Many species of violets occur, with flowers white, blue, purple, or yellow. Typical examples are *Viola canadensis*, which has flowers not unlike those of our Dog-violet, but the plant is much larger, often a foot in height.

V. rotundifolia, with yellow flowers, and *V. pedata*, a striking species with large blue flowers about an inch across, and leaves deeply cut into almost linear segments.

In the Milkwort family are found two rather curious forms. One is the Seneca Snake-root (*Polygala seneca* var. *latifolia*) a robust plant, which was not assigned even to its proper order very readily. The other, the lowly but very beautiful little fringed Milkwort (*P. pauciflora*). The plant does not exceed 4 inches in height and has from one to three showy rose-purple flowers with delicately fringed lips. These specimens are the only ones I met with; and I remember having to wade with bare feet through mud and water to procure them.

Although so many plants of the large order Leguminosae furnish man with wholesome food for himself and equally nutritious food for his cattle, some of its members are astringent, irritant or even poisonous like the seeds of Laburnum. One of the injurious species known as Loco-weed (*Oxytropis lamberti*) has all the appearance of being useful as cattle fodder, but the Manitoban farmer is specially warned that it is poisonous to animals. The plant bears its attractive purple flowers on a long peduncle often a foot in height.

The Triple-flowered Avens (*Geum triflorum*) surpasses in beauty our graceful Water-avens. The awn-like unjointed styles are finely feathered and grow to a length of two inches in the ripened fruit, giving it an extremely pretty appearance.

Several kinds of Grass of Parnassus occur, including our single British species *Parnassia palustris*, which *P. caroliniana* closely resembles. Another Saxifrage known as Alum-root (*Heuchera hispida*) has showy flowers, so attractive as to make it well worth cultivating in our gardens. A third member of the same order is the delicate little Bishop's-cap or Mitre-wort (*Mitella nuda*), which occurs sparingly on moss-covered logs. Its small green flowers are remarkable for the curious pinnatifid petals, which are so attenuated as to have the appearance of finely branched hairs. I rather prematurely posted away some of the few I gathered, expecting to find more later on, but I did not meet with it again.

A curious and ornamental member of the Gourd family is the Balsam-Apple (*Echinocystis lobata*), which climbs by numerous tendrils to a considerable height. Its flowers are monoecious, staminate flowers growing in long compound racemes, and the pistillate ones singly or in small clusters from the same axils, the whole inflorescence closely resembling that of the Sweet Chestnut. The large oval fruit capsules, sometimes two inches long, and much like those of *Datura*, consist of two membranous locules, surrounded by a persistent calyx of equal length, the latter covered with prickly spines. The seeds, of size and form like those of the vegetable marrow, are coloured and prettily variegated. The fruits and flowers shown grew on the banks of the Assiniboine River in Winnipeg. This plant was one of the commonest throughout the city, in waste places between houses; and in the Spring its cotyledons, like those of the beech but much larger, were frequently to be seen struggling for existence in gardens or even on the sidewalks in the streets.

One of the Sanicles, known as Snake-root (*Sanicula marylandica*), differs from our single species in the partition of the leaves and in the larger size of the flower-heads. A near relative of the Aralias so common in English gardens is the wild Sarsaparilla (*Aralia nudicaulis*). The true stem is very short, sending up a naked scape bearing three or four long-peduncled umbels. From the stem also springs a large ternately divided leaf, with five leaflets on each division. In the specimen shown, it is interesting to notice the perfect symmetry of the central one of the three, and the beautiful manner in which the lowest inner leaflet on each of the lateral main divisions has accommodated itself to the exigencies of its position.

It was a great delight one day while collecting plants in a swampy part of the Ethelbert bush, to make my first acquaintance with the little Twin-flower (*Linnaea borealis*). This charming little plant is in Britain confined to one or two northern English counties and some of the fir woods of Scotland.

As might be expected, the Order *Compositae* embraces many interesting Canadian plants, including some of the most showy and gorgeous flowers, so abundant in uncultivated districts of the Prairie Provinces. One of the most beautiful is the Blazing Star (*Liatris scariosa*), its tall many flowered stems, four or five feet high, often giving a purple hue to large patches of landscape. Golden-rods comprise over twenty species, of which *Solidago rigida*, reaching a height of five feet, is a common type. Asters include about 30 species, among which *Aster multiflorus* and *A. puniceus*, a taller relative whose height often exceeds six feet, were frequent in waste spaces about the streets of the City. In similar situations several species of the Bur Marigold often grew in profusion, *e.g.*, the Common Beggar Ticks (*Bidens frondosa*) and the Swamp Beggar Ticks (*B. connata*). Among the gayest blossoms some of the Rudbeckias were pre-eminent. *R. hirta* was as abundant in its season in the north as the Blue-bell is with us in spring, and was likewise gathered in huge bunches to decorate the homes. *R. columnaris* (the Cone flower) has a conical receptacle, an inch or more in length.

I met with only one specimen, this grew upon the slope of the railway track near Ethelbert, and was daily visited with the intention of plucking it when fully expanded. I remember setting out on a Sunday morning with the express purpose of bringing it back to press. To my dismay I found the section-foreman had mown down all the vegetation bordering the track along that part of the line. However, I was fortunately in time to rescue my specimen as a 'brand plucked from the burning' from the heaps waiting to be fired. And here it is, still to some extent 'a thing of beauty.'

Of the Sunflowers, numerous species are common, nearly all well worth cultivating for their attractive and abundant blossoms, as even the examples from this 'hortus siccus' will, I think, testify for themselves, *e.g.*, *Helianthus rigidus*, *H. giganteus* and *H. doronicoides*.

Our two British species of Everlasting (*Antennaria*) both occur in the Province ; *A. dioica* with its elegant silky pappus-tufts being apparently as common as with us. The flea-banes (*Erigeron*) are numerous. The Canadian 'Common fleabane' (*E. philadelphicum*) has extremely pretty flowers, with numerous rose-purple ray florets almost as fine as hairs.

Half a dozen or more species of Wild Lettuce include some very tall and showy plants, some attaining a height of six feet and one, *Lactuca canadensis* as much as nine feet in height. This last, with another species *L. floridana*, grew in the City Park and Tuxedo Park respectively. The Blue Lettuce, *Mulgedium sibericum*, represents a genus closely allied to *Lactuca*, and is also a tall and conspicuous plant. Fine blue flowers spring from the axils of the leafy stem, which terminates in a many flowered compound panicle. A curious Composite confined to the Prairies of the N. West is known as the Broad Leaved Gum Plant (*Grindelia squarrosa*). This, also, was not easy to identify, owing to the absence of ray-florets which are present in normal specimens of the type form. It is peculiar both from the capitate inflorescence looking as if it had been dipped in glue, and from the sparkling glandular points on the silvery leaves, which give the appearance of their having been sprinkled with fine particles of glass.

It comes rather as a shock to those accustomed to think of Ambrosia as the 'food of the gods' to learn that the various plants of the genus have been designated by our matter of fact American cousins, by such names as Ragweed, Horse-cane and Hogweed ! However, 'a rose by any other name would smell as sweet,' and contemptuous appellations do nothing to diminish the beauty of the leaf-curves and sculpturing of the burrs of the Ambrosias. The species shown, *Ambrosia trifida*, and its var. *integrifolia*, which according to Britten and Brown is frequent with the type, are both from Winnipeg. As may be seen, the plant is monoecious, the terminal spike consisting of staminate flowers only, enclosed in a cup-shaped involucre. Lower down and springing from the axils of the upper leaves arise the female flowers in stalked groups of two or three, together with one or two that are sessile. Botanically the Ambrosias are of great interest as belonging to a small aberrant group which includes one member occasionally found in Britain, viz., *Xanthium strumarium*.

Concerning this plant Bentham says "Its immediate connection with the remainder of the Composites can only be traced through several exotic genera forming the sub-tribe *Ambrosiae*, the general habit and unisexual flowers showing at first sight some analogy to *Urticeae*." At least one species of *Xanthium*—the Cockleburr (*X. canadense* v. *echinatum*), is a native of Manitoba. Another known as the Clotburr (*X. spinosum*), has been introduced, the seeds having been brought in wool from S. America. I believe the burrs from Winnipeg now shown belong to the latter species.

On the outskirts of Ethelbert were many uncleared tracts of bush and moist woods. In the summer months every visit to these secluded and delightful spots would be rewarded with the sight of new and charming flowers Two species of Winter-green flourished in the virgin soil of one such locality in abundance, one being *Pyrola rotundifolia* var. *incarnata*, with splendid rose-purple blossoms. In England only the type, which has white flowers, occurs among other species, and all of them but rarely here. The other, known as Shin-leaf (*P. elliptica*) has waxy white flowers. To be free to gather at will great bundles of such glorious blossoms was like the realisation of a beautiful dream!

The English Primrose does not grow as a native species in N. America, but a first cousin, *Primula mistassinica*, has a delicate charm of its own. Its pale lilac flowers and general habit resemble those of our *P. farinosa*, but the leaves are not mealy. This plant is not common. The Chickweed-Wintergreen or Star flower (*Trientalis americana*) was abundant in damp and shady places and is very similar to our single species, *T. europaea*, which is confined almost entirely to the Scotch Highlands, and is not common there.

A near relative to our native Louseworts is *Pedicularis canadensis* which is very like *P. palustris*. The genus *Pentstemon* of which many kinds are now cultivated in English gardens, though none are native, embraces several species in Manitoba. The Pentstemons possess five stamens, one of which is always sterile and bearded with yellow hairs; hence the popular name Beard-Tongue applied to all the species, of which *P. cristatus* is a typical representative. The next plant proved to be very puzzling to identify from the close resemblance of its inflorescence to that of the Scrophularineae. After searching through that Order for it in vain, it eventually proved to be a Labiate. It is called the False Dragon-Head (*Physostegia virginiana*).

A Labiate more characteristic of the Order is the Wild Bergamot (*Monarda fistulosa*)—a true Prairie flower, peculiar in having only two stamens and with anthers extending beyond the elongated corolla. Others in the same Order are the true Dragon-Head (*Dracocephalum parviflorum*) with pretty little blue flowers, and the Fragrant Giant Hyssop (*Agastache anethiodora*).

In one spot on the banks of the Red River in Winnipeg the vegetation was covered with large masses of Dodder (*Cuscuta gronovii* (?), but I met with none elsewhere.

A very curious and interesting plant is the Spurred Gentian (*Tetragonanthus = Halenia deflexus*). Here, all the corolla lobes are spurred so that each flower resembles a small form of Aquilegia and still more so, the peloric flowers of our own Yellow Toadflax. The umbelliferous clusters and peculiar shape of its flowers are characters which might puzzle anyone previously unacquainted with it, in a first attempt to determine the Order to which it belongs.

Gentiana amarella var. *acuta* appears to be common. It differs but little from the type known here as the Autumn Gentian.

A near relative of our two Periwinkles is the Spreading Dogbane (*Apocynum androsaemifolium*) with clustered rose coloured flowers. Closely allied to the last mentioned comes the family of the Asclepias, which are remarkable on account of the pollen occurring in waxy masses, and for each of the five stamens bearing on its filament a curious hooded body with an incurved horn rising from the cavity of the hood. I was very much pleased to come upon a member of this interesting Order in Ethelbert, where I found *Asclepias ovalifolia*.

Nearly all the British spadiceous Monocotyledons are included in the Canadian flora, together with other interesting forms. Among the latter is the Indian Turnip (*Arisaema triphyllum*) in which the striped spathe is crimson coloured and the spadix very similar to that of our Wild Arum. This plant with several other genera of the Araceae, such as the Skunk Cabbage and Calla Lily are not uncommon in Manitoba in certain localities which it did not fall to my lot to visit. The specimen I have brought is one I plucked on the American side of the Niagara Falls, and is the only plant exhibited this evening not from Manitoba.

A good many Orchids are indigenous to the Province. A list of these would comprise nearly all the British genera, but very few of our species. Within a mile of Ethelbert town (which by the way was a mere hamlet consisting of a score or more of frame-houses, a hotel, school and no fewer than three churches), there was a little copse densely overgrown, and with boggy places here and there. This proved to be a rich hunting ground for insects and a paradise for wild flowers. There, in the month of June, the splendid Lady's Slipper or Moccasin Flower (*Cypripedium parviflorum*) (Plate I.) abounded in hundreds. In a few minutes one could pluck huge

Photo. E. J. Bunnett

CYPRIPEDIUM PARVIFLORUM

armfuls. I have always greatly wished to see our single species *C. calceolus*, in its native habitat, which as is well-known, is restricted to one or two spots in two northern counties. The joy of greeting its beautiful relative, growing in such profusion that it was scarcely possible to walk without treading some of them down, may be more easily imagined than described. Under rather difficult circumstances I managed to make a photograph of some of these before they withered, so as to show the spiral twist of the two long chocolate coloured lateral sepals and the form of the deep yellow inflated tip. Occasionally as in *C. calceolus* two flowers grow on the same scape.

The Coral Root Orchis, *Corallorhiza trifida*, was one of a number of plants which though growing wild in my native country, I met with for the first time when over six thousand miles distant from it. A tall and slender Habenaria—*H. dilatata* (?) and two species of Orchis, *O. spectabilis* (?) and *O. rotundifolia*—are all bog plants and the only specimens of each that I met with.

The last Orchid to be mentioned is also from Ethelbert and belongs to a genus whose remarkable characteristic is the pendant beaked appendage of the stigma. After endeavouring in vain to identify it from any N. American or Canadian Flora in the Nat. Hist. Museum in S. Kensington, I fortunately lit upon a recent volume which gave a description of an obscure genus which had been discoverd in one or more of the States. From this I was enabled to identify my specimen as *Gymnadeniopsis = Hobenaria integra*, and, as far as I have been able to ascertain, the genus, up to the time of identification, was new to the Canadian Flora.*

The Blue-Eyed Grass, *Sisyrinchium augustifolium* is common throughout N. America, but very rare with us, in fact occurring only in the West of Ireland. This extremely pretty flower was plentiful among grass in the open spaces in the North.

All the species of Smilax are climbers more or less shrubby with net-veined leaves and umbellate dioecious flowers. In Manitoba several species are found of which the Carrion Flower, *Smilax herbacea* is typical. Next comes one which I watched from its infancy with tenderest solicitude, and plucked when at its best. It was the only one I saw. Its name, Twisted Stalk (*Streptopus amplexifolius*) refers to the bent peduncles. The anthers are sagittate and rather curiously horned.

In the same locality as the last, I daily noted the growth of some little Liliaceous plants. These I at first mistook for our May Lily which I had found abroad, but never in England. It proved to be the Canadian May Lily (*Maianthemum canadense*), which chiefly differs from ours—very obviously when the two are seen together—in the form of the leaf. After gathering with great care the first of

---

* Rychberd's genus *Gymnodeniopsis* has long been merged in *Habenaria*.—E.S.

these flowers that bloomed, I was amused shortly afterwards to see it springing up everywhere in and around Ethelbert in thousands, even along the side-walk of the main (and only) street.

Vagnera=Smilacina stellata, another lily, was apparently not common; I met with only one or two plants of it. This also is well worth cultivating, for its elegant foliage and pretty white flowers. Half-a-dozen or more species of wild Garlic include our Chives, also the Prairie Onion (*Allium stellatum* ?) with pink flowers in a globose umbel.

The last in this list of Flowering Plants (excepting the grasses), and one of 'the best of the bunch,' is the splendid Prairie Lily, (*Lilium philadelphicum*). This is one of the commonest flowers of the Province: and in places where I met with it, was growing in great abundance. The large purple-spotted orange-red flowers usually grow singly, but here and there one finds two on a stem, and in one specimen, as may be seen, there are three.

Among the Grasses, *Spartina cynosuroides* is a handsome form with sometimes as many as a dozen spikelets, all set edgewise on the rachis as in Darnel Grass. The Spear Grass (*Stipa spartea*) is noteworthy for its beautiful awns, some of them over four inches long. The lower portion, spirally twisted in nine or ten turns, is followed by a sharp bend, the remainder being straight and finely pointed. When freshly gathered, the awns are highly hygroscopic.

The Ferns of the Province include most of our British genera. Two species of *Botrychium* are especially worthy of remark—*B. ternatum*, with a variety of the same, and the slender and elegant Rattlesnake Fern, *B. virginianum*, which is said to be very common in the woods everywhere.

[*Specimens of all the Canadian Plants mentioned, with the exception of trees, were exhibited during the reading of the paper.*]

Some Insect Musicians.

By K. G. Blair, B.Sc., F.E.S.—*Read March* 11th, 1926.

To the attentive ear the ceaseless and ever varying hum of insect life in the course of a summer ramble affords a continuous source of interest and wonder. The great body of this sound is produced by the collective efforts of a large number of individuals belonging to many different species of the insect host; yet ever and anon one particular note emerges above the rest to claim attention. From the high-pitched hum of the Hover-fly, to the low buzz of the Bumble-Bee, or, later in the day, the shrill treble of the Mosquito to the deep-toned drone of a passing Dor-beetle, the characteristic note of any species may occur anywhere in the scale within, and in some cases probably beyond, the compass of the human ear. In all these instances quoted, however, the note produced is a mechanical effect inseparable from the action of flight, and does not entitle the insect producing it to rank amongst our musicians. By this term we mean only those possessing a definite musical instrument, *i.e.*, modifications of certain parts to form a localised sound-producing organ.

This faculty of emitting a more or less musical note is to be found in most of the large orders of insects. Frequently, the exact mechanism employed remains yet to be satisfactorily demonstrated; sometimes it appears to be due to the muscular vibration of the wings, or of the walls of the thorax, such as we find for example in many Diptera belonging to the family *Syrphidae*, which delight to sit in the sunshine with wings nearly closed but vibrating with the emission of a shrill sustained note.

Lepidoptera.—In the Lepidoptera the squeak of the Death's Head Moth has been the subject of much argument, some observers asserting that it is a true stridulation caused by the rubbing of the palpi against the sides of the base of the proboscis, others that it is a wind instrument consisting of the forcible expulsion of air from a large sac in the base of the abdomen through the proboscis. *Halias* (*Hylophila*) *prasinana* ♀ has been observed when on the wing, to utter a shrill note which is believed to be produced by a structure at the base of the abdomen not unlike the drum of the male *Cicada*.

In certain species of the genera *Vanessa*, *Thecla*, etc., stridulation has been observed to be produced by rubbing one pair of wings against the other, the strong anal vein of the forewing being provided with fine ridges and being rubbed by the bare and enlarged base of the costal vein of the hindwing.

HYMENOPTERA.—In the Hymenoptera, *Mutilla* has been observed to stridulate loudly in both sexes on seizure ("E.M.M.," XV., 1876, p. 118) by withdrawing and protruding the terminal portion of the abdomen, which has transverse striations on the front of the third segment, into the elongate second segment, the edge of which forms a scraper.

Myrmica ruginodis and other ants have been observed to produce a continuous singing sound by rapidly vibrating their abdomens vertically from the pedicel.

Ammophila sabulosa, when hard at work excavating her cell, frequently emits a sharp sibillant, interrupted note, while her abdomen is in rapid vibration; sometimes this same note will be produced while she is sitting quietly on the surface in the hot sunshine.

The cry of the queen bee has been frequently commented upon, but I believe there is yet no concensus of opinion as to the method of its production.

COLEOPTERA.—In the Coleoptera stridulating organs of many types occur in numerous families. Darwin, in "The Descent of Man," brings together such observations upon them as had then been made. In "Trans. Ent. Soc.," 1900, Gahan has a very comprehensive paper upon them, while in the same series for 1904 Arrow has a valuable paper on "Sound Production in the Lamellicorn Beetles," followed in 1924 by one on the "Vocal Organs in the families *Dytiscidae*, *Erotylidae* and *Endomychidae*"; in both of which papers many new discoveries are announced and hitherto unrecognised sound-producing organs described.

Generally speaking the stridulating organs in this order consist of two parts, one passive, in the form usually of a series of very fine hard parallel ridges, which correspond to the strings of a violin, or according to Prochnow to the teeth of a siren, the other active, consisting of one or more sharp ridges or a series of knobs, which is worked across the passive portion, setting this in vibration much as the bow of a violin sets the strings vibrating. The principal modification of this type consists in the ridges of both active and passive parts of the apparatus being replaced by short stout bristles.

The situation of these organs is almost infinitely varied, almost any part of the body that is capable of movement over another part being brought into play in some group of beetles. Thus the head moving up and down in the socket of the pro-thorax has stridulating files on the upper side in various genera of *Hispidae*, *Erotylidae*, *Endomychidae*, *Curculionidae*, etc., on the lower side in *Scolytus*, in *Priobium* and in the Tenebrionid genus *Praogena*, etc.

The prothorax is frequently capable of an up and down movement upon the mesothorax, so we find stridulating files on the scutellum almost throughout the *Cerambycidae*, in *Clythra* and some allied genera, while on the ventral side of this articulation we find them in *Serica* on the dorsal or posterior face of the prosternal process, rubbing against the sharp edge of the mesosternum; something similar has been described in the case of *Lacon murinus* and also in *Cychrus*.

Again, the abdomen is frequently capable of an up and down movement, so we find stridulating organs at its base, where it rubs over, or is rubbed against by the coxae, as in *Geotrupes* and various other Lamellicorn genera. Again, the dorsal surface of the abdomen in such movement can rub against the tips of the elytra, so we find correspondingly situated stridulating organs in *Necrophorus*, in *Copris*, *Trox*, and various exotic genera of Lamellicorns, in *Heliopathes*, etc., in the *Tenebrionidae*, in *Cryptorrhynchus* and other genera of *Curculionidae*, in *Blethisa* and *Elaphrus* in the *Carabidae*, and in *Crioceris* in the *Chrysomelidae*.

In *Cychrus* stridulation appears to be produced by the lateral margins of the abdomen working in an epipleural groove on the edges of the elytra (*vide infra*).

In all these cases of abdominal movements we find that the component parts of the apparatus are sometimes reversed, thus in *Geotrupes* the file is on the coxae and the scraper on the abdominal wall of the coxal cavity, while in *Frickius*, a S. American genus, the file is on the abdominal wall of the cavity, the scraper on the coxa. So in *Necrophorus*, *Heliopathes*, etc., the file is on the dorsum of the abdomen, in *Copris*, *Elaphrus*, etc., it is on the elytra. In certain Scolytid genera also a ridge on the dorsum of the abdomen scrapes the edge of the elytra.

The limbs also are movable against the body; thus we find stridulatory organs in connection with the wings, sometimes on the upper side where modified areas on the folded wings are rubbed against specialised parts of the elytra, as in many *Dytiscidae*, *Endomychidae* and *Erotylidae*; sometimes on the lower side where they work in conjunction with the abdomen, as in *Passalidae*. In both groups we find instances of the abortion of the wings so that they have become useless for flight, yet their stridulatory function has not been impaired. Thus, Arrow gives the instance of *Trichulus pubescens*, an Erotylid, and *Colymbetes bifarius*, a Dytiscid, in which the wings are reduced to long narrow strips bearing the stridulatory area at the end, with the corresponding case of *Proculus* in the *Passalidae*.

The legs also are capable of movement against the sides of the body, so we find stridulatory organs involving the anterior femora and the sides of the prothorax in the Bostrychid genus *Phonapate* (in which the ♀ only is so provided).

In the Tenebrionid genus *Cacicus* the hind femur plays against a ridge on the side of the elytra, in a manner recalling the musical arrangements of a Locustid grasshopper: while in *Geniates* and certain other tropical American genera of the *Rutelidae*, and in some *Paussidae* the hind femora are similarly involved with the abdomen. In some N. African spp. of *Graphiptera* a longitudinal keel on the inside of the hind femora plays along a file on the epipleural edge of the elytra. Whilst usually in Coleoptera the vibratory area is uniformly striated throughout, in certain cases it is divided into two or more parts with the striae of different degrees of fineness. Thus, in the Hispid *Anisodera scutellata* it is divided into three such parts separated one from another by shallow, transverse depressions. From this structure Dr. Gahan infers that these beetles can and do produce sounds of probably three different degrees of pitch, while the further possibility has to be admitted that by the requisite movement of the head, the beetles might be able to vary the order or succession of the notes in such a way as to give rise to several simple musical airs.

Sometimes we have two types of stridulating apparatus developed in one family, or even in the same species. Thus in the *Erotylidae* and *Endomychidae* in certain genera we find stridulating files on the vertex of the head, while in others the sound is produced by the wings working on the elytra; in *Tritoma* and other genera of the smaller species the two sets of organs are present in the same insect; a parallel instance in the Longicorns has been recorded by Sharp in the Hawaiian genus *Plagithmysus*, which not only stridulates in the manner normally found in the *Cerambycidae* but has a stridulating file along the lateral edges of each elytron, against which they rub the hind femora; they further possess stridulatory areas on the coxae of the intermediate and posterior pairs of legs. In *Pelobius* and *Cychrus* also, two different structures have both been considered to be musical.

The act of stridulation in a great many beetles is accompanied by energetic movement of the abdomen up and down, giving the impression that it is the rubbing of the tip of the abdomen against the elytra that produces the noise; but such action is apt to be misleading. If we pick up a specimen of *Geotrupes*, it at once protests loudly by moving its abdomen up and down in this way, but the sound arises not from the tip but from the base of the abdomen, a strong ridge upon it playing over the stridulating files on the back of the posterior coxae.

Cychrus rostratus behaves in a very similar way, but observers are by no means agreed upon the position of the apparatus producing the sound. Marshall, in the "Entomological Magazine" for 1833, attributes it to the lateral edges of the abdomen against a very fine file lying in the epipleural groove along the side of each elytron. This observation is confirmed by Prochnow (1907) and my own observations lead me to the same conclusion, localising it more particularly to the sides of the penultimate segment and possibly the antepenultimate, the corresponding part of the epipleural groove being here considerably enlarged. With the magnifying power at my disposal no definite stridulating file could be discerned, but these areas are both somewhat dull as though very finely and closely sculptured. On the other hand, Kirby and Spence stated that the sound was produced by the friction of the prothorax against the base of the elytra. Gahan was unable to find any stridulatory apparatus in the position indicated by Marshall, and the only structures he could discover at all likely to answer the purpose are situated on the epimeral lobes of the prothorax, which rub over the sides of the mesosternum. In support of this claim he quoted the observations of Mr. B. Penny, who stated that the noise seemed to him to be produced by the friction of the lower part of the base of the thorax against a small plate on or about the episternum.

Again, Dr. Chapman as long ago as 1869 noted stridulation in several species of *Scolytus*, the noise being produced by a rapid movement of the abdomen against the elytra. Dr. Gahan was unable to discover any apparatus in the parts indicated, but eventually found stridulatory areas of normal type on the underside of the head. Personally, without in any way doubting the function of the organs discovered by Dr. Gahan, I do not feel quite satisfied that Dr. Chapman's observations were erroneous. There is near the tips of the elytra a strongly sculptured, but somewhat reticulate area, very different from the fine parallel ridges so frequently observed in these stridulating organs, which may be operated upon by a strong ridge on each side of the apex of the abdomen. The sculpture of the areas on the elytra appears to be not unlike that of the areas similarly situated in the family *Brenthidae* and claimed by Kleine* to be stridulatory areas. This, however, is a point that should be quickly settled by careful observation of a *Scolytus* in the act of stridulating.

However, in certain groups of beetles true stridulating organs are found operated by the pygidium or pre-pygidium upon the elytra, *e.g.*, in the Carabid genera *Blethisa* and *Elaphrus*, in *Pelobius*, *Trox*, and in certain genera of Weevils. In most of these cases the "passive" area is on the elytra, and is played upon either by a single hard ridge on the abdomen or by a series of short strong ridges or knobs. In *Crioceris* the position is reversed, and in *Necrophorus* the passive part of the apparatus consists of a pair of narrow conspicuous and comparatively coarse files on the back of the 5th abdominal segment, a short transverse ridge on the underside of each elytron just before its apex acting as the scraper.

* "Arch. f. Naturgesch." 1918, A. 10.

Stridulation and Sex.—In most cases where stridulating organs are present in the Coleoptera they are found without distinction in both sexes; occasionally they differ in character or position in the two sexes, *e.g.*, in the weevil genus *Cryptorrhynchus* and some allied genera. More rarely they are found in one sex only, sometimes the male, *e.g.*, *Heliopathes*, in which the stridulatory area forms a large naked, finely ridged median patch on the pygidium; in the female the pygidium is normally punctate and hairy all the way across. In *Sibinia*, a genus of weevils, stridulation appears to be confined to the male (Kleine, 1913).

In the Bostrychid genus *Phonapate* the female only is so provided, the organ consisting of a patch of fine ridges on the upper side of anterior femora near the tip, which are rubbed against some coarser ridges beneath the posterior angles of the prothorax.

Larval Stridulators.—The presence of stridulating apparatus in beetles is not confined to the perfect insect, but is found also in certain larvae, though I doubt whether these should on that account really be included amongst "musicians." So far as I am aware such organs are confined to the larvae of the Lamellicorn series of families, but here, excepting only the *Trogidae*, they are of general occurrence though differing in situation. In the *Scarabaeidae*, *Melolonthidae*, etc., the stridulatory area is found on the underside of the base of the mandibles, and is worked upon by some hard tubercles on the maxilla. In the *Geotrupidae* it is situated upon the legs, the stridulatory area being found on the intermediate coxae, which are scraped by the much reduced posterior legs. In *G. typhaeus* however the posterior legs are of normal size and stridulatory apparatus is apparently lacking. In the *Passalidae* the structure is very much as in the *Geotrupidae*, but the third pair of legs is here still more reduced, so that the larva appears to have only two pairs of legs. In the larvae of the *Lucanidae* the situation is similar to that of the *Geotrupidae*, but the position is reversed, the file being on the trochanter of the posterior legs, while the coxae of the intermediate pair bear the knobs that work upon it.

In many cases of these stridulating larvae no audible note is produced, though if the larva be held in the fingers some vibration can be felt. It is suggested that in the case of *Geotrupes*, *Scarabaeus*, and other dung beetles, in which the larva passes its whole existence in a cavity in a mass of dung prepared by the mother beetle, these vibrations may serve to scare away earthworms and other terrestrial creatures that would be liable to damage the walls of their chambers; that in the case of more actively burrowing larvae, such as those of the *Lucanidae*, *Melolonthidae*, etc., which are often found in small colonies or families, they give warning of the presence of another larva thus enabling them to avoid collision with one another with the risk of injury; in the case of the *Passalidae* the note is very distinct, but these beetles live in families in rotten wood, the larvae being tended by the parent beetles, and the sound in this case is probably a true call; the larvae when removed from their abode have been observed to collect again at the call of the parent, its own note giving an intimation of its whereabouts.

It is noteworthy that in some of these families in which stridulatory powers are general so far as known in the larvae, yet in the perfect insect they occur but rarely. Thus in the *Melolonthidae*, *Serica* is the only genus in which the adult is known to be musical (though such powers for *Melolontha* and *Polyphylla* have been disputed), and in the *Cetoniidae* only the genus *Ischiopsopha.*

Hemiptera.—Among the Hemiptera again are found several groups of stridulators (vide Handlirsch, "Annal. K.K. Naturhist. Hofmus. Wien," 1900). In the Pentatomids, *Pachycoris* and numerous allied genera have a striated area upon the underside of the abdomen, which is played upon by a series of knobs on the posterior femora, thus recalling the apparatus found in the Cetoniid genus *Ischiopsopha.* In *Coranus* and other genera of *Reduviidae* the stridulating file is in a groove between the anterior coxae, and is scratched by the tip of the proboscis. In both these groups the musical faculty is present in both sexes, but in the two following in the males only. In many species of *Corixa* the power of singing has long been known, the vocal apparatus consisting of a series of knobs on the peculiarly shaped front tarsus.

There appears, however, to be some doubt as to the stridulating surface upon which these knobs work, some observers asserting that they play across the rather coarse transverse ridges above the base of the rostrum, while others claim that they play upon a striated area on the front of the femur. In addition to this apparatus the males have an additional organ termed the strigil on one side of the dorsal surface of the abdomen, which is rubbed by a small fold on the underside of the corresponding elytron. The note emitted by these two sets of organs is very different, that of the front leg producing a chirp, while that of the strigil gives a more prolonged sound, which has been compared with that produced in grinding a knife.

In *Buercoa*, an American genus allied to our *Notonecta*, the front legs are so constructed that the femora are applied closely to the coxae, a shearing movement of the one over the other being the only movement possible; upon the face of the femur is found a striated area, while on the opposed face of the coxa is a single stout peg which works upon it.

In America certain species of *Ranatra* have been found to produce a sound by rubbing a striated area on the anterior coxae upon a similar area on the wall of the enclosing cavity; Mr. Butler found traces of a similar structure in our *R. linearis*, but could find no definite evidence of a sound ever having been heard to be produced by it.

In *Notonecta* and *Naucoris* stridulating files upon the mesonotum have been described which operate very similarly to those of the Longicorn beetles.

Orthoptera.—Postponing for a while, on account of the special structure of their sound-producing organs, consideration of stridulation in the Homoptera, there is no doubt that in this country the best known insect songsters are the Grasshoppers and Crickets, represented in the United States by the Katydids.

The Grasshoppers fall into two great divisions, those with short stout antennae, not or scarcely as long as the body, the *Acridiidae*, and those with long threadlike antennae considerably longer than the whole body, the *Tettigoniidae*; and in these two divisions the musical apparatus differs widely.

In the Short-horned Grasshoppers, which include the common species of our meadows and roadsides, the usual form of stridulating organ consists of a row of knobs along the inside of the thigh of the large jumping legs. When he wishes to play he—for in most genera the male only is the musician—jerks the knees sharply upwards, thus working this row of knobs against a stiff projecting nervure in the folded wing covers.

The note, or series of notes, emitted by this apparatus is highly characteristic for each species, while structural characters in these insects are frequently very poor, so that certain species, of *Stauroderus* for example, are readily separated on their chirps, but otherwise are scarcely distinguishable. For the museum worker, however, specific characters of this nature are unfortunately of very little practical value.

Dr. Uvarov, to whom I am indebted for much information in regard to these insects, has drawn my attention to a small group of genera *Hyalorrhipis*, *Bryodema*, etc., the members of which are desert insects and exactly resemble the sand on which they sit. They have no stridulating organs of the usual type, but repeatedly rise up into the air, dropping at once to earth again. Their wings are provided with very stiff hard nervures which cause them to make a loud clattering noise, hence the name 'clatter-wings.' The sole object of the flight is to make this noise, which is indeed their own peculiar call, distinct from the rustling noise made by the wings of many Orthoptera in flight. Blatchley (*Orthopt. of N. America*) refers to a somewhat similar habit in the 'Carolina locust,' *Dissosteira carolina*, but in this case the flight is more sustained, of an up and down dancing nature, so that the insect resembles a butterfly in flight rather than a grasshopper, and as its wings are black with a creamy border he likens it to the "Mourning Cloak Butterfly" (*Vanessa antiopa*).

Another remarkable exception to the general rule is found in the South African family *Pneumoridae*, in which the abdomen of the male is inflated like a small balloon, and bears on its sides a stridulating file operated upon by the posterior femora. The inflated abdomen amplifies to an enormous extent the sound emitted, so that Dr. Péringuey (1916) says that the noise is louder than that of any orthopterous insect known to him.

The Long-horned-Grasshoppers, on the other hand, normally produce their music by rubbing one elytron over the other, the nervures in a specialised area near the base of each being modified, a transverse vein at the base of the left (uppermost) being thickened and provided beneath with a file-like surface, upon which a short sharp upturned ridge on the right elytron works. The sound is amplified by the wing membrane in this modified area being tense and vibratile.

The sound produced by these insects is of a more persistent character, their wing-cases moving steadily in and out, whereas in the short-horned grasshoppers the chirp takes the form of a series of staccato jerks. In most of our British *Tettigoniidae* the musical function of the wings is evidently of more importance to the species than the normal function of flight, for in nearly all of them the wings are reduced and useless for flight, until in some cases such as *Leptophyes* the basal portion forming the musical instrument is all that is left. In these insects, too, the possession of stridulating organs is usually confined to the male, in one group only, *Ephippigerinae*, it is found in both sexes; while occasionally, as in *Meconema*, it is absent altogether. While many of these insects are diurnal in habit, preferring, like the short-horned grasshoppers, the hot sunshine to indulge in their musical performances, not a few of them are nocturnal. Exceptionally, another type of instrument is found in this group, thus in the remarkable wingless New Zealand genus *Deinacrida*, there is low down on the sides of the second abdominal segment a strong elevated short hard ridge, over which some small knobs near the base of the posterior femora are drawn, an arrangement approaching that of *Pneumora* in the *Acridiidae* but without the inflated abdomen (for *D. megacephala*, see note by G. V. Hudson, "Ent. Mo. Mag." 1919, p. 232).

In the Crickets this musical power is still more developed. The instrument is the basal portion of the wings as in the Long-horned Grasshoppers, but there is this difference. In the latter the two wings are not alike, and the arrangement of the veins in the specialised areas of the right and left wing-covers is very different, whereas in the Crickets the two sides are quite symmetrical. One would suppose that the part played by the two wings would be interchangeable, that since there is no apparent difference in structure, it would be immaterial whether right played over left or left over right, but in practice this is not so, and always right plays over left.

The great French naturalist, Fabre, records his experiments with the Field Cricket, how he forcibly changed the position of the wing covers, placing the left over the right, but before the insect could start its fiddle again it had to change the wing-covers back to their original position. Even when the attempt was made soon after the final moult, before the teguments had acquired their full hardness, it was equally unsuccessful.

The best known of the Crickets is, no doubt, the Domestic or House Cricket whose merry chirrup must be familiar to most. Though frequently found in dwelling houses, they seem to show a preference for warmer situations, such as bakehouses. Not infrequently they live out in the open; in the very hot summer of 1921 they might be heard out in the streets in many of the London suburbs, but usually they prefer the higher temperature of large rubbish dumps, where they sometimes abound. As the insect is really a native of Palaearctic deserts, this preference for a little extra warmth is comprehensible. Its larger more stoutly built relative the Field Cricket, now unfortunately seldom heard in this country, prefers rough uncultivated hill-sides, sand-hills, and so forth. The structure of his fiddle is very similar to that of the House Cricket, but he sings by day, coming to the mouth of his burrow for the purpose where he has a cleared space swept and garnished, in which he can enjoy the full rays of the sun during his performance.

The quaint little Wood Cricket is, like the others, much more readily heard than seen, his sibilant hiss being frequent enough among the dried leaves carpeting the wood, though considerable patience and quiet watching are necessary before a sight of the performer can be obtained.

The strangest of all these creatures is the Mole Cricket, with its broad, toothed forelegs, reminding one irresistibly of the forepaws of its mammalian prototype, and its long wings folded closely up like a fan and projecting far beyond the short broad wing-covers. Though somewhat rare in this country, the sustained low jarring note, which has been compared with that of the nightjar, coming from the ground is unmistakable.

Again, however, we find an exception to the general rule, for the Mediterranean genus *Arachnicephalus* is wingless, and for his call note the male has to be content with tapping on a leaf.

Homoptera.—But the songster, *par excellence*, among insects is undoubtedly the Cicada. In this country we possess but a single species, and this appears to occur only in certain spots in the New Forest, while its call is but a poor thing in comparision with that of its relatives in warmer climes. In southern Europe, however, they are more numerous and more vociferous. They were naturally well known to the ancients, to whom also the fact that the male only indulges in song was known; witness the cynical couplet of Xenarchus:—

Happy the Cicadas' lives
Since they all have voiceless wives.

Despite his song being loud and rather shrill, and indulged in only in hot sunshine, it is frequently difficult to locate the performer. Human appreciation of their efforts is by no means unanimous; to some they appeal as bright and cheerful, while to others the sound is excessively wearisome. In the tropics the noise produced by them is sometimes terrific, thus Mr. Joseph Thomson, writing from Zanzibar, says "the deafening music of the Cicadae is in full force with all its marvellous ringing of bells, jingling of rings and whistling of steam engines."

In this group of insects, as mentioned above, we find that the sound is produced by means totally different from anything we have hitherto seen, and partakes of the character of a drum rather than of a fiddle. The vocal apparatus is situated at the base of the abdomen on each side, but on examination of the insect from beneath, is completely concealed by a pair of large flaps, or opercula, arising from the metasternum. The sound appears to originate from a hard chitinous plate, the timbal, at the side of each chamber, which is probably set in vibration by muscular action, while a tense pellucid membrane, the mirror, displaying an oval figure of iridescent colours, situated in the posterior part of the chamber, is probably the chief amplifying reflector. While this apparatus is in action the whole body of the insect vibrates and the abdomen is rapidly extended and withdrawn thus continually altering the size and form of the complex series of cavities forming the vocal organ, and no doubt modifying the sound produced.

A somewhat similar apparatus, though developed to a very much less degree, is found also in the female Cicada, but does not appear to produce any sound. It has been supposed to form an auditory organ.

In *Tettigades* and other allied Chilian genera of Cicadas we find a structure, that has been described as a true stridulating organ, present in both sexes. This takes the form of a sharply striated area on each side of the mesonotum. A sharp down-turned edge on a small lobe at the base of the tegmina is supposed to play across this area (Jacobi, "Zool. Anzeig." XXXII. nr. 2, 1907, p. 67). Mr. China has kindly examined some of these insects with me, and it appears to us very doubtful if this basal lobe of the wing could in any position play across the striated area which, when the wings are closed is still fully exposed. Further the ridges of the striated area appear to be too coarse to be functional as a sound-producing structure, neither does there seem to be sufficient rigidity in the basal lobe of the wing.

Auditory apparatus.—The mere fact of the production of (more or less) musical sounds by insects presumes the possession of means suitable for their perception, and in the case of those species in which it is a sexual feature, either by the female for whose delectation the sound is produced, or by rival members of the performer's own sex. That the sound is appreciated by the female can scarcely be doubted by anyone, who has watched any of the grasshoppers at close quarters, or who has kept *Geotrupes* in captivity and heard them call to one another in their burrow. Indeed, in a number of insects the auditory organs have been definitely recognised, and are found to be almost as varied in their position as the vocal organs: thus, in the *Tettigoniidae* and *Gryllidae*, they take the form of oval cavities near the base of the anterior tibiae (present in both sexes).

In the *Acridiidae* the auditory organs take the form of a cavity on either side of the base of the abdomen, while it has been suggested that a cavity similarly situated in many *Noctuae* and in *Acherontia* may serve the same function.

In the Coleoptera, the auditory organs have been less definitely recognised, but have been supposed by some to be situated in the antennae, by others in the metathorax.

In the Cicadas the auditory organ has been supposed by some authors to be situated in the antennae, by others in the complex vocal organ, though it may be questioned how a male in full blast can possibly hear any other sound than his own voice. That the female possesses organs similar in structure though developed to a very much less degree is in favour of this supposition, and it may be that the male ceases his own call when he wishes to judge of the efforts of his rivals.

Conclusions.—From the foregoing very cursory survey of sound-producing organs as found among insects, we can perhaps attempt to draw a few general conclusions. From the great number of cases in which these organs are present in the male sex only, it may I think fairly be assumed that they play an important role in sexual selection, either as a means of calling to the distant females, or as a display of personal accomplishments, analogous to the brilliant colours of many male butterflies, the males presumably vieing with one another for the attention of the more soberly attired or less well endowed females. There can be little doubt also that often the spirit of emulation is responsible without any sexual factor; indeed it would almost seem that the song at times is indulged in from the mere *joie de vivre*, or from the pride of the performer in his own prowess. In other cases, such as that of the Death's Head Moth, and possibly of the Queen Bee, it may perhaps be rather a cry of fear, of anger, or of warning; the latter explanation also has been suggested to account for the stridulatory powers of certain burrowing larvae. Further, it will be obvious that in many cases stridulatory functions have been ascribed on a supposed analogy of structural characters to other cases where such are known to be stridulatory. In many such cases we have no actual records of sounds having been noted, and it is highly desirable that observation should be kept on the living insect before certainty can be arrived at. On the other hand, there are numerous cases where stridulatory powers are known to exist, but in which investigators differ as to the position and character of the organs responsible. Of many quite common British species detailed accounts of the stridulating habits are still lacking, *e.g.*, of *Dytiscus*, *Gyrinus*, and many other water beetles, some of which squeak under water, while others leave the water and in strong sunlight will stridulate long and loudly; of others, *e.g.*, *Cychrus*, as noted above, observers are not agreed as to the point of origin of the sound. I would therefore strongly urge upon all entomologists the desirability of careful observation, with full notes written down at the time, of the behaviour of any insect observed to squeak, and great caution against too hasty assumptions as to the source of the sound.

Intersexes in the Lycaenidae.

By E. A. Cockayne, D.M., F.R.C.P.—*Read March 25th*, 1926.

Intersexes exist in the Vertebrata from man downwards, but the internal secretions of their gonads and other glands modify the secondary sexual characters, so that the intersexes are bilaterally symmetrical and intermediate between the two sexes in appearance and structure. Except in a few gynandromorphous birds, full development of the secondary sexual characters of both sexes does not occur in the same individual. Insects on the other hand have no internal secretions of this kind and so the secondary sexual characters of the two sexes are found unmodified side by side and often show a mosaic arrangement.

I can think of no definition of an intersex, which will permit of its recognition from a gynandromorph by an examination of its external appearance or gross internal anatomy. They can only be distinguished with certainty by the difference in their mode of origin.

Gynandromorphs arise in the two following ways. A binucleate ovum, of which each nucleus is fertilised by a separate spermatozoon, produces a gynandromorph or a somatic mosaic. In the former case the individual is partly male and partly female, in the latter it is partly of one colour or structure and partly of another, and sometimes both sex and somatic characters are different in the two parts.

A sex chromosome, Z in Lepidoptera, X in Diptera, may be lost. Male Lepidoptera have two Z chromosomes in every somatic cell, but females have only one. If at the first division of a fertilised ovum, one of the resulting cells loses one of its Z chromosomes and the other retains both, any part arising from the subsequent divisions of the former is female and of the latter male. The final result is a halved gynandromorph. If the accident happens late in development the major part may be of one sex and only a small fraction of the other. In Diptera it is the female which has two X chromosomes and the male only one. Other causes of gynandromorphism have been suspected, but proof of this is still lacking.

Intersexes arise in several ways. They may occur in hybrids owing to a difference in the maleness in different species. The maleness of *Smerinthus ocellatus* is greater than that of *Amorpha populi*. If we suppose that the Z chromosome of *ocellatus* is equal to one and a half Z chromosomes of *populi*, when *ocellatus* is the male parent, the hybrids, which ought to be females, will have one Z chromosome derived from *ocellatus* with a maleness equal to one and a half Z chromosomes of *populi*. This is insufficient to make them like males but enough to give them some male characters, or in other words to make them intersexes. The genitalia show a mosaic of structures belonging to both sexes, and all grades are found from those almost all male to those almost all female. The same thing may happen in mongrels, the result of crossing different races of the same species. *Ocneria dispar* var. *japonica* is much larger and more strongly marked than the European races, and its maleness is correspondingly greater. The usual result of a cross with *japonica* as the male parent is 50% males and 50% intersexes, but if a female of a very feeble European race be the other parent, all the offspring may look like males. Microscopical examination shows that half of them possess only a single Z chromosome like females, and if one of these be paired with a normal female there are two females to every male amongst the progeny.

Intersexes of pure species and race also occur. Sturtevant obtained one kind in the fruit fly, *Drosophila simulans*. They were intermediate in some secondary sexual characters and had very small sex glands or none at all. Investigation showed that they had two X chromosomes and in this respect were like females. Male structures were due to a recessive character carried by one of the autosomal chromosomes, which in some way modified the insects, weakening their femaleness. On breeding, they appeared in the proportion expected of a Mendelian recessive but were themselves sterile.

Bridges came across another kind of intersex in *Drosophila melanogaster*, which had ovaries, ovo-testes, or one ovary and one testis. This arose from a triploid condition of the chromosomes, the somatic number being three times instead of twice the genetic number. This prevents an even distribution amongst the offspring and several different combinations occur. X represents an X chromosome and A the autosomal chromosomes, 1A, 2A, and 3A indicating the haploid, diploid and triploid condition respectively. Individuals were found with the following chromosome constitution, 2X : 2A, 3X : 3A, and ?1X : 1A, all females; 2X : 3A, intersexes, 3X : 2A, sterile females, and 1X : 3A, sterile males. The proportions in a brood were 96 females : 80 intersexes : 9 males. The point I particularly wish to call attention to is the great preponderance of females and intersexes.

All the intersexes mentioned above have been bred in captivity. Intersexual insects have been found at large in both Diptera and Lepidoptera, but with the exception of the *Lycaenidae* only isolated examples have been met with. Some of the Lycaenid intersexes have been found in varying numbers in the same restricted areas year after year, and it is probable that where only single specimens were seen more would have been discovered, if adequate search had been made. The intersexual forms of all the species known to produce them, *Agriades coridon*, Poda, *A. thetis*, Rott., *Plebeius argus*, L. (*aegon*, Schiff.), *P. armoricana*, and *P. pseudaegon*, Butl., resemble one another so closely that there can be no doubt that the cause is the same in every case. I will deal in detail with each in turn.

A. CORIDON.—Distribution. Cambridgeshire, Hertfordshire probably extending over the border into Bedfordshire, Buckinghamshire Berkshire and Wiltshire. One or two have been taken on the Sussex coast. They are commonest at Royston and gradually become scarcer until a point just east of Tring is reached. At Kimble and in Wilts they are much rarer, but little is known of the intervening region. For none of the localities are there definite figures available as to the proportions of males, females and intersexes. Reliable figures are very difficult to get. Males emerge earlier and die sooner than females, and are more conspicuous, so that when the two sexes are equally numerous the males appear to be more abundant. There is without doubt a great excess of females at Royston, but the proportion is inconstant. It has been estimated that there are from 10 to 50 females to 1 male. The percentage of intersexes is also variable. In some years they are comparatively common and in others scarcely any are taken. There is perhaps one intersex to every 500 or 1000 females. Near Tring the females are much more numerous than the males, but in Wilts the sexes appear to be equally common.

Characters. The wings on one side are female, but on the other the wings are reduced in size and sprinkled with rounded blue scales like those of the male and with androconia. Long narrow blue scales also are present, apparently intermediate between the hairs of the male and the short blue scales (coarse hair scales). The amount of male scaling is very variable and seldom uniform; sometimes only a small part of one wing is affected. The underside of all the wings is female. Occasionally, the wings on both sides are reduced and have this peculiar scaling. Only about 2% of the intersexes show a bilateral distribution of male characters. The unilateral specimens have been named ab. *roystonensis*, Pickett. Externally, the abdomen is like that of a female. In 24 that were dissected the following abnormalities were found; ductus seminis absent or short and blind (3): small cement gland: bifid spermatheca: ovipositor spread out and functionally useless. The ovaries were normal except that in one case there were three egg-tubes on each side instead of four. The eggs appeared to be well formed in all. Examination of the bursa showed that some had been fertilised. The behaviour of the intersexes is female; they have been found paired, and the ova laid in two instances produced larvae. Now and then several are found close together, suggesting that they are members of one brood.

With these another aberrant form occurs. The less striking examples are ab. *inaequalis*, Tutt; and the more remarkable are often wrongly called gynandromorphs. They have streaks or large areas of bright blue scales closely set together, with a lower layer of blackish scales as a background, but without reduction in the size of the affected wing. The appearance given is that a stripe or patch from ab *syngrapha* has been let into the surface of a normal female wing. There are no androconia or coarse hair scales. At least two have been taken at Royston with both wings on one side entirely blue like *syngrapha* and those on the other side typical. Bilateral examples with streaks or patches on both sides are very much rarer. The only one dissected was entirely female. These insects have no definitely male characters, but their association with *roystonensis* and the fact that most are found where it is commonest, suggest that they may be a second kind of intersex.

Agriades thetis, Rott.—Distribution. France. One colony near La Rochelle and another near Fontenay, Charente-Inferieure. In both places they have been taken year after year. There is a single specimen in the British Museum labelled Martigny, Switzerland 1923. M. Charles Oberthür wrote that he had one from Digne and another from Geneva. The only English example I know about was in the Maddison collection, taken at Ventnor, September 5th, 1906, and figured in "Étud. Lépidopt. Comp." Vol. III., Pl. XIX. fig. 69.

The wings on one side are small like the *coridon*, but much more heavily sprinkled with blue scales and androconia. Unlike *coridon* they have no coarse hair scales.

Plebeius argus, L. (*aegon*, Schiff.)—Distribution. Kent (two colonies), Hants, Surrey, Berkshire, France: two colonies near Rennes. Germany: single specimens have been taken at Oberbayern, Wildenhain near Torgau, and Würzburg. Mr. Castle Russell, in a Surrey locality, took on one half of the ground 150 females and 15 intersexes on one day, and on the next day on the other half of the ground 140 females and 11 intersexes. On the third day he took 50 females and 5 intersexes. Not more than 10 males were seen altogether on the three days. He found intersexes *in cop.* with males on another occasion. The intersexes seemed to be commoner and bluer every year until the heath was burnt and the colony destroyed. In the Berkshire locality, which is also a very restricted one, I counted the numbers on two evenings when the insects were asleep; and found 230 females and 2 intersexes the first time and 175 females and 1 intersex the second. There was a considerable excess of females over males. Colonel Rattray says that, in a Kent locality, intersexes are scarce and males appear to exceed females in number, probably indicating an equality or close approach to equality in the two sexes.

The intersexes have normal female wings on one side; on the other side the wings are smaller, sprinkled with blue scales and androconia, and when these male characters are well marked near the margin the border is blackish and the fringes white. The underside and abdomen are female. Of my series of 58 the wings on both sides show male characters in 4, a higher percentage of bilateral specimens than in *coridon*. An intersex from the Dover locality is so blue on all four wings as to resemble a male, but bits of some of the orange lunules are left and the abdomen is female. Even the underside is more like that of a male than a female. In 25 dissected the following abnormalities were found; one with three egg-tubes on each side instead of four: two with small ovaries containing many aborted ova: great variation in the size and shape of the bursa copulatrix. Fertile eggs have been obtained as in *coridon*. One specimen was taken in Berkshire with a blue stripe like *coridon* ab. *inaequalis*, and may be a second kind of intersex.

P. PSEUDAEGON, BUTL.—There is a bilateral example in the British Museum labelled Oiwake, Japan, 1885, which is exactly like the *argus* from Berks.

P. ARMORICANA, Obthr.—Intersexual forms of this species very similar to those of *argus* were taken by Oberthür in France. *Armoricana* has two broods, one of which is on the wing before and one after *argus*.

The problem of the Lycaenid intersexes is a fascinating one. They occur in the same places year after year, and must be due to some inherited defect. There seems to be a definite relationship between the number of intersexes and the excess of females, but we need many more accurate observations on the proportion of males, females and intersexes in the various colonies of all the species affected, and in the same colony in different years, before this can be regarded as proved. Our knowledge of the geographical distribution in the species concerned is very deficient. Intersexes have been found in three of our few native Lycaenids and only one more amongst the much larger number of European species. It is unlikely that this represents the true state of affairs, and a careful search will probably reveal their presence in other continental species. Information on these points can only be supplied by the field lepidopterist; and I appeal to everyone who is in a position to do so to make detailed notes and to publish them. It is impossible at present to offer any explanation of this kind of intersexuality. It differs from all the others, that we know, in that the distribution of male characters is unilateral in the great majority of affected individuals. The association of intersexes with an excess of females at first sight suggests a close relationship to Bridge's *Drosophila*;

but in *Drosophila* the male has only one X chromosome and the female two, whereas in Lepidoptera it is the female which has one and the male two Z chromosomes. The inequality of the sexes and the unilateral arrangement of male characters both point to a chromosome abnormality, but it cannot be the same one as that discovered by Bridges. Only breeding experiments and cytological investigation can solve the puzzle, but there are other facts which point to a solution of this kind. At Royston, where intersexes of *coridon* are commonest, aberrations are most remarkable for their frequency and variety, and females have been found differing on the two sides in pattern and sometimes in size as well. In the Berkshire colony, *argus* is more variable than usual; and I took one female with the two sides quite unlike one another in a way which could not be attributed to injury. The following quotation from Wilson, who bases his conclusions largely on a study of plants, throws some light on this and links it up with the presence of intersexes.

"Disturbances of normal equilibrium by changes in the number of chromosomes may *per se* be a cause of mutation and, whenever such changes produce an uneven nnmber of chromosomes, one may look for genetic instability in the offspring. I cannot help thinking that when the cytology of these intersexes has been worked out we shall find some uneven number of chromosomes present, and I will venture on the rash prediction that in the commoner unilateral intersexes there is a difference in the chromosome constitution on the two sides of the same insect."

Further proof of the association of intersexuality with an abnormal number of chromosomes is afforded by secondary hybrids such as those of *Saturnia*, in which a triploid condition of the chromosomes was found in those showing a mosaic of male and female characters. Intersexes of *Ocneria dispar* were bred by Kosminsky. Larvae in the third instar were kept at a temperature of 30 to 35 C. and the resulting imagines were inbred. Only two females laid fertile eggs; from the first pairing 11 imagines were obtained, 5 males, 1 female and 5 intersexes, and from the second 32 imagines were obtained, 13 females and 6 intersexes. Intersexes appeared again in the next generation in two out of eleven broods, two in one brood and five in the other. A triploid condition of the chromosomes was found to account for the abnormality.

The sex chromosomes common to both sexes are known as X and Z chromosomes in Lepidoptera and Diptera respectively, and those found in only one sex are known as W and Y chromosomes. In Lepidoptera the sex chromosomes in the male are ZZ and in the female ZW, in Diptera they are XY in the male and XX in the female.

Three Weeks in the Cevennes.

By O. R. GOODMAN, F.Z.S., F.E.S.—*Read April 22nd*, 1926.

The credit of having first suggested this interesting district as an objective for a Natural History excursion is due entirely to our Hon. Secretary, Mr. Turner, and it is therefore to be deplored that when the idea matured, he was unable to be present as he was visiting the Zurich Congress.

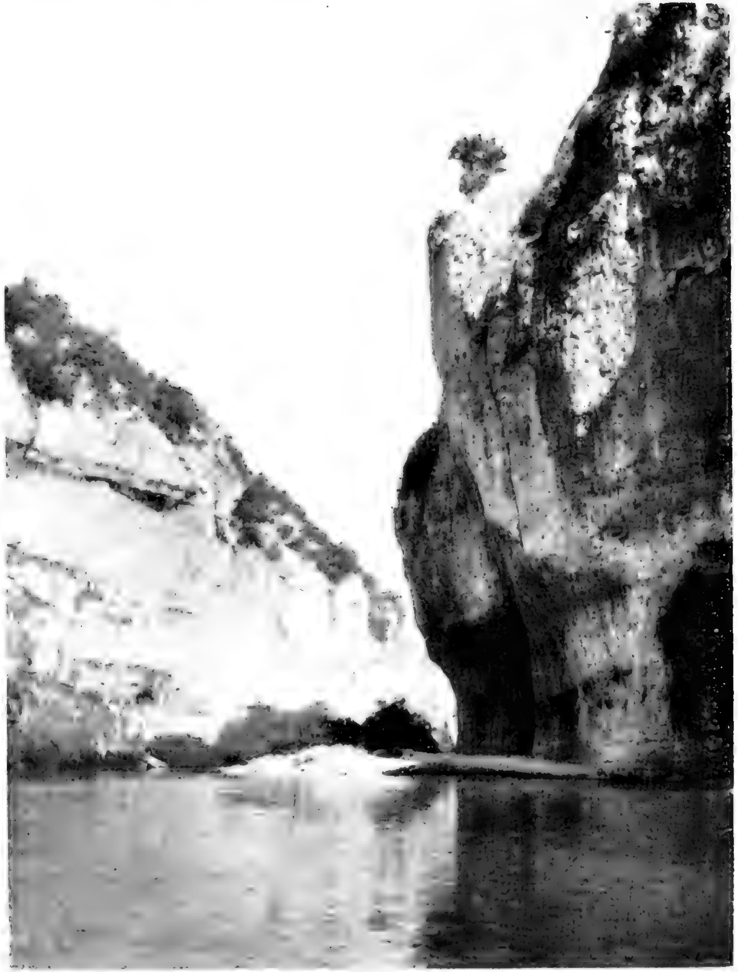
One of the chief attractions to us British was the fact that so very few compatriots had visited the district; for one may search the journals without success for enlightening notes, if one excepts the short accounts of Mr. Bethune-Baker and Mr. Jones who spent a few days there. The same may be said of our French colleagues, and, until Mr. Lhomme published his interesting articles in the admirable "Amateur des Papillons" on Rozier, very little was known of the lepidoptera of this district. This article has been ably translated by Lieut. Ashby in the "Ent. Record."

When the trip was first broached, I was pleased at the enthusiasm with which it was received, and soon found we could constitute a sort of Society Field Meeting on a larger scale, and the final members of the expedition were as follows:—

Mr. Hugh Main, F.E.S., F.Z.S. (who does not belie his name), Photographer of Living Objects and disciple of Fabre. Mr. H. Candler, member of the Alpine Club; Ornithologist and Botanist. Dr. G. S. Robertson, Physician to the Expedition; Lepidopterist and Neuropterist. Mrs. Robertson, Commissariat Department. Major Liles, Athlete and Excursion Leader. My son, Albert de B. Goodman, understrapper to Mr. Main; and your humble Organiser and Guide.

Before proceeding to the relation of our adventures it will be necessary to give some description of the Cevennes, Geologically, Historically, and Geographically, in order to get a true idea of this curious district.

The name Cevennes is usually applied to that portion of the High Massif of Central France, bounded on the east by the great Rhone Valley and on the west by the lias formation. Its approximate northern limit is 36° latitude and the southern 44° latitude, if we include Mt. Aigoual, which is not in the Cevennes proper. It will therefore be seen that this chain of Dolomitic Plateau is as



LES ETROITS, TARN

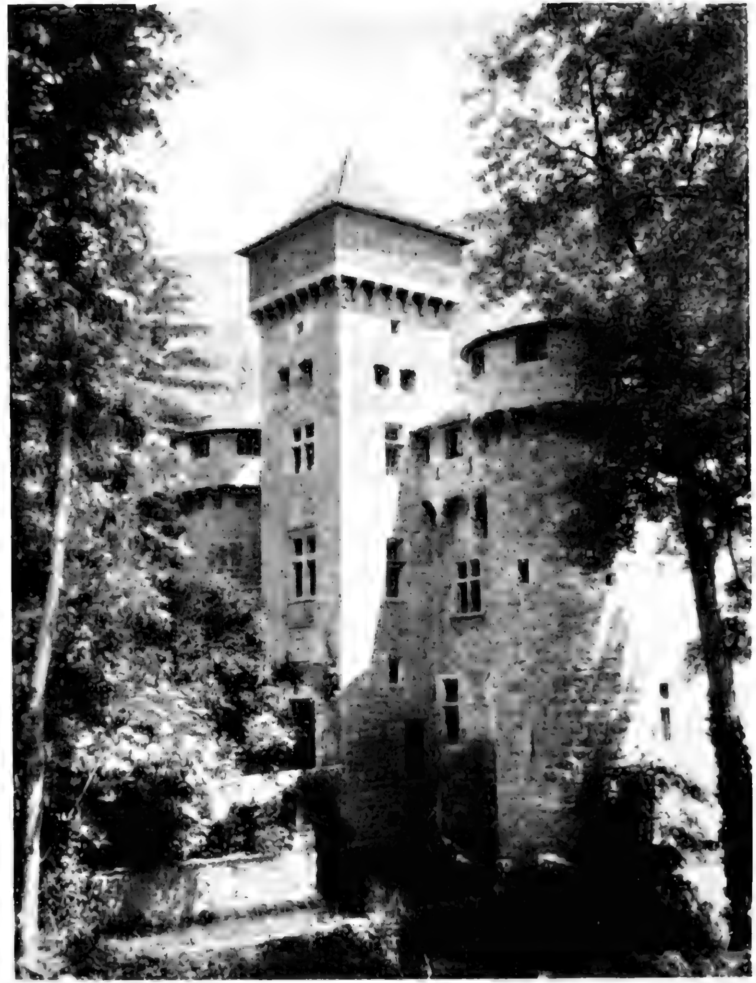


Photo. A. de B. Goodman

CHÂTEAU DE LA CAZE, TARN

Photo. A. de B. Goodman.

MONTPELLIER-LE-VIEUX.—VALLEY OF THE JONTE

far south as Orange and Avignon in the valley of the Rhone. The Cevennes form a part of a very large formation occupying an extensive district of Central France called the Causses. These Causses form a series of three steps or stages rising from the Atlantic side to the Western limit of the Rhone Valley.

Underlying are the volcanic rocks of granitic formation surmounted by rich red micaceous schist, which can be seen between Florac and Meyrueis; then the lias of a dust coloured calcareous nature; and, capping the whole, the Dolomitic limestone. It is this limestone that gives to the district its grotesque and fantastic characteristic beauty. It forms a sieve through which all rain and moisture percolates, it runs into every cleft and hole. There are no wells, ponds, or streams upon the drear plateaux of the Causses. No water is retained; it all sinks at once until it meets impervious strata and then follows its fall; if below ground it forms an underground river and subsequently it breaks forth, into one of those cañons which in course of time are enlarged into enormous clefts or gorges such as those of the Tarn, Jonte, Dourbie, or Lot. Some of these cañons are as deep as they are wide and the boundary cliffs attain a dimension of 1500 ft. vertical height. The erosive action of the weather upon the limestone portion of the Causses has formed the most fantastic rocks, battlements, minarets, caves, grottos, and tunnels; but more of these in detail later. It must not be supposed that the Causses were previously as now, bare, bleak, and windswept wastes. The upper surfaces were, prior to the French Revolution, clothed with woods and forests, which enabled these plateaux to support a considerable population, and the remains of these dead colonies are still to be seen. All, however, is now denuded of soil, bare and desolate, intensely cold in winter and incapable of supporting but a few miserable beings, who bear the name of Caussenards, allied to the Basques and of Iberian descent, and having a language of their own, the great Langue d'Oc, which is now dying out rapidly.

However deserted are the Causses, this cannot be said of the gorges and stream beds; here is vegetation, foliage, shelter and warmth golore, all derived from the necessary water.

The history of the Cevennes has been quite as varied as the other harried parts of France. The district at the time of the Hundred Years War (14th century) was under the control of what were called the "Free Companies," forming a no-man's-land bordering the English possessions. These companies were the retainers of the decadent descendants of the feudal lords who terrorised and devastated the country and hired their banditti out as mercenaries to the various royal combatants. The wars of Religion followed: and the Cevennes were the scene of many sanguinary murders, massacres, and atrocities, and were for some time the stronghold of the Huguenots under Captain Merle after the Massacre of St.

Bartholomew. The Cevennes are finally noted in history at the time of the French Revolution, when thev produced in the little town of La Bastide, a remarkable man who rose to occupy a throne. This man was Joachim Murat, the son of a taverner, and one of Napoleon's most dashing Generals, who married the Emperor's sister, and whose descendants still figure in the nobility of France and Italy.

Although the Cevennes and more especially the Gorges du Tarn are visited yearly by the French on account of their extraordinary beauty and charm, the district has not up to now attracted the attention of very many English or Americans to its great advantage. The excursions are, however, well organised by the Syndicats d'Initiatifs. The valley of the Tarn was until recent years entirely impassable except by boat, and the very exciting descent of the rapids constituted the prime attraction of this excursion. The same thrills can still be experienced by the tourists, but now the descent can be made by road by the more timid. We all know what a poor chance the fauna has of surviving in France, but here the protection afforded by the ravines, grottos, shrubberies, and the vast uninhabited plateaux of the Causses, form a secure refuge for the fox, hare, wild boar, roebuck, etc., amongst the beasts, and the nightingale, hoopoe, woodpecker, sand piper, etc., not excluding the Raptores among the birds.

The party proceeded by detachments in the second week of June, travelling by way of Paris and thence by the P.L.M. railway to the little station of La Bastide, about 90 miles beyond the great iron-work centre of Clermont-Ferrand, and situated over 2,000 feet above the sea. Descending here in the early morning, a narrow-gauge railway connects this station with Marvejols on the Orleans railway, by way of Mende, the most convenient place of approach to the Valley of the Tarn. This little railway passes high up over the Alpine Meadows on the flank of Mt. Lozère (4,000 ft.), which is the highest point and eastern rampart of the Cevennes, and is formed by the outcrop of volcanic formation. The railroad is protected at many points by long wooden tunnels and galleries from the danger occasioned in the winter by the snow, which at this altitude forms deep moving drifts. The Alps here are covered with a peaty subsoil in which the fading flowers of that lovely bulbous plant *Narcissus poeticus* were in profusion, and at the sides of the rail could be seen numbers of the dark-hued butterflies of the genus *Erebia*, presumably *stygne* and perhaps *epiphron*. The sharp descent brought us to the capital town of the Department of Lozère, Mende, which is situated on the bank of the river Lot and nestles beneath the towering cliffs of the Causse of the same name (3,480 feet). We were received at the station by Mr. Main and Major Liles who reported nothing doing; so after an excursion to the lower slopes of the Causses, where the ordinary English spring butterflies, *Brenthis euphrosyne*, *Cupido minimus*, *Leptosia sinapis*, the two *Colias* species, *Polyommatus icarus* males and very worn specimens of *Euchloë cardamines* were common; and one or two *Papilio podalirius* and a single example of *Heodes alciphron* ssp. *gordius* were observed. We returned to the town where numbers of *Eugonia polychloros* larvae were found wandering under the elms in search of positions for pupation. The chief interest, however, was the quantities of lizards' eggs, in batches under each stone on the hillsides, each with a soft leathery skin, doubtless those of the animated streak of lightning (*Lacerta muralis*). Three motorcars being requisitioned, we commenced our thrilling journey for the Gorge du Tarn. The morning was fine and warm as we mounted the Col du Montmirat, which separates the valleys of the Lot and the Tarn, passing a disused lead mine; and from thence descended to the little town of Ispagnac and skirted the river as far as St. Enimie, above which is a ruined monastery founded by St. Enimie, sister of Dagobert, in 630 A.D. It is from here that the journey is continued by flat-bottomed boats, each containing five passengers and propelled by two boatmen, who guide the boat down nearly the entire length of the Tarn as far as Le Rozier: different boats and boatmen being employed in each reach of the river, which is very shallow and rapid, and constantly passes over foaming rapids, occasioning many anxious moments, and thrilling sensations are experienced, besides occasional wettings. The boatmen are, however, good-humoured and usually efficient and are very skilled in the use of the pole. The first stage, as far as the Chateau de la Caze, is typical of the entire journey, the river winding and forcing its way at the bottom of a narrow and deep gorge, the sides of which rise sheer 1500 feet above, and the summits and sides are weathered into castellated needles, pinnacles, overhanging precipices, terraces, grottos and caves, and the slopes and ledges clothed wherever possible with shrubs, bushes and maidenhair and other ferns. The slow descent gives opportunity to study each new view as it reveals itself, and to watch the banks and shingle beds for the bird and other life which abounds. Here you will see a snake resting upon a mossy rock but plunging into the stream as you approach; and you listen to the hundred nightingales trilling from every bush and thicket. Numbers of sandpipers dart in advance from strand to strand, and once or twice the blue-flash of the Kingfisher, and the bullet-like flight of the Dipper or Water Ouzel until he finds a little rockhole to shelter in. Fish dart from one limpid pool to another, and a careful search will reveal the freshwater Crayfish stalking along the pebbly bottom.

Everyone who had visited this district had been unanimous in advising a short stay at the Chateau de la Caze; and that advice we were most delighted to have accepted. This Castle was erected in the 15th century on a bend of the river, and at a point where the cliffs recede somewhat from the bank, giving room for a strip of wood and meadow. After falling into decay it was converted into a hotel, but with its character entirely unchanged. Here you approach the castle gate across a moat of clear blue water, with water plants clothing the bottom, and enter a Baronial hall with stone cobble paving, arch, and groined recesses and stone stairs, 16th century chimney piece, and painted ceiling. The bedrooms are in cloisters with black beamed ceilings and the parapets and towers loop-holed for defence. The effect is romantic in the extreme ; and one expects to see a Knight in full armour emerge to dispute the passage, but instead, the motor-bus arrives with our luggage. Our meals were al-fresco ones on a terrace overlooking the river and wooded cliffs.

The evening and morning were devoted to collecting and photography, and much interest was occasioned by the study of the antlions (*Myrmeleon*) in their shallow sand pits under the overhanging cliffs. There were hundreds of these depressions of all sizes and the tracks where the larvae had crawled from place to place were most pronounced. It was surprising how all these larvae obtained a livelihood, as ants at this time were decidedly few. We were also much amused at the amatory passages of the little wall lizards (*Lacerta muralis*) who were evidently revelling in the joys of the springtime. A consultation was held on the safety of handling a particularly suspicious looking little snake, but on the advice of Mr. Main discretion was held to be the better part of valour, and it was ignominiously secured in a butterfly net and duly despatched to Mr. Step who pronounced him to be the harmless Viperine snake (*Tropidonotus viperinus*), and he was condemned to perform before the next meeting of this Society.

The large green lizard (*Lacerta viridis*) was seen here, and a torn specimen of the great emperor moth (*Saturnia pyri*). The morning sun brought out the butterflies in some numbers and we were pleased to see *Coenonympha arcania*, *Lycaena arion* ; and Dr. Robertson obtained *Strymon ilicis*, *Pararge aegeria*, of the typical continental form, and a few white admirals *Limenitis rivularis* (*camilla*) in the pink of condition. The genus *Melitaea* was represented by *deione*, *cinxia* and *pseud-athalia*, and the "Coppers" by *Heodes dorilis*, and ssp. *gordius*, in both sexes just emerged. Much as we would have liked to linger here, time pressed, and we re-embarked in the evening and dropped down the river to La Malène, where we spent the night.

The event of the evening was the initiating of the acolytes to the solemn rite of crayfish (ecrevisse) eating. The high priest (maitre d'hotel), seated at the head of the table, demonstrated the necessary intricate manipulations, followed by the novices step by step. I preferred to look on, especially as the net result from one cray amounted to less than a small prawn of unpleasant taste and odour.

The prize for efficiency was, however, carried off by Mrs. Robertson, who was presented with a red rose by the Patron with a gallantry that would have graced a Beau Brummell.

The early morning hours before petit-dejeuner were occupied by retrieving larvae of *Polygonia c-album* from the lime trees outside our bedroom windows; these curious caterpillars with their white backs forming the subject of a nature photo.

The next stage of the descent, again in fresh boats, is acknowledged by all as the pick of the lot. The Gorge here narrows between overhanging cliffs of great height and passes what is called "Les Etroits," or straits, which are set off by the vivid coloration of the limestone contrasting with the clearness of the water and depth of the blue sky; below these straits the river and the valley widened into a circus of high rocks covered with verdure. This is the famous Cirque des Baumes, and the boats must be left here, as the Tarn plunges into a chaos of rocks, and in places disappears underground. A little old, broken-down diligence, driven by an old native in a smock, conveyed us the two miles to Les Vignes, where lunch was taken and the hillsides around explored. The first plants of *Aristolochia* were noted, making us wonder if any *Thais* larvae were present. A butterfly new to us was here abundant, namely:—*Epinephele pasiphaë* with striking white bands on the underside, but otherwise not unlike our *E. tithonus*. Multitudes of *Hesperiidae* were here noted sucking the mud on the river bank, each species in its little group not mingling with the others. Those noted were *Carcharodus lavatherae*, *Spilothrus altheae*, *S. alceae*, *Nisoniades tages* (worn), and possibly *Hesperia alveus*, the latter in dozens.

The last stage is again by boats; the Gorge is somewhat less picturesque, but is enlivened by the shooting of the "King of the Rapids," as it is called, occasioning some consternation on account of the shipping of several bucketfuls of water. However, "all's well that ends well," and we disembarked at our journey's end in the grounds of our Hotel at Le Rozier, after an entrancing and exciting three days.

The twin villages of Le Rozier and Peyreleau deserve some description, especially as this was to be our headquarters for several days. They are situated at the juncture of the Jonte with the Tarn, which here turns west and passes into more open country. The old town is Peyreleau; Le Rozier is more modern and has a modern bridge, the old bridge having been partly swept away in a flood in 1900. The town of Peyreleau is grouped about the summit and sides of a high rock around which the streets wind and the whole is surmounted by a picturesque old tower. The valley of the Jonte is similar to that of the Tarn, but the stream is smaller and not navigable. The stream is bordered by lovely woods and glades, where we were attracted to delightful picnics and bathing parties. The two villages are dominated by a most extraordinary rock called the Rocher de Capluc, 200 feet high, and weathered into the semblance of an enormous toadstool, on the top of which is a huge iron cross to be reached only by iron ladders pinned into the rock. Around the foot of the "toadstool" are grouped the ruined remains of an old village long since deserted, but still clinging above the precipice; no water is available, and there are no remnants of cultivation. The slopes of this hill are clothed with masses of white *Dorycnium* which provides the food for countless numbers of Zygaenid larvae; full fed or pupating. These have been identified by our President as *Z. carniolica*, race *occitanica*; and I believe he has bred through a nice series either from this plant or from lavender. The photographers here got very busy, bringing back subjects from every walk, including a most entrancing object, namely:—a newly emerged imago of a Cicada clinging to its nymph case. Its colour on emergence was an iridescent emerald green, every vein gleaming like metal; this was, however, lost in the drying process and this colour soon disappeared. An excursion was organised to the farm of Aleyrac, the locality for *Parnassius apollo* race *lozerae*, Obtr., but without success as this species was evidently in pupation. The energies of the whole party were somewhat sapped by the extreme heat, and generous were the libations to Bacchus in the most primitive stone-flagged kitchen of the mountain farm. However, after a refreshing siesta many insects were taken. Some nice *Papilio machaon* flying around the inevitable cross, and many beautiful *Issoria lathonia* mostly females, *Satyrus alcyone* also put in a first appearance. The walk back in the evening cool was most delightful, and beautiful views were obtained across the Valley of the Jonte.

Dr. Robertson has most kindly supplied me with some notes of the Dragonflies frequenting these two valleys, which I here append:

ANISOPTERA.—*Gomphus vulgatissimus*, Linn. Four specimens taken at Le Rozier, three males and one female. *Cordulegaster annulatus*, Latr., a male, Le Rozier. *Aeschna mixta*, Latr., a male, Meyrueis, and a female, Chateau la Caze. *Orthetrum caerulescene* Fabr., a male and a female, Le Rozier. *Sympetrum meridionale*, Selys. A male, Aigoual; and another male, Meyrueis. *Sympetrum striolatum*, Charp. A female, Chateau la Caze; and another female, Meyrueis.

ZYGOPTERA.—*Calopteryx virgo*.—Linn. A male and a female, Le Rozier. *Calopteryx splendens*, Harr. A male of the meridional form with the blue spot reaching to the wing tip, and two females, Le Rozier.

No one who tours the Cevennes must miss the visit to Montpellier-le-Vieux. This extraordinary spectacle consists of a group of rocks two miles square, situated on the very top of Causse Noir at a height of 3000 feet, all of the dolomite formation and weathered into the most extraordinary shapes, which are likened in the poetic mind to a second Pompeii, with petrified arches, houses, temples, sphinxes, etc. The party were conveyed by brakes to the lonely farm of Maubert; and the old, but extremely active proprietress acted as hostess and guide; and certainly she set a pace that few could follow. It is impossible to describe the rocks, but the few slides I exhibit will convey an impression, in spite of the unfavourable weather conditions under which they were taken. Not much collecting was done, but quantities of *Bupalus piniaria* ♂ and ♀ were noted around the stunted firs on the Causse, which also bore the nests of the Processionary Moth *Thaumetopoea processionea*, in great numbers. It was here we first obtained a sight of that lovely bird, the Hoopoe (*Upupa epops*) with its fawn plumage and black and white crest.

Having now taken stock of the delights of Rozier, we move on up the lovely valley of the Jonte to Meyrueis, this time by the very comfortable motorcar service. Our objective here was a visit to the farfamed Grotto of Dargilan. This Grotto forms one of the chief wonders of Central France and is unrivalled throughout Europe for its wealth of stalactite and stalagmite. It was first discovered in the 18th century and explored in 1888 by M. Martel; and is formed by the constant dropping of impregnated water down the underground chasms or vaults, which occur throughout these limestone mountains. It has been opened up and exploited in late years, and is now most conveniently seen, having been lighted by electricity and very capable guides are provided. When one discovers that the length of the two main galleries exceeds 2000 metres, besides having branches, one realises its great extent. The stalactitic deposits are everywhere, forming the most wonderful, beautiful, and grotesque groups, one of which is known as the Grand Organ on which it is possible to play a tune by striking stalactites of various sizes. The two most beautiful formations, however, are the Bell, over 60 feet in height and formed of innumerable little fluted columns through whose transparent mass a light gleams with a rosy glow; and the Minaret and Mosque, a photo of which I am able to show you.

The other attraction of Meyrueis is the underground river of Bramabiau, situated on the plateau of Camprieux, where the river Bonheur plunges headlong under a natural rock arch down a yawning chasm and emerges nearly 300 feet below, after a plunge underground of nearly half a mile. Its entire length has been explored by M. Martel. This excursion is very attractive as the paths wander through Alpine meadows with all their characteristic vegetation and flowering plants.

After a visit to the old Chateau of Roquedols, which was burnt down by the Saracens in the eleventh century and since rebuilt, we left the limestone district of the Causse for the volcanic formation of Mont Aigoual. We, however, had to part company with Mr. Main as he was compelled by the call of duty to leave.

So very little seems to be known about Mont Aigoual by our fellow countrymen that a few explanatory words will not be amiss. This mountain is the most southerly peak of the Cevennes, and is entirely of volcanic and granitic formation. It attains a height of about 5000 feet and is entirely covered with young plantations of beech and fir, undertaken, about forty years ago, by the administration of forests under M. George Fabre, to prevent the serious erosion then taking place. The mountain is surmounted by an observatory, and is provided with a most comfortable and modern hotel near the summit, placed amongst lovely alpine meadows in which the yellow gentian and other alpine flowers exist in the utmost luxuriance. Although still in the southern half of Central France and bordering on the hot meridional plains, we seem to be transported into the Alps. All the vegetation has changed from that of the Causse, and new insects are in evidence even at this altitude. Here we see the lovely orange *Gonepteryx cleopatra* contrasting with two species of *Erebia*, *E. stygne* and *E. epiphron*, the latter approaching the Pyrenean form. Of the fritillaries *Brenthis euphrosyne* was still fresh and one or two *B. selene* and *Melitaea parthenie* in the pink of condition; besides *Argynnis niobe* var. *eris*, and a few *M. phoebe* and *M. pseudathalia*.

The last few days of our holiday in these mountains were spent here, wandering through the woods and glades and visiting the observatory on the summit, and the botanical garden, which has long since been left to run wild.

On the day before our departure we were treated to a severe thunderstorm and deluges of hail. All, however, proved fine for our departure by the motor diligence; and we enjoyed such a ride as is rarely made. The road, winding around the flanks of the mountain, afforded views to all points of the compass, and over immense districts, owing to the extraordinary visibility due to the recent storm. The range of vision gave us a clear view of the blue extent of the Mediterranean and Mt. Canigou and the Pyrenees in the far south, over fifty miles away. As we got lower, we passed many fantastic rocks and descended through chestnut trees to the vineyards and mulberry trees. The latter at this time of the year are stripped of all leaves to feed the silkworms, as the silk industry forms a staple source of income to the peasants, the study of which is of immense interest and would form the subject for a paper in itself.

We at last took rail at the meridional town of Le Vigan, and spent a sweltering afternoon crossing the quivering plains on our way home to Nîmes.

I cannot close without including the most interesting notes put together by Mr. Candler on the Birds and Flora in the district we have been visiting.

Notes on Birds in the Cevennes:—Birds were fairly plentiful, many familiar British species being noted. In the gorges of the Tarn and Jonte we found the Dipper, Kingfisher, Grey Wagtail, White Wagtail, and Sandpiper, all typical denizens of mountain streams. House-martins and swifts were abundant, but swallows absent. The House-martin here nests on cliffs as in the Alps. We were unable to identify the crag-martin, which one would expect to find in the river gorges. The Alpine or white-bellied swift is said to frequent the rocks of Montpellier le Vieux, but we did not see it there or elsewhere in the Cevennes, though we found a small colony of this rare and interesting species nesting in holes on the famous Pont du Gard. Missel-thrush and blackbird were common, but the thrush was noticeably scarce, and we looked in vain for the ring-ousel. Nightingales and blackcaps were abundant in the river gorges, and in full song even in the third week of June. Redstarts and black redstarts were frequent. Chiffchaffs were heard, but no willow-wrens, and in the woods on Mt. Aigoual, Bonelli's warbler took the place of its congener the wood warbler, as it does in the higher Alpine forests.

Amongst the finch tribe the goldfinch was conspicuous everywhere, and the serin-finch was also seen.

Of the buntings, only yellow-hammer and cirl-bunting were noted, both being frequent.

In addition to the five common species of titmice we found the crested tit in conifer woods on the Causse Noir and Mt. Aigoual. A tit's nest, probably a coal-tit's, was found in a roadside bank on Mt. Aigoual, an unusual situation.

The golden oriole haunted the wooded valleys, where its high-pitched flute-like note was often heard.

Nightjar, hoopoe, and cuckoo were also noted, and a nest of the spotted flycatcher was found.

Raven, crow, jackdaw, magpie and jay were seen, but no choughs.

Birds of prey were not much in evidence, only buzzard, kestrel and tawny owl were identified, but other species were seen, and we understood that vultures and eagles occurred in the Cevennes.

On the arid limestone plateaux of the Causses birds were not so plentiful. Skylarks and woodlarks were in song there, and wheatears, tree-pipits and meadow-pipits were noted.

Notes on the Flora of the Cevennes:—The flora of the limestone gorges and plateaux is rich and varied, most of the typical calcicole plants were noted. In the valleys, vegetation is luxuriant; the rivers are fringed with alder, poplar and willow and the slopes clothed with beech, chestnut and conifers. The elevated plateaux are dry and stony, partly covered with dense thickets of stunted pine (*Pinus sylvestris*), box, juniper and bearberry (*Arctostaphyllos uva-ursi*), which are said to harbour wild boars. Only here and there are depressions like dry lake beds, known locally as "sotches," where grain and potatoes can be grown. Among the many interesting plants seen may be mentioned the following non-British species:—*Geranium nodosum; Genista sagittalis*; *Dorycnium pentaphyllum*, a bushy plant with woody stems and small non-expanding flowers, the foodplant of a *Zygaena*; *Aster alpinus*; *Scorzonera* ? sp.; *Arnica montana; Helichrysum stoechas*, the French 'immortelle'; *Carduncellus mitissimus*, a small nearly stemless composite; *Campanula speciosa*, with large and handsome flowers; *Vincetoxicum officinale*; *Gentiana lutea*; *Convolvulus cantabrica. Onosma echioides*, with yellow tubular flowers and hairy tubercles on the leaves; *Cynoglossum pictum*; *Anarrhinum bellidifolium*, a tall, slender, plant with long racemes of small blue flowers with short recurved spurs; *Linaria striata*; *Erinus alpinus; Digitalis lutea*; *Salvia aethiopis*, a very woolly species with white flowers; *Lamium longiflorum*, a very rare plant with handsome fragrant flowers; *Armeria plantaginea*; *Muscaria comosum*; *Aphyllanthes monspeliensis*, a small blue lily with leafless stems, abundant on the Causses. The red helleborine (*Cephalanthera rubra*), a very rare orchid with us, was quite common. Amongst grasses the most noteworthy was the lovely *Stipa pennata* with its long, feathered awns. Ferns were abundant; 15 species were noted. The exquisite Maiden-hair, so rare at home, was common, festooning the rocky banks of the Tarn and Jonte.

The granitic and schistose region of Mt. Aigoual exhibited a flora of quite a different character. The lower slopes are densely wooded with beech and conifers, with ling, bilberry and genistas in the open spaces.

The following Alpine plants were noted:—

Trifolium alpinum; *Alchemilla alpina*; *Sempervivum arachnoideum*; *Saxifraga aizoon* and *S. caespitosa; Valeriana montana*; *Adenostylis albifrons*; *Doronicum austriacum*; *Arnica montana*; *Gnaphalium dioicum*; *Phyteuma hemisphericum*; *Gentiana lutea; Veronica fruticulosa; Pedicularis comosa*; *Veratrum album.*

The woods were carpeted with May lily, *Maianthemum bifolia*, and Star of Bethlehem, *Ornithogalum umbellatum.* In the clearings the white flowered wood-rush *Luzula nivea* abounded. We found here an elegant and fragrant little golden tulip, *Tulipa celsiana.*

Some stony slopes near the summit of Mt. Aigoual were covered with *Reseda jacquini* and *Scleranthus perennis*, whose greenish-white flowers lent a hoary aspect to the soil. Two plantains, *Plantago carinata* and *P. serpentina* were abundant on the higher slopes.

On a steep rocky bluff a small clump of *Rhododendron ferrugineum* was seen in full flower—an obvious introduction.

I tender my best thanks to my colleagues, Dr. Robertson and Mr. Candler for these careful notes; to our Hon. Lanternist, and to Mr. Dennis who supplied the beautiful slides prepared from Kodak Films.

Photo. E. Step.

ORCHIS HIRCINA (LIZARD ORCHIS)

The Lizard Orchis (Orchis hircina).

By Edward Step, F.L.S.—*Read July 18th*, 1926.

The appearance—or reappearance—of the Lizard Orchis in Surrey, and the opportunity for exhibiting a living specimen, seems to justify the reading of a few notes upon this most remarkable of our native Orchids.

A plant of Central and Southern Europe, extending to North Africa, it appears to be nowhere abundant, occurring only sporadically, and frequently as a solitary example. In my early days, its claims to a place in the British list were little more than traditional. In the various floras it was marked " Kent and Surrey : very rare." Kent, no doubt, was its real home ; and its somewhat doubtful Surrey station appears to have been Box Hill. Ray says the Lizard Orchis was first noticed as a British plant by Dr. Bowles, who found it between Dartford and Crayford. Bowles was one of the earliest of the field botanists ; and his discovery would be somewhere about the middle of the seventeenth century. In *The Botanist's Guide* of 1805, it is again recorded from the Dartford district, by Woods :—" Chalky pastures by the side of Darent Wood, two miles from Dartford ; and in Haley Wood pits, near Dartford Heath." The authors of the *English Botany* gave Box Hill as a locality ; but respecting this, Brewer in 1863 says " If this is correct, it is probably now extinct there, as it has not been met with for many years." Bentham, also, in his *Handbook* (1858) remarks—" Has been found in Kent and Surrey, but not in recent years." But in spite of Bentham, it appears to have held its ground in Kent, for in 1860, Mr. Oxenden, the then owner of Broome Park, Barham, near Canterbury, speaks of it as though it were a regular inhabitant of the estate ; and it was from him that Darwin received fresh specimens for use when he was writing *The Fertilisation of Orchids*, in which he refers to the species as " this extremely rare British plant." This work was published in 1862. Nothing more appears to have been heard of the Lizard until near the end of the century, when Lord Avebury says he obtained a single specimen in Ollantigh Park, near Wye : a careful search failed to find others.

During the present century, its occurrences have been comparatively and increasingly frequent. It early made an appearance in the Wye district of Kent ; and has repeated the performance at intervals. Then, in 1907 it turned up in West Sussex ; also as far west as the Wiltshire Downs. In 1911, Mr. Bedford found it in the Cuckmere district of Sussex. During the War—I think in 1916—I received a wire from our late friend, Mr. Sidney Webb, telling me that the "Lizard" had appeared in the Dover district, and that he had obtained permission to take me to it, if I would bring my camera down by the first train next morning. Conditions at that time made it impossible to go at such short notice, and I lost my opportunity. Since then, it has appeared in many places, even as far west as E. Gloucestershire, but mostly in Kent.

In 1924, some school-children discovered a small colony of the plant on the North Downs, near Dorking, and a specimen was sent for identification to Mr. A. J. Wilmott, F.L.S., of the British Museum, with whom I arranged to photograph it *in situ*, if it should appear in the following year. Next year, when the signal came, we were both away. This year, the clump produced eleven spikes, and these were watched closely for the stage when they should be ready for the camera. When the psychological moment arrived, however, the lady who was acting as guardian-angel was horrified to find that some plant-exterminator had found the spot, and made a clearance of the Lizards. One small plant, growing apart, and concealed in long grass, had been overlooked; and, fearing that the same fate awaited it, she dug it up with sufficient of the surrounding soil to avoid damage to the roots, and brought it to my home. These details explain how I am able to make my present exhibit. I may add that I am under promise, should the plant produce seed, to sow them near where the parent was found, and in any case to restore the tubers.

I have not attempted to compile a full record of the plant's appearances, but from my outline it will be seen that these have been more frequent in Kent, whence it has spread westward, mainly following the line of the North Downs, with sorties into Sussex. Now, in its Continental distribution, its northern limit is Belgium, which is due east of Kent and pretty much on the same line of latitude (51°) as bounds the plant's range in Britain. It is true that there is an old record (1738) of its occurrence near Nottingham; and Sir Francis Darwin mentions its casual appearance in the Botanical Garden at Cambridge, but in botanical gardens anything may appear from the soil attached to imported plants. I think it is probable that the Lizard Orchis is an ancient inhabitant of East Kent, from which, in favourable seasons, its light seeds blow along the North Downs westwards, and establish the plant for a time in suitable situations; but the cupidity of collectors will not permit of its producing seeds for local increase. I put the blame upon collectors in this case, because I do not think the flower-spike, though large, is sufficiently attractive in colour to arrest the attention of the ordinary bouquet-hunter. The desire to have a representative of so rare a plant in one's herbarium is perfectly legitimate; but the wiping out of an entire community is a crime. An alternative to my supposition that the Lizard may have persisted in East Kent is that the light seeds have in recent years been blown across the Channel.

A description of my exhibit may not be out of place, seeing that, in small points, it differs from or supplements the details given by the authorities; which, no doubt, have been drawn from the examination of many examples, and may be considered to represent the average or normal form. I have alluded to it as a small specimen, regarding it in the matter of height and the number of blossoms: the stem measures thirteen and a half inches clear of the soil. Bentham gives its height as "1-2 feet;" Babington, "2-3 feet;" Hooker, "1-5 feet." The two large lower leaves, which appear quite early in the year, had been used up in the building of the stem; and were now thin and brown. Five others were attached to the stem, of which the lowest was five and a half inches long: all were unspotted, and oblong-lance-shaped. The flower-spike proper measured six inches, and there were about twenty-eight blossoms—a small number.

Concerning the individual flowers: the three sepals are in contact, forming a greenish-grey hood, in which are concealed the two small upper petals; the inner surfaces of both sepals and petals are covered with delicate lines and stippling of minute brown dots. The most striking feature of the flower is the strap-shaped lip, two inches long and 3mm. wide, except at the base, where it is 5mm., with crisped margins ending in two long, twisted lobes near its base, and the main strap with a divided tip. The greater part of its length was coloured a dull, pale greenish brown, at first with a tinge of mauve. The basal half-inch was white, marked with two or three longitudinal bars of upright, bright violet hairs, which may coalesce into a broad blotch. There were dots of the same tint around the contracted mouth of the short spur, almost closed by white hairs. The rostellum or beak was violet; the anther covered with minute brown dots. The pollinia were 2mm. high, connected at the base; and the short, rounded pollen-masses were green.

The strong smell given off by the flowers was submitted to several nostrils more efficient than my own: and it was described variously as resembling that of a herd of goats when they are at a little distance; as strongly suggestive of cockroaches; and like decaying vegetable refuse. It is probable that this odour may render the flowers attractive to some small species of Diptera or Coleoptera; it is almost certainly not intended to beguile any long-tongued insect, for the spur is too short to accommodate such. It is more likely that the fertilising agent will be found to be a beetle that gnaws the juicy, hair-like filaments around the mouth, and so gets the pollinia fastened upon its head.

The great length of the lip is another problem: but it may be presumed to offer a particularly convenient alighting stage for the insect chiefly concerned in the fertilisation of the flowers. In the opening bud, it may be seen coiled closely after the manner of a watch spring. When expanded, it twists spirally—corkscrew fashion—with about four coils. In some photographs I have seen the lips are shown more or less horizontal, some with an upward inclination: some of my own show a similar tendency though in a lesser degree. I mention it because it is due to the pictures having been made before most of the lips have become fully extended, when they show a remarkable uniformity in standing out from the very straight stem at a downward angle of about 50°.

[Since the exhibit was made, the author reports that the plant remained in flower for three weeks; that it produced no seeds; and that the fertile tuber was replanted in the neighbourhood of its growth, but in a secret spot, to give the species another chance for establishing itself in Surrey.]

The Balance in Nature.

With special reference to Local Species of British Lepidoptera and their Protection.

By Robert Adkin, F.E.S.—*Read June 24th*, 1926.

The terrestrial globe, this earth on which we dwell, is inhabited by a number of classes (in the Linnean sense) of animate creatures; Mammals, Birds, Reptiles, Fishes, Insects, and many others lower in the scale. These classes are, and always have been at war among themselves and with each other, each class, each individual struggling, not necessarily for supremacy, but for its very existence. Yet each continues to exist and to maintain roughly its relative position: here, then, we see the Balance in Nature.

Man, although gifted with an intelligence higher than that of any other living creature, is no exception. He has to take his place in Nature, to battle for his existence like the others. He may have succeeded in dominating most of his larger enemies; he has even turned some of them to his advantage; but he is beset by hosts of others, some of them so minute that, even with all his powers, he has so far failed to visualise them. They attack him on all sides; they spoil his crops, they contaminate his food, they instil diseases into his body; his intelligence is taxed to the utmost to combat them and to maintain his position. Yet, knowing all that he does, he is not always content to leave Nature to her ways—he sometimes ventures on experiments, often to his own cost, or it may be that his much-vaunted civilisation leads him unwittingly into error; perhaps a few examples will illustrate my meaning.

The Rabbit (*Oryctolagus* (*Lepus*) *cuniculus*) is essentially a European, or perhaps more correctly Mediterranean animal. Some years ago it was taken to Australia, where it has multiplied so rapidly that it has become one of the greatest pests that that country has ever known.

The House-Sparrow (*Passer domesticus*), an inhabitant of the Old World palaearctic and sub-tropical regions was, so recently as about 1862, taken to the Antipodes and the New World. Its story there is eloquently told by Howard Saunders,[1] who says "Introduced, like the rabbit, through officious ignorance, into Australia, New

---

[1] "Manual of British Birds," p. 172. (1889).

Zealand, and also into the United States, it has become such a curse that special legislation is being loudly invoked for its destruction."

As with the mammals and birds, so it is with the insects, as is well shown by the following quotations. Both the species mentioned are inhabitants of the Old World palaearctic area. Of the gipsy moth (*Ocneria dispar*) Holland says: "A gentleman interested in entomology, and residing at the time in Cambridge, Massachusetts, received from a friend in Europe a number of cocoons of the moth, from which the insects in due season emerged. A few of the number were prepared and mounted in his cabinet, and the remainder were allowed to escape through the window of the room in which they were. They rapidly multiplied and became a scourge. Fully a million of dollars has thus far been expended in an endeavour to exterminate them."[2] And of the small garden white butterfly *Pieris rapae*), he tells us: "The insect reached Quebec, about 1860. How it came no man knows; perhaps in a lot of cabbages imported from abroad; may be a fertile female was brought over as a stowaway. At all events it came. In 1863 the butterfly was already common about Quebec, and was spreading rapidly. By the year 1881 it had spread over the eastern half of the continent, the advancing line of colonization reaching from Hudson Bay to Southern Texas. In 1886 it reached Denver, as in 1884 it had reached the head waters of the Missouri, and it now possesses the cabbage-fields from the Atlantic to the Pacific, to the incalculable damage of all who provide the raw material for sauer-kraut. The injury annually done by the caterpillar is estimated to amount to hundreds of thousands of dollars."[3]

Now, so long as these creatures were living in their natural habitats their natural enemies would keep them in their relative positions; they might vary in their relative numbers from time to time, as indeed we know they do, but so do their enemies, and the balance is thus maintained. Again, should a species, under natural conditions, extend its geographical range—and many of them have been doing so for quite long periods—the process is generally a comparatively slow one, and their natural enemies are able to keep pace with them; in such circumstances, they are not likely to become dangerous. But in all these cases that I have cited, the species have been taken from their natural habitats and placed in others where they had few, if any, natural enemies. In such circumstances only one of two things would be likely to happen; either the species would meet unfavourable climatic conditions and be unable to establish itself, or, conditions being favourable, and having no natural enemies to hold it in check, it would simply run riot. It is not difficult to see how this may happen. The rabbit will do as an

[2] "The Moth Book," W. J. Holland, p. 308. (1903).
[3] "The Butterfly Book." W. J. Holland. p. 280. (1904).

example ; it begins to breed when about six months old, brings forth from three to eight young at a time, may produce anything from four to eight such families in a year, and has a natural life of some seven or eight years ; it is appalling to contemplate the number of rabbits that a single pair, and their offspring, might produce, even during the original parents' life-time. It may be said that in selecting the rabbit I have taken a particularly favourable example: among mammals perhaps it is, but I think the insect is quite as prolific. Take the gypsy moth ; it is true that it produces only one brood in a year but it is a large brood. I have no record of just how many eggs this moth does lay, but, from what I know of closely allied species, I think four hundred would be a moderate estimate, and it is easy to see what huge numbers of moths might result in the course of a few years when the species was removed from its natural checks.

And if, as we have seen, man can improve the status of a species, may he not equally well—it may be either intentionally or unwittingly—be able to damage it? We acknowledge the insect as man's deadliest enemy, may not man, by reason of his superior knowledge, also be the deadliest enemy of the insect? The well known case of the introduction of the ladybird (*Novius cardinalis*) to prey upon the coccus (*Icerya purchasi*) on the oranges of the Pacific Coast of America is a sufficient illustration.

I have said that even under natural conditions species do vary in their relative numbers from time to time, but that if a species becomes unduly numerous Nature steps in to keep it in its proper place. Many cases might be cited, but I do not think that I could find a better illustration than that of the little pea-green moth that infests the oak-trees, *Tortrix viridana.* It is a very common British species, and from time to time becomes so exceedingly abundant that its caterpillars very seriously affect the foliage of the oak trees on which they feed. A bad attack of these has recently occurred in North Sussex; I first noticed it in 1918, when at the end of June most of the oak trees were as bare of leaves as they had been in December, and it continued with little, if any abatement until 1923. Fortunately, we know a good deal about the economy of this species; its larva is subject to the attacks of quite a large number of parasitic insects ; birds devour the larvae and pupae readily, and there is one critical time in the larval life when the prevailing meteorological conditions may affect it seriously. With such a host of enemies it seems remarkable that it could have maintained a state of such undue abundance for so long a time. We cannot suppose that its parasitic enemies would be any less numerous than usual, for it is well known that at the time of a host-species' greatest abundance the parasitic species that prey upon it generally become abundant also, and often reduce it temporarily to below its relative position. Birds were admittedly below their average numbers during the earlier years of the attack, but were assuming their normal numbers towards the end; and it is probable that both they and the parasites were beginning to make an impression, but their effect upon it was not very noticeable, and it appeared that something more was required to put the species back into its proper place. We must now look a little further into the life history of this troublesome little moth. The parent female lays her eggs, not on the twigs of the first or second years' growth, where they would be near the leaves, as might be expected, but on the bark of the branches, where they remain during the autumn and winter. About the beginning of May, just when the leaf-buds of the oak are opening, the eggs hatch, and the tiny larvae crawl along the branches to reach the expanding leaves. This is the critical time, for if they once reach the leaf buds they at once spin themselves in and are fairly well protected; but, if during this short period they should meet with bad weather conditions, they might be swept from the branches along which they were travelling and be inevitably lost. Now, this is just what did happen in the spring of 1924. Just at the time when the eggs were hatching, the district was visited by a series of thunder storms accompanied by deluges of rain, and as a result the oak trees were rid of the pest; the moth was reduced to its normal numbers, and the countryside, after years of desolation, resumed its natural greenery.

More simple cases are furnished by the common Arctias, *A. caia* and *A. villica*. A few years ago the former species became so scarce that it was difficult to find a larva, even in spots where generally hundreds occurred, but the latter had become, for the time being, unusually abundant. A large number of *A. villica* larvae were taken in early spring and fed up under observation, with the result that some eighty per cent of them were killed by the parasites *Apanteles caiae* and *Carcelia cheloniae*, Rud. There is no doubt that the one species having been reduced to its normal status or below it, the parasites had turned their attention to the other in order to bring it, too, into its relative position. *Orgyia antiqua*, when it becomes unduly abundant, is liable to be attacked by a *polyhedral* disease, which not only kills the larva by thousands, but is capable of being passed on to the next generation through the egg. The larva of *Erannis* (*Hybernia*) *marginaria* and *E.* (*H.*) *defoliaria*, when too numerous, may be seen hanging by silken threads from the branches of the trees on which they have fed, dead, killed by disease. So we see that Nature has many and diverse methods of dealing with species that attempt to exceed their proper status, and that she can use them very drastically when occasion demands.

With these preliminary remarks we may now pass on to the consideration of the latter part of my subject; and in the first place it may be well to glance at the geographical position of the terrain with which we propose to deal.

A glance at the map will show us that the British Islands form the North-western extremity of the continent of Europe, but separated from it by a narrow, shallow sea. The geologists tell us that at some remote period they were joined up to it by a land connection; if this be so it gives an easy explanation of the occurrence here of some few northern and mountain species whose presence is not otherwise so well accounted for.

The British lepidopterous fauna consists in large part of what we may term indigenous species, many of them having a range over practically the whole, or at any rate, a considerable part of the area, but some few of them are very localised, occurring only in a few areas, or it may be in one small area. Now, all these species are liable to times of abundance and of scarcity, but so long as they have a wide-spread distribution we need have little fear for them.

We have also a considerable number of species which, although they have occurred here so long as we have records, do not appear to be altogether at home, and unless reinforced by frequent immigrations from their natural homes would soon die out. I refer to our *Colias*, some of the Vanessids and such like species, and I think we may well include our common *Pieris brassicae* among them. But we need not worry about this class either, they are wanderers; in Britain they have reached the extreme limit of their possible geographical range, and their abundance or scarcity depends chiefly on the amount of reinforcement they receive and the climatic conditions prevailing here at the time of the arrival of the immigrants. If, for instance, we were to catch and kill every *Colias croceus* or *Pyrameis* (*Cynthia*) *cardui* in the country this year, there is no reason why, conditions being favourable, one or both species might not be more common than ever next. Nor need we concern ourselves with the welfare of such rarities as some of the larger *Sphingidae* and so forth, that occasionally visit us; no amount of protection will avail them, they, when they do come here, have exceeded their natural limits and there is an end of them. If, then, protection in any form is to serve a useful purpose, its application must be to our indigenous, but very local sedentary species.

It is a deplorable fact that within the memory of living man, several of our most cherished local species have totally disappeared; and it is to be feared that some few others are, at the present time, in a very precarious position, and that, unless some measure of protection can be afforded them, they too, will soon have to be regarded as things which were but are not. I believe I am speaking for the whole body of entomologists when I say that it would be deeply regretted if this should happen, and that they would be ready to follow any suggestions that might be made with a view to retaining these species among us; but the question is what is the best course to follow? We have already lost several species, and we know something of the circumstances under which they disappeared;

perhaps an examination of them may help us—at any rate, it may be useful to briefly recapitulate them.

Up to about the middle of the last century *Chrysophanus dispar*, *Laelia coenosa*, *Ocneria dispar*, *Noctua subrosea* and some others, occurred quite commonly in restricted localities in the fen-lands of our eastern counties. They must have existed there for quite a long time, for, in the case of three out of the four species named, they had developed races differing very materially from those occurring on the continent. Now, of all that may have happened at or about the time of their disappearance, we know only two things: collectors, but at most only a few, did go to their haunts and helped themselves pretty freely to both larvae and imagines; but as they described the species as being very common it is hardly likely that they alone can have had any very great effect upon their status. It was at about this period also that a good deal of drainage work was being carried out in the fen-lands, their food-plants were, however, by no means exterminated. It therefore seems that some more potent agent than either of these must have been at work to account for their so complete disappearance. Unfortunately, we have absolutely no knowledge of what, if any, natural agencies may have been affecting them at the time, or of the persistency or otherwise of the collector's attentions.

Nola albula used to occur over an area of a few acres in Chattenden Roughs, a wood situated not far from the banks of the Thames and the Medway in North Kent. I first made its acquaintance in 1876, when it was so common that one might easily have taken a hundred larvae in an afternoon from the dewberry leaves in spring, or a couple of score of the moths during twilight in July. It was a species much sought after on account of its being a very local one, and it was no uncommon thing to find a dozen or more collectors on the ground in its season. Seven or eight years later half a dozen specimens in an evening was a good catch, and a few years later still, diligent search failed to produce any. At first glance, this looks like a case of a species being simply 'collected' out of existence; but I find in my notebook an entry, under date of 4th June, 1881, that of some thirty larvae found, many appeared to be sickly, and that from seven larvae taken 1884 I bred several ichneumons but no moths. It is, however, significant that other species, namely *Melitaea athalia*, *Apatura iris* and *Zygaena lonicerae*, which occurred fairly commonly in adjacent parts of the same wood, disappeared at or about the same time as *N. albula*. So far as one could see, the general character of the locality had not materially altered during the whole period.

Nola centonalis, which occurred in some numbers in a restricted area on the Deal Sand Hills, in the early eighties, was we know, completely wiped out soon after by the formation of golf greens, etc, right over its very circumscribed habitat.

Trigonophora flammea (*empyrea*) was first noted as inhabiting this country in 1855, and was found to occur in several places, over some thirty miles of the Sussex Coast; it came freely to 'sugar' and was also taken at ivy-blossom. For a few years it appeared to become increasingly common, particularly in one locality, near Lewes, but then gradually diminished, and so far as I am aware has not been met with during the past thirty or more years. The following extract from a local collector's notebook may throw some light upon its disappearance from the one locality where it had been so common. It reads—"This insect is not nearly so common as formerly, which is not to be wondered at, considering the persecution it has suffered. During the first three or four seasons after its discovery, as many as thirty persons might be counted at the locality in one evening; the trees being frequently sugared in seven or eight places. One man took about 140 specimens in one season—1858 or 9." Even this 'persecution' did not, however, immediately extinguish it, for in the same notebook is a record of some ten years later (1869) that the writer took about a dozen specimens between October 1st and 8th, and that two other persons each took about the same number. But in any inference that we may draw from the behaviour of this species it should not be overlooked that its occurrence in this country at all is rather remarkable, for it is apparently not an inhabitant of latitudes similar to our own, its range abroad being from central and southern France through Spain, Italy, Corsica and Dalmatia, all places considerably to the south of these islands.

Then, again, there are quite a number of species which, years ago, occurred in practically any suitable spot throughout the greater part of the country, but which have within the past few years disappeared from many of the localities where they were formerly common. I refer to such species as *Leptosia sinapis*, *Apatura iris*, *Melitaea athalia*, *Pararge aegeria* and the like.

But on the other hand some of our very local species have, within the last few years, actually improved their status. As an example *Melitaea cinxia*, we are told, was a few years ago getting so scarce in its few restricted haunts that there was good reason to fear its complete disappearance. Yet, within the last two or three years, it has prospered to such an extent that it has not only been exceedingly common in its former haunts, but has been able to materially extend its area.

But is this state of abundance likely to continue? I fear not. I have no exact figures for this species, but it is on record that in 1924 a closely allied species, *M. aurinia*, was suffering severely from the attacks of a parasite; of 143 larvae obtained from Wiltshire 124 died from this cause.[4] Is it not probable that, as in the case

---

[4] Shepherd. "Entom." 1926, p. 17.

of *A. caia* and *A. villica*, the parasite having completed its work on the one species, may transfer its attention to the other; or if it is not the same parasite that attacks both species, may not the one that we know is always present with *M. cinxia* increase its attacks as we see the one attached to *M. aurinia* has done? Out of 25 larvae of *M. cinxia* collected in April of this year (1925), 12 were killed by a parasite.

It has been said that "the more a locality is collected in, the more certain is a species to remain abundant there."[5] It is conceivable that in certain circumstances this might be so. If a species were badly congested in some particular, confined spot, it is quite possible that the killing of a large number of individuals might be for the good of the remainder. This is quite in accord with the laws of Nature; but as applied to the British lepidoptera, it is seldom that such a condition exists, at any rate, one that is beyond control by natural conditions, and it is, to say the least of it, a very dangerous doctrine to preach.

But, as I have already said, it is not with cases of this sort that we need concern ourselves, but with those where a local species appears to be losing ground, and to ascertain what, if any, part, man is playing in its decline. In considering such evidence as we have been able to adduce, we must bear in mind the peculiar situation of the British Islands, the district with which we are dealing; arguments that might be perfectly valid in some places might not apply here. We are dealing with a densely populated area. Man is for ever pushing his building, his agriculture, his forestry, further and further afield: he is over-running the land: he is, it may be unwittingly, for ever at war with the insect, the insect retreats before him; is not this quite sufficient to account for the loss of many widespread species from localities where they were formerly of common occurrence?

And all the while Nature is playing her part; what would have been the plight of *Tortrix viridana* in 1924 had it been a very local species? Probably its occurrence in that year did not represent one per million of that of 1923, Nature alone had dealt so hardly by it.

We see, then, that we have a very complex problem to deal with. Many of our very local species probably have a hard struggle to maintain themselves at all; the general conditions are none too favourable for them. *T. flammea* might have existed even at the present time near Lewes had it been given a chance, but man took a heavy toll of an insect that had probably not fully established itself in conditions both new and unfavourable to it.

We know nothing of any possible attack by natural enemies upon *C. dispar*, *O. dispar*, etc., in the fens just prior to their disappearance,

---

[5] Bright. "Entom." 1925, p. 274.

but we do know that man had meddled with the amenities of the district and that he had also taken toll of the species both in the larval and imaginal states. And we know that just prior to the disappearance of *N. albula* from Chattenden it was suffering severely from the attacks of parasites, possibly also disease, and that man was persistently worrying it.

Need we say more: is it not only too evident that at a time when natural causes have materially reduced the strength of a species, the killing of even a very few individuals by man may mean its ruin?

The question of devising some means for the protection of our rare and local lepidoptera is no new one. Just thirty years ago a committee was set up for that purpose.[6] They drew up a 'Memorandum of Association' for signature by all those willing to support them,[7] and they published a list of upwards of thirty species that they considered needed protection,[8] but the whole thing seemed to fizzle out.

Within the last few months the Entomological Society of London has again appointed a committee having the same object.[9] The matter with which they have to deal is admittedly one of much complexity, but during the years that have elapsed since the labours of their predecessors ceased, much has been learned regarding the life-history of some of our rarer species and the part that Nature plays in their economy. Of such information we may be sure they will take full advantage; they will assuredly avoid the pitfalls into which their predecessors floundered, and take note of any useful suggestions contained in the voluminous correspondence that has recently appeared in the entomological press. They are unlikely to publish long lists of species that are thought to need protection, including, as in the former case, some potential pests, or to promulgate laws and regulations that they have no possible means of enforcing. Rather may they be expected to seek the good will of the inhabitants of the districts where species thought to be in danger occur, and through them gain some measure of protection for such species; to study their habits and thus possibly gain knowledge that will enable them to combat some of the causes that may be calculated to lead to a species' extinction; and above all, to endeavour to enlist the sympathy of not only the true entomologists, but also that of even the thoughtless collector. There are in this country still many tracts of land that are not open to the general public, and some of these contain situations eminently suitable for the establishment of colonies of some of our most cherished species.

---

6 "Entom." 1896, p. 332.
7 ,, 1897, p. 144.
8 ,, 1897, p. 198.
9 ,, 1925, p. 278.

It is quite likely that the committee may even go so far as, having gained the good will of the respective owners, to endeavour to establish colonies in them. In their activities, in whatever direction they may tend, every true entomologist will, I doubt not, render his assistance and good will.

To sum up, I have endeavoured to show, and I hope I have been successful in showing, that all living creatures are subject to the laws of Nature and that the balance is thus maintained. That man, although subject to the laws of Nature equally with other living things, can and does at times upset the balance. That many of our rare and local species are rare and local because they are living on the extreme limits of their possible geographical range, and yet are still subject to the levelling influence of natural laws, and that any additional interference with them may mean their ruin. There may be times, indeed we know that there are times, when some of these species are reduced to a very low ebb by purely natural causes, yet if left entirely to themselves might recover, but when even the slightest adverse interference by man, might just turn the scale and lead to their extinction.

Races of Polyommatus coridon, Poda. particularly those of Italy and Spain.

By Hy. J. Turner, F.E.S.—*Read October 28th*, 1926.

The most recent general summary of the variation occurring in *Polyommatus* (*Agriades*) *coridon* is that given by the late J. W. Tutt, in Vol. IV. (XI.) of his masterly unfinished work on the British Butterflies in 1910.

In his chapter on Variation in this species he noted the remarkable parallelism between the races of the S. Eastern portion of its area of distribution, Asia Minor, Syria, etc., and those of the S. Western portion, the plateaux and plains of the Iberian peninsula. He went on to refer to the double-broodedness of the Rivieran *coridon*, as the result of peculiar conditions prevailing there, not, however, comparable with those of the Spanish races. He had not realised that two very closely allied and very similar species were involved: a single-brooded species and a double-brooded one. He stressed the fact that almost exactly the same range of forms occurs on the Stelvio, at an elevation of 7,500 to 9,000 ft. as one finds at Gex in the Jura, the Salève in Haute Savoie, at Digne in the Basses Alps, Fontainbleau, Dover, Cuxton, Guildford, and with Assissi in Italy. He also pointed out that extreme colour variation was not remarkable outside Spain and Asia Minor; *i.e.*, although extreme forms may occur as aberrations in all localities, it is only in the two areas mentioned that they occur in such numbers as to become racial.

What is a race? We seem to understand what it is, without any definition, with the result that the term gets used very loosely and with a very wide significance. Perhaps we may be safe in saying that, When, in any locality, a species produces a peculiar form, or forms, in such number as to predominate over the typical form, there we have what has been called a race. It cannot be represented by a single specimen from that locality, but must be exemplified by an average series of specimens, among which there may be examples of other forms, and the typical form may actually be an aberrant form among a series of that race. The fact, of course, is that no line can be drawn. It is the old unsolved, and to many of us unsolvable, question, what is the definition of a species?

Tutt classified the races of *P. coridon* under the headings: Local, Rivieran, Spanish, and races of Asia Minor and Syria.

Adopting his arrangement for convenience of comparison, we will take first those which he calls

Local Races.—Tutt gives three, all of which on his own finding are more, rather than less, of doubtful validity as races.

(1) race *altica*, Neust. "Int. Ent. Zeit." Guben. III. 198. Alps from 3,000 to 7,000 ft. It is described as smaller, lighter, more whitish silver-blue. Black border narrower. Hindwing: fine black border and black marginal spots broadly circled with white. Underside of f.w. whitish to cream-coloured; hindwing somewhat darker, grey to light brown. ♀ smaller, ground colour duskier, underside paler. S. Tyrol, Carniola.

Tutt discusses the above description, compares it with series from all elevations and concludes that "The *coridon* that fly in the Alps from 800-2,000 metres have no general racial facies whatever."

(2) race *pallescens*, Tutt. Described from 2 specimens (!!) labelled Hungary in the B.M., from the Leach collection. They are said to be exceedingly pale, margins almost uniform with rest of the wing, wanting the greenish scaling of the rest of the wing. Undersides of f.w. whitish and of h.w. fawn with orange chevrons moderately developed. Two specimens cannot make a race, as nothing further has come forward to support the suggestion.

(3) race *nivifera*, Kef. "Stett. e. Zt." XII. 308. Pyrenees. There is no description, and again no confirmation of the occurrence of a white form from the Pyrenees. It may have been a *trans ad albicans* of Spain, an aberration merely, and no race. Still, I think we may use this name for Pyrenean *coridon*, since most of us who have collected there can clearly see a racial difference from a series collected say on the Riviera, or on our Downs.

(4) To these three more or less doubtful races, we must add a fourth, *viz.*, that met with at Royston,* which up to now has gone unnamed. This race is characterised by its strict localisation, its great preponderance of females in most years, its numerous female examples exhibiting asymmetry of wing-shape, *inaequalis*, its large relative proportion of gynandromorphic specimens, *roystonensis*, its abundance of *semi-syngrapha*, and by its tendency to produce various unusual colour aberrations in considerable numbers.

Rivieran Races.—Tutt registered three races as occurring in this area, but it was with great feeling of dissatisfaction to himself, for he felt that more knowledge of the facts was necessary before any real classification could be made. The existing facts at his disposal at that time were (1) the double-brooded species around St. Maxime, in the Western French Riviera, which he had named *meridionalis*

---

* Dr. E. A. Cockayne, M.A., F.E.S., "Trans. Herts. N.H.S.," 1915, p. 21.

("Ent. Rec." XXI., p. 299); (2) Bartel's *coridon* from the Western Italian Riviera, which had been named *rezniceki* ("Ent. Zeit." XVIII. 117); and (3) Reverdin's form *constanti* from the Eastern French Riviera ("Ent. Rec." XXII. 60), a spring form. He tells us that he can make very little of the long and unsatisfactory descriptions, and not having sufficient material before him to make his comparisons, he has to leave further consideration of this Rivieran group.

Dr. Verity was impelled to this question by the fact of meeting with a double-brood *coridon* near Florence and in the Eastern Italian Riviera. He proceeded to obtain lengthy series from all four sections of the Riviera and of both broods. Comparative series placed side by side, revealed to him certain differences, which he registered in the following nomenclature. ("Ann. Ent. Soc. Fr." 1915, p. 514) and (*List of Races and Seasonal Polymorphism*, "Ent. Record," 1923-4).

Eastern Italian Riviera.	*florentina*, Vrty. I. gen.	*altera*, Vrty. II. gen.
Western " "	*rezniceki*, Bart. I. gen.	*septembris*, Vrty. II. gen.
Eastern French "	*constanti*, Rev. I. gen.	*reverdini*, Vrty. II. gen.
Western " "	*meridionalis*, Tutt. I. gen.	? II. gen.

It is only right to add that *meridionalis*, Tutt, from St. Maxime, etc., appears to comprise both *constanti* and *rezniceki*, as stated by Tutt himself and supported by Verity. However, this year Mr. P. P. Graves obtained very much worn females of a *coridon* form near Nyons, Drome, in the early days of July, which were succeeded shortly by a fresh emergence of males. Considering this area as an extension of the Western French Riviera, the name *meridionalis* may be extended to it quite reasonably, when more material and facts are to hand.

To this double-brooded *coridon* Dr. Verity has given the specific name *aragonensis*; intending to identify it with the Spanish *arragonensis*, Gerhd., but mis-spelled the name. Subsequently, he corrected his identification to the Spanish *hispana*, H.-S. figs. 500, 501, of which *arragonensis*, Gerh., was only the II. gen. of the silvery white race. Thus the four Rivieran double-brooded races are considered by Dr. Verity to be races of the species *hispana*, H.-S.

Turning now to the single-brooded *coridon* of the Italian Riviera and central mountains, Dr. Verity has described and named the four races (1) r. *apennina*, from the slopes of the Apennines of N. Central Italy; (2) r. *sibyllina*, from the Sibillina Mts. in Caserta province; (3) r. *apuana*, from the Alps of Tuscany; and (4) r. *superapennina* from the neighbourhood of Lucca. These are described at length,

(1) Zeller, "Isis," 1847, p. 148; (2) Verity, "Boll. Soc. Ent. It.," 1914, p. 131-3; (3) Verity, *l.c.*; (4) Verity, *l.c.*; respectively.

In northern Greece there occurs a race, which has been named *graeca*, Ruhl, and is said to be quite similar to the *florentina*, Vrty., of Italy. Nothing further is known of it, whether it be single or double-brooded.

Spanish Races.—Tutt gives four (three) Spanish races, assuming them all to be single-brooded.

race *albicans*, Bdv., characterised by its very large size, white, not blue, colour, long silky hairs on thorax, abdomen and wings, absence of metallic sheen; on the underside, a tendency to weakness in spotting and faint in colour, and to obsolescence of the hind-marginal band.

race *arragonensis*, Gerhd., characterised by the unusually bright underside, abundance of ocellated spots, its delicate blue-grey colour, not white as in *albicans*.

ab. *caerulescens*, Tutt. Although Tutt places this as one of the four races, he plainly states that it "is merely a form of *arragonensis* in which the long blue hair scales are in excess."

race *hispana*, H.-S., is small in size, strongly blue, with wide dark margins to the wings. (This does not agree with Herrich-Schaeffer's figures.)

Since Tutt's book appeared numerous further facts have come to hand, and it is now recognised that there exist a single-brooded and a double-brooded species. Dr. Verity has endeavoured to clear up the complications, basing his conclusions largely on the intensive collections made by the assiduous Querci family and the scattered observations of numerous holiday-makers, who have visited the wonderful plateaux of central Spain.

Verity points out that the single-brooded *coridon* has a smaller, very brilliant blue race, which he names *coelestissima*,* and the large beautiful white race *albicans*, Bdv. The double-brooded species he designates as *hispana*, H.-S., which is a small blue form, as stated above; its corresponding large, silvery blue race with long silky hairs is the *arragonensis*, Gerh. Both these races of the double-brooded species are II. gen., and Dr. Verity has named the I. gen. *prior* and *florentina* (?) respectively ("Ent. Record," XXXIII. 191).

I think you will agree with me that some of the most beautiful blues in existence are among the *lilacina* forms of the single-brooded species.

I. gen. *prior* of the race *hispana* is stated to have a slightly brighter blue, with no tawny colour on the underside, while the I. gen. of the *arragonensis* race is just the *florentina* of Central Italy.

---

* Which Chapman had already named *lilacina*. See Tutt, "Brit. Lep." XI.

coridon (single-brooded)	*hispana* (double-brooded)	
r. *coelestissima*, Vrty.	Gen. I.	Gen. II.
=*lilacina*, Chap.	r. *prior*.	r. *hispana*.
(bright blue)	(slightly bluer)	(pale greenish blue)
r. *albicans*	r. f. *florentina*	r. *arragonensis*
(silvery white)	(v. similar to	(white tinged blue)
(large size)	typical *coridon*)	(small size).

It is often somewhat difficult to follow Dr. Verity in his intensive study of a species without having access to the material he had before him. Or it may be from a more individual and subjective reason that we are at times unable to assimilate his work and to give it its true value.

Eastern Races.—Our knowledge of the more Eastern *coridon* is very imperfect; in fact information based on odd day's collecting in many places by travellers, who rarely stay in any locality, cannot be of much value, except as to mere facts of distribution.

Tutt gives the following as races, some of which can have no standing as such.

(1) race *caucasica*, Led., a large bright blue form, approaching *thetis* in tint. From the Caucasus, Armenia, Syria, Transcaucasia.

(2) (3) Tutt then gives *ossmar*, Gerh., Turkey; and *corydonius*, H.-S., S. Russia, both of which he admits are but forms of *caucasica*, the former occurring very rarely, and the latter as a local form in the mountains of Asia Minor, where it may occur racially.

(4) race *syriaca*, Tutt. The Lebanon form of *coridon* is smaller and closely allied to *caucasica*, of which it is probably a modification slightly more metallic.

(5) race *olympica*, Led., from Olympus, near Brussa, characterised by the pale milk-blue colour of the male with abundant spotting below. It is stated in Seitz to be the same as *corydonius*, H.-S.

It will be gathered from the above that nothing is known as to the broods of the Eastern *coridon*, whether there we have also the double-brooded species. All we know is, that some of the extreme forms of coloration seem to be parallel with those of the Spanish Peninsula.

Here I will leave the matter, as it was not my object to deal with individual variation, aberration, but to endeavour to clarify the mystification arising from the jumble of names, which have been thrust upon the various forms before it was known what the relationships were. You will have noted that I have kept the names *aragonensis*, *arragonensis*, *hispana*, etc., as near as possible to their original significance, rightly or wrongly, in order to save the confusion that arises in the absence of adequate series comparatively arranged before one. I trust that I have, at any rate, somewhat simplified matters in the understanding of this complex of species and races of such similarity.

I have not dealt with the r. *penuelaensis*, Ribbe, Andalusia; r. *borussia*, Dadd, E. Prussia; ? *samsoni*, Verity, Grand Saleve; r. *guadarramensis*, Ribbe, Sr. Guadarrama; r. *ciscaucasica*, Jach., Caucasus; ? *praecox*, Rev., Var; ? *superapennina*, Verty., Lucchesa; *negra*, Ribbe, Andalusia; *morena*, Ribbe, Andalusia; *margarita*, Ribbe, Andalusia; *blanca*, Ribbe, Andalusia; which are practically unknown, and may prove to be only aberrations or forms at the most.

Note.—I have purposely omitted to use the term "sub-species" which probably might be applied to *lilacina* (*coelestissima*) and *albicans* with reason.—Hy.J.T.

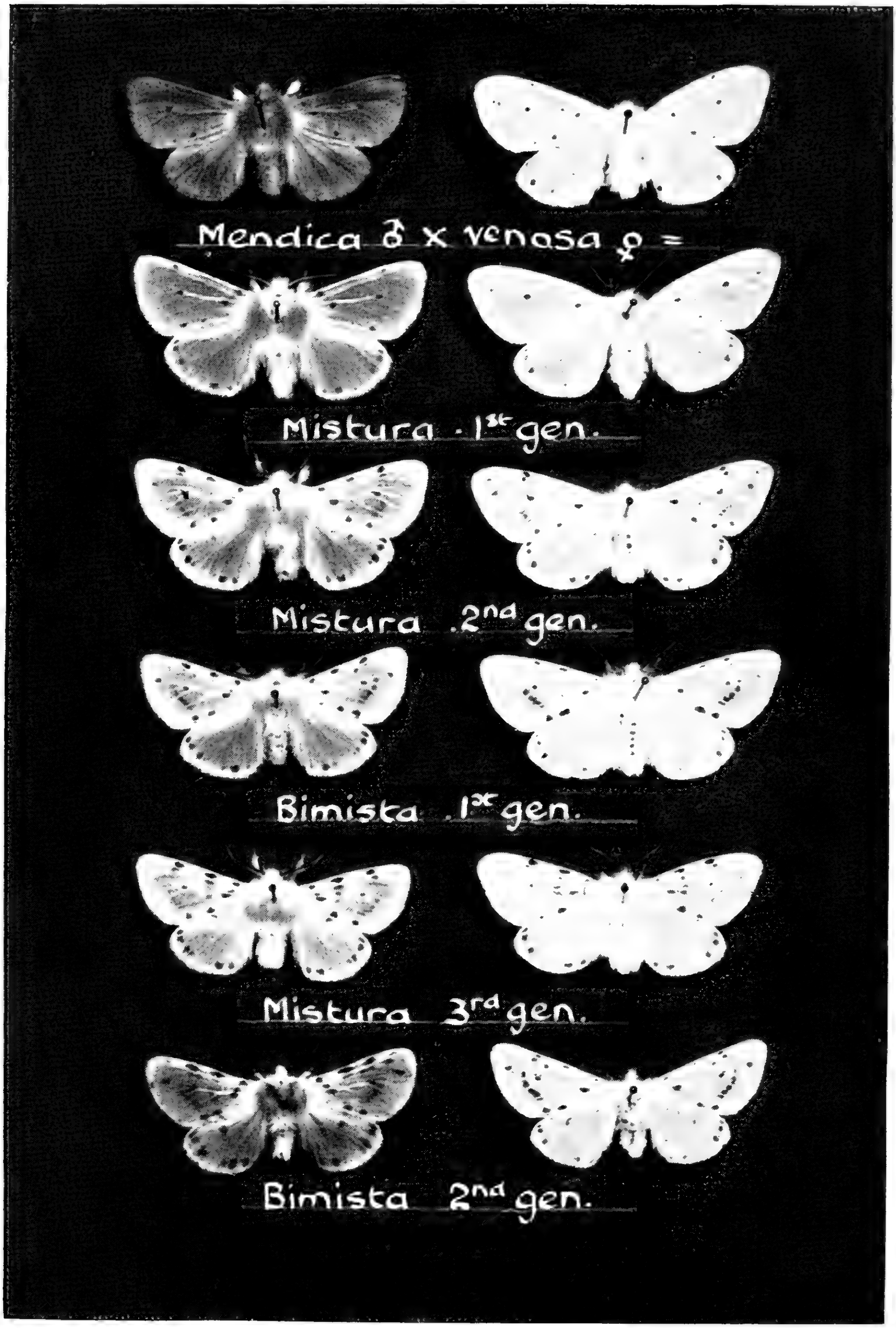


Photo. A. W. Dennis

DIACRISIA MENDICA, MONGREL RACES

Species in the Making?

By Robert Adkin, F.E.S.—*Read November 11th,* 1926.

When Darwin in 1859 published his great work entitled "On the Origin of Species by Means of Natural Selection," he propounded a fascinating theory in language that the average naturalist could easily grasp, and by them his views found fairly general, if in some minds tentative, acceptance. The Doctrine of Evolution was no new thing, the underlying idea is easily traceable as far back as the writings of the Greek philosophers; but it was not until comparatively recent times that it began to take definite shape, and it remained for Darwin to put it in such a form as would attract general attention.

Some twelve years later he published "The Descent of Man," in which be brought the doctrine of evolution still more forcibly home to us. The book had a very mixed reception; many of the more advanced naturalists accepted his views as a distinct advance in scientific theory, others were equally opposed to them, as will be seen from the following quotation from one of the hostile reviews of the book, written by a zoologist too; he says of it:—

"It will and must amuse and instruct, but it cannot convince the most enthusiastic admirer that there is truth in the hypothesis of evolution. It is obviously no part of my duty as a Zoologist to teach Theology, nor shall I attempt it, but it seems to me that the science of Zoology—certainly not the Bible—is endangered by Mr. Darwin's teaching; for every work that brings on Science the contempt or disapproval of the wise and good, is an attack on Science itself."[1]

The mentality of the author of the critique just quoted seems to me to be very much on a par with that of some citizens of the United States of America, who are pleased to call themselves "fundamentalists," and whose enactments rendered possible a somewhat notorious trial that took place in that country not many months ago. The subject is one that I should hesitate to pursue further, for words that would be likely to treat it adequately without the possibility of offence, even in these more enlightened times, fail me; but it has been so skilfully handled by Sir Oliver Lodge

---

[1] "Zoologist." 1871. pp. 2615.

in his recently delivered Huxley lecture that I am fain to quote the concluding sentences of his introduction which, I think, fairly well convey his meaning. It is all that time and space permit me to do here, but I would strongly recommend my hearers to read the whole of it.

His concluding remarks are: "The book of inspiration, by which I mean the thoughts of the great thinkers and seers and saints and prophets of all time, is one avenue of truth: the book of Nature, explored by a multitude of energetic workers, that is to say, the book of science, is another. In so far as both are true, they cannot be in opposition. In so far as either is mistaken, opposition is inevitable; and although the virulence of the opposition is now greatly mitigated, and is not so fierce and uncompromising, as it was even in the life time of some of us, some amount of opposition exists still. Indeed, in the minds of half-educated people its virulence is still manifest, and some fierceness of opposition still subsists to this day. It is so easy to take one side only of a controversy, to regard that as completely right, and the other as hopelessly and completely wrong. We find this attitude even in party politics. We find it more or less in the forensic activities of counsel in the law courts. It is understood, there, as a method of laying the case before the judge, to whom is left the impartiality of scrutinising the evidence for what it is worth, and coming to a judicial and balanced decision.

"We ourselves, however, in our own minds and with our own responsibility, are both counsel and judge. There are moods in which we emphasise one side; there are moods in which we emphasise the other; but ultimately we try to hold a balance between them, and we doubtless hope that our ultimate convictions will be based on the evidence, and lead to a true and impartial verdict.

"My thesis is that there is no essential opposition between creation and evolution. One is the method of the other. They are not two processes, they are one—a gradual one which can be partially and reverently followed by the human mind. We have the right to follow the methods so far as we can, the right to probe into the manner by which the manifold things around us are inter-related and how they have come into their present form. We try to set forth the physical processes in detail, and for that special purpose to limit ourselves to the mechanical, the physical, the chemical, the calculable, and the directly observed, without the least trace of impiety, and without being reasonably accused of denying a great tract of country which is not on our beat, which we are not exploring, and which, though through lack of time and energy we perforce neglect, we do not (if we are wise) ever think of denying."[2].

Well, during the half century that has elapsed since Darwin's

---

[2] "Nature"—Vol. 116., p.939. December 26th, 1925.

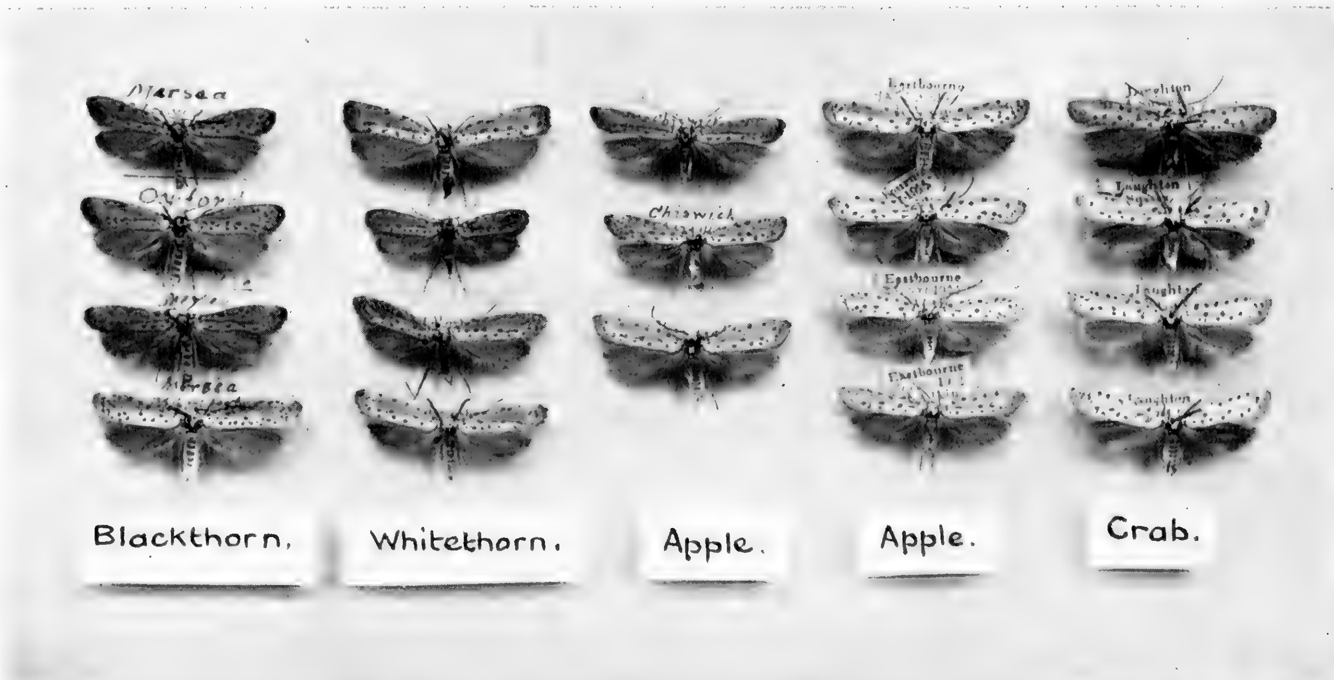


Photo. A. W. Dennis

HYPONOMEUTA Sp. Bred from food-plants indicated works were published, the biologist, the physicist, the chemist, the whole crowd of workers in natural science have, by experiment, by observation, by every avenue that has presented itself to them, been endeavouring to test Darwin's theories, yet even now the only verdict we can give is "not proven." But is it likely that they could be? Is it likely that changes which have taken countless ages, under the most violent changes in geological and climatic conditions, to mature, can be imitated by a few experiments extending at most over a few short years? Yet all our experiments, all our observations strengthen our belief in the doctrine of evolution; it is the causes and methods that we have not yet unravelled: and so we are content to continue our experiments; we hope with results that are both interesting and instructive.

Even with our own lives, in that small group of creatures with which I am best acquainted and which we know as the British lepidoptera, we have seen changes. We have seen that in smoky neighbourhoods, where the surroundings become darkened, many normally light coloured species become darker; it is an obvious advantage to them, in that they will be less easily seen by their enemies when resting on the trees, walls and so forth. So we experiment with them. We find that by selecting these dark specimens and breeding from them, that in the course of a few generations, the dark colour becomes a fixed character; that the race breeds true. We carry our experiments a stage further and we find that by chemically treating the food on which the larvae are fed we can produce dark forms of normally light coloured species and that these also breed true.[3] So we assume, and I think rightly so, that we have accomplished artificially what takes place under particular circumstances naturally, and that we have, by careful selection, rapidly produced a race that natural selection, would have taken a much longer time to produce. So we are able to congratulate ourselves that we have succeeded in establishing a form; it may be a new or it may be a reversion to some ancestral type; what we have not proved is that it would ultimately develop into a new species.

Mongrelism and hybridism provide another avenue that we may well explore: in nature it may be a difficult one to follow, but it provides ample opportunity for experiment. During the past few years I have reared several broods of a mongrel race of *Diacrisia mendica*, in which the male parents were our ordinary dark Sussex form and the females the Irish race *venosa*, which has an almost white male, and in which the chief characteristic is the dark veining on the wings, particularly in the female. In the first mongrel generation (race *mistura*) this character was less evident; in a second it had disappeared: but a new character had arisen in the first of these generations, namely, a pale streak along the costa and on some

---

[3] Harrison and Garrett. "Proc. Roy. Soc.," B. Vol. 99, 1926, p.241.

of the veins, but only in the males, and this was continued in the second generation; in both cases the majority of the specimens being affected. Further, in the second generation a few of the specimens showed a transverse shade on the forewings, a character which, although not common to the species, has also been observed in some other specialised races. A further cross-pairing was obtained between a dark Sussex male and a female of the race *mistura* and the progeny (race *bimista*) showed both the above mentioned characters in a considerable number of the individuals, and in some of them they were even more strongly emphasised. Race *mistura* was carried to a third generation and race *bimista* to a second, but disease had crept in and therefore only a small number of each was reared to maturity; but in both cases the two characters were present in nearly all of the specimens and in most of them were more prominent than in the earlier generations.

Dr. Heslop Harrison, some few years ago, carried out a number of experiments in cross-pairing species of *Bistoninae* with some remarkable results, both in regard to the shape, markings and behaviour of the offspring; and he found that whereas in some cases, particularly where one of the parents used was of a naturally weakly race, the ova produced by the hybrids were sterile; in others they were partially fertile and the resulting larvae robust.[4] More recently, it was found that by pairing *Tephrosia bistortata* with *T. crepuscularia* a fully fertile race is produced, and that of this race unmated females deposit ova freely, a small percentage of which ova will develop parthenogenetically.[5] Species of the *Pygaeridae* have been cross-paired and the hybrids were not sterile. (Federley.)

The results of all these experiments, and of many others that have been tried, seem to me to point only in one direction; they all seem to show some physical disturbance of the organism, but its interpretation does not appear to be very clear; our experiments have brought us to a dead end, beyond which we have so far been unable to pass. But even though our experiments may have, up to the present, been disappointing in their results, we have by no means exhausted their possibilities, and in the meantime we have the phenomena of nature to fall back upon, to observe and to interpret. I often think that in so doing we are too prone to follow up what appears to be the obvious, as for instance, the darkening of the colour in the smoky districts, to the exclusion of the more obscure, and that the beginnings of evolution may quite as likely be found in some alteration of habit or environment and possibly manifest in, or at any rate accompanied by, some slight modification in facies and structure.

A case in point is that of the two common moths, already referred

---

[4] Oberthür's "Études de Lép. Comp." Fasc. VII. p. 341.
[5] "Nature" Vol. 117, p. 378.

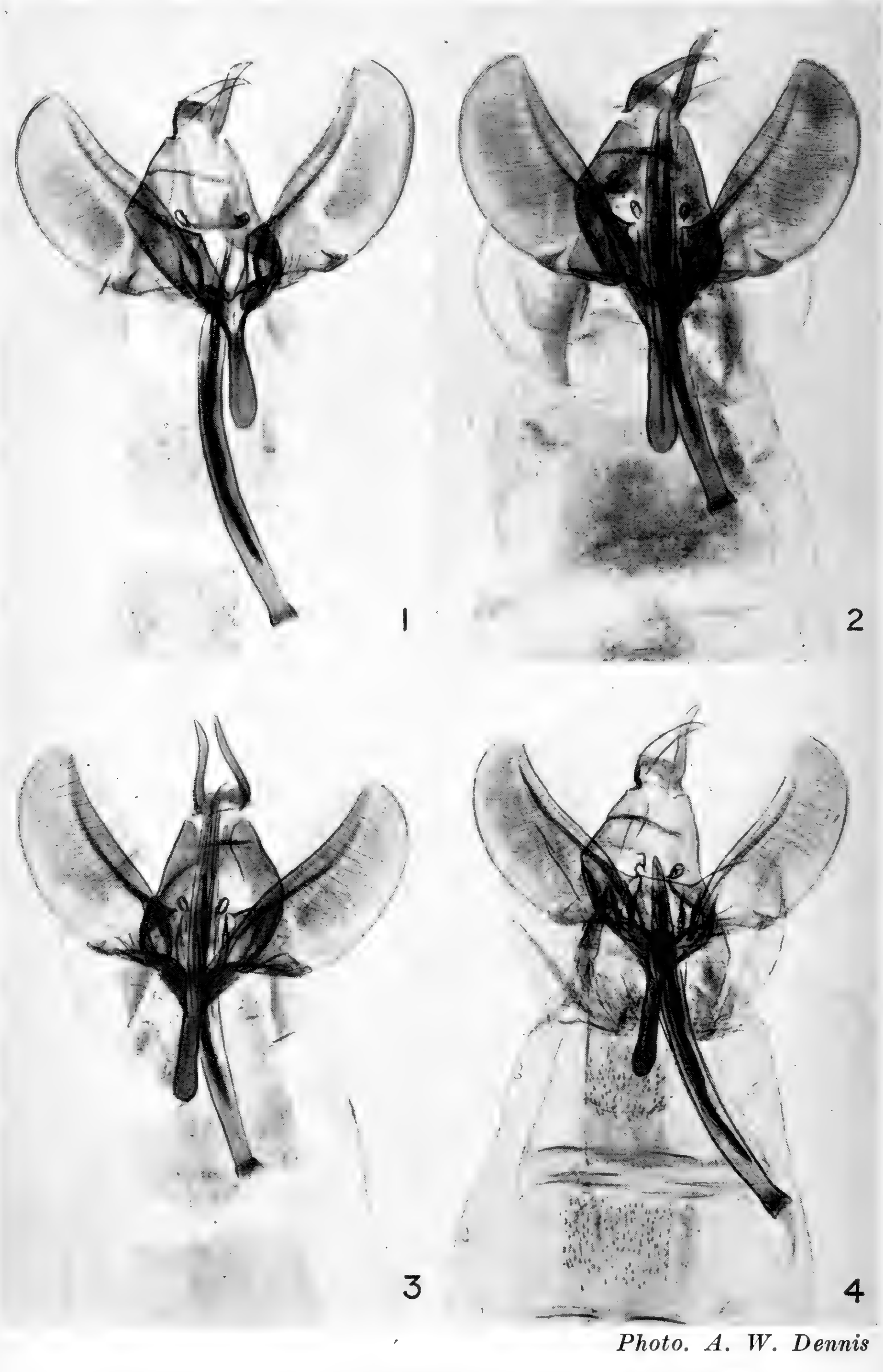


Photo. A. W. Dennis

GENITALIA OF HYPONOMEUTA Sp. Bred from

1. Blackthorn. 2. Whitethorn. 3. Apple. 4. Crab

to, *Tephrosia bistortata* and *T. crepuscularia.* Both occur in similar situations throughout our southern counties; one has but one brood in the year, the moths appearing from the middle of May to early June; the other has two emergencies in the year the moths of the first appearing in March and April, those of the second in July and August. But this second emergence is only partial—that is, the eggs laid by the March-April moths hatch, the larvae from them feed up and turn to pupae, but only part of the pupae produce moths in July-August, the remainder producing moths in March-April the following year, that is at the same time as those from the eggs laid by the moths of the July-August emergence. The moths of the March-April emergence are of a warm brownish-grey colour as compared with the paler ochreous-grey of the July-August emergence, which is very similar to that of the single May-June brood. The eggs, larvae and pupae of the various broods are practically indistinguishable from one another.

In the case of closely allied species a detailed study of the genitalia is often a useful means of differentiation. In this case the genitalia agree in every detail except one, the cristae, a cluster of hairs arising from a pad on the juxta. In *crepuscularia*, Pierce tells us these cristae terminate in cup-shaped heads, while in *bistortata* they terminate in flattened discs.[6] Although in Nature the two insects live side by side, they appear to keep their regular times of emergence and, consequently, not to cross. But if, in confinement, we force the single-brooded insect so as to make it emerge at the same time as the double-brooded one, we have no difficulty in obtaining cross-pairings.

It is doubtful whether any other species has been so closely studied as that which we have just been considering, for at one time controversy as to whether one species or two were represented ran very high: material was easy to obtain and to deal with, and a very great deal of experimental work was carried out with the results that I have briefly stated. But of late years several other groups of moths have received considerable attention with results that are, to say the least of it, illuminating.

The Oporabias provide another interesting example. Here we have four moths that we know by the names of :—*dilutata*, *christyi*, *autumnata*, and *filigrammaria*. They are all single-brooded, all emerge in autumn and very closely resemble one another throughout their various stages. I do not wish to imply that we can in no case separate them ; I am quite sure that many of my friends who have made a close study of the group would fall foul of such a suggestion : but I do say that in almost any long series of any one of them we shall find specimens that, from their superficial appearance, might equally well belong to any of the others, for they are all

---

6. Pierce " The Genitalia of the British Geometridae," pp. 19-20, pl. XIII.

variable within certain limits. As to the larvae, they too have their general lines of difference, but they are not stable; captured larvae that have had, so far as could be detected, all the points of the one, have, when reared to maturity, produced the other. *Dilutata*, *christyi*, and *autumnata* frequent woodlands, their larvae feed upon forest trees; *filigrammaria* favours moorlands, its larvae feeding on bilberry and heather. Although superficially all four are so much alike; structurally they show fairly significant differences, greater than in the case of *T. bistortata* and *T. crepuscularia* already referred to. Allen tells us that they fall naturally into two groups, viz., *dilutata-christyi* and *autumnata-filigrammaria*[7] and this is well shown in Pierce's drawings of their genitalia.[8]

The more important differences given by Pierce may be tabulated thus:—

Valvae with lateral hooked projections—*dilutata* and *christyi.*
Valvae without lateral hooked projections—*autumnata* and *filigrammaria.*

These may be again divided:—
Octavals wide apart, without deep excavation between—*dilutata*;
Octavals close together, without deep excavation between—*christyi*:
Octavals without deep excavation between them—*autumnata.*
Octavals with deep excavation between them—*filigrammaria.*

In confinement, as might be expected, *dilutata* pairs readily with *christyi* and *autumnata* with *filigrammaria*; but a cross between *dilutata* and *autumnata* is less easily obtained; all these cross-pairings have, however, been obtained with fertile results; but I am not aware that a pairing between *dilutata* and *filigrammaria* has been successful.

Somewhat similar conditions prevail in the *truncata-immanata-concinnata* group of the Cidarias. The two first named are very variable, some of their forms being practically indistinguishable from one another; *concinnata* appears to be more constant and to very closely resemble some of the forms of both *truncata* and *immanata*. *Truncata* is normally double-brooded, the emergences taking place in May and August, and the winter is passed in the larval stage; *immanata* and *concinnata* are but single-brooded, the moths appearing in July, and the winter is passed in the egg-stage. *Truncata* and *immanata* are wood-loving species, their larvae feeding chiefly on shrubs and plants that grow in and around such situations; *concinnata* prefers high-lying ground, occurs chiefly but not entirely in the Isle of Arran, and its larva appears to be a heather-feeder. The differences in their genitalia are slight, and as given by Pierce may be tabulated thus:—[9]

---

[7] Cockayne. "Proc. Ent. Soc. Lond.," 1912, p.vi.
[8] Pierce. "The Genitalia of the Geometridae," pl xxv.
[9] "The Genitalia of the British Geometridae," p. 65, pl. XL.

Uncus narrow—*immanata* and *truncata*.
,, rather stout—*concinnata*.
Anellus lobes rounded, spines curved—*immanata* and *truncata*.
,, ,, ,, spines strong—*concinnata*.
Cornuti very large patch of stout spines—*immanata*.
,, narrow patch of fine spines—*truncata*.
,, large patch of long, fine spines—*concinnata*.
Signum ovate, entirely scobinate—*immanata*.
,, ,, edge scobinate—*truncata*.
,, ,, centre free from scobinations—*concinnata*.

I am not aware that any attempts at cross-pairing have been undertaken, but they may have been and if so it would be interesting to have the results on record. However that may be, we have here again a group of insects practically indistinguishable superficially in some of their forms, but differing to some considerable extent in their structural characters.

All these examples that I have given, when viewed in the order that I have placed them, appear to show a sort of progressive movement, steps towards separation. In superficial appearance they have made no very definite advance; in each group, although some individuals differ considerably, others are indistinguishable the one from the other; that is, in each group we find a number of specimens that from the appearance of their markings alone we would have difficulty in saying whether they should go into this series or into that. But in structure; that all important part of the structure, the genitalia, which we believe to be specificially constant or practically so; we find characters, trivial in some groups, a little more advanced in others; stepping-stones as it were, leading us on from the very early rudiments of change in the detail of some trivial appendage to a modification in structure of some important organ, sufficient, we say, to take specific rank. And further, that in the most closely allied groups, the species that has the more diverse habit, has also the greater difference in structure.

Tephrosia bistortata and *T. crepuscularia* differ from one another structurally in one small matter of detail, the shape of the termination of the cristae hairs; and this is accompanied by a change of habit, the one being single, and the other double-brooded, or partially so.

Of the four Oporabias one has acquired habits differing from the other three, and it is this one, *O. filigrammaria* that shows a difference from all the others in the deep excavation between the octavals.

Again, in the three Cidarias we find differences of habit accompanied by slight modifications of structure. *C. truncata* and *C. immanata*, so much alike superficially that we separate them with difficulty, agree in many details: but the one is double, and the other is single-brooded, and this difference in habit is accompanied by a difference in structural detail—the spines of the cornuti and the scobinations of the signum. *C. concinnata* affects a different class of habitat and of food-plants from either of the others, and further differs from them in the shape of the uncus and the spines of the anellus. Possibly these three groups may represent different stages of evolution, the comparatively recent to the more advanced.

There is a small group of Tineina, the genus *Hyponomeuta*, of which some half a dozen species occur in this country. Most of them have well defined characters and markings, and to some extent special food-plants, so that we have no difficulty in recognising them; but in one case some uncertainty exists. The larvae are all gregarious, living in a common web. If we take some of these webs from the blackthorn and rear the larvae we get moths either wholly suffused with lead-colour or very considerably so; if from hawthorn, the moths, although more or less lead-coloured, are less densely so, and occasionally there may be among them a few that might be described as whitish, but there is no doubt that both lots are one and the same species. If, however, we get larvae from some old crab-apple tree growing out in the wilds, we breed nothing but white moths. Occasionally these creatures invade our gardens and orchards and feed on our cultivated apple trees, and if we collect the larvae and rear them, we may get from one lot possibly moths that are clearly referrable to the hawthorn series, while those from another may equally well resemble those from crab, but in my experience not mixed or intermediate broods. Structurally the whole genus is said to be rather primitive, and we should hardly expect to find any very marked differences in their genitalia. So far as I and my friend, Mr. Rayward, who has very kindly made the very beautiful microscopic preparations, have been able to examine them, we find no very marked differences between any of the series, yet there does appear to be some slight, and apparently constant modification in some of the structures of the crab-feeding series as compared with those from the blackthorn and whitethorn. The only batches of larvae that I have had the opportunity of comparing side by side are those from blackthorn and from crab; and although there appears to be a fairly well-marked colour difference between them, the markings, which consist of a double row of black spots along the back, are alike in both. The blackthorn larvae are of a dark slatey grey colour, and in this they agree, so far as I can remember, with those from whitethorn, while those from crab are of a distinctly lighter, yellower grey. One wonders whether this is a case of what Prof. Osbourne aptly terms 'Speciation.'[10] It is questionable, so far as I can see, whether there is anything to justify us in regarding the whole lot, as we now know them, as anything more than a species; yet is it not possible that by reason of the environments

---

[10] British Association, 1926. Section D.

and food plants that it has taken to, it may be on a fair way towards a splitting up into more than one?

Mr. Tate Regan in his Presidential Address to Section D (Zoology), at the 1925 meeting of the British Association, took for his subject 'Organic Evolution."

Of course, he dealt almost entirely with fishes, but I think some of his remarks are quite in accordance with the view I have just expressed. He says:—

"I have studied with particular attention the fishes known as char, or salmonid fishes of the genus *Salvelinus*. Char are very like trout in appearance, but have orange or scarlet spots instead of black ones; they inhabit the Arctic Ocean and in the autumn run up the rivers to breed in fresh water, often forming permanent fresh-water colonies in the lakes. There are many such colonies in the lakes of Scandinavia, of Switzerland, and of Scotland, Ireland, and the Lake District of England; the formation of these colonies must date back to glacial times, when these Arctic fishes occurred on our coasts and entered our rivers to breed. These lacustrine communities show considerable diversity in habits, and also in structure; for example, the Char of Lough Melvin in Ireland are quite unlike those of Loch Killin in Inverness in form, in coloration, in the shape of the mouth, and in size of scales." . . . . "I confess that I do not understand why the scales are much smaller and more numerous in the char of some lakes than in those of others, but I suspect that these differences in scaling are the expression of physiological differences and are the result of differences in the environment or in the activities of the fish."

And then, after further illustrations from the behaviour of other classes of fishes, he continues—"Changes of structure have been intimately related to, and may even be said to have been determined by, changes of habit. Evolution has been adaptive, but modifications of structure that were originally adaptive persist when they are no longer so; they become historical and the basis for further adaptive modifications. I am satisfied that these principles, which I have illustrated by examples from the group I have specially studied, have a general application."[11]

Fishes and moths live under very different conditions, yet Mr. Regan's remarks that I have quoted and the examples that I have given, seem to show that in similar circumstances—an alteration of environment—structural modifications are likely to occur. Some doubt has been thrown on the possibility of the inheritance of acquired characters, but if these examples, both of the fish and the moths that have been quoted are to be relied upon, there seems to be very good reason for believing that acquired characters such as we have been considering, not only may be inheritable but actually are so.

It may be asked, how can such characters arise; by what

[11] "The Advancement of Science." 1925.

mechanism can they originate? I fear this is just the point to which we have not yet found the answer. We believe that the structural materials in the germ cells are the chromosomes, and that these, under normal conditions, ensure that like begets like. But there is some evidence that the chromosome may be a complicated structure composed of smaller units. Further, there is a theory that these smaller units are arranged in linear fashion in the chromosomes; and this suggestion receives some support from Morgan's work on the fruit-fly, *Drosophila*. Now, we may assume that so long as this arrangement is maintained we may expect like to continue to beget like, but there appears to be some evidence that this linear arrangement is capable of disarrangement; and it may be that, should this prove to be so, it might be the method by which new characters are evolved. Assuming that this be so, is it not possible that an alteration in habit or environment may be a sufficient stimulus to bring about such a condition? I am fully aware that in our present state of knowledge this is little more than conjecture; yet, should these suggestions ultimately prove to be correct, do they not offer a possible solution?

Be that as it may, the conclusion at which I arrive is that organic evolution is an exceedingly slow, adaptive process. I think the idea is well conveyed in some words recently published by Prof. J. Arthur Thomson; he says:—"Organic evolution is a natural process of racial change in a definite direction (or in several definite directions in different parts) in the course of which new forms, with new adaptations and linkages, arise, take root, and flourish alongside of or in place of originative stock."[12]

It is probable that all species are not equally susceptible; some may be stable, apparently incapable of change and therefore possibly decadent; others appear to contain elements of change and therefore to be capable of adaptation. *S. mendica* will serve as an example of what I wish to imply. Here we have a species with two distinct races, the one having a smoky brown male while in the other the male is almost white. As we have already seen, by mongrelising these two races we get forms showing facial characters differing materially from those of either, and in succeeding generations these characters become still more pronounced. This seems to suggest that the species is in a state of flux, awaiting only some adventitious circumstances; it may be some change of habit or of environment; to set in motion its latent tendencies to cause some physical alteration in its constitution, possibly leading to the evolution of a new species. This is but an example of numerous similar cases known to the biologist; is it possible that among such we may be witnessing the phenomenon of species in the making? I think our experiments and our observations tend to suggest that this may be so.

---

[12] "The New Natural History." p. 1149.

Random Notes on Rumicia phlaeas, L.

By H. B. Williams, LL.D., F.E.S.—*Read December 9th*, 1926.

I do not offer this as a deeply scientific paper; indeed my only excuse for writing it is a particular attraction which I have felt for this nimble little butterfly, with the result that for the last 20 years I have lost no opportunity of improving my acquaintance with it. As a consequence, I am able to exhibit to you the majority of the more usual forms found in Britain, and to offer you these few observations.

On August 5th, 1909, the heat in the Gower peninsula, in South Wales, was such that in the afternoon I abandoned the pursuit of lepidoptera for the more refreshing occupation of sea-bathing. Passing through a little valley leading down to the sea, I observed settled just in front of me a perfect ♂ specimen of *R. phlaeas*, ab. *alba*, Tutt. For some while I successfully demonstrated the futility of attempting to capture an active little butterfly in a straw hat. I then returned for my net, and for some days haunted that valley in vain, seeking another sight of the specimen and ruminating on the folly of entomologists who walk abroad unprepared. Reference to my series demonstrates that four days later I captured a fresh ♀ with a pallid right hindwing, the band being straw-coloured. This capture, the possible significance of which eluded me until very recently, set its seal on my budding enthusiasm; and I treasure that specimen as my first variety of *R. phlaeas*.

To ab. *alba* and other varietal forms I will return later. For the moment, let me dispose of some preliminary observations.

While *R. phlaeas* is common in most places in most seasons, it cannot be said to be common always. It occurs in wet marshes, as in its favoured haunts on Wimbledon Common; on dry chalky slopes, as at Ranmore and Royston; and on heathery moors and heaths, as at Oxshott and elsewhere, wherever *Rumex acetosa* or *R. acetosella* grow in abundance. Like many other species, however, it is subject to remarkable fluctuations in numbers, for no very obvious reason—at least for no reason obvious within the limited scope of human intelligence.

In 1911, as most of you will remember, it was extremely abundant everywhere until late in the autumn. I have pleasant memories of a flowery field in the Chiltern Hills, where the scent of marjoram and thyme rendered the August temperatures of that year almost enjoyable, and where many of my specimens were taken, including the ♂ of ab. *alba* which compensated me for the disappointment of two years before, and which is the only other specimen I have ever seen alive. In 1925, on the other hand, it was rather scarce, in spite of a favourable summer. I do not remember seeing the spring brood at all. I only saw one specimen of the June brood, and not more than 20 of the autumn brood, so that I count myself fortunate in having taken a freshly emerged ♀ ab. *radiata* on August 9th.

This leads me to refer to the dates of emergence, and I will content myself with the observation that there are normally three broods in the year. The first may occur as early as April in a favourable season, but May 15th-20th is, in my experience, an average date. Some of the larvae resulting feed up with extraordinary rapidity, and at the end of June and during July and August, according to the season, the second brood is on the wing, the period of emergence being somewhat extended. At the end of September, a third brood flies, and in a fine summer is generally the most abundant. In cold and wet years this emergence may be very limited ; in 1924, for example, the whole of the larvae from a July ♀ persisted in going into hibernation.

I have bred the species from the egg repeatedly. The hibernating larvae can be managed without much difficulty on growing plants of sorrel—*R. acetosella* for preference. Otherwise, in my experience they cannot be managed at all. The second and third broods, unless one is unlucky, are easy to breed. Mr. Wood, who is very much more successful than I am with most species, tells me he always fails. I had succeeded so invariably in breeding almost every one to the imago that I found Mr. Wood's experience incomprehensible, until in 1923 and 1924 larvae from first and second brood ♀ ♀ refused to feed or grow and I lost entire broods. I still do not understand this, and pass from the painful subject with the reflection that Mr. Newman may be able to throw some light on it, and the suggestion that any who have not yet bred the species should not abandon the attempt if at first unsuccessful.

I have bred few varieties—indeed all I have bred, 7 in number, were the produce of a single ♀, and I shall have occasion to refer to them later. One obtains, of course, specimens in a condition rarely seen in the field, and there is always the possibility of something really good appearing. Mr. Newman can tell us something of these matters, I believe. I would add, however, that there is a very real possibility of a good proportion of varieties if one happens to have selected the right ♀. Unfortunately, I cannot indicate the right method of selection, and can only suggest that late June and early July ♀ ♀ are likely to be the most promising in this respect.

I now pass to the consideration of the principal lines of variation.

I. Colour Variation.—I include here the whole range of major and minor varieties leading up to ab. *alba*, Tutt. I must first remind you that all these have been definitely shown by Dr. E. A. Cockayne [" Trans. Lond. Nat. Hist. Soc.," 1921, pp. 52, 53, 60] to be pathological forms due to one of the peculiar forms of scale defect with which he has made us familiar. The differentiation by Tutt [" Brit. Lep.," VIII., p. 354] and by Ford [" Trans. Ent. Soc. Lond.," 1923, p. 698] between such forms as *alba* or *schmidtii* and those presenting pallid spots or patches in an otherwise normal wing, restricting the latter to the pathological group, is therefore unsound and cannot stand. The distinction between ab. *alba* and the common form with a brassy patch near the inner margin is purely one of degree. Moreover, it is clear from the fact that in 1920 I bred 7 of these (minor) forms from one ♀ that there is a hereditary factor, and it is a fact that ab. *alba* has occurred on the ground where I take the minor forms most freely, and from whence I obtained the ♀ just referred to. I believe others have met with the minor and extreme forms on the same ground elsewhere, and I have already mentioned a similar experience of my own in South Wales.

I am able to exhibit all the ordinary forms in this series—abs. *alba*, *schmidtii*, and *intermedia*, and numerous partially white and pallid forms. I have had the advantage of examining the majority of these specimens under the microscope in the company of Dr. Cockayne, and desire to record the observation that there is a more even gradation from the less to the more extreme than is apparent to the unaided eye. The division of the specimens in which the whole of the coppery area is affected into the three named varieties *intermedia*, *schmidtii*, and *alba* is purely arbitrary. There is a very considerable distinction in the degree of curling of the scales, and to a lesser extent of the deficiency of pigment, in my specimens of ab. *alba*. The same observation applies to my series of ab. *intermedia*. Among my minor forms there are specimens in which the scales are only slighty affected, and others in which they are as seriously affected as in the most extreme ab. *alba*. The occurrence of a patch of these seriously affected scales in a normal wing is a striking phenomenon, and cannot in the majority of cases be attributed with certainty to any physical cause.

It may be well to refer here to the form described by Tutt as ab. *anteroalba*, having white forewings but a normal coppery band on the hindwing. Several specimens of this form exist. One ("Ent." III., 211) was in the Gregson coll., and was figured in Mosley's varieties. I acquired it at the dispersal of the Webb collection and found, when I relaxed it for resetting, that the attachment of the forewings to the body was by no means permanent. This historic specimen no longer has a place in my series, and it is as well to record the reason. A second specimen was in the Webb collection, evidently of considerable antiquity; and this I am able to exhibit.

It may be well to remark that the peculiar form of fraud by which Gregson was deceived was rather prevalent at that period. It was suggested in an early volume of the "Ent. Rec.," that specimens of ab. *alba* or ab. *schmidtii*, produced by exposure to some chemical, were in many collections. I have seen two of these, and they were so utterly unlike any genuine form that they failed to raise a bid at Stevens', and eventually passed into my possession in the company of the next lot for some 4/-. They no longer exist; I only mention them to remark that in these days any doubtful specimen of this series of varieties can be determined with certainty in a few moments.

II. Dark Suffusion.—We do not get, in this country, the dark summer generation that is so conspicuous a feature of the seasonal variation of the species in the more southerly areas of its distribution. Nevertheless, in hot summers, as for example in 1911 and 1921, suffused forms are common. Associated with this phase of variation is the development of a pronounced tail to the hindwing. In the Chilterns in August, 1911, I found that a high proportion of the specimens examined were either of typical coloration with tails (ab. *typica-caudata*, Tutt.), or of the slightly suffused form (ab. *initia*, Tutt.) without tails. The majority of my series of these two forms came from those examined at the time and place referred to, and it will be remarked that of the ab. *typica-caudata*, almost the entire series are ♀ ♀, while of the ab. *initia* almost every specimen is a ♂.

In the same season and place, I took certain specimens of the next stage in this phase of variation—the form which is both tailed and slightly suffused. I have no females of this form. I also took three specimens more strongly suffused—(ab. *suffusa*, Tutt.) which are not tailed, and these again are all males.

ab. *eleus*, Fb., is the strongly suffused form with tails, and is a rare aberration in this country. I found none at all in 1911, in spite of the abundance of the transitional forms. I have five specimens, one from Dover 1906, one from Purley 1913, and three taken in the hot summer of 1921, one in North Kent and two in the New Forest. 1921, however, did not produce any great number of the intermediate forms.

Extreme suffusion on the forewings is frequently accompanied by a restriction of the copper band on the hindwings. I have a series of some thirteen specimens with obscured or restricted bands. Several of these are also of the *initia* forewing form, and the majority of the latter were taken in 1911. Males again predominate. I regard this hindwing form as transitional to ab. *obsoleta*, Tutt, in which the hindwing band is absent, and as proceeding in that direction, if I may so express myself, by a different route from that adopted by the series of forms which we include under the name of ab. *radiata*, Tutt, and which has from one to five copper spots or streaks of varying length on the veins. This latter form is, in my experience, more frequent in the female, and I have yet to have the pleasure of taking the male. It is also, for some obscure reason, most frequently met with in late August and September, when it has a tendency to become almost racial in some favoured spots. On September 24th, 1914, I had the good fortune, during the morning, to take two females, together with a ♂ ab. *obsoleta*, in a small area of heathy ground near Wimbledon; and I know of eight being captured in the same field in a single August day. Of my 1914 captures, one is freshly emerged and the other very worn. Circumstances at the date in question did not encourage the idea of breeding from the worn one and hibernating the larvae, but I hope some day to breed from this form.

III. Markings of Forewings.—This being no scientific essay, I am enabled to flit from one phase of variation to another with the same inconsequence and suddenness as distinguish the species itself in its movements from flower to flower on a sunny day ; and I now have a few notes on the extent of the black markings of the forewings. I turn to this subject with some zest, as I have pleasant memories of the capture of a fine ab. *extensa-conjuncta*, Tutt, from the boot of a distinguished member of this Society, who had summoned me from some distance to inspect some pallid form of that socially, if not scientifically, plebeian insect *Coenonympha pamphilus*, and who, whenever he sees the insect, claims that it is his property by reason of that slight and temporary attachment. I hope I shall not rend the veil I have drawn over the identity of that distinguished member if I add that his energy in the pursuit of Lepidoptera is such that, were he to pursue his argument to its logical conclusion, he might lay claim to the ownership of the greater part of most of the counties of Great Britain, by virtue of the temporary adherence of their soil to those same boots.

Having mentioned ab. *extensa-conjuncta*, I pass to a subject of no importance. Is there a form validly named ab. *extensa*? No form is dealt with under this name in the "Nat. Hist. Brit. Lep.," but it is clear that Tutt supposed himself to have described such an aberration ; and it is quite clear what form it is that he supposed himself to have so described. Neither in the "Nat. Hist. Brit. Butts.," nor anywhere else, however, can I trace any such description. Reference to p. 379, where Tutt refers to underside aberrations "corresponding with our ab. *extensa* or ab. *extensa-conjuncta* of the upperside" will illustrate the origin of this little howl, and reference to the index (p. 472) will show that the compiler (the Rev. G. H. Raynor) supposed this to be the description, or at least the principal reference. Forms with spots extended inwardly, but not reaching the discoidal, may, one supposes, be conveniently placed under this name without causing anyone undue suffering, and those with a passion for exactness may solve their consciences by placing the name in brackets.

I cannot pass from this series of forms without recording the extraordinary fact that ab. *extensa-conjuncta* is figured in Frohawk (pl. 46, fig. 29.) under the name of *radiata*. There can be no excuse for this sort of carelessness, but it is always a pity when a ludicrous error of this sort is broadcast in an otherwise delightful book and one likely to be regarded as authoritative.

There are other errors of description among these forms and I may as well refer to my own description of ab. *addenda* in the "Ent. Rec." XXIII., p. 275. I there describe three forms with additional spots in the forewings and continue "This last form does not appear to be mentioned by Tutt, and I would suggest the varietal name *addenda* for it." It was careless of me to refer to three distinct specimens as "This form." The word "last" was an editorial interpolation. I make no complaint of it. It is an attempt to make the apparent meaning clearer. Perhaps, at the age of 22, I was insufficiently acquainted with the possibilities of precise expression in the English language. But the result is that an outstanding example of what I have heard a Lord Justice of Appeal describe from the Bench as "sloppiness of thought" has been made even sloppier, and it must now be beyond the wit of man to discover what form was intended to be described as ab. *addenda*. To repair the deficiencies of 15 years ago, I put it on record now that the words used were intended to include all forms with additional spots on the forewings; the name applied is in common use in the *Lycaenidae* for this purpose. There is, of course, one previously named form, which is not included under ab. *addenda*, and that is ab. *basilipuncta*, Tutt, with an additional spot in the discal cell towards the base. This aberration was described from a ♀ taken by J. F. Bird at Tintern in August, 1906. I have a ♂ taken in the Chilterns in August, 1911. The spot here corresponds to one, which is always present on the underside, and it is really rather remarkable how very rare this form is. I do not recollect seeing any specimen other than my own, and I have not heard of more than two or three.*

Forms with reduced spotting are also rare. Even the absence of single spots is most unusual.

In the Plebeiid blues there is on the underside a discal or submarginal series of spots crossing the forewing. This series of spots is liable to displacement. The whole series may be thrust out against the margin in a rather straight line, or may be closely clustered round the discoidal, the forms being known as ab. *discreta* and ab. *glomerata* respectively, in the majority of the species. The phenomenon also occurs in *Rumicia phlaeas*. I have up to the

---

* Several Turkish specimens were exhibited at the meeting.—H.B.W.

present only observed it on the upperside though I have undersides suggesting a development in this direction. The form with the spots thrown out to the margin is ab. *remota*, Tutt, and I am able to exhibit a fine and extreme form. I also have the clustered form which is un-named. These forms are so usual in the "Blues" that they have not, I think, attracted the attention they deserve. It is however, really a remarkable phase of variation and I cannot at the moment recollect other instances in the Lepidoptera of markings, which are liable to occur in different positions on the wings in specimens of the same species, except perhaps in some extreme aberrations of Geometrid moths in which the whole scheme of markings is altered; and these are hardly comparable cases.

IV. Local Races, with some general observations.—I have nothing to add to these notes on the variation of the British forms, as no useful purpose can be served by the further discussion of forms, which have been completely worked-out by Tutt.

With regard to the local races I cannot enter into any lengthy discussion. I have parted with my European and American specimens to a specialist in local variation, and am therefore confined to criticisim of recent writings, and am, moreover, obliged to confess that the more I read of these writings the less I find myself able to understand the subject. From this observation I except, with a slight reservation, the able paper by Mr. Edmund B. Ford in the "Trans. Ent. Soc. Lond.," 1923, pp. 692 *et. seq.* This very thoughtful paper is most useful with regard to the seasonal variation in different parts of the range of the species; and I find it very interesting to observe that, as regards suffusion, the author states that in all cases the male is much more strongly affected by heat than the female, so that in these southern localities, where the suffusion is very great, the species becomes, in certain broods, a sexually dimorphic butterfly. This observation is of particular interest in view of the facts, to which I have already directed your attention, in connection with the British specimens in my series of the suffused forms.

In the whole of this paper the only difficulty arises from what is possibly a too wide application of the term "sub-species," and perhaps your comments on my notes may assist me to a better understanding of what a "subspecies" is, if I conclude this paper with a few observations on this subject, which have particular reference to the writings of Verity and others on *R. phlaeas*, but are applicable to entomology in general.

In all scientific study, I take it, that exactitude is an aim, unattainable perhaps by the human intellect, but approachable more nearly by precision in statement. And though it may appear at first sight to be a paradox, I think that precision in statement is the more essential as the objects described become less capable, in our present state of knowledge, of exact definition.

Before the late war, the student of variation in Lepidoptera had to deal with aberrations, local races, seasonal forms, sex-limited forms and sundry other less frequent phenomena. By the use of the expressions "varietas," "aberratio," "generatio," with appropriate additions and combinations, it was possible to deal, with some approach to a logical system, with these forms. Clearly an absolute precision is unattainable, for while we do not know precisely what is a species, or rather do not agree to what particular degree of constancy in characters we shall, as an arbitrary human act, apply that term, and while a more accurate understanding, or a closer agreement, is to be sought not only in research and discovery, but also in the arbitrary application of the results of those processes to an almost infinitely variable series of positive facts, we cannot hope to define very precisely what the various forms within a species are, because the part must be defined with reference to the whole. Nevertheless, the old system did enable one to present facts in a scientific scheme, and in scientific language, with some prospect, or at least some possibility, of being understood.

The student is now faced with an increasing number of names for various entities within the species, and the expressions "sub-species," "form" and "race" are the most frequent. I assume, though I admit that some recent practice leads one to doubt the legitimacy of the assumption, that "form" and "race" are not scientific expressions, but are used for convenience, though I fail to follow the need for scientific names in that case. We all talk at times of the Delamere "race" of *Plebeius aegon*, the Yorkshire "form" of *Boarmia gemmaria*, and so on. This is all well and good, but when I find such a conception as *Rumicia phlaeas*, sub.-sp. *eleus*, race *initia-caudata*, I become a little fogged. *Initia-caudata* as an aberration of *phlaeas* I know; *eleus* I know, as an aberration, and as possibly something more in some broods and in some places, but to this new monstrosity I can only say "Who are you?" Surely *eleus* cannot be a sub-species. It is a temperature form and nothing else.

What, too, are the equivalents of "form" and "race" in their novel use, in foreign languages.

In Warren's masterly account of the *Hesperiinae* ("Trans. Ent. Soc. Lond." 1926, p. 24) these three expressions are used, and the sense in which they are used defined. I say at once that the author needs these expressions, or some similar ones, to describe the facts he has in mind, but the necessity for definition is surely an indication in itself of the instability of modern thought on these matters. I understand Mr. Warren's conception of a sub-species to be a form which has completely superseded the old species in some area, and is in fact in a transitional stage preparatory to its becoming a new species. The first part of this definition no one will quarrel with. The expression is appropriate in every sense to such facts; but surely the second part of the definition proceeds upon an assumption of something that no-one knows, and no-one ever will know. It is not necessary, in my view, to postulate the transitional stage at all.

When all is said, it is our aim, or one of our aims, to study distinct forms of life and their relationships and not to study geography, with insects as pawns. Much modern work is little more; for example the description of new sub-species based on the capture of a single specimen in a new locality for the species. Reference to any volume of our magazines, or of the "Transactions of the Entomological Society," will provide examples of this pernicious practice. Furthermore, is there any difference, logical, anatomical, biological or other, between the *Pachys betularia*, ab. *carbonaria* (*doubledayaria*), I get rarely among the the typical form in my garden, and the *P. betularia*, var. or sub-sp. *carbonaria* (*doubledayaria*), which replaces the type in Yorkshire? If it does not, assume for the purpose of argument that it does. Surely the black ones are all the same, and if so, what is the distinction between aberration, variety, and sub-species? It becomes a matter of mathematics. Surely the old practice suffices for such cases as these (I include *R. phlaeas* ab. *eleus*), and "aberratio" is a sufficient prefix to the name of my garden ones and "varietas" for the Yorkshire ones, and surely the whole assemblage can be referred to by the good old expression "ab. (et var.)" with more complete precision than by the use of a term which has no possible application to the facts and reduces scientific nomenclature to mere jargon. I think the true sub-species is a comparatively rare phenomenon, and I very gravely doubt the wisdom of applying the rank of sub-species to any form, which is known elsewhere as a common aberration.

I believe the expression "sub-species" was first used by Darwin, and though I have not the reference, my impression is that it was used in the way we all of us use, and rightly use, such words as "race," "form," "group," etc.—not as a scientific term but as a convenient expression. However that may be, I make no complaint of its modern elevation into a scientific denomination. It is needed to express a well known and definable class of phenomena; but I do feel the need for some approach to consistency in the use of the term. The local races of certain oriental Papilio are good examples of a sub-species as I understand the term in its legitimate use, but all local races are not sub-species in this sense. Particularly the Mediterranean races of *R. phlaeas* present quite a different phenomenon, and merely exemplify the occurrence of aberrations of general distribution in proportionate numbers different from those observed elsewhere, and varying, be it noted, in the several broods or races. I object to the description of such mathematical propositions as sub-species. I have made no reference to the meaningless repetition of the same name four or five times over that one sometimes meets with, for by no misuse of language can this recreation be termed Science.

I do, however, wish to add a few words on another aspect of the mental tangle I have just discussed. I believe it is proposed to limit the application of the Rule of Priority in nomenclature to forms not below the rank of a sub-species. With the apparent object of this manoeuvre, the limitation of varietal names, everyone must be in sympathy, as with the concurrent proposal to adopt a more informative notation for hybrids, avoiding the necessity for names. But the method proposed for the attainment of this desirable object seems to be illogical. Let us again take an example, and for the purpose of argument assume facts which are not of necessity established. An aberration of *P. betularia*—in its first occurrence it can be nothing more, is named *carbonaria* (*doubledayaria*). The name is unrecognised—it has at any rate no permanent validity based on priority. In course of time in some area, county, continent, the form entirely replaces the typical form:—it becomes a sub-species. The name as applied to the sub-species is valid and binding on future writers, but how, when, and where does it procure this validity? Does the name become valid from the unascertainable moment when the original type became extinct, or has its validity retrospective action? I may here be anticipating difficulties that will be avoided in drafting the new rule. Perhaps the sub-species will have no recognised name until named as such: the name *doubledayaria* will be inapplicable to the sub-species. This will perhaps avoid the difficulty, if it is clear that the original description was of an aberration or of something less than a sub-species, but we may not always know. And let us suppose, on the other hand, that in Surrey I discover a sub-species of *Boarmia roboraria*—entirely replacing the type. I name this form, and it has a valid name. Presently the new form appears as a rare aberration in Dorset. Has the aberration any name at all? If so, what is it, and how should it be indicated?

Surely too much fuss is made over aberrational names. No one is bound to use them. I imagine few people do. In my series of *R. phlaeas* and of most other butterflies I use them, and label the forms accordingly. I find them useful, and they assist me in many ways. They avoid the necessity for lengthy descriptions in conversation with other enthusiasts, for example. Many Lepidopterists feel no need of this particularity and do not use them. Both sub-species of the species Lepidopterist are presumably satisfied. The only persons who suffer, as it seems to me, are the library entomologist who does not know the insects, and the less tolerable person who is too lazy to work them out. A restriction on aberrational names will only result in forms which are not subspecies being described as such, as is obvious from the numerous instances in which this has already happened; and the writer of the future, escaping from the present torture of sorting aberrational names, and disentangling their priority, will fall into the worse torment of dealing with a mass of sub-specific names in respect of which he must determine not only the validity and priority of the name, but also the title of the form to sub-specific rank.

Let us hope he will at least have some accepted definition of a subspecies to work upon. That definition I hope, will ignore the modern tendency to regard evolution as a rapid process, and recognise that before any new species is evolved from any subspecies now known to us, we and our specimens, possibly our books and our knowledge, will have passed into the land of forgotten things ; and perhaps I cannot better conclude than by voicing the thought that must occur to some of you, in the hope that it will afford you as much relief as it does me, that this paper will have gone with the rest.

Notes on a Collection of Polyommatus icarus race clara made in the West of Ireland in 1925-6.

By Hy. J. Turner, F.E.S.—*Read January 27th*, 1927.

Mr. C. W. Sperring has submitted to me an exceedingly fine collection of *Polyommatus icarus* from the West of Ireland, consisting of nearly 500 exquisite specimens. Mr. Sperring tells me all are of the single brood which occurs in Sligo, Clare and Galway and the North of Ireland. The bulk are from Sligo in 1926 (299) and 1925 (89) with 53 from Galway and 46 from Clare, both sets taken in 1926. The Sligo sets were all taken in the latter half of June, as also were the Clare specimens, but some of the Galway specimens were taken the first week in July.

Tutt in his small work on "British Butterflies," 1896, named the *icarus* examples of the first brood, characterised by "♂s bright blue approaching *bellargus*=*thetis*, ♀s bright blue with orange spots (especially on fore-wings) almost obsolete," as ab. *clara*, and added that he had never seen it except in the early brood.

In the "Ent. Record," XIV. 113. (1902), with greater knowledge, he widened his definition of the form as "A large bright blue form of the ♂, more approaching that sex of *A. thetis* (*bellargus*): the fringes often distinctly marked with black dashes at ends of nervures, occasionally extending half way through them. The female also larger, and usually well marked with blue scales. On the underside the spotting is frequently restricted. The normal form in Western Ireland and in some parts of Scotland, much rarer in England, where it only occurs as an occasional aberration,"

In his Vol. XI. "British Lepidoptera"=vol. IV. "Brit. Butts.," 1910, Tutt stated that this form *clara* "becomes more or less racial in the extreme west and north of Europe, and attains perhaps its greatest brilliancy in certain parts of Ireland and Scotland."

His remark, in 1896, "♀ with orange spots (especially on fore-wings) almost obsolete," is hardly held out in his summary of observations in 1910 ("Brit. Lep." XI=IV., p. 178.)

Perhaps the red chevrons are the most conspicuous features of the undersides of both sexes, both on account of their brightness, as well as of their full size and almost invariable presence.

The whole collection well substantiates Tutt's remarks, which I have given above. Only in a very small percentage of females are the red chevrons absent or even obsolescent on the upper sides, except occasionally the apical two or three of the forewing.

The specimens are remarkably uniform in being very large in both sexes, with only a minute variation in expanse either in males or females, which approximate very closely in size. In marking also there is no striking aberration, either on upper or undersides. All seem to follow a tendency, to a certain extent, of obsolescence in the underside marking, which is generally fainter, the ocelli slightly smaller, and less emphasised than normally, so that the absence of a spot, or it may be two spots, wholly or partially, does not readily catch one's eye.

Only a very small percentage of the males are ab. *nigromaculata*, Ckll., with a row of black spots on the hind margin of hindwing.

Although there is a considerable number, possibly approaching 50 p.c. of the males, with the two basal spots of the forewing more or less obsolescent, or only one present on the forewings below, only some half a dozen quite perfect ab. *icarinus* are present. In the females these two spots are not nearly so obsolescent as in the males.

Male Uppersides.—The males are very uniform in their brilliant blue; a few individuals show a more decided *adonis* blue, but from their glossy tint may be better classed as ab. *hylasoides*, Tutt.

In some positions many males appear shaded or clouded obscuring the colour, but when the angle of vision is changed this appearance vanishes. Presumably, this is on account of the scales not being flattened, and not because of an admixture of dark scales.

Male Undersides.—In the ♂ undersides the ground colour of the forewing is pale dove and there is a contrast of ground colour between fore- and hindwings, which is more pronounced than in our average South England specimens. The hindwings are more or less tinged with chocolate colour, which does not appear on the forewings. In the female the contrast is between two shades of chocolate, that of the hindwing being often very thick and rich. The ground of the male hindwing approximates closely to that of the forewing female in a good proportion of specimens. The ground colour of the Clare males is on the average darker than the Sligo examples.

In most of the underside ♂s the red chevrons of the forewings thin out in colour, even to complete absence in both the apical and inner marginal areas. In the ♀s this occurs but rarely. In a few ♂ undersides (h.w.) the marginal chevrons are yellow-orange rather than the usually pronounced red-orange.

The black tips of the chevrons are generally small in length and width, the inner side is always margined with white and this white edging is continuous.

Outside the chevrons of the ♂ underside is a white band crossed by the very fine black-lined veins; each square or compartment thus formed is occupied by a strong black dot.

The veins vary much in the emphasis of their white lining.

The blue, or green, metallic flush at the base of the forewings is sometimes only just traceable, even in a good light, but is more apparent if the insect be tipped forward. The flush at base of hindwings is very strong comparatively and larger in area also.

The discoidal spot on the hindwing underside of the males is usually a well developed white area, with or without a mere black streak centrally.

The discoidal spot on the underside forewing of both sexes is unusually uniform in size, shape, and pupillation. In one Sligo 1925 specimen it is obsolescent, with a few dark scales in centre.

On the other hand the white discoidal spot of the hindwings both ♂ and ♀, although also very uniform in shape and size, is often without a black crescent or with only the merest trace of it with a few black scales. There is often a white circular prolongation on the outer margin of the discoidal, extending along vein 5 towards the marginal row of ocelli between no. 3 and no. 4. A more obtuse projection usually lies towards the inner margin.

The black-brown marginal line, from which the fringes spring is very thin and hair-like, with thickening at the crossing of the veins, but the fringes are not chequered. They are for the most part pure white, with a very faint brown line running through, and occasionally an extension of light brown from this central line to base of fringes.

One ♂, Sligo, 1925, has the fringes pure white on both fore- and hindwings, which are much emphasised by the almost total suppression of the narrow black marginal band, leaving only the black hair line with an outer shade at base of fringes, and an inner narrow white lining. The costa of this specimen is also margined with perfectly pure white.

On the hindwing there should be a basal row of 4 ocelli in a curved line, the first three from the costa often being in a straight line. That on the costa is invariably present and well-developed even in otherwise obsolescent specimens, *i.e.*, it is the most permanent. The second is, as a rule, less emphasised and in 25% is wanting, with a further percentage of weakly developed ones. The third is practically always weak and often absent. The fourth is scarcely traceable or completely absent. (It must not be confused with the last of the marginal series of ocelli which is usually displaced considerably inwards.)

One of the Sligo 1925 ♂s is underside ab. *obsoleta*, Clarke, except for one well developed ocellus on the R. hindwing; and several in the collection are *semi-persica*, with the ocelli on the hindwing more or less obsolete.

Although the basal spots on the forewing below are so obsolescent, a very few only are ab. *iphis* with one spot alone present. But I note on the other hand, one ♂ which has a small ocellus on top of the upper basal one, thus making it have two pupils. This, I think, is the only *addenda*-form in the whole collection. According to Tutt, it must be a very rare form, and should be styled *excessa*, Gillmer. I have been unable to trace any reference to this form of *addenda*, even in Courvoisier's comprehensive scheme of Lycaenid markings.

Strange to say, this is the only specimen in the collection, which can in any way be included in the "luxuriantes" section of Courvoisier's scheme.

A Sligo 1925 ♂ specimen has the fringes wholly pure white, both fore- and hindwings, with a very fine black hair line at the base, which is succeeded inwardly by a narrow pure white shade, giving a very delicate appearance to the specimen.

There is a general tendency to smallness or absence of ocelli, with the pupils also very small and inconspicuous.

The band of sub-marginal ocelli should consist of 6 + a double one, + 1 inner-marginal ocellus removed considerably inwards out of alignment. The first costal spot is also removed inwards and approaches the costal spot of the basal series. This is practically never wanting and the last to disappear in an obsolescent series ; it is usually well emphasised. The second is decidedly smaller and often obsolescent, 25%, and frequently only a white dot and no black centre. The third and fourth approach the chevron series and with the fifth and sixth are mostly present and perfect, but never so strongly developed as in the corresponding ocelli in normal specimens. The double ocellus is present in about 25% to 30%, and then often only one half is developed. The last ocellus is absent in quite 60%.

Because "the basal, submedian and discoidal spots are all very small," many of the males may be called form *parvipuncta*, Courv.

The white submarginal wedge arising from chevrons 4-5, thrusts its apex between the ocelli 4-5, and occasionally engulfs one or both without trace of the black pupils, thus becoming more prominent. Very occasionally, this wedge elongates and makes an approach to the discoidal spot, the extension of which runs on a vein parallel with it.

Female Upperside.—It is a difficult matter to discuss and compare the blue colour of the females, even in the clear sunlight, on account of the intermixture of the dark scales of various shades of brown and black, and of the mixture of light (white) scales also of different shades, and what is equally influential, in differing proportions.

These dark scales are, of course, the normal specific scales of the female, and the alteration of coloration in the female scales is rarely so complete as to render the scaling a facsimile of that of a male; the influence of the original, natural coloration of the normal female scale is always there more or less, hence the female rarely has or could have such a brilliant appearance as the male has.

There is no female wholly without blue scaling on all four wings; only a very few, have the blue confined to a restricted area near the base, ab. *semi-clara*, and these are practically all of the 1925 Sligo captures. The whole of the remainder have more or less brilliant blue over the surface of all the four wings. In no sense are any specimens patchy with blue suffusion.

A certain number of examples have white, or bluish white, irregularly shaped patches in the marginal area of the hindwings, and also have the discoidals similarly emphasised by more or less regular whitish scaling around them. A few have white or bluish white chevron-caps on the inner side of the marginal chevrons. The black chevron cap is very thin in many examples.

About 30% have only a very faint discoidal usually only apparent in certain lights.

Female Undersides.—The ground colour of the under-surface of the females is again of a very uniform rich brown, usually deeper, although not always, on the hindwings than on the forewings. A few specimens have this ground colour darkened on the hindwings, suppressing the brilliancy of rich brown.

On the underside the red chevrons are always well, even strongly expressed, and on the forewing somewhat obsolescent towards the apex; in about 10% the top spots are almost totally suppressed. The double ocellus is also smaller and tends to suppression.

There is also a tendency in both sexes for the submedian ocelli to be thrown back towards or against the marginal series, sometimes forming a line parallel to them and straight. This is ab. *discreta*, Tutt. One female of Sligo 1926 is a very fine example of this, the ocelli being enlarged, oval, touching the marginal chevrons, without any intervening ground colour.

This example of ab. *discreta*, because of the much emphasised submedian spots, also answers to the name ab. *crassipuncta*, Courv.

The number of ab. *subobsoleta*, Tutt, in the collection is rather large, as having some of the ocellated spots in the submedian and basal row absent on fore- or hindwing below, or on both. This is particularly characteristic of the males.

A peculiarity of the underside coloration, which I have not noted before, is that in the females the suffusion towards the base of the hindwing is of a golden or brassy blue, while in the males it is of a greenish blue, sometimes more of the blue, sometimes more of the green predominates.

The discoidal is perfect in all forewings, with a large black crescent and white surround. About 25% have one basal spot absent and about 5% both absent = ab. *icarinus*; 15% have the top basal and 10% the bottom basal spot wanting.

The row of ocelli on the underside of the hindwing should be 6, 1+1, 1, but is very seldom complete. The double spot is often single and very small. The spots generally small, largely and wholly wanting in 25%, most examples have one or more ocelli absent, and always less pronounced than in the upper wing. The most stable are ocelli 1, 3, 4, 5 from apex. Only 7% have the double ocellus present and perfect, and the anal ocellus is the most obsolescent.

The basal row of four on the lower wing is also very unstable. In the majority the costal spot is the only one present, the remains of the others are minute dots hidden in hair scales or they are completely wanting.

From the amount of material before us, I think we are fully justified in considering the West of Ireland *P. icarus* as constituting a well defined sub-species. We have the form *clara* completely replacing the typical *icarus*.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read January 27th, 1927.

By T. H. L. Grosvenor, F.E.S.

LADIES and GENTLEMEN. The reports of the Council, and of the Hon. Treasurer which have just been read to us, once again show that the Society has been making very satisfactory progress, which is gratifying to all of those who have the interest of the Society at heart.

To briefly summarize the events of the year, we must first of all consider the membership, which is the truest index of advance. At the end of January 1926, the number of members was 242, from this total 2 have resigned, death has removed 4, and 4 names have been removed for non-payment of subscription. These deficiencies have been more than counterbalanced by 25 new members joining, which brings the total membership to 257. Once again it was found to be unneccessary to make an appeal for the publication fund; but we must not take too much credit for this, as we owe a very considerable debt of gratitude to a member who has financed the cost of illustrations for many years past. It is most sincerely to be hoped that with an increasing membership the Society may be entirely self-supporting. The "Proceedings" published this year are worthy to rank with their predecessors.

The Annual Exhibition was again an unqualified success; but, unfortunately, the Clerk of the Weather was in a contrary mood, and produced one of London's own particular brand of fogs, so dense that there was a large number of absentees. Yet, in spite of the weather 169 members and friends attended; and there is every reason to believe, that if conditions had been favourable, the record number of 211 would have been passed. The arrangements appeared to meet with very general satisfaction and the thanks of the Society are due to Mr. O. R. Goodman and other members for material assistance in carrying them out.

In view of the prevalence of fog in London during November, it has been suggested that the date of this meeting should be altered ; doubtless this will be considered by the new Council.

Last year I reminded members that this is a Natural History as well as an Entomological Society, and appealed for a greater variety in the exhibits. It is not possible to give the numbers of each class shown during the past year as they have not yet been published, but, speaking from memory, this suggestion has been acted upon. Another point, which is very gratifying to note, is the larger number of exhibits by the younger members. Altogether, this branch of the Society's work has been maintained.

Unfortunately, the field meetings have been very disappointing: neither the Society, nor the members can be blamed for this, as owing to the lamentable trade disputes, and the consequent lack of railway facilities it was impossible to carry out the programme that had been arranged, and several of these usually successful summer meetings had to be abandoned.

The saddest part of an annual address has now to be faced. Unfortunately, the Angel of Death has been very active this year, sparing neither old nor young, and has taken from the Membership roll some of the most brilliant names in the entomological world.

Dr. William Bateson, whose death took place on February 18th, 1926, at the comparatively early age of 64, was elected an Hon. Member of the Society in 1912. Bateson's name will live in the annals of biology, for his work on Mendelism. When Mendel's celebrated paper was rediscovered in 1900, he recognised it at its true worth, and immediately commenced work to prove or disprove the theory. As a result, he published his work "Mendel's Principles of Heredity." In 1908 he was made Professor of Biology at Cambridge, but two years later he vacated the chair to become Director of the John Innes' Horticultural Institution at Merton. He received from the Royal Society the Darwin Medal in 1904 and the Royal Medal in 1920. He was also a Trustee of the British Museum. In the passing of Dr. Bateson the South London, in common with many other societies, loses one of the most brilliant scientists of the age.

Dr. C. L. Withycombe, whose death occurred on December 5th last, at the early age of 28, joined the Society in 1920 and was a most regular attendant at the meetings until 1923, when he went to Trinidad as lecturer in Entomology at the Imperial College of Tropical Agriculture. During the war he served in the 16th Battn. the London Regiment, and on demobilization went to the Imperial College of Science, where he was the favourite pupil of the late Professor Maxwell Lefroy. In October last year he returned from Trinidad, and took up the newly created appointment of lecturer in Advanced and Economic Entomology at Cambridge University.

The Revd. F. D. Morice, M.A., F.E.S., whose death occurred on September 23rd last, joined the Society in 1911, becoming a life member. He occasionally attended the meetings, and was a very regular attendant at the Entomological Society, where he served as President in 1912. Born in 1849, Mr. Morice was educated at Uppingham and Winchester, proceeding to Oxford in 1866, where he gained high distinction. In 1871 he was elected a fellow of Queen's College, and was ordained in 1873. In the following year he became Assistant Master at Rugby, but retired in 1894. His chief entomological interest was the Sawflies; he has left his collections to the Hope Department of the Oxford University Museum.

F. W. Enefer, who died suddenly in the street in October last, joined the Society in 1920, and from that time until his death was a most regular attendant at all the meetings. He was well known to most of the members, as he made many exhibits, usually of orders other than lepidoptera.

I will now confine my remarks to the lepidoptera. The genus *Zygaena* has appealed to me strongly for many years. In the earliest stage my interest was aroused by the vast amount of variation the species exhibit; and as I did considerable selective collecting with a view to obtaining as many of the various forms as possible, I rather fancied that I could with certainty differentiate the various species, and, being able to separate *lonicerae* from *trifolii*, I began to think I knew all there was to know. But I hasten to acknowledge that this was entirely due to insular views (one of the deadly sins), and as I began to interest myself in the Zygaenids from the whole of their palaearctic range, things began to take a different aspect. Lord Tennyson admirably summed up the situation in his line "Behold, I know not anything."

To differentiate between *trifolii* and *lonicerae* from English specimens is comparatively simple; how to do so is difficult to explain, but when one gets used to them there are very decided differences. First, if one finds a colony with a large majority of the examples having spots 3 and 4 separated, one immediately has a clue that the insect is *lonicerae*; then there are differences in the wing-shape and antennae, and also a different tone in the colour, which, when one is familiar with the genus, lead to a definite conclusion. Things are different, however, when the continental forms are considered: one finds perfect transitions from 5-spotted to six-spotted species, some regularly producing 5- and 6-spotted forms, to species that are so completely confluent that the insect is red all over with the exception of a narrow black border; this is seen in the very local Italian species *rubicundus*. We find on the Continent *trifolii*, *lonicerae* and *filipendulae*, all tending very strongly to one another; even in England one can find difficulties if looked for. At Tring there is a colony of *lonicerae* that has every appearance of being *trifolii*; in fact, I passed them over as being that species, and it was only due to the fact that they would not pair with *trifolii*, that made a more careful study necessary, when the outstanding features of *lonicerae* became apparent. I gave some of these Tring specimens to Dr. Verity, and he considers them completely intermediate between the two species. I cannot agree to this, and consider them without any doubt to be *lonicerae*, but they are a local race having developed the facies of *trifolii*.

That the Zygaenids can be puzzling is shown by the fact that Tutt was entirely led astray, with *trifolii* and *filipendulae*. At Chattenden, in May and June, 1892, he found 5- and 6-spotted forms flying together. The 6-spotted form he named *hippocrepidis* and stated that he considered this insect to be, if not an offshoot of *trifolii*, at least very closely allied to it. I have no hesitation in saying this is quite incorrect. There are many colonies in Sussex where these two species fly together and many others where they fly alone. Tutt described *hippocrepidis* as being a small insect with the 6th spot reduced in size. I have for many years past collected at East Grinstead in a locality where *hippocrepidis* occurs without a 5-spotted species; the insect emerges there in late May and early June, and as a general rule could not in any way be distinguished from the most typical *filipendulae*, that occur on the chalk-hills in late July. The curious fact now appears: in 1923, this large, heavily-built *Zygaena* disappeared, its place being taken by very considerable numbers of a much smaller insect (on an average 10 mms. less in expanse). Unfortunately, I did not notice this at the time I collected them, and it was only when I took them off the boards and they were compared with previous years' captures from the same locality, that the small size was most noticable.

These small specimens compare in every detail with Tutt's Chattenden specimens, except that the East Grinstead types were much brighter, and probably this may be ascribed to the fact that Tutt's specimens are 30 years old. I visited East Grinstead again in 1924 with the idea of taking a very long series of this small race that had so suddenly appeared in the previous year, but things had again changed, the small form had entirely vanished, its place being taken by the large form, and so it has remained ever since. The early emergence of *hippocrepidis* I consider to be a case of suitability to environment, as these early forms always appear in more or less marshy ground, whereas *filipendulae* generally occurs on dry uplands.

A very curious analogous case has come directly to my notice, and the whole process can only have taken a few years to adapt itself. As *filipendulae* has an early and a late form, so has *trifolii*; but in this case the process is reversed, the early form appearing on dry hillsides in May and June, and the late form in marshes in July. The instance of adaptation to changed environment that I wish to show is this. A colony of mid-July *trifolii* was discovered in 1907: the insects were in every way typical, except that they were rather smaller than is usual with this late emergence; and from then until 1914 they regularly occurred from the middle to end of July, in a marshy field, so that everything was as one would expect. In 1914, owing to the outbreak of war, the district was short of labour, and whereas prior to 1914 the fields were regularly kept free of weeds and undergrowth, this work was neglected, and the whole of the land was covered with very rank vegetation, whilst another part of the ground was cleared for vegetable culture. The result was, that the foodplant, the large marsh form of *Lotus corniculatus*, (=*L. major*) was eradicated, and in the normal course the Zygaenas would have been exterminated. Owing, however, to an unnatural feature of the country, a railway bank had been cut; and on this *Lotus* was growing in large quantities. Prior to the war *trifolii* did not occur on this cutting, or if so only stray ones, but by being gradually forced out of their original habitat, they changed their quarters to this bank. When this change took place I do not know, as I could not visit the locality between the years 1915 to 1919; but when I visited the old ground in 1920 there was not a *trifolii* to be found. A chance visit to the railway bank showed the species in plenty, but with a curious change: whereas, it should have been only just emerging, it was already worn and practically over. The interesting fact is this, that owing to the change of ground, the species has changed its habit in the short space of six years, emerging nearly a month earlier, thus making it more nearly to correspond with the form found on the chalk-hills. The emergence date of the early form being about May 20th to 25th, the insects from the railway bank about June 15th, against their old emergence date of about July 15th.

The Zygaenids are apparently a very primitive genus, and have travelled a very short distance on the road of evolution, the consequence being that all the family have a more or less common form, and extreme aberrations of one species overlap, and may be hardly distinguishable from the type of another apparently very distinct species. Being very primitive forms of the lepidoptera, to my mind, may account for the very wide range of variation to which these insects are prone; and, possibly, we have here instances of species in the making, such as have occurred in ages past with species now showing a higher degree of specialization.

Z. filipendulae is a species well known to all entomologists in England, and it is equally common on the Continent, but whereas its phases of variation in England are comparatively slight, it is very different in its most southern areas, where we have a multitude of different forms known as *stoechadis*, which have until recently passed as distinct species. To my mind, different as *stoechadis* may be from our *filipendulae* in appearance, specifically they are the same. The most extreme forms of *stoechadis* will pair quite readily with English *filipendulae*, and produce fertile ova. I have many times had these pairings, but have not yet succeeded in breeding from them. Zygaenids from these Southern regions do not hibernate as well as those from more northern areas, and are prone to produce second emergences, in small numbers. It would seem, therefore, that on the shores of the Mediterranean, hibernation is not so complete as in England and Central Europe, where it is extremely rare to get even a single example through as a second emergence. I have bred many thousands from English parents, but to the best of my recollection have never obtained one. The more usual occurrence is for larvae to hibernate a second time; this in the extreme north or in high altitudes is always the case, and several mountain species regularly pass two winters in the larval state. Mr. Bethune-Baker has recently described a new species of *Zygaena* from

Spain, which he calls *Zygaena clorinda.* These were taken in Catalonia by Querci in October; surely a most unusual date for this genus. I have not had an opportunity of seeing this species, but judging by the date, locality and small size, I would suggest that these are second emergences. I do not wish to infer that this is not a previously undescribed species, particularly as they come from Spain, a country where there are some very curious species, and also little known; but I certainly think that if a search were made in this district an insect would be found in June or July, from which *clorinda* could be bred as a second emergence. *Z. stoechadis* is perhaps the most remarkable of the genus, even more so than *transalpina.* It will readily produce from a parent 5- or 6-spotted forms, and with all grades of intermediates it will produce nearly black examples: thus we have a species which has many forms transitional to several other species. So close do some of these approximate, that they can only be differentiated with the greatest difficulty. Many of the darker forms are almost identical with *lavandulae*, except that the white collar of the latter makes identification certain and easy. Here, it seems, we have several forms that may in course of time become species, especially so as the various forms are all more or less differentiated as local races; and as each race seems to flourish one can only assume the variation is beneficial to the race.

In the tropics we see this same tendency to local variation in many species, and especially is this the case, when we have insects in insular habitats. These being isolated, a local race quickly comes into being, and not having any mixture from foreign invasion, the race quickly becomes stabilised. The Island of Celebes is particularly noteworthy in this respect, inasmuch as the tendency in this island is to form races with acutely pointed wings, which we see very strongly developed in the Papilios and Pierids. What may be the influence that causes this development, I do not pretend to understand, but the fact remains that species that are common to the mainland and Celebes may be readily differentiated by this peculiarity; apparently this form is suited to its habitat, but how it originates it is difficult to see. Where particularly specialized local races are prevalent, it is generally found that these show marked virility; thus, it would seem that weakness does not come into the question, and a local race, which has been evolved particularly suited to its environment by reason of this virility, will increase and multiply, and so tend to further divergence from the type, until the time comes when it is so distinct that it becomes what we understand as a species. The reverse is often seen in aberrations, which from some obscure cause may have deviated from the type; this may or may not be hereditary, and if it is not beneficial it may linger for a time, but eventually it will die out. In the course of collecting Zygaenids with the late Dr. Hodgson, a colony of *trifolii* was found that produced a small percentage of black forms. These continued regularly until 1920, after which the race disappeared; the cause was certainly an artificial one, but by breeding this aberration, I proved at least to my own satisfaction, that this black form could never become more than an aberration, although it bred in strict conformity to Mendelian laws. These black insects behave in a very curious manner, in regard to sexual attraction. A black male would always select a typical female, and a red male would always show a decided preference for a black female; to such an extent would this selection be shown that by enclosing a black female and several red females, and then introducing a red male it was quite a foregone conclusion as to the result—the black female and red male would be paired. This pairing would produce the expected result, the offspring being all of the typical red form and the offspring of these would show perfect Mendelian results: they produced 25°/₀ black forms, and the results never varied. Thus, if this black form had been in any way beneficial, the colony being only a small one, one would expect the whole race to be permeated with the black blood, and this form become if not predominant, at any rate increasingly represented; but the numbers did not increase, and when the entire ground was burned during the excessively dry season of 1921, few insects escaped and a black aberration has not been seen since. Although the colony has increased in numbers, the black strain has been entirely eliminated. The reason why the black form did not increase has been made quite clear by breeding from this race, although opposite types show decided sexual attraction, it is only when black pairs with black that one can expect any material increase in numbers. Although the black strain is latent in the race, the chance of the blacks to increase in numbers is very limited, as it is only when a parent carrying the factor for black comes into contact with the other parent also heterozygous for this factor, that these aberrations are produced. The 25% or rarely 50% of this form are subject to the same high death-rate common to all insects. The typical form in the large majority of cases stands three times the chance of surviving, and even under the most favourable conditions the chances are only equal. Why the black form can never be the prevailing type is quite clear, when one knows what happens when the remote chance of black pairing with black takes place. In the first place there is most marked sexual aversion between these black forms. To such an extent is this carried that I do not believe such a pairing would ever take place in nature. I have on a few occasions obtained pairings in captivity; but often two or three days would elapse before the moths could be induced to pair, and finally it was only made possible by putting normal females in close proximity, and only separated by fine gauze. Now the final act is this, that even when black is induced to pair with black the resultant ova have been, in every case, quite infertile. Thus, we plainly see the reason why this cannot become a local race. It may persist, as it has done, for a considerable period, so long as circumstances are favourable, but some unusual occurrence may arise which may decimate the colony; and the chances are that the heterozygotes, which are rarer than those homozygous for the type will be largely killed off, and give the type an opportunity to increase. Of course, the few remaining heterozygotes will still continue to carry the factor for blackness, but owing to the chance of pairing with a similar heterozygote being very remote the black strain can only occur as a very rare aberration.

Another case of an extreme aberration came to my notice when breeding these black forms: a female emerged with the usual red coloration replaced by white, caused by the red scales being shrivelled up. In this case the sexual attraction was nil; and although I tried every means to obtain a pairing for many days, I could not succeed. I look on these two instances of aberrant forms as being unsuitable, either from inherent weakness or some other cause, and therefore of no benefit to the race; and if this can happen in one species, there is no doubt that it occurs in others. Thus, we see the workings of Nature, in producing through the agency of variation a vast number of forms on the chance that one may be produced that will confer material benefit to the species; and so down the ages evolution proceeds, new forms being produced, the old giving place to the new.

In conclusion I hope I may be excused if I read a couple of verses from that noble poem of Lord Tennyson's, which so admirably sums up the situation.

"Are God and Nature then at strife,
That Nature lends such evil dreams?
So careful of the type she seems,
So careless of the single life;

So careful of the type, but no,
From scarped cliff and quarried stone
She cries, a thousand types are gone
I care for nothing, all shall go."

Ladies and Gentlemen, I have now a last duty to perform, and that is to most sincerely thank the Officers and Council for all their kindness and consideration shown to me during the past two years in which you have honoured me by electing me President of the South London Entomological and Natural History Society. All that now remains for me to do is to join with you in extending a very hearty welcome to my successor, Dr. Cockayne, a gentleman too well known to all to need any introduction from me.

I do not think I can better utilize my few last words from the chair than by wishing all success to the South London; and may the progress that has been such a noteworthy feature of the last few years continue from generation to generation, varying in a beneficial manner to meet the changes that may come in the future, but continue to be homozygous for those factors that now distinguish it, a means whereby entomologists of all degrees may assemble and meet together assured of a hearty welcome.

ABSTRACT OF PROCEEDINGS.

FEBRUARY 11th, 1926.

The PRESIDENT, Mr. T. H. GROSVENOR, F.E.S., in the chair.

Mr. H. A. B. Harmsworth, of 3 Marlborough Gate, Hyde Park, W., was elected a member.

The decease of an Honorary Member, Mr. Wm. Bateson, F.R.S., was announced.

Dr. Cockayne exhibited a specimen of the white variety of *Zygaena trifolii* from Swanage (Harper-Crewe Colln.).

Mr. Grosvenor exhibited a specimen of the same aberration, which was bred from a Sussex Weald larva.

Mr. Barnett exhibited a long series of *Dianthoecia conspersa* taken in the S. Croydon area, where it was very plentiful some fifty years ago.

He also presented a copy of the portrait of Henry Doubleday for the Society's album.

Mr. Hy. J. Turner exhibited about 50 species of Exotic Coleoptera, including Longicorns from Madagascar, New South Wales, Malaya, Java, the Cameroons, Corea, etc.

Mr. E. J. Bunnett read a paper; " Some Notes, on the Flora of Manitoba," and exhibited a very large number of herbarium specimens of the more characteristic plants.—(See page 1.)

FEBRUARY 25th, 1926.

The PRESIDENT in the Chair.

Mr. R. M. Long, 21, Gay Road, Beddington, was elected a member.

Mr. E. Step, F.L.S., exhibited the legumes of *Poinciana regia*, received from Mr. W. H. Miles, F.E.S., of Calcutta. These are two feet in length with a breadth of two inches, and of a hard, woody texture. The valves do not separate spontaneously, as in our familiar furze, pea and vetch pods; the hard seeds remaining until the pod decays. The exhibitor had opened one specimen, to show that the seeds (about 40) were each accommodated in a separate woody cell, which looked like the work of a craftsman. The object of such care of the seeds is not apparent. The tree is a native of Madagascar, but has been introduced to Calcutta and other warm cities for the sake of its brilliant orange flowers.

Mr. Turner, on behalf of Mr. Greer, exhibited an illustration of "Wild Silk Moth just after emerging from its chrysalis at the London Zoo," taken from the *Daily Mail* of February 19th. Needless to say it was *not* of a moth, but a large North American Papilio, probably *P. glaucus*.

Dr. Seth-Smith exhibited a female of the ab. *fuscata* of *Hemerophila abruptaria* from South Hampstead, and several males of the same form.

Mr. Barnett exhibited *Heliothis peltigera*, bred from Ventnor in 1908; he also showed *Bankia argentula*, from Wicken, taken in 1908.

Mr. A. A. W. Buckstone exhibited series of *Pararge aegeria* which in the early stages had been subjected to temperature experiment; and contributed the following note.—

PARARGE AEGERIA. TEMPERATURE EXPERIMENT.—The larvae from which these specimens were bred commenced to pupate on September 20th, 1924, the last undergoing this change on November 17th.

During the first week of December, three butterflies emerged, two males and a female, constituting a partial third or autumn brood. The two males, it will be noticed, are extremely dark, the pale markings being very slight, while the female is of the usual summer form. Although the cage containing the pupae was exposed to the direct rays of the sun during the day and was brought indoors at night, no other emergence took place; and of the remaining two hundred or so pupae, one half were placed out of doors, while the cage containing the remaining half was removed to a room in which there was frequently a fire. The pupae were kept in their respective situations during the winter.

Emergence of butterflies from the indoor chrysalids took place from January 17th to February 15th. On the latter date, a number of the pupae, which had been kept out of doors, had commenced to change colour. These were placed in a warm room and the imagines commenced to emerge on the 27th. The remainder of these outdoor pupae were treated in a similar manner as soon as they commenced to change colour, and emergence continued up to the second week in April.

Judging by the two extremely dark males which emerged in the previous autumn, and in view of the temperature of the room (about 50 to 75 degrees), he rather expected that those of this sex resulting from the protected pupae would have been at least as dark as those of the average summer brood; but when they are compared with the several series brought for the purpose of comparison, it is seen that this, with the exception of the five dark (pathological?) specimens, is not so: the markings being scarcely less pronounced than in those which emerged from the unprotected pupae, which latter may, be described as of the usual spring form. The females however, with a few exceptions, differ somewhat from those of this sex, which emerged from the unprotected pupae, the majority having the pale markings less pronounced, therefore approaching the summer form in this respect. In a few specimens the markings of the hind wings are scarcely discernible. It is in the undersides, however, that the difference is most marked—the undersides of the hindwings of all these female specimens having a delightfully soft appearance, which is due chiefly to the cross lines being subdued.

The following aberrations appear in both ♂ ♂ and ♀ ♀ of each series.

Specimens without yellow blotch on disc of hindwings.
,, with dark purple-brown underside of hindwings.
,, with yellow radiation on hindwings.

The following series were shown for comparison.

Spring brood, captured at Dorking, Surrey.
Spring and Summer broods, bred, Chiddingfold, Surrey.
Summer brood, bred, North Cornwall.

The following members exhibited Lantern Slides :—

Mr. Hugh Main, items in the Life-history of the Trap-door Spider.

Mr. R. Adkin, the scaling of various forms of *Polyommatus* (*Agriades*) *thetis* (*bellargus*), to show their shape, arrangement, and the development of the scales in each form.

Mr. Dennis, the clinging of adventitious roots of ivy, acacia thorns which are tenanted by ants, the clinging of Ampelopsis, etc.

Mr. A. de B. Goodman, stages of the larva of *Pharetra euphorbiae*, and of *Zygaena carniolica*, from Le Rozier, Cevennes; the Neuroptera, *Myrmeleon formicarius*, *Ascalaphus longicornis* and *A.*

cocajus, from the Cevennes, and *Palpares libelluloides*, from Pont du Gard, S. France; and the Hymenopteron, *Polistes gallica* (nest and imagines), from Pont du Gard.

MARCH 11th, 1926.

The President in the Chair.

Mr. H. D. Pearson, F.E.S., was elected a member.

Dr. Cockayne exhibited the following examples of Homoeosis (1) *Noctua rubi*, in which some of the forewing marking was reproduced on the left hindwing; (2) *N. primulae* (*festiva*), a specimen with a light band on the forewing, and with forewing markings reproduced on the left hindwing; (3) *Catocala nupta* with a number of jet black markings on the discal area, a red crescent on the inner margin, and two other small red patches on the disc of the forewing.

Mr. Barnett exhibited three races of *Hipparchia semele*, (1) from Eynesford on the chalk, with the general coloration light; (2) from South Devon on the Red Sandstone, with a decided tinge of reddish colour; (3) from the New Forest, where the soil is dark, with a darker shade of colour throughout. He also showed a *Xanthorhoë montanata*, which was dark suffused generally, with the pattern darkened in proportion, except the transverse discal band, which was normal.

Mr. H. Moore exhibited specimens of the Cicads and Grasshoppers, which are well-known as "songsters" on the continent, and an example of a small cage in which the country people of Italy keep one of them occasionally.

Mr. H. Main exhibited a number of insect "songsters," Cicads, Beetles, Grasshoppers, Hymenoptera, Homoptera, etc., and also an example of the largest British woodlouse, *Ligia oceanica*.

Mr. Enefer exhibited several Cicads from India.

Mr. K. G. Blair read a Paper entitled "Some Insect Musicians," and showed lantern slides in illustration (See page 11).

MARCH 25th, 1926.

The President in the Chair.

Mr Stanley Edwards exhibited the living larvae of the stag-beetle, *Lucanus cervus*, obtained at Blackheath from an old tree-stump.

Mr. A. A. W. Buckstone exhibited long bred series of *Aglais urticae*, viz.:

1. A series having the yellow patch between the second and third costal black spots united with the yellow patch on the inner margin, forming a complete band across the forewings. They were bred in September, 1925, from larvae obtained full-fed from Wimbledon. The blue marginal spots were larger and brighter than in normal specimens.

2. A series having the two black spots between veins 2 and 4 on the forewings reduced in size almost to being obsolete in the males. These were bred in June, 1925, from Chiddingfold larvae.

3. Two large-spotted, smoky examples, captured near Brighton in 1892.

4. An example from Sutherlandshire, with the yellow patch on the inner margin wanting.

Mr. Robert Adkin exhibited the specimen of *Cloantha polyodon* (*perspicillaris*) taken by Major E. W. Brown at Raindean Wood, Folkestone, on June 4th, 1892; only four or five other specimens are known to have been taken in Britain since its discovery here by C. J. Paget at Yarmouth, Norfolk, in 1839. Also, the only known British specimen of *Calophasia platyptera*; it was taken by our late member J. T. Carrington, on September 14th, 1896, in some rough fields near Brighton.

Dr. H. B. Williams exhibited *Polyommatus* (*Agriades*) *coridon*, ab. *inaequalis*, Tutt, ab. *impar*, Cockayne, and ab. *roystonensis*, Pickett; also a specimen combining ab. *semisyngrapha*, Tutt, with ab. *roystonensis*, Pickett; *Polyommatus icarus* ♂, with underside of ♀ coloration, together with normal ♂ and ♀ undersides for comparison; *Aglais urticae* ab. *fulva*, Rur., Claygate, 1924, captured; ab. *polaris*, Stdgr., Sussex, 1925, bred; a dark ab. captured, Warminster, 1917; and a richly coloured form, bred 2nd brood, Co. Down, 1918, with the yellow markings replaced by the red ground colour; *Dryas paphia*, ♂, with extensive white spots, New Forest, 1918 (Sir V. H. Crewe coll.); ♂ with coalescent spots, New Forest, 1910 (A. F. Hemming coll.); ♀ intermediate between type and ab. *valesina* with pallid hindwings, New Forest, 1907.

Dr. E. A. Cockayne read a paper entitled "Intersexes in the *Lycaenidae*," and illustrated his remarks with lantern-slides. (See page 24).

APRIL 8th. 1926.

The PRESIDENT in the Chair.

Dr. Cockayne exhibited a specimen of the rare ab. *fasciata*, Prout, of *Cosymbia linearia* (*trilinearia*), from Epping Forest.

Mr. A. A. W. Buckstone exhibited a bred specimen of *Pieris napi*, with distinct yellow ground coloration ; also a second specimen with very narrow forewings and with all the wings freely sprinked with black scales, giving the insect a smoky appearance.

Mr. Hy. J. Turner exhibited the following local races of butterflies from Central Spain. Race *camboi*, Sag., of *Strymon ilicis*, of a quite different shade of ground colour from that of the typical form. Race *nevadensis*, Sag., of *Melanargia syllius*, characterised by slight duskiness of ground, due to scattered black scales and hairs. Race *catalana*, Sag., of *M. lachesis*, in which the area of the black markings was extended, showing much less marginal white coloration. The three generations of *Zygaena fausta*, which had received the names gen. I. *macraria*, Sag., gen. II. *microsaria*, Sag., gen. III. *oranoides*, Brgf.; and expressed the opinion that although perhaps races could be named with some reason, there seemed to be no purpose in naming generations, which could, for all practical purposes, be sufficiently designated by gen. I., etc.

Mr. Step, on behalf of Mr. L. E. Dunster, exhibited specimens of the pedunculate form of the Primrose (*Primula vulgaris*), from Somerset. In this form, the entire umbel of flowers (all with shortened pedicels) is borne upon a tall scape ; so that a close resemblance to the inflorescence of the Oxlip (*P. elatior*) is produced, and by that name it is known, though erroneously, for the true Oxlip of botanical authors is restricted to the eastern counties. It has, at times, been assumed to be a hybrid between Primrose and Cowslip, but without warrant, for, apart from the stalked inflorescence, it has none of the characters of the Cowslip. There can be little doubt, however, that this was Shakespeare's Oxlip.

Mr. Hugh Main exhibited the larva of the stag beetle in a terrarium, which he had arranged so that he could see the subterranean work and movements. It was so constructed that moisture could be applied at the bottom instead of at the top, where it almost invariably caused the occurrence of mould. He said that the same plan could be used in the case of captive trap-door spiders, etc.

Mr. K. G. Blair exhibited the beetle *Cleonus sulcirostris*, taken at Lowestoft, September, 1925.

Mr. C. N. Hawkins exhibited a number of spring larvae including *Agrotis agathina*, *Noctua primulae* (*festiva*), *N. triangulum*, *N. brunnea*, *Triphaena fimbria*, *Aplecta nebulosa*, *Boarmia repandata*, *Ellopia fasciaria* (*prosapiaria*), *Scodiona fagaria* (*belgiaria*), and *Hemithea aestivaria* (*strigata*).

The following records were communicated: *Euchloë cardamines*, *Pararge aegeria*, *Pieris napi*, *P. rapae*, *P. brassicae*, and *Lycaenopsis argiolus* had been seen. Two examples of *Pyrameis cardui* were reported on March 15th; and the cuckoo was seen by Mr. Pycraft at Reigate at the beginning of April; while *Nola confusalis*, taken on a tree trunk, was about a month earlier than its normal time of appearance.

APRIL 17th, 1926.

Field Meeting—Oxshott.

Conductors—Dr. E. A. Cockayne, M.A., F.E.S., and H. Worsley-Wood, F.E.S.

Apart from furze, there were no flowers yet to attract the botanists, but note was taken of the way in which the birch has invaded the areas made bare by the felling of the pines in war-time, and the rapidly approaching disappearance of the Black Pond through the activities of the reed. Some of the mosses were conspicuous through their profuse fruiting, notably *Polytrichum juniperinum* and *Webera nutans*, with its var. *longiseta*. Although no definite search was made for them, Mr. Step reports that he obtained the following additional species:—*Sphagnum subsecundum*, *Ceratodon purpureum*, *Dicranum scoparium* and its var. *paludosum*, *Leucobryum glaucum* *Aulocomnium palustre*, *A. androgynum*, *Amblystegium serpens*, *Hypnum cupressiforme*, and *H. schreberi*. There was, also, the small hepatic, *Lophocolea bidentata*. A number of small aethalia of the "myxy" *Reticularia lycoperdon* were found on dead trees. The call of the cuckoo was heard.

Dr. Cockayne and H. Worsley Wood reported larvae on the pines as scarce. Only a few *Thera obeliscata* were beaten out. At night the following larvae were obtained: *Triphaena comes*, *T. fimbria*, *Leucania impura*, *L. lithargyria*, *Noctua xanthographa*, *Dyscia* (*Scodiona*) *fagaria* and *Boarmia repandata* with imagines of *Eupithecia nanata*, *Gymnoscelis pumilata* and *Taeniocampa gothica*.

Mr. K. G. Blair contributed the following notes on his captures.

Coleoptera.—*Elater balteatus*, beetles and larvae in rotten pine stumps, larvae also in old *Polyporus schweinitzii* (det. E. Step), *Asemum striatum*, pupae in pine stumps, *Anchomenus sexpunctatus*, on boggy ground, and many common spp.

Neuroptera.—*Raphidia xanthostigma*, pupae under bark of pine stumps, *Hemerobius stigma*, beaten from pines.

Diptera.—*Lipara lucens* (fam. *Chloropidae*), the cigar shaped galls common on reeds fringing Black Pond. From these were subsequently reared in addition to the gall-maker: a Chalcid parasitic upon it, *Pteromalus liparae*, a Chloropid inquiline, two spp. of Cecidomyiid inquilines, and a Proctotrupid, *Pachygaster* sp., parasitic upon one of them.

Hymenoptera.—A rare Sawfly *Xyela julii* found floating on the surface of a pool.

Mr. Syms reported the beetle *Anchomenus sexpunctatus* in numbers running about in the bright sunshine on the wet moss.

APRIL 22nd, 1926.

The President in the Chair.

Mr. Henderson exhibited a teratological specimen of the Coleopteron, *Prasocuris junci*, ♀, from Lewes, April 4th, 1926, with right posterior tarsus abnormal. The second joint is enlarged, and there are two third and fourth joints, both complete with claws.

Mr. Grosvenor exhibited a specimen of *Zygaena filipendulae*, with the spots on the forewing coalesced.

Messrs. O. R. and A. de B. Goodman exhibited a number of species of the Lepidoptera taken by them in the Cevennes last summer, in illustration of the paper by Mr. O. R. Goodman, "Three Weeks in the Cevennes." (See page 30.)

MAY 13th, 1926.

Mr. Hy. J. Turner in the Chair.

Mr. H. W. Andrews exhibited examples of British *Stratiomyiinae* (Dip.)

This meeting occurred during the General-Strike and only 8 members succeeded in reaching the meeting, which lasted 10 minutes ; another Society record !

MAY 27th, 1926.

The President in the Chair.

Mr. R. Adkin exhibited the living larvae of *Plusia chrysitis*, a species which, he said, he used to find abundantly on nettle in waste places many years ago, but which, in his experience, had become comparatively scarce recently.

The President exhibited an unusually elongate stem of a sweet pea plant; and pointed out that there had been 5 single flowers produced, each 2½ inches apart, and these were succeeded by several flower stalks each bearing 4 flowers. There had been 6 plants shewing this character.

Mr. Enefer exhibited a series of twigs of currant-bush shewing extensive ravages of the currant clearwing, *Synanthedon tipuliformis*, from Blackheath.

Mr. Step exhibited an abnormal flower-head of the Garden Daisy (*Bellis perennis*), received from Mr. T. L. Barnett. The cultivated form is ordinarily a monstrosity—the disc-florets being ligulate—but, through fasciation, the present example was hyper-abnormal: a large number of heads being packed closely at the summit of a single flat scape.

He showed, also, a small collection of Mosses made on the occasion of the Society's visit to Oxshott, on April 17th.

Mr. Vredenburg exhibited species of Coleoptera from the neighbourhood of Lake Lugano, Italy; and the larvae of *Cicindela campestris* from Oxshott.

Mr. Syms exhibited the young larvae of *Ruralis betulae* and *Strymon w-album*, from Essex.

JUNE 10th, 1926.

The President in the Chair.

Mr. L. E. Dunster exhibited *Polyommatus icarus*, taken in Somerset, May 24th, 1926, including four male uppersides shewing variation in colour, one blue female upperside ab. *caerulea*, and thirteen male undersides shewing variation in ground colour and markings.

Mr. A. de B. Goodman exhibited the following items all taken during the last week in May and the first week in June at Teniet-el-Haad, situated in the North Atlas Mountains in Algeria :—

1. Giant Grasshopper (*Pamphagus elephas*), male and female,

examples of which are fairly common. Those exhibited are rather small specimens 5″-6″ long.

2. Sand Skink (*Scincus officinalis*). Large specimen, one of four. This species occurs on the stones of many of the drier localities visited.

3. Terrapin (*Emys europaea*). Frequents streams, and ranges in size from the small one exhibited to 6″ or more in length. Very many in the stream at Hammam Rirha.

Mr. C. N. Hawkins exhibited the living larvae of *Brephos parthenias*, *Euchloris smaragdaria*, and *Earophila badiata*.

JUNE 24th, 1926.

The President in the Chair.

Mrs. Olive Grey, F.Z.S., of 90, Charing Cross Road, was elected a member.

Dr. G. S. Robertson exhibited the pupa cases of *Psychoides verhuella* on the fern *Scolopendrium vulgare*. The larva first mines the green fronds, later feeds on the indusia and constructs its pupal case from the latter.

Dr. E. A. Cockayne exhibited living larvae of *Toxocampa pastinum*.

Mr. A. de B. Goodman exhibited a species of Cricket (*Scobia ambigua*, Bol.) from Teniet-el-Haad, Algeria, which has a curious leathery structure, a spoon-shaped projection over the head, which is present in both sexes. The specimen, together with the figure shown, had an exceptionally large projection of this kind; specimens found by Mr. Main and himself at Hamman-Righa had a similar structure, but the hood was one fourth of the size of those found at Teniet-el-Haad. Habitat: cracks in the parched earth; note emitted, much lower than that of field-cricket.

He also showed a gecko (*Tarentola mauritanica*), from Timgad in the Aures Mts., Algeria. These reptiles are nocturnal, and numbers are attracted to electric light on the walls of the Hotel at El Kantara. Mr. Main found these reptiles by aid of a pocket torch fairly abundant on rocks after dark at El Kantara.

Mr. R. A. Priske exhibited living varieties of the Black Slug (*Arion ater*) from the Chiltern Hills.

Mr. R. Adkin read a paper entitled "Balance in Nature." (See page 45.)

JULY 8th, 1926.

The PRESIDENT in the Chair.

Dr. Cockayne exhibited the living larva of *Luperina cespitis*, comparing it with the larvae of *Charaeas graminis* and *Neuronia popularis*, both of which it resembled closely. All three feed on various species of grass. When young, they agree in being of a greenish colour with whitish lines, but those of *cespitis* are of a purer white than in the other two species.

Mr. Hy. J. Turner exhibited a cluster of each of three species of British insectivorous plants found growing in close proximity in a small bog on the confines of south-west Dartmoor. (1) *Pinguicula lusitanica*, a species confined to the south-western counties, and as pointed out by Mr. Step, considered to be of Iberian origin. (2) *Drosera rotundifolia* and *D. longifolia*, the former having round leaves, which spread out on the ground, the latter with ovate leaves, which stand out at about 45° angle from the stem. The *Pinguicula lusitanica* is quite a small plant and is usually very much hidden and inconspicuous, until it bears its pretty little hood-like, solitary, lilac flowers on comparatively long stalks. The other British species of *Drosera* (*D. anglica*) found chiefly in the N. of England, has the leaves more slender spoon-shaped and standing nearly or quite upright.

On behalf of Dr. Cockayne, Mr. Step exhibited a sprig of sallow, which showed an irregular additional growth from the blade forming a pouch. Several members had met with similar growths.

Mr. Robert Adkin exhibited a series of *Venilia maculata*, that he had recently captured near the summit of Beachy Head, Eastbourne. He said that in the early years of the war, practice trenches were dug along a considerable portion of the Downs at the position indicated. These had been only partially filled in, leaving considerable depressions, and these harboured an extensive growth of Wood Sage (*Teucrium scorodonia*), the natural food-plant of the species, and which had, no doubt been attracted by it; but it was remarkable that such a wood-loving insect should have established a large and flourishing colony in such an exposed, windswept position, far from any woodlands and where the only shelter was that afforded by the derelict trenches and a few widely scattered bushes, that had sprung up among them. Several of these trenches contain luxuriant growths of Sea Kale (*Crambe maritima*).

Mr. Hawkins exhibited a number of living larvae, including *Pterostoma palpina* and *Gonoptera libatrix.*

Mr. Step exhibited a living plant of the Lizard Orchis (*Orchis hircina*), from the North Downs, near Dorking, with photographs, and read a short paper. (See p. 41).

A short discussion took place, several members remarking how common the Bee Orchis had become in some districts. The President referred to the fact that in some places he had noted that the "bee" portion of the flower, the "lip," was replaced by an ordinary greenish petal. Mr. Step noted that there was much variation in both tint and markings in the flower of the Bee Orchis ; and mention was made of a curious washed-out form met with on the Eastbourne downs.

JULY 22nd, 1926.

THE PRESIDENT in the Chair.

Mr. H. Moore exhibited (1) A portion of a lizard's skin from Java, damaged apparently by a beetle, for although no beetles were present, there were several larval and pupal skins, (which Mr. Step afterwards pointed out were those of *Dermestes murinus*). (2) Several ticks (*Ophiodes* sp. ?) parasitical on a lizard. *Ophiodes* is a genus of ticks found usually on snakes. The President stated that the Indian iguanas were often infested with ticks.

Mr. H. Main exhibited a pupa of a female stag-beetle, *Lucanus cervus,* in one of his terrariums for observation of the various metamorphoses, and explained that the oak saw-dust used could be kept sufficiently moist without encouraging mould while other substances, such as sand, invariably did. He also shewed the pupa of *Papilio morania*, developed from a larva found near Lagos, W. Africa, by Miss E. Fountaine. It was of a bright green colour with a few dark markings.

Dr. Cockayne exhibited the larvae of *Acontia luctuosa* on bindweed (*Convolvulus*).

Mr. O. R. Goodman exhibited races and forms of *Brenthis pales* : typical from La Grave and Pontresina, f. *isis* and f. *napaeae* from the Central Urals, race *graeca* from Mt. Parnassus, race from Turkestan possibly *korla*, with various very dark suffused aberrations like those from the Val du Fain, Engadine, where there exists a very characteristic dark race.

Mr. C. N. Hawkins exhibited a series of *Amorpha populi* bred in May and June, 1926, from a pair of wild parents taken at Upper Tooting, in July 1925. About 60 ova were laid, and most of the larvae produced imagines, of which all but two were normal. One specimen appeared to be male, but as it refused to pair with any female and also refused to fly, it may be somewhat gynandrous.

Mr. K. G. Blair exhibited some galls on the Common Reed, and read the following notes on the exhibit.—

√ GALLS OF LIPARA LUCENS, MG. (DIPTERA, FAM. CHLOROPIDAE).

The cigar-like galls were found in numbers on the Common Reed, *Phragmites communis*, bordering the Black Pond on the occasion of the Society's excursion to Oxshott, on April 17th last. A considerable number of the galls had been torn open by birds in search of the maggot within.

The gall chamber is a long, narrow cavity with hard woody walls occupying about the basal half of the "cigar," the terminal half being composed only of the rolled leaves of the plant, the outer ones enwrapping the gall, the inner growing from its apex; within the chamber lives a single larva of the *Lipara*. The flies from these began to emerge at the beginning of June, the fly forcing its way through the top of the gall chamber and between the rolled leaves to the tip of the gall, so that a vacated gall can scarcely be recognised from a full one. The galls, however, had been kept too dry, so that very few flies succeeded in emerging, the majority having died in the attempt to force their way up the centre of the stiff and hard rolled leaves.

As well as the legitimate inhabitant of the gall, numerous parasites and inquilines made their appearance.

Parasitic apparently upon the *Lipara* itself was the Chalcid √ *Pteromalus liparae*. In order to effect their exit these make their way some distance up the centre of the rolled leaves and then cut a clean round hole through them to the exterior. Like the *Lipara* many of these had found these enwrapping leaves too dry and hard for them and had perished in cutting their way through.

On stripping off the enwrapping leaves numerous small secondary galls were found embedded in the hard outer wall of the primary gall chamber. Some of these were comparatively shallow, parallel with the main axis of the gall. In some of them were found empty puparia of a small black Chloropid fly *Haplegis flavitarsis*, Mg. (= *divergens*, Lw.) a number of which emerged about the same time as the *Lipara*. Other puparia were found nearer the tip of the gall between the enwrapping leaves; and it seems that the fly makes its way between these to the apex, in order to effect its exit. None were found that had perished in the attempt.

Some of these secondary galls penetrated much deeper into the wall of the primary gall, pushing it inwards and sometimes almost closing the lumen of the chamber. Most of these were found to contain dead pupae, frequently with signs of an attempt to cut a passage straight through to the outside of the "cigar." These pupae are heavily armed with one long pair and one shorter pair of sharp cutting teeth on the top of the head. Only one fly had succeeded in emerging, and proved to belong to the family *Cecidomyiidae* or gall-midges. From some of these pupae emerged some small Proctotrupids belonging to the *Platygasteridae*.

These only emerged after the galls had been stripped (in July) so that their natural mode of exit was not observed.

By far the most numerous flies to emerge from the galls were some other more slender Cecidomyiids. These were first observed on May 11th, and continued to emerge for some time. In July when the box in which they had been kept was overhauled their empty pupa cases were found all over the bottom. On stripping the galls no dead pupae were found, so that emergence seems to have been completely successful. As no exit holes were found, and no galls attributable to them, it is presumed that their larvae fed freely between the enwrapping leaves of the gall, and that the slender unarmed pupae made their exit from between these. They proved to belong to two closely related species that have not yet been definitely determined.

Finally, also between the enwrapping leaves of the gall, was found a single somewhat flattened Coleophorid larva-case. The presence of this may, or may not, have been purely accidental.

He also exhibited a rare sawfly *Xyela julii*, taken at Oxshott on the same occasion. (For a previous record from Oxshott by A. Beaumont on May 3rd, 1896, see "E.M.M." 1897, p. 257).

On behalf of Mr. Wm. Fassnidge, F.E.S., of Southampton, Mr. Hy. J. Turner exhibited two bred specimens of *Synanthedon* (*Sesia*) *flaviventris*, ♂ and ♀, a species not hitherto found in this country. He said: "In the winter of 1925-6 while searching for the galls produced by the larva of *Grapholitha servillana* in the smaller shoots of willow species, Mr. Fassnidge found some swollen stems in size and appearance somewhat resembling those produced by the Coleopteron, *Saperda populnea*, in aspen shoots. Two of these stems he sent to me, with a number of the *servillana*-infested twigs. From his stems Mr. Fassnidge bred the two exhibited, the rest dying from being disturbed. From my two twigs I bred one male. I am exhibiting a pair of *S. andrenaeformis* and of *S. tipuliformis*, the two nearest related species, for comparison, and also the two shoots of sallow from which the *S. flaviventris* emerged. It will be seen that the larvae pupate head downwards. Several distinct markings will be noted. Abdominal segments 4-6 entirely yellow below. Anal brush of ♀ striped with yellow at the sides. Antennae pale beneath. The bright yellow tibiae and tarsi. It was described by Staudinger in 1883 from Mecklenberg, and has been found since in other parts of Germany as well as in one or two places in Russia. I feel sure that during the coming year we shall find that, like *S. andrenaeformis*, it will be obtained over a considerable area of the South and Midlands." (Plt. VIII.)

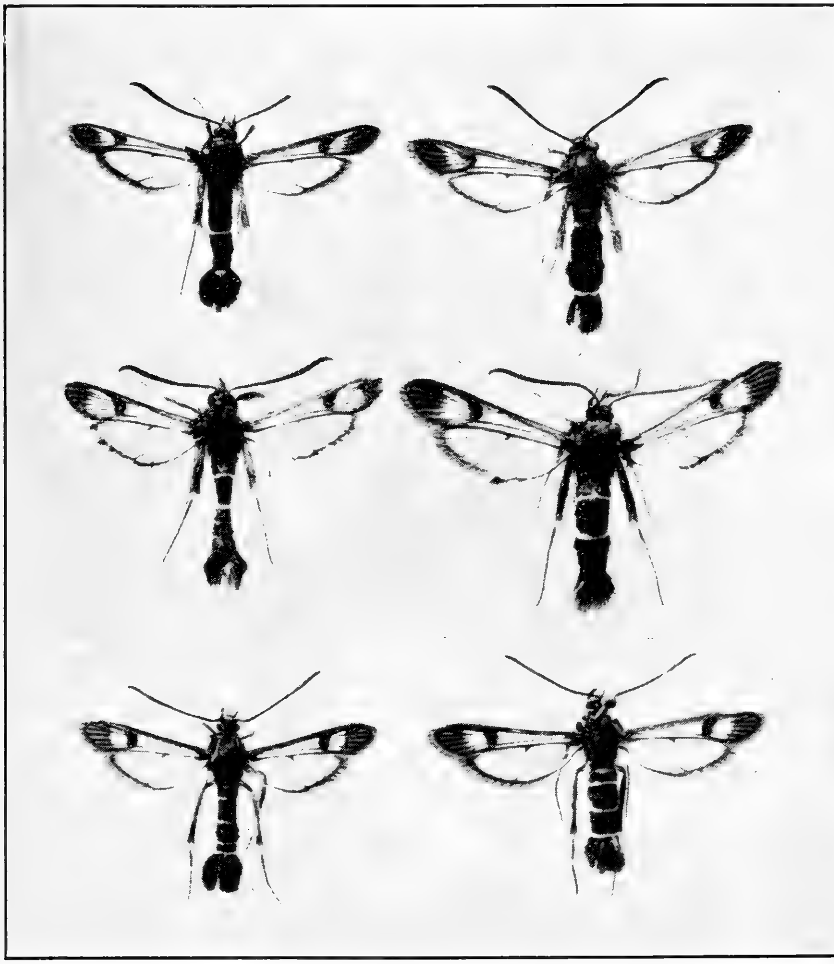
Mr. Turner also exhibited several of the, up to now, rare *nevadensis* form of *Parnassius apollo*, from Central Spain. Last year the Querci family made a special trip to Catalonia to obtain some of the local forms of Rhopalocera, which were reputed to be easily obtainable. The *nevadensis* are characterised by the whole of the usually brilliant red coloration being yellow or terra-cotta. It was found that the typically marked form did not exist in that part of Spain, and that *nevadensis* was there a race; and not only that, but it was in abundance. Typically red *P. apollo* were exhibited for comparison.

Mr. Turner showed, on behalf of Mr. K. J. Hayward, a curious small white lantern-like spider's nest, found attached to a twig in the Chaco Forest, Argentine.

Mr. A. W. Dennis exhibited the Hepatic, *Conocephalum conicum*, a species not far removed from the well-known *Marchantia polymorpha*, and pointed out the dark thalli of the male plants. It came from Ashurst Wood,

Mr. Sparrow exhibited the race *rutilus* of *Chrysophanus dispar*, from France; also the Lasiocampid, *Malacosoma alpicola*, from Zermatt.

Mr. Adkin and others remarked on the common occurrence of *Limenitis sibilla* in Tilgate Forest, Ashdown Forest, Rusper, Abbot's Wood and in all the Sussex Woods of any extent.



From The Entomologist's Record. *Photo. H. Main.*

1-2. *Synanthedon flaviventris* (new British species).
3-4. ,, *andrenaeformis* (for comparison).
5-6. ,, *tipuliformis* (for comparison).

A NEW BRITISH SPECIES.

AUGUST 12th 1926.

The PRESIDENT in the Chair.

Mr. R. Adkin exhibited a short series of *Acronicta alni* and remarked on the ease with which it could be reared if cavities were furnished for the larval pupation. Short portions of elder stems were usually put in for this purpose, but he had found that old dahlia stems were much preferred. The specimens were noted as being very deep black without trace of brown in it. They were reared from summer parents.

Mrs. Gray exhibited a moth bred from a walnut, which was subsequently found to be *Carpocapsa splendidana.*

Mr. Hy. J. Turner exhibited (1) male and female specimens of a race of *Polyommatus escheri* from Llinas, Catalonia, which had recently been described by Professor Sagarra of Barcelona and named r. *rifai*; compared with the forms of the Southern Alps it was considerably smaller and of a different shade of blue. (2) Male and female specimens of a race of *P. thetis* from the same locality, which had also been described and named by Professor Sagarra, as r. *josephina ;* compared with bred specimens from Southern France it was a much smaller, more round-winged, compact insect. (3) Specimens of a form of *Erebia pirene*, Hb. (*stygne*, Ochs.), from Santa Fe, Catalonia, identical in size and marking with the race *penalarae*, Chap., from La Granja.

Mr. K. G. Blair exhibited the following species and read notes on their habits.

I. *Pezomachus aquisgranensis*, Forst. (?) 1 ♂ and 2 ♀ ♀ bred 29.V.26., from egg cases of a spider, *Prosthesima* (*Zelotes* sp.) (family *Drassidae*) ; from Swanage, collected in 1924 by Mr. Step.* Several species of *Pezomachus* have been recorded from spider's nests, others from lepidopterous and coleopterous larvae and some as hyperparasites through *Apanteles*, etc. In a few cases all these different classes of host have been recorded for one species.

II. *Myrmosa melanocephala*, F., ♂ and ♀ ♀, from Hendon. This little insect, one of the Aculeate Hymenoptera, bears a curious resemblance to the ichneumonid just mentioned. In both species the ♂ is entirely black and fully winged, while the ♀ is more or

---

*Mr. Step states that a female of this species was, in error, exhibited at the Society's meeting of July 10th, 1924, as an example of *Methoca ichneumonoïdes.*

less reddish and wingless. Its similarity to an ant is enhanced by the active manner in which it runs over the ground.

Of its habits Saunders merely says that 'very little is known,' and that the ♂ is often found on the flowers of wild carrot. I was fortunate in finding the ♀ ♀ last month running on my neighbour's garden wall and entering the burrows of *Crabro elongatula*, which was nesting in some numbers in the mortar. The *Myrmosa* was rather shy, and would often drop to the ground on an attempt to box it.

This association of *Myrmosa* with the genus *Crabro* has been hinted at before; thus R. C. Bradley ("E.M.M." 1897, p. 215) found a male "while working a wall for Crabros," later securing both sexes from this same wall, and R. Stenton ("E.M.M." 1909, p. 279) took the ♀ on Wimbledon Common on a sandy flat, in which various Hymenoptera, including *Crabro*, were nesting.

Possibly I was too late for the ♂, for though they were repeatedly searched for none were seen; the ♀ ♀ were taken at intervals between July 18th and August 2nd. Mr. Bradley's capture of the ♂ was on July 11th. Another single ♀ was found running on bare sand at Oxshott on August 5th.

III. *Methoca ichneumonoïdes*, Latr. 2 cocoons, with the skin of the host larva (*Cicindela campestris*) attached; one cocoon was cut open and the ♀ pupa ready for emergence extracted. The details of the relations between the *Methoca* and its host were worked out by H. G. and R. J. Champion ("E.M.M." 1914, p. 266; 1915, p. 40) and their results compared with those of previous investigators, Adlerz (1903) and Bouwman (1909).

Mr. Step exhibited photographs of the rare Irish orchid (or orchids) known as *Spiranthes romanzoffiana*; and read the following note:

"Several of our native orchids are exceedingly rare, and among these one is set down in the lists as being restricted to a couple of limited areas, far apart, in Ireland.

"The Proliferous Lady's-tresses (*S. gemmipara*) was first made known as an inhabitant of these islands by Mr. J. Drummond, who found two plants growing in a salt-marsh near the shore, at Castletown, Co. Cork, in 1808 or 1809. Lindley gave it the name of *gemmipara*, to mark the fact that it produced buds from the base of the stem, from which tubers and new plants are developed later. Asa Gray, the American botanist, declared that the supposed new species was the same as *S. romanzoffiana*, which occurs right across North America, from the Atlantic to the Pacific. Babington identified it with another American species, *S. cernua*; but in recent years British botanists have agreed to regard it as *S. romanzoffiana*.

"In 1886 the site of the original station for the orchid was found to have been reclaimed, ploughed up, and was yielding a crop of potatoes: so the plant was considered to be extinct on this side of the Atlantic. Then, in the nineties, R. Lloyd Praeger reported the discovery of a new station for it, in the neighbourhood of Lough Neagh, in Ulster.

"A few weeks ago, my friend, Mr. A. J. Wilmott, of the British Museum, devoted part of his vacation to an effort to obtain more information concerning this plant. First, he explored the old Cork station: and in its neighbourhood discovered the plant in flower. He then hastened up to Lough Neagh, and found others. He brought away living material from both stations; and within a few hours of his return home, kindly afforded me the opportunity for photographing the two local forms in flower side by side. It is probable, that the southern and northern plants had never before been brought together in the living state for comparison. Not only so, but they have been brought together in one photograph in which the details of agreement and difference can be seen at a glance. These photographs I have pleasure in laying before you.

"Mr. Wilmott's material has been added to the National Herbarium. From a consideration of it in the living state, point by point, it appears to be probable that the South Irish and the North Irish plants are distinct species. The superficial differences will, I think, be obvious on a comparison of these photographs; but Mr. Wilmott is engaged upon a critical investigation, comparing both with the American examples, and his results will be published later.

[Mr. Wilmott, in a communication to the Linnean Society, has now announced that both forms are distinct from *S. romanzoffiana*; the Lough Neagh plant agrees with the North American *S. stricta* of Rydberg, and the Southern species must be known as *S. gemmipara*, Lindley.]

Mr. Step called attention to the recent acquirement by the National Trust of the fine Surrey beauty spot, White Hill and Cockshot Wood, adjoining the Box Hill area. He had recently gone over the ground and found abundance of many chalk plants. He also referred to the wonderful views to be obtained from the tops of the steep slopes; and recommended members to make its acquaintance.

Remarks were made on the pupal position of *Mimas tiliae*, that it frequently did not enter the ground, but might be found upright in hollow trees or at the base of "suckers" of shrubs, again upright.

AUGUST 26th, 1926.

The President in the Chair.

Mr. A. E. Tonge exhibited a series of photographs of the ova of Lepidoptera; and called attention to those of *Sphecia crabroniformis* on the underside of sallow leaves, and of *Gonoptera libatrix* on the underside of willow leaves.

Mr. S. A. Blenkarn exhibited an autumn-bred example of the Coleopteron, *Callistus lunatus*, from Otford on August 14th, an unusually early date; a unique black ♂ of *Athous longicollis*, taken in salt-marshes at Worthing, July 19th; and the local *Apion millum*, from Otford, on August 14th.

Mr. Enefer exhibited the leaf-cutting bee, *Megachile centuncularis*, with examples of its depredations on rose-leaves in his garden; also an abnormal double fruit of the Victoria Plum.

Mr. O. R. Goodman exhibited the following scarce species of *Colias* from Central Asia—*Colias sieversi*, from Turkestan: *C. christophi*, an exceptionally marked species with peculiar reddish brown at the basal end of the costal area, from Fergana and Turkestan; *C. ladakensis*, from Ladak; *C. eogene*, from Kymyl, Tartary and Skorota; the beautiful and very variable *C. wiskotti*, from Turkestan, with its race *draconis*, from Forykul.

Mr. K. G. Blair exhibited a living specimen of the sand-wasp, *Ammophila sabulosa* captured with its prey, the larva of *Euplexia lucipara*. The larva was also exhibited with the egg of the *Ammophila* attached, Mr. Blair having obtained it from the wasp's burrow, which he located subsequently. He noticed other holes near this, which probably were the work of the same insect.

Mr. Andrews exhibited the Dipteron, *Volucella bombylans*, L., with its form *haemorrhoidalis*, Zett., from Bexley, Kent, June, 1926; and pointed out the yellow hair on the abdomen of the latter.

Mr. R. Adkin exhibited a short bred series of *Plusia chrysitis*, from larvae found last autumn. They were reared on nettle growing in a pot, and very few were lost in hibernation, but when full fed most perished from some disease. The President remarked that the species had been very common at light at Redhill.

Mr. Dunster exhibited a box of aberrations of *Polyommatus icarus*, and of *P. coridon*, from Dorset and Royston.

Miss E. Cheesman exhibited the nest of a solitary wasp, *Odynerus* sp., which had been made in the wood of her hut in Tahiti, and communicated the following note.

Burrow of a Solitary Wasp, Odynerus bizonatus from Tahiti.—This wasp burrows in wood, using coral sand mixed with saliva to line the bottom and to close the entrance. It is a small black wasp with yellow markings. The female stocks the burrow with small caterpillars and while this operation is in progress she will stop and rest in her burrow—for what reason is not obvious—and guard it jealously with her head at the entrance. The temptation to tease them when they are "doing sentry-go" is irresistible. One had a burrow near the table in my hut at Papeete; and as I sat writing if I made my dissecting needle approach the entrance, tapping the wood and behaving generally like a mischievous marauder, she would attack it with mandibles well apart, and even come outside to finish off the adversary, then hurry back head first into the burrow. After once or twice receiving a tap on her retreating abdomen, she would not turn her back on the enemy again, but afterwards always lowered herself backwards. An instance of a change of a specific habit as a result of a special experience.

She also exhibited the mud cells of a Potter Wasp or Mud Dauber, *Sceliphron tahitense*, half formed, revealing the manner in which they are built. The female wasp cuts off a ball of mud, rolling it with the mandibles and the first pair of legs, and carries it to the site of the nest which is usually a rock, wall, or the beams of a building. The mud is unrolled in a flat ribbon, the wasp moulding it as she works, and laying on each added strip obliquely so that the faint lines where each overlaps the last, make a pattern of slanting lines moulded on the cell.

SEPTEMBER 9th, 1926.

The President in the Chair.

Mr. A. E. Tonge exhibited photographs of the ova of a dozen species of British Lepidoptera including four Noctuid and three Geometrid.

Mr. H. Moore exhibited a male of the Stick-insect (*Carausias morosus*) now commonly kept by entomologists in this country; and remarked that he had bred them continuously for the last 20 years without introducing any from outside sources. They were produced parthenogenetically for the most part; it was extremely rare for a male to be produced, the records of such were very few. Mr. Turner had also had his colony for at least 20 years; in the winter all the imagines usually died leaving only ova at the bottom of the cage amid the frass and debris.

Mr. H. Main exhibited in one of his terrariums a portion of the life-history of the sand-wasp *Ammophila sabulosa*, given him by Mr. Blair; and also a portion of the life-history of *Methoca*, the parasite of the tiger beetle larva (*Cicindela*). Each cell contained a larva with an egg of the parasite attached transversely just below the third pair of legs.

Mr. Carr exhibited a pupa of *Dianthoecia carpophaga*, which had its head fixed in a seed pod upon which the larva had been feeding.

Reports on the season showed that *Vanessa io* was common; *Colias croceus* had occurred at Exmouth; *Pyrameis atalanta* was in very small numbers; *Gonepteryx rhamni* was common in its haunts; and that *Limenitis sibilla* had of late years become very common in south-east Sussex.

Mr. R. Adkin read his report of the Meeting of the British Association at Oxford in August.

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

It was my privilege to attend each of the two Meetings of the Conference held on August 5th and 10th respectively. The President of the Conference, Sir John Russell, F.R.S., gave an Address on "Regional Survey and Scientific Societies." As was to be expected, he dealt largely with the agricultural side of the question, but he also alluded to its many other aspects and pointed out that the local Natural History Societies could render much service. As he truly said, "For students it provides a valuable record of the Countryside as it is now, as its resources are used now, and how these things came to be. But perhaps its greatest value is that it arouses an interest in the Countryside, which we shall hope will be followed by a desire to keep the best of what we have."

A long and interesting discussion followed the reading of the address.

It is perhaps not my province as the reporter of a meeting to interpolate my own views, but I might be permitted to say that in my opinion, if we now possessed accurate regional surveys of the past, we might be in a better position to discuss the much vexed question of the causes that have led to the decline, or disappearance, of some of our most cherished species of Lepidoptera.

Among other matters before the Conference was a request by the geologists for information. It was pointed out that at the present time many arterial roads were being cut and foundations for buildings dug in various parts of the country, often exposing sections of much geological importance, and that any opportunity for studying them was too often lost by the attention of no competent person being called to them. The delegates present were asked to mention the matter to their Societies with the request that any of their members, who should notice any such surfaces being exposed, would at once communicate with some local geologist, who would no doubt be able to decide whether they were of sufficient importance to have technical attention called to them, and further know where such attention was to be obtained.

It has been my custom, when reporting the proceedings of the "Conference" to also say a few words on the meeting of the "Association" in general, and on the business of Section D. in particular.

The Meeting of the British Association held in Oxford from August 4th to 11th, 1926, will long be remembered as a memorable one; the amenities of the city, the number of members attending and the distinguished standing of so many of them, the plethora of scientific addresses and papers, and the numberless social functions all combined to make the meeting an outstanding success.

The Presidential Address, delivered by H.R.H. The Prince of Wales in the Sheldonian Theatre, was in itself an epoch-marking event. His subject was "The Bearing of Scientific Research on the Daily Life of the Community." It has been so widely reported that I doubt not you are all well acquainted with its import.

In Section D. (Zoology), Professor J. Graham Kerr, F.R.S., delivered an address on "Biology and the Training of the Citizen," in which he pleaded for a larger share of biological teaching in our schools and colleges, and hinted that a greater knowledge of biological subjects, as now understood, might even have a beneficial effect on present-day unrest.

Professor H. F. Osborne, President of the American Museum of Natural History, read a paper on "The Problem of the Origin of Species as it appeared to Darwin in 1859 and as it appears to-day," in which he said that "Darwin's species stood out like isolated mountain peaks, whereas to-day living species are often comparable to mountain chains composed of lesser peaks completely connected by ridges known as intergradations. Consequently, in 1926 the problem of the 'origin of species' is absolutely different from what it was in 1859;" and he concluded that "Species originate through a continuous and creative adaptation in either stable or changing conditions of environment. The word 'creation' must certainly be linked with the word 'evolution' to express in human language the age-long origin of species."

Among several joint discussions was one with Sections C. (Geology) and K. (Botany) on "The Concept of a Species," in which Dr. F. A. Bather, Prof. Poulton, Mr. Tate Regan and others took part. Owing to the overlapping of papers I was crowded out of the Meeting-room, and so far have not heard what were the conclusions arrived at.

More purely Entomological matters included papers by:—

Dr. H. Eltringham on "Butterfly Vision," in which he arrived at the conclusion that the range of sight was very limited, probably not exceeding a few feet.

Dr. Heslop Harrison on "Induced Mutations and their Significance in Evolution," in support of which he detailed his experiments in inducing Melanism in *Selenia bilunaria*, *Tephrosia bistortata* and *T. crepuscularia* by the administration of metallic salts to their food plants.

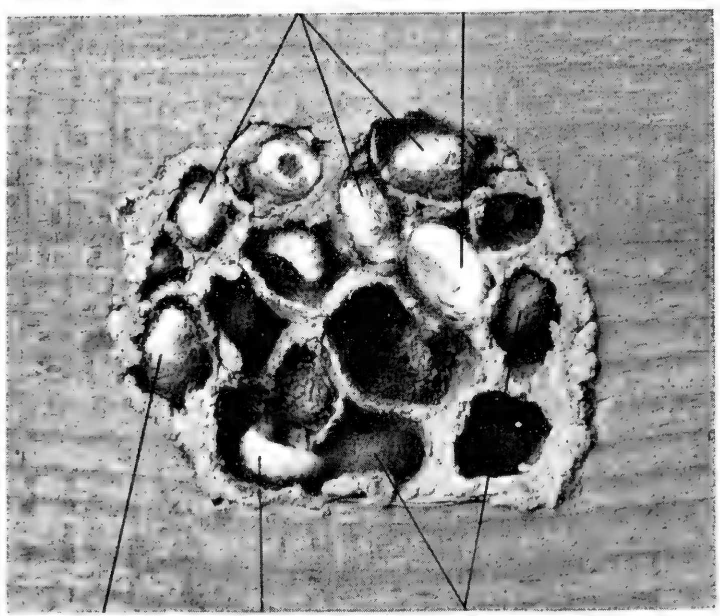
Dr. F. A. Dixey lectured on "Recent Criticisms of the Theory of Mimicry."

Mr. B. N. Schwanwitsch read a paper on "Evolution of Wing-pattern in Butterflies."

Dr. G. D. H. Carpenter, on "Mimicry in Relation to Geographical Distribution in the Ethiopian Nymphaline Butterfly *Pseudacraea eurytus*"; and

Professor A. D. Peacock, on "Spermatogenesis in Sawflies"—all of which were of very considerable interest.

Several exhibits were on view, and in many instances served to illustrate the papers: thus Dr. Harrison showed a series of moths resulting from his Melanism experiments; and Dr. Hale Carpenter butterflies of the Genus *Pseudacraea*, with map of their distribution.



Nat. size.

NEST OF OSMIA RUFA

Photo. E. J. Bunnett.

Dr. Eltringham also had on view a very beautifully constructed large scale model of the tympanic organs in the abdomen of a Geometrid moth.

The next Meeting of the Association will be held in Leeds on August 31st to September 7th, 1927.

SEPTEMBER 23rd, 1926.

The PRESIDENT in the Chair

The decease of Rev. F. D. Morice was reported.

Mr. Hugh Main exhibited portions of the life-history of the parasitic Hymenopteron, *Methoca ichneumonoides*. A female had been given him by Mr. Blair. This was induced to lay an egg on the larva of *Tephrosia biundularia*, which had been exhibited at the previous meeting. The parasitic larva fed rapidly on its victim; and he was able to exhibit the cocoon spun at the top of the burrow, the larval stage lasting only a fortnight from egg to cocoon. The skin of the victim was thoroughly emptied of its contents.

He also showed a large scorpion, *Buthus occitanus*, from Algiers, with which he was anxious to test the notes of Fabre on its life-history; the pink-coloured larva of a large species of glow-worm; and the natterjack toad (*Bufo calamita*) from Norfolk.

Mr. O. R. Goodman exhibited a large *Chamaeleon vulgaris*, from Algiers which varied in coloration, changing from earth colour or black, to sandy colour or gamboge, grass green, brown, or grey-green. At times it would hiss vigorously.

Mr. Bunnett exhibited a block of wood sent to him on June 22nd, 1925 by Mr. A. Andrews of Beckenham. The block was 8 inches wide and 2 inches thick, and had been cut out of a beam that had been placed in position in the web of a steel joist supporting the fascia of a new house in course of construction. The beam was found to be very loose and on taking it down it was discovered that one of the bolt holes had been enlarged and a family of grubs established in the cavity. There were no cocoons when the block was received but six days later (June 28th) when the photograph was taken, only three larvae were still feeding, the remainder having spun up.

The Bees, which proved to be *Osmia rufa*, emerged in the following Spring (1926).

Of the family of fifteen, seven were males and eight females; all the latter, with one exception, appeared after the males were already on the wing.

They emerged on the following dates :—Males, on April 3rd, two; on 14th, two; on 19th, one, and 20th, two. Females, on April 19th, one; on May 1st, four, and on May 3rd, three.

The exhibit included the nest in the wood, the fifteen bees, and the photographs shown in Plate IX.

Mr. Tonge exhibited a small Hymenopteron, which was parasitic on the ova of *Orgyia antiqua*. The holes in the eggs showed that the parasites emerged low down at the side.

Mr. H. W. Andrews exhibited the female of *Asilus crabroniformis* with its prey, a specimen of the Coleopteron, *Necrophorus vestigator*; also examples of other prey, 4 species of Diptera and 4 species of Orthoptera. [See "Trans. Ent. Soc. Lond," pp. 341-358 (1906)].

Mr. W. J. Lucas exhibited an example of the scarce dragonfly, *Sympetrum flaveolum*, Linn., and remarked that there had evidently been an immigration this year again. It has already been reported from Hurn, Dorset; Epping Forest; Pinner, Middlesex; Letchworth, Herts; and no doubt will be from other localities. One or two females have occurred this year. He shewed also a drawing of a naiad of the species.

OCTOBER 14th, 1926.

The PRESIDENT in the Chair.

The decease of Mr. F. W. Enefer was reported.

Mr. Nixon exhibited the Hymenopteron, *Crabro dives*, ♂ and ♀, from Norwood, a species new to the British Islands.

Mr. Turner, on behalf of Mr. E. Step, the white larval cases of a Micro-lepidopteron, probably *Coleophora caespititiella*, on the heads of the rush *Juncus squarrosus*, from Wimbledon Common.

Dr. E. A. Cockayne exhibited a large number of preserved larvae of British Lepidoptera, of which the following were noted for their varied forms :—*Opisthograptis luteolata* : green forms, forms resembling lichen, varying from almost entirely grey-green to almost entirely brown, and a grey form with green markings (this has turned pink). *Odontopera bidentata* : various forms resembling lichens. *Miselia oxyacanthae*, resembling lichen, brown, and black. *Hadena pisi* : green and brown. *Noctua plecta* : brown and green forms. *Amorpha populi* : fully spotted. *Phragmatobia fuliginosa* :

black and chestnut. *Eupithecia expallidata*: green and white ground colours. *Venusia cambrica*: varying from almost all green to almost all purple. *Cosymbia linearia* (*trilinearia*): whitish, green and brown.

Dr. Imms gave an interesting lecture on his visit to the Hawaian Islands, illustrating his remarks by the aid of the lantern.

OCTOBER 28th, 1926.

The PRESIDENT in the Chair.

Messrs. P. B. Fletcher, of Wimbledon, S.W.; A. Bliss, of Purley; and P. T. Ennis, of Wimbledon, were elected members.

Mr. Tonge exhibited a series of *Bryophila perla*, from Deal. This was a very dark form which had occasionally occurred on a particular wall in the neighbourhood, but this year quite 25% of the specimens noted were melanic.

Mr. Ashby exhibited specimens of a Scolytid beetle with the date-stones from which they emerged, showing the holes and beetles *in sitû*. 22 specimens were taken alive on October 30th, 1920, in a small carton of dates. Mr. K. G. Blair has determined the species as *Coccotrypes dactyliperda*, F., and says it occurs in Arabia, Persia, India, Ceylon, S. Africa, France, Germany, etc.

Mr. Ashby also showed a female specimen of the Dragonfly *Sympetrum flaveolum*, Linn., taken in his garden at Pinner, July 24th, 1926.

Mr. B. W. Adkin exhibited a short series of *Plebeius aegon* (*argus*), from Eynsford; and pointed out that in disposition of marking and in colour they were quite comparable with the New Forest form: the females, however, had rather more blue scales.

Capt. Crocker exhibited a perfect gynandromorph of *Polyommatus icarus*, the R. side male and the L. side female.

Mr. Greer exhibited various aberrational forms of Lepidoptera from Co. Tyrone, Ireland, including a pale yellow male of *Euchloë cardamines*, which he said was rare; a wild yellow form of *Pieris napi*, of which form he stated that bred examples were of a much more pronounced yellow; with the *addenda* aberration of *Epinephele jurtina*.

Messrs. Moore, Buckstone, Goodman and Turner exhibited races of *Polyommatus coridon*; and the last named read notes on the races, continental as well as British, which had hitherto been recognised. (See page 55).

Mr. Buckstone exhibited a good series of a remarkable dwarf form or race of *P. coridon*, taken by him in several successive years in a restricted locality near Shere, Surrey. They were approximately only two-thirds of the normal size, and were dark in general coloration.

Mr. Goodman showed numerous striking aberrations of *P. coridon*, obtained on his recent continental holidays.

Mr. H. Leeds exhibited specimens showing all Tutt's ♀ upperside named aberrations of British *Polyommatus coridon* except :—*unicolor*, *peraurantia*, *subradiosa* and *caeruleo-lunulata* ; also some aberrations of ground colours and markings at present unnamed.

Mr. O. R. Goodman exhibited *Polyommatus coridon*, Poda, from the Swiss Alps, the Engadine, Bignasco Ticino, the Rhone Glacier, the Pyrenees, Albarracin and Granada Spain, Central Italy, and from the Dauphiny Alps, and communicated comments on the exhibit of which the following is a summary.

By comparison the ♂s showed considerable range of tint and width of dark outer margins, they also differ in the sharpness of definition in the venation. The undersides do not vary to any great extent in the different areas.

The *P. coridon* from the Pyrenees is very distinct from the Alpine specimens shown. The ♂ undersides being uniformly grey, the usual fawn tint of the hindwings being nearly absent. Those from the Valley of the Aude and from Vernet-les-Bains, do not have these characteristics.

The ♂ var. *hispana*, H.S., = *arragonensis*, Gerh. from Albarracin, Spain, will be noted as a very much paler form than the type with the distal marginal spots more distinct. It is said to frequent limestone districts.

The form named *lilacina* by Chapman (*coelestissima*, Vrty.) is in the males of a brilliant blue approaching that of *P. thetis* (*bellargus*).

The ♂s of the more extreme var. *albicans*, H.S., from Granada, S. Spain, are practically white both above and below. It occurs sometimes by itself and sometimes in company with *hispana*.

Race *apennina*, Z., from the Sibillini Mountains, Central Italy, differs slightly from type in the paler ground colour of the ♂s and less distinct marginal border.

The form in the Riviera is double-brooded and is referred to as race *constanti*. The distinctive markings in the ♂s are in the paler ground colour, the brown tint of the outer margins, and the continuance of the marginal dots along both wings. The second brood is somewhat brighter coloured than the first brood.

The spring brood of a form from Digne, Basses Alpes, are stated by Rev. Wheeler to be specifically distinct from *coridon* type, as are the summer (2nd) brood from the same locality.

These forms seem to closely approach the form *constanti* from the Riviera. In which case *constanti* would seem to be a species distinct from *coridon* type.

Mr. H. J. Turner read a paper entitled "Races of *Polyommatus coridon*, Poda, particularly those of Italy and Spain." (See p. 55.)

NOVEMBER 11th, 1926.

The PRESIDENT in the Chair.

Mr. H. C. S. Halton, of Essex Museum, West Ham; Mr. W. J. Wootton, F.R.H.S., of Wannock Gardens, Polegate, Sussex; Mr. A. G. J. Harris, B.A., of Philbeach Gardens, W, were elected members.

Dr. Cockayne exhibited two long series of *Thera variata* and *T. obeliscata*, bred from larvae obtained from the same trees at the same time of the year, and pointed out three specimens of the ab. *nigrosignata*, Prout.

Mr. Hugh Main exhibited the Dipteron, *Drosophila* sp., which was used as a test for acetic acid, and hence known as the "acetic-acid fly." A mash was made with malted barley, and the flies introduced to the receptacle. Ova were laid and the larvae fed, while no mould appeared in the jar. Reference was made to the important work carried on by Prof. Morgan and his colleagues in America in the investigation of Heredity problems with other species of *Drosophila*, which are there known as "fruit flies."

He also showed an example of the Winter-fly, *Boreas hiemalis*, which was common in Epping Forest. It was allied to the Scorpion-fly, but it was not carnivorous. The larvae fed on moss and the nearly apterous fly was abundant in the autumn.

Mr. O. R. Goodman exhibited a large number of Satyrids collected on his various holiday trips on the continent, showing the racial variation in different parts of Europe. *Erebia melas* from S.E. Hungary and Greece, deep black with small ocelli, and the Pyrenean race *lefebvrei* larger and with larger, brighter ocelli; *E. stygne*, from the Pyrenees (race *pyrenaica*) and S.E. France; *E. tyndarus*, the striking Pyrenean form from Mt. Canigou, and the duller form from Gavarnie, a series of the ordinary Alpine forms and the largest of all the forms *ottomana* from S.W. Bulgaria; *E. neoridas* from the Cevennes, and the very closely allied *E. zapateri* from Albarracin; *E. gorge* from Heuthal, Switzerland and Gavarnie; and the Pyrenean *E. gorgone* also from Gavarnie.

Of the genus *Coenonympha* he showed *C. corinna*, the locally abundant and smallest European species from Corsica; *C. dorus* from the Cevennes and Digne, with the very local *C. mathewi* from Portugal; *C. pamphilus*, summer broods from Corsica and Gavarnie, with examples of ab. *marginata* and summer generation *lyllus*; *C. arcania* from many localities, with its forms *satyrion* and *darwiniana*; the N. African *C. arcanioides*; and *C. iphis*.

Mr. Robert Adkin, referring to his paper on "Melanism in the Lepidoptera" ("Proc." 1925, p. 7), said he had recently heard from his fellow member, Mr. W. Gifford Nash, that the var. *doubledayaria* of *Amphidasis betularia* occurred quite commonly in Bedfordshire; also from Mr. Alfred H. Sperring, of Southsea, that it had been taken several times near both Portsmouth and Havant in Hampshire, and twice bred from larvae taken at Westbourne in West Sussex. It would appear therefore, that its "Recorded Distribution" may be taken as extending from Northumberland and Cumberland in the North to Sussex and Hampshire in the South.

Mr. Macdonald exhibited a large "bird-eating" spider, *Mygale*, from S. America.

Mr. A. A. W. Buckstone exhibited a series of cells of the leaf-cutting bee, *Megachile*, in the groove of an old window sash.

Mr. Bunnett exhibited the fly, *Urophora cardui*, a Dipteron bred from galls caused by it on thistles.

Mr. Tonge said that *Hypena rostralis* had been very common at sugar at Reigate; and he exhibited a varied series, including the forms *palpalis* and *unicolor*.

Mr. R. Adkin read a paper "Species in the making" and showed a series of lantern slides illustrating forms of *Diacrisia mendica*, *Ectropis crepuscularia* and *E. bistortata*, *Boarmia repandata*, *Hyponomeuta* sps., *Oporabia* sps., and *Dysstroma truncata*, etc. (See page 61).

NOVEMBER 25th, 1926.

ANNUAL EXHIBITION.

The PRESIDENT in the Chair.

There was no formal business, the evening being spent as a Conversazione.

More than 160 members and friends were present, in spite of the extremely thick fog which prevailed. The exhibits were not so numerous as usual, owing to at least a dozen members being unable to reach the Society's rooms.

Mr. H. W. Andrews exhibited three store-boxes containing examples of British species of *Leptidae* and *Asilidae* (Dip.).

Mr. S. R. Ashby exhibited British Coleoptera of the genera *Cryptocephalus* and *Chrysomela* of the *Chrysomelidae*; and *Otiorrhynchus*, *Polydrusus*, *Sitones*, *Hypera*, *Lixus*, etc., of the *Curculionidae*.

Mr. T. L. Barnett exhibited an aberration of *Hemaris fuciformis*. similar to that illustrated in *Ent.* LVI. 195, with abnormal neuration and markings. The discoidal cell extends to the centre of the forewing, the marginal bands are wider, with convex not concave inner margin; the colour is paler and the band of the hindwing is pale reddish. There is slight scale-dusting on the wings.

Mr. E. J. Bedford exhibited a series of water-colour drawings of the rarer British orchids, painted by himself.

Mr. K. G. Blair exhibited galls of the Chloropid fly, *Lipara lucens*, on the Common Reed (*Arundo phragmites* = *Phragmites communis*), with parasites together and inquilines that have emerged from them. The galls were collected on the occasion of the Society's field meeting at Oxshott on April 17th. The following were insects reared from them.

1. *Lipara lucens* (Dipt. Fam. *Chloropidae*), the gall-maker. In emerging the fly makes its way from the gall chamber along the middle of the rolled leaves forming the upper part of the "cigar" to the tip.

2. *Pteromalus liparae* (Hym. Fam. *Chalcididae*), parasitic upon No. 1. The fly on emergence cuts its way through the successive layers of enwrapping leaves.

3. A smaller Chloropid, *Haplegis flavitarsis*, Mg., which forms secondary galls on the outer walls of the primary gall chamber. These secondary galls do not appear to affect the well-being of the primary gall-makers.

4. A Cecidomyiid fly (Gall-midge), also forming secondary galls on the walls of the primary gall.

5. *Platygaster* sp. (Hym. Fam. *Proctotrupidae*), parasitic upon No. 4.

6. Two other species of Cecidomyiids, probably living between the enwrapping leaves of the gall.

Mr. S. F. P. Blythe exhibited a specimen of *Daphnis nerii*, a rare Sphingid moth, taken by himself at Chiselhurst on September 14th.

Miss Winifred M. A. Brooke exhibited a series of drawings of insects and flowers.

Mr. A. A. W. Buckstone exhibited series of the spring and summer broods of the two very closely related species which were separated a few years ago, *Anaitis efformata* and *A. plagiata*. He also showed a series of the dwarf race of *Polyommatus coridon*, which he had been taking for some years past in a very restricted area on the North Downs.

Mr. L. C. Bushby exhibited the Freshwater Crab (*Potamon edule*), from Algeria, three species of Desert beetles from Algeria, the Locust (*Anacridium aegyptium*), the Crested Mantis (*Empusa egina*), the Great Water-beetle (*Hydrophilus piceus*), the Fairy Shrimp (*Cheirocephalus diaphanus*), the Phantom Larva of *Corethra plumicornis*, and egg-cases of the Signature Spider (*Argiope trifasciata*).

Mr. C. J. Cheeseman exhibited the silk moths, *Attacus edwardsi*, *A. atlas*, *Actias selene*, *Antheraea mylitta*, *Samia cecropia*, *Philosamia cynthia*, and the Saturniid, *Graellsia isabella*.

Dr. E. A. Cockayne exhibited a long series of *Triphaena comes*, from East Aberdeenshire, 1926, including ab. *rufa*, ab. *curtisii*, ab. *rufo-nigrescens*, ab. *nigrescens*, etc., and communicated the following note.

" The first three rows are representatives of a brood from a female var. *nigrescens*, Tutt, with *hindwings free from black dusting*. About half the progeny were pale, half melanic and three var. *rufa*, Tutt. The melanic forms varied from those with reddish forewings (var. *curtisii*, Newm.) through intermediates (var. *rufo-nigrescens*,) to those with black forewings (var. *nigrescens*, Tutt). The hindwings were *free from black dusting* like those of the parent. One melanic specimen has the black fore-and hindwings replaced by grey and the yellow of the hindwings by straw colour.

" The next three rows are representatives of a brood from a female var. *nigrescens*, Tutt, with hindwings *dusted with black*. Exactly half the progeny were pale and half melanic. They range from var.

curtisii through var. *rufo-nigrescens* to var. *nigrescens*. All had the hindwings *dusted with black* like the parent.

" The seventh row and the first five of the eighth row are from a female with *dark brown forewings* like the bottom specimen of the seventh row.

" The last eleven of the eighth row and the last row are from a female var. *rufa*, Tutt (bright chestnut) and range from specimens free from red through intermediates to var. *rufa*."

Mr. H. M. Edelsten exhibited sections of various rush and reed stems with pupae *in situ* together with photographs of ova and larvae to show the early stages of some of the British moths of the genera *Leucania* and *Nonagria* occurring in the Fens, Broads and Marshes.

Messrs. O. R. and A. de B. Goodman exhibited the Rhopalocera taken by them in Algeria in May and June, 1926. The following is a list with their localities:—

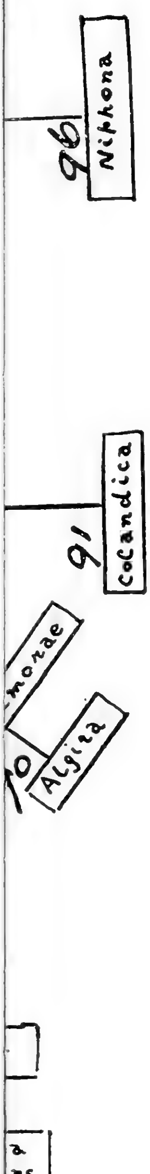
Papilio podalirius, Hamman Righa. *Thais rumina*, Hamman Righa and Teniet el Haad. *Aporia crataegi*, Belezma and Teniet el Haad. *Pieris brassicae*, Phillipville and Hamman Righa. *Pieris rapae*, Biskra, Constantine, and Hamman Righa. *Pieris napi*, Blida and Teniet el Haad. *Synchloë daplidice*, Biskra, El Kantara, and Constantine. *Euchloë belemia*, Hamman Righa and Teniet el Haad. *Euchloë belia* (very varied), Constantine, El Kantara, Hamman Righa, and Teniet el Haad. *Teracolus nouna*, Biskra. *Euchloë charlonia*, Lambessa, El Kantara, and Teniet el Haad. *Euchloë eupheno*, everywhere except Biskra. *Colias croceus*, abundant (many v. *helice*). *Gonepteryx cleopatra*, Hamman Righa. *Callophrys rubi*, Belezma (worn). *Cigaritis zohra*, very local, at Teniet el Haad. *Lycaenopsis argiolus*, Hamman Righa and Constantine. *Polyommatus hylas*, two specimens on Mount Belezma: a new race. *Cupido lorquinii*, Mount Belezma and Teniet el Haad. *Zizeeria lysimon*, Biskra only. *Scolitantides baton* race *abencerragus*, El Kantara only. *Tarucus theophrastus*, El Kantara and Biskra. *Lampides boeticus*, Hamman Righa. *Scolitantides fatma*, this species is confined to the Aures (Belezma) district, and is exceedingly local. *Plebeius allardii*, Teniet el Haad (confined to North Africa). *Plebeius martini*, Teniet el Haad, and Hamman Righa (confined to North Africa). *Glaucopsyche melanops*, Teniet el Haad. *Polyommatus icarus* (very various), from all the localities. *Polyommatus medon* (*astrarche*) from all districts and a white aberration from Teniet el Haad. *Eugonia polychloros*, the race in the Atlas at Teniet el Haad approached type *polychloros* in contradistinction to the lowland var. *erythromelas*. *Dryas pandora*, Hamman Righa and Teniet el Haad. *Issoria lathonia*, two only, Blida and Belezma. *Melitaea didyma*, Blida and Teniet el Haad. *Melitaea aetherie* var. *algirica*, Teniet el Haad and Hamman Righa. *Melanargia lucasi*, Teniet el Haad and Lambessa. *Melanargia ines*, El Kantara and singly. *Satyrus abdelkader* var. *lambessana*, this is supposed to be an early form of typical *abdelkader* and flies in a restricted area in the Aures Mountains. I think it should be examined to see if it is specifically distinct. *Hipparchia semele* var. *algirica*, El Kantara and Teniet el Haad. *Epinephele fortunata*, common in most localities. *Epinephele megera*, and *Pararge aegeria*, common everywhere from the desert to the Atlas Mountains. *Epinephele pasiphaë* var. *philippina*, only at Teniet el Haad, and local there. *Coenonympha pamphilus*, generally common. *Coenonympha arcanioides*, occurred at Hamman Righa, Blida, and at Phillipville. This has become a species distinct from *arcania*. *Erynnis alceae*, generally common. *Spilothrus stauderi*, the rare species from El Kantara. *Powellia ali*, very similar to *sao* (*sertorius*), but proved specifically distinct. *Sloperia ahmed*, fromTeniet el Haad. *Gegenes nostrodamus*, two specimens from the Oasis in Biskra. *Hesperia onopordi*, common on the ruins at Lambessa. *Hesperia* (*Tuttia*) *leuzeae*, Obthr. this very rare species was taken in dozens, in the glades of the Cedar Forest at Teniet el Haad. *Thymelicus* (*Adopaea*) *acteon*, common at Hamman Righa. *T.*(*A.*) *hamza*, a nearly allied species confined to N. Africa. All from Teniet el Haad. *Adopaea flava* (*linea*), from Constantine and Hamman Righa.

Mr. T. H. L. Grosvenor exhibited a large case of *Zygaena* species arranged as in the accompanying diagram (Plt. X.) and communicated the following note :—

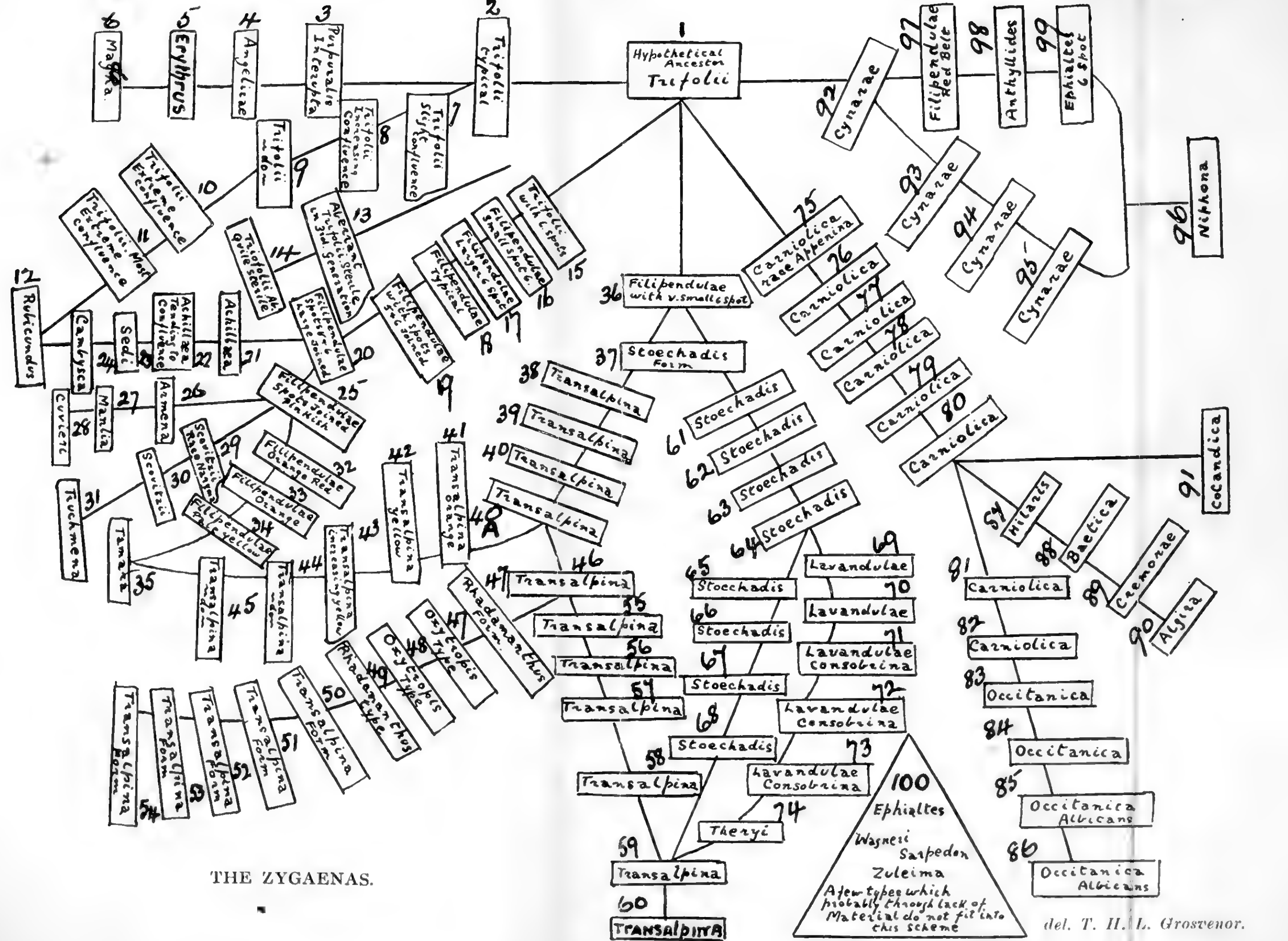
In making the exhibit of the genus *Zygaena*, which has been arranged on somewhat unusual lines, I wish to make it understood clearly that this is entirely hypothetical; species, sub-species, races, aberrations, have been freely utilised where they fit into the best advantage, the idea being to show a possible line of descent from a common ancestral type.

Trifolii has been taken as a starting point, but any other species, aberration, etc., could have been utilised for this purpose. The most extremely divergent types will be found at the end of each line, *viz.*

PLATE X.



L. Grosvenor.



THE ZYGAENAS.

del. T. H. L. Grosvenor.

6. *Erythrus-magna.*
12. *Rubicundus.*
28. *Cuvieri.*
31. *Truchmena.*
35. *Tamara.*
54. *Transalpina* (large spotted very red form).
60. *Transalpina* (very dark with black secondaries).
86. *Occitanica-albicans.*
90. *Algira.*
91. *Cocandica.*
96. *Niphona.*

It will be seen from an examination of the above eleven insects that, except for structure, they are most divergent, in colour and markings particularly. Yet with comparatively small gaps they are shown to grade very closely towards each other through intermediate forms.

Taking each line by line it will be seen that

2/6. *trifolii* through *purpuralis*, *angelicae*, to *erythrus-magna*, there is a gradual increase in size and in the extension of the red markings of forewings.

7/12. *trifolii*, showing varying degrees of confluence until an extreme aberration almost corresponds with the Italian *rubicundus.*

13/4. Extreme aberrations of *trifolii* (white and black forms): see extended notes in Presidential Address.

15/24—12. *trifolii* with six spots, through *filipendulae*, *achilleae*, *sedi*, *cambysea*, meeting 7/12 at 12=*rubicundus.*

25/28. *filipendulae* pinkish, through *armena*, *manlia* to *cuvieri.*

25—29/31. *filipendulae* pinkish, through *scovitzii*, *naryna-scovitzii*, to *truchmena.*

25—32/35. *filipendulae* pinkish, orange red, orange, yellow to *tamara.*

36/45—35. *filipendulae* with spot six almost absent through *stoechadis* and *transalpina* pink to yellow forms to 35=*tamara.*

40A—46/54. *transalpina*, through *radamanthus*, *oxytropis*, to extreme red large spotted form of *transalpina.*

40A—46—45/60. *transalpina* varying to extreme dark form.

36/7—61/8. *filipendulae* with spot 6 almost obsolete, through varying forms of *stoechadis* to extreme dark form of *transalpina.*

64—69/74—59/60. *stoechadis* through forms of *lavandulae* to extreme dark form of *transalpina.*

75/86. *carniolica* race *apennina*, through intermediate forms to *albicans.*

80—87/9. *carniolica*, through *hilaris*, *baetica*, *cremonae* to *algira*.

80—91. *carniolica—cocandica.*

92/6. *cynarae—niphona.*

92—97/9—96. *cynarae*, *filipendulae* (with red belt), *anthyllidis*, *ephialtes* to *niphona*.

100. *ephialtes*, type *wagneri*, *sarpedon*, *zuleima* are a few species that probably through lack of material do not fit into this scheme.

It will be seen readily from the foregoing that this arrangement could have been made by starting at any of the most extreme or any intermediate forms, thus showing how closely races of one species approximate to aberrations of an entirely different species superficially. In making this exhibit one very clearly recognises the fact that a considerable amount of imagination enters into it, as many of the gaps in the series are somewhat wide; but this must be attributed to lack of material, as by means of aberrations that one knows to exist, this scheme could possibly have been made so perfect, that it would have been almost an impossibility to show where a species ended and another began.

Mr. H. A. Leeds exhibited, among many others, the following varieties :—

Epinephele jurtina, showing homoeosis; *Aphantopus hyperantus*, male undersides with three (instead of one) apical spots in contact, each black spot white-centred, but all three with a common pale surrounding; *Hesperia malvae*, intermediate to ab. *taras*; and many striking forms of *Coenonympha pamphilus*, *Polyommatus icarus*, *P. coridon*, *Plebeius argus* and *P. medon*. The whole were named in accordance with the cumulative method adopted by the late J. W. Tutt in his "British Butterflies."

Mr. O. R. Goodman, on behalf of Mr. Dicksee, exhibited a rare female of the large *Ornithoptera victoriae* race *rubianus*.

Mr. W. J. Lucas exhibited drawings of Natural History subjects.

Mr. Hugh Main exhibited living specimens including a terrapin and several scorpions from Algeria, the large British earwig, and various beetle larvae.

Mr. A. de B. Goodman exhibited living examples of two species of Algerian scorpion, *Buthus occitanus*, abundant throughout the Aures and Atlas Mts. with its rare variety *nigrovesiculosis*, one specimen from Biskra; and *Scorpio maurus*, from the same localities, but not common; the black-bellied Tarantula spider, *Lycosa* *narbonensis*, a ♂ with its pit, from Teniet-el-Haad, Atlas Mts.; the beetle *Scarabaeus variolosus* from the same place; *Pamphagus elephas*, a large wingless grasshopper ♂ 3 ins. long, ♀ 4 ins. long, also from Teniet-el-Haad; and the extremely rare cricket *Scobia ambigua*, from the same place. This last has since been placed in the British Museum. Most of the exhibits were aided by a series of drawings.

Mr. A. W. Mera exhibited a case containing melanic forms of *Boarmia roboraria*, bred from W. Essex larvae in 1926; and a case containing a varied series of *Polia chi*, from Huddersfield eggs.

Mr. Saville exhibited a form of *Dryas paphia* intermediate between the type and *f. valesina*; with aberrations of *Aglais urticae* and *Arctia caja*.

Mr. Harry Moore exhibited the long-tailed Bombycine Moths, *Actias*, *Argena*, and *Eudaemonia* sps.; the African Bombycine Moths, *Gynanisa*, *Lobobunaea*, *Bunaea*, and *Carnegia* sps.; and the leaf-moths, *Gloriana ornata*, *Phyllodes maligera*, and *Miniodes discolor*.

Mr. L. W. Newman exhibited long series of female aberrations of *Polyommatus thetis*, showing ground colour varying from brown to extreme blue, a melanic *Stauropus fagi* from Reading, and an aberration of *Callimorpha dominula*, with only two white spots on the forewings and with hindwings heavily banded with black.

Mr. Newman also showed on behalf of Mr. W. G. Dawson, a fine collection of Butterflies taken in Morocco in 1926.

Mr. D. H. Pearson exhibited two cabinet drawers mainly consisting of aberrations of British and continental Rhopalocera, including *Aglais urticae* with ab. *caerulapicata*, ab. *ignea* and ab. *nigricans*; *Vanessa io* vars; a long series of *nigrata* forms of *Limenitis sibilla*; yellow Donegal forms of *Pieris napi*; a pale bleached ab. of *Epinephele jurtina*; a golden *Pararge megera*; very orange females of *Euchloë euphenoides*; etc.

Mr. G. B. Portsmouth exhibited the beetle *Hypotheremus cassiae*, Eichk., ♂s and ♀s, bred from Brazil nuts.

Mr. G. R. Simpson exhibited a fine striated female variety of *Polyommatus coridon* from Royston Heath, August 8th, 1923.

Miss Tomlinson exhibited a series of needle-work portraits of butterflies, copied from Coleman's "Butterflies."

Mr. C. W. Sperring exhibited *Papilio machaon*, with red markings in all crescents (except the last) on the hindwings. Bred, Norfolk, 1926.

Euchloë cardamines: a male underside, bred, Scarborough, 1926, with the usual dark green coloration of the hindwings replaced by pale lemon green; and female underside showing an extra spot on each of the upper wings, with broad white bands on the hindwings. Bred Scarborough, 1926.

Pyrameis cardui, with very lightly marked upperside hindwings.

Melitaea cinxia: two males and two females, bred, Isle of Wight, 1925, with broad band suffusion on upperside of hindwings; also a female underside, bred, 1926 (Isle of Wight), with broad cream band.

Melitaea aurinia: 20 specimens bred from 24 larvae taken from one nest, at Eastleigh, S. Hants, showing extreme divergence of upperside markings; and 7 specimens bred 1926, ex Hodhill, Dorset, showing considerable upperside variation.

Pararge aegeria: 3 upperside suffused varieties, three dark-banded hindwings, underside; 2 females, bred, N. Cornwall, 1924, extra large and bright markings.

Epinephele jurtina: 2 male uppersides and one female, showing an ocelli at the anal angles on each specimen on the hindwings. Mayo, 1924; Sligo, 1925; Galway, 1926.

Plebeius aegon: a series of 7 males and 5 females, captured, Maidstone, 1926, showing striation on undersides in all cases.

Polyommatus icarus: 2 gynandromorphs, both left side male, right side female with typical Irish blue female characteristics, and the orange lunules on both wings of female side. Captured, Galway, 1926.

Mr. H. Worsley-Wood exhibited a case of preserved larvae of British Lepidoptera; the first British example of *Xanthia ocellaris* taken in 1893; a *Perizoma taeniata* without the central band, and *Erannis* (*Hybernia*) *defoliaria*, a melanic specimen from Epping Forest.

Mr. R. M. Prideaux exhibited—1. Specimens of *Pararge aegeria*, bred from a late-summer female, S. Devon, 1923: some of the resulting larvae responded to continued warmth, and produced imagines during the winter; others, kept in the same cage, settled down for hibernation when about one quarter grown, on grass-stems, and did not produce butterflies until the following Spring.

2. Specimens of *Lycaenopsis argiolus*, bred from late autumn larvae found on ivy, in October and November, 1922. The resulting butterflies were all a pale greyish lavender colour. Three normal specimens for comparison.

3. Rather dwarf specimens of *Plebeius aegon*, reared from ova; larvae fed on the young green shoots of furze; they matured very late in captivity.

Mr. Percy Richards exhibited the following aberrations of British butterflies:—*Pieris brassicae*, females with one spot on forewings: *P. rapae*, a nearly spotless female and another with spots on forewing joined up into a band; *Hipparchia semele*, pale and dark, and one nearly spotless; *Lycaenopsis argiolus*, with spots on underside nearly obsolete; *Polyommatus icarus*, a very fine striated underside female; dark and pale *Melitaea athalia*; pale *Aphantopus hyperantus*; etc.

Mr. H. J. Turner exhibited a copy of Twidle's "Beautiful Butterflies" with highly coloured plates of scenery and butterflies; illustrations from comic papers concerning former annual exhibitions of the Society; a coloured illustration of an "Entomologist" made up of various species of insects (early nineteenth century); various excerpts from newspapers re Entomology; etc.

He also exhibited a living water-beetle, *Dytiscus marginalis*, which flew into a house at Chipstead in the middle of November.

Mr. C. H. Williams exhibited series of aberrations of *Polyommatus coridon* and *Abraxas grossulariata*, with three very large *Manduca atropos*, and a *Daphnis nerii* taken near Purley in 1905.

Mr. J. J. Joicey sent for exhibition from the Hill Museum, Witley, a series of *Pyrameis cardui*, L., and of 156 *Lampides boeticus*, L., arranged to illustrate the wide distribution of these species. *P. cardui* is known to be the more widely distributed, occurring over the Old World to the Malay region, over Africa and its islands, and in the New World from Canada to Central America. *L. boeticus* does not occur in the New World, but ranges over the entire Old World and Africa.

Although the distribution of *cardui* may be due chiefly to its migratory instinct, this is not so much the case with *boeticus*, which is not a true or regular migrant. It is probable that since this species has become widely spread many other allied forms had come into existence.

The series of *P. cardui* shown included nine striking aberrations, one from Cape Town (Trimen Coll.), two from Britain (Gregson and Devignes Colls.), the others from Switzerland (bred).

DECEMBER 9th, 1926.

The PRESIDENT in the Chair.

Messrs. L. H. Newman, of Bexley, W. T. Watts, of Elmers End, F. W. MacDonald, of Leytonstone, and Miss Fullylove, of Wandsworth Common, were elected members.

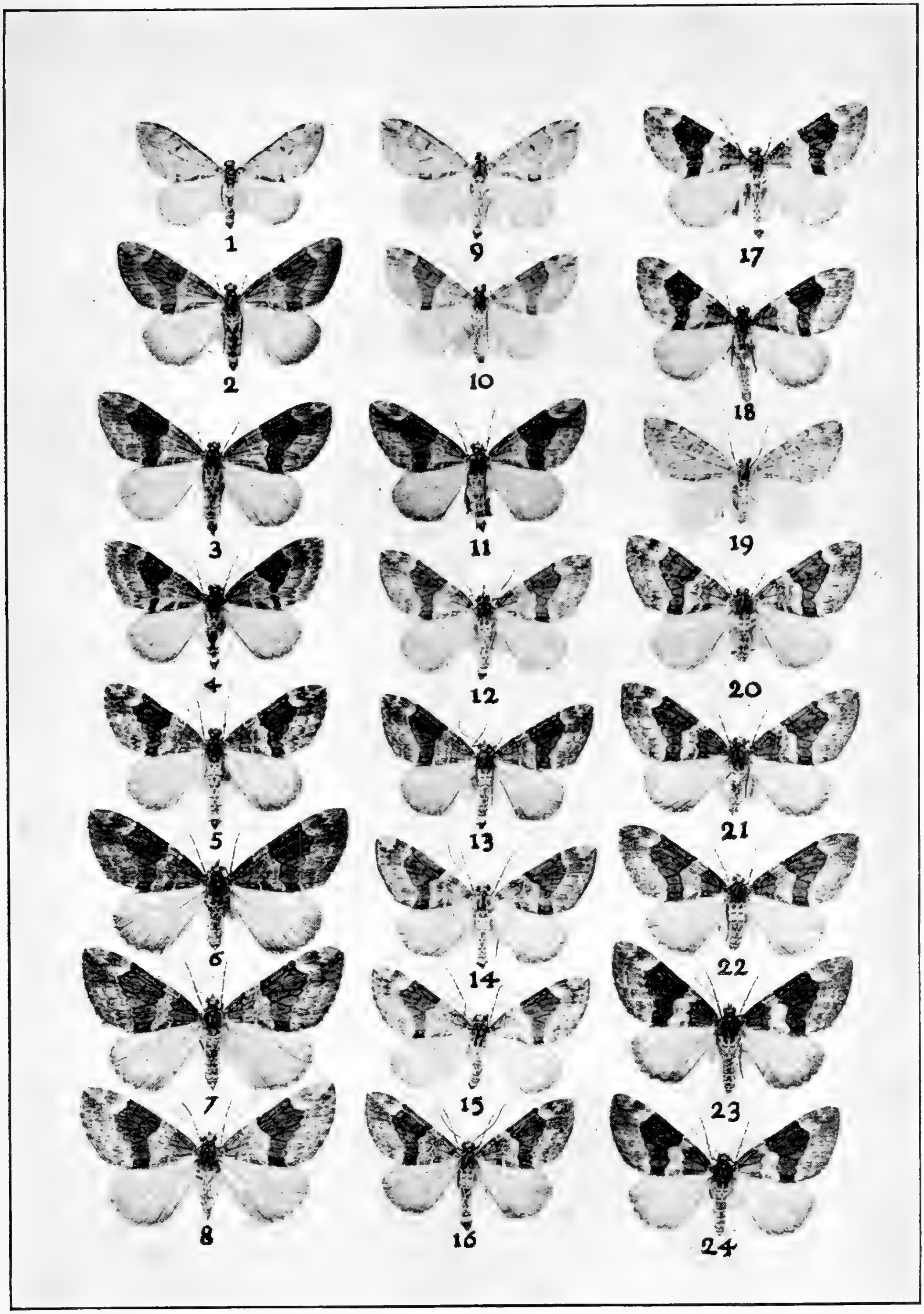
Mr. Robert Adkin exhibited series of mongrel *Spilosoma mendica*, obtained by crossing males of the race *rustica* from King's County and County Cork respectively with typical *mendica* females. The King'sCounty mongrel males varied in colour from almost as light as the *rustica* parent to almost as dark as typical *mendica* males: a feature of the markings being a broad, pale costal stripe and a pale basal streak extending to the centre of the wing, where it was often blurred; a large proportion of the brood was thus affected. In the County Cork mongrels these features were less marked, and the colour somewhat less variable. The females of both broods showed no unusual characters.

Dr. E. A. Cockayne exhibited preserved larvae of *Ptychopoda fuscovenosa* (*osseata*), *P. seriata* (*virgularia*), *Laphygma exigua* (from immigrant females), *Orthonoma obstipata* (*fluviata*), all bred from eggs.

He also showed long bred series of *Thera obeliscata* and *T. variata*, including brown forms of the latter, an ab. *nigrosignata*, together with series of both hybrids, *obeliscata* ♂ × *variata* ♀ and *variata* ♂ × *obeliscata* ♀, which he was naming hyb. *prouti* and hyb. *woodi* respectively (See "Ent. Record" XXXIX., p. 1, 1927). Plate XI.

Dr. H. B. Williams exhibited his series of *Rumicia phlaeas* in illustration of his paper. The series included examples of abs. *alba*, *schmidtii*, *intermedia*, *remota*, *obliterata*, *basilipuncta*, *radiata*, *obsoleta*, *eleus*, *suffusa*, *initia-caudata*, etc., and many bleached and partially white forms.

Mr. C. N. Hawkins exhibited a short series of *Oporinia* (*Oporabia*) *dilutata*, Bkh., bred from larvae beaten from oaks at Bookham on May 28th, showing a fair range of variation. A few larvae collected at Sandown produced 5♂s and 16♀s. Also 2♂s and 2♀s of the same species from Wimbledon for comparison. He also showed a short series of *Triphaena fimbria*, L., bred from larvae collected last spring on Wimbledon Common. One ♂ has the orange portion of hindwings clouded with black, and another (unfortunately partly crippled) shows an orange sheen over the black borders of hindwings



From The Entomologist's Record. *Photo. E. A. Cockayne.*

THERA HYBRIDS.

Hybrid prouti, ♂ 1-5, ♀ 6-8.
Hybrid woodi, ♂ 9-18, ♀ 19-24.

apparently through the curling of the scales in these parts and the fact that these scales are small and widely spaced, allowing the wing membrane to show between the rows. Some 18 or 20 larvae of this species picked up by chance produced 9 ♂ s and 4 ♀ s.

Mr. O. R. Goodman exhibited many races of *Heodes* (*Rumicia*) *phlaeas* from different parts of the Western Palaearctic Region, including forms native of Norway, Turkey and Palestine.

Mr. H. Moore exhibited a short bred series of *Arctia caja* of the 2nd brood, shewing more than usual aberration in marking.

Mr. A. A. W. Buckstone exhibited numerous series of *Rumicia phlaeas*, including spring, summer and autumn emergences captured and bred, chiefly from Wimbledon Common. The spring and autumn specimens were, generally speaking, much paler than those of the summer broods, and the spots were smaller. Many females of the autumn broods had a tendency to approach ab. *schmidtii*; and usually quite 60% of this emergence have blue spots on the hind-wings. Two males with dull copper-coloured spots on the disc of the hindwings were bred from ova in the autumn; Wimbledon Common. A series of males of the summer brood, captured, were an approach to form *eleus*; and one specimen of this series was golden with much dark suffusion. Many of the bred specimens were exceedingly large, some having spots much reduced in size, others, chiefly of the summer broods, have spots very large. A few of the summer brood, bred from ova, have undersides with spots slightly striate. A specimen taken at Beckenham, in August, 1886, was ab. *alba*.

Mr. Buckstone observed that larvae preparing for pupation usually make one silk girdle besides the pad on which they rest; but this year (1926) his larvae of the summer brood mostly spun what may almost be called cocoons. He suggested that this might be due to overcrowding.

Mr. Hugh Main exhibited the very beautiful pupae of *Papilio nireus* and *P. demoleus* sent to him from Freetown, Sierra Leone, by Miss Fountaine; also a pupa of *P. morania* from Lagos.

Mr. Grosvenor exhibited species allied to *R. phlaeas* from Kandahar.

Mr. H. W. Andrews exhibited the Dipteron *Trypeta acuticornis*, Lw., bred from heads of Woolly-headed Thistle (*Cnicus eriophorus*) by Mr. A. H. Hamm.

Mr. Edwards exhibited the Jew's-ear fungus, *Hirneola auricula-judae*, on elm from Blackheath.

Mr. P. P. Graves exhibited some Rhopalocera from the Cevennes and from the Balkan Peninsula. The former included *Parnassius apolla* race *lozereae* Obth., the large Cevennes race, and a ♀ *Melanargia* ssp. *cleanthe.* Among the Balkan insects were *Dryas paphia* race *kerkirana*, Buresch., from Corfu ; the Bulgarian race *balcanica*, Rebel, of *Brenthis pales*; a fine race of *Erebia tyndarus*, which Rebel has named *balcanica*, and Chapman, from genitalic investigation suspected might prove a different species from *E. tyndarus.* A fine gynandromorph, left ♂ right ♀, of *Polyommatus meleager*, from N. Greece, was among the exhibits.

Dr. H. B. Williams read a paper "Random Notes on *Rumicia phlaeas*" (see page 71), which was followed by considerable discussion.

Mr. Newman said that he had found it impossible to obtain pairings of *R. phlaeas* in captivity for the 2nd generation, and only once had he seen a pairing. It was easy to breed the species in small numbers, but disease always attacked and destroyed large numbers ; he had been quite unable to hibernate larvae, even on the growing plants.

Mr. Buckstone said that he had been more fortunate, breeding large numbers in overcrowded cages without disease to the third brood, but he had not tried to hibernate the larvae.

Mr. P. P. Graves considered that many of the local forms were a matter of temperature.

JANUARY 13th, 1927.

The President in the Chair.

Mr. W. B. Pratt, of Richmond ; Mr. R. R. Richards, of Bexley Heath ; Mr. H. B. Lawson, of Woking ; Mr. C. Wainwright, of W. Ealing ; Mr. A. G. White, of Chaldon ; Dr. G. V. Bull, of Sandhurst ; Mr. G. C. Danby, of Tooting Common ; and Mr. E. C. Bedwell, of Coulsdon, were elected members.

Mr. C. N. Hawkins exhibited a ♀ *Aglais urticae*, bred in September from a pupa found in the Isle of Wight, in which there was black scaling on the veins and across the disc of the forewings, tending towards form *polaris* ; a ♀ *Boarmia repandata*, bred from an Oxshott larva, June, 1926, with pale hindwings and curiously mottled light and dark forewings ; a ♂ *Xanthorhoë fluctuata* ab. *costovata* and a ♂ with buff ground colour, both from Upper Tooting, the latter bred ; a clouded, sooty example of *Boarmia* *punctinalis*=*consortaria*, from Wimbledon, in 1925; a *Euzophera pinguis* bred from a pupa found in an old burrow of *Zeuzera pyrina* in an ash trunk; and a *Palimpsestis ocularis*, L. (*octogesima*, Hb.), taken at rest at Tooting, on June 10th on a twig of privet near a *Populus nigra*: and submitted the following note in reference to the last named. "The resting habit is peculiar. The insect grasped the twig between its claws, all the legs being held close together under the body which leaned back at an angle with the twig, the head being upwards. The wings were wrapped closely around the body and their tips enveloped the twig also, so that no break appeared between the twig and the insect. The whole looked just like a broken stump of a branch projecting from the main twig." A dark ♀ specimen of the same species bred from Upper Tooting was also shown.

Mr. Jarvis exhibited a fossil wing of a Buprestid beetle in slate.

Mr. H. Main reported a specimen of *Vanessa io* as flying in the sunshine on Tuesday, January 11th.

Mr. Hy. J. Turner exhibited two species of Cacti which he had just received from his correspondent Mr. Alfredo Faz, F.E.S., of Santiago, Chili. They were collected by him near the sea on the Pacific coast, where they subsisted on the bare rocky cliffs without rain for some nine months of the year. The only water they had was from a few showers during the other three months. One was *Echinocactus ceratites*, often called "Sandillon"; the other a recently described species, *Cereus litoralis*. The exact locality was Punta de Lobos, near Pichilemu, Lat. 34° 20° S. Chili.

Mr. Turner also showed a series of photographs from our fellow member Capt. K. J. Hayward, taken by him while on a holiday up country, in the Chaco Forest district of the Argentine; and read the following extracts from his letter.

"We took with us only tea and the necessary etceteras, cooking, butter, flour and rice, a few potatoes and 6 lbs. of cheese and jam. We fished and shot and lived like lords, albeit game was especially scarce and shy, and I had to average 9½ hrs. walking a day, for the pot mainly. The bird life was simply marvellous, I would have given a lot to have had a keen ornithologist collecting with me. Flowers were scarce, and only found in a few open patches, but luxuriant where they did grow. A carpet of purple petunias, whose scent lay heavy on the hot air. Banks of blue delphinium-like flowers, with a similar pink flower; red, purple, rarely white verbenas. *Nicotiana affinis* and bright yellow, lemon, and white "moon," or as they are sometimes called harvest-daisies: a glorious yellow "spanish" iris-like flower; masses of mauve convolvulus covering the trees; the algaroba bean or carob (*Ceratonia*), scarlet with its flower clusters; the "lapacho" with its pink flowers and the "jacaranda" with its purple and sweet-smelling blossom. A species of *Citrus* with a white fragrant "orange blossom" sort of flower, and on the weed-covered lakes countless forms of water-flowers, purple, white and pink. We saw none of the *Victoria regia* water-lily, although it flourishes in the district in certain lakes, their roots going 20 ft. or more into the mud. The butterflies I found were almost without exception plentiful, and a few trips served to collect a good series of most. Moths turned up occasionally by day, sugaring in the environs of both camps produced not a single specimen, and dusking was rather out of the question, as I should have had to find my way back some distance to camp in the dark through pathless forest, and usually I was just done in by that time in the day."

Mr. O. R. Goodman exhibited teratological specimens of the following species.

Brenthis dia.—1. Abortive left hindwing. 2. Abortive left forewing. *Melitaea parthenie.*—With whitish film appearance, resembling mould, on the entire surface of all the wings. *M. pseudo-athalia.*—1. Abortive left forewing. 2. Abortive left hindwing.

Miss L. Cheesman gave a lecture on her entomological experiences in Tahiti during her 5 months' stay in that island and illustrated her remarks with a long series of lantern slides. The following is a short summary.

Collecting Insects in the Society Islands.

In 1924 I accompanied the St. George Expedition to the South Seas; when we had reached the farthest point of the voyage, namely Tahiti, which we touched on February 16th, 1925, I remained behind while the expedition made the return voyage, in order to devote more time to one group of islands.

The five months following were spent on three islands of the Society group. Tahiti, Raiatea and Bora Bora.

The first problem was to house the greater part of the equipment while making excursions into as many different localities as could be accomplished in the time. By good fortune I was offered a palm-leaf hut, which for a nominal sum was put at my disposal for that period ; to this I returned periodically to write up notes, put away specimens and take out fresh supplies of collecting material.

These islands are part of the French Possessions in the Pacific. Since no serious collecting has been carried out on these islands, the French officials and cultivators were extremely anxious to aid me in every possible way, for they cannot even make use of the literature which is extant concerning the economic species for lack of a comprehensive work on their insect fauna.

The great obstacle against collecting inland is the scrub, which covers the islands of Tahiti and Raiatea from the coast hills to the tops of the mountains, and since it is costly to employ a guide constantly, and because the natives are lazy, it was necesssary to carry a machete with me, wherever I went, to cut my own trails.

The eastern side of all the islands presents different conditions, because those districts are the first to tap the rain-laden winds ; and the temperature is correspondingly lower. Certain species of plants, which favour cool and moist conditions, are found 500 ft. above sea-level in the eastern districts, whereas the same species are only taken at 4,000 ft. on the north and west. I observed the same conditions with regard to some species of insects, though not in the same degree. Collecting centres were made at various distances inland on the dry hills of the north, and the densely clothed spurs of the eastern districts, and of the peninsula of Taiarapu. I also worked certain rivers as far up as it was possible to follow them.

The centre of Tahiti is an old crater, covering a large area, which consists now of high mountains with precipitous sides, and very deep ravines. Only one river drains the crater, and one river drains the smaller crater of the peninsula. Both these rivers offered exceptionally good collecting grounds. One very interesting expedition was made to an inland lake, formed by the damming up of a river at the head of a valley about ten miles long.

Although the general conditions of the Society Islands appear to offer every inducement for their colonisation by insects, the insect fauna is remarkably poor in indigenous forms, the majority of the species belonging to very widely distributed genera. Lepidoptera and Hymenoptera are surprisingly poorly represented : among my collection the largest number of species belonged to the order of Diptera.

Although it is not possible to generalise upon the distribution until the whole collection has been worked out, the majority of species appear to be more nearly connected with the Indo-Malayan insect fauna, than with that of Australia or of other island groups of the Pacific.

JANUARY 27th, 1927.

ANNUAL MEETING.

The PRESIDENT in the Chair.

The Reports of the Council and of the Treasurer, with the Balance Sheet, were read and adopted (see pages 14-19) and the retiring President Mr. T. H. L. Grosvenor read the Annual Address (see page 88). Votes of Thanks were passed, congratulating the Society on the success of the year. The following is a list of those declared elected as Officers and Council for the ensuing twelve months.—

President, E. A. Cockayne, D.M., A.M., F.E.S. *Vice-Presidents*, H. W. Andrews, F.E.S. and 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*, 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*, C. Craufurd, A. W. Dods, O. R. Goodman, F.Z.S., F.E.S., C. N. Hawkins, F.E.S., S. B. Hodgson, W. Rait-Smith, F.Z.S., F.E.S., E. Step, F.L.S., W. H. T. Tams, F.E.S. and H. Worsley-Wood, F.E.S.

ORDINARY MEETING.

DR. E. A. COCKAYNE, M.A., F.E.S., PRESIDENT in the Chair.

Messrs. F. Hawkins, 37, Benhill Road, S.E.5; F. J. Gibbons, 51, Weldon Crescent, Harrow; C. G. M. de Worms, F.E.S., M.B.O.U., Milton Park, Surrey; Capt. K. F. M. Murray, 11, Eccleston Place, S.W.1; L. P. M. Black, 12, Wontner Road, S.W.17; and E. Scott, M.B., Hayesbank, Ashford, Kent, were elected members.

Mr. W. J. Lucas exhibited the very distinctive lichen *Sticta pulmonacea*, Ach., =*Lobaria pulmonaria*, Hoffm., spoken of colloquially in the New Forest as "Lungs of Oak." As its popular name implies, it grows on oak trunks, and in damp air is of a rich green colour, but when dry takes on a dull ochreous tint. Boiled with liquorice and laudanum, it is (or was) by the New Foresters considered a certain cure for colds, etc.! There is, however, a fully authenticated fact in connection with it—that it will dye wool a rather rich sienna tint, as may be seen from the specimen exhibited.

Mr. C. N. Hawkins exhibited Fossils from Sandown, I. of Wight, consisting of a portion of the end of a large femur bone and a short section of a rib of an Iguanodon from the Wealden beds; and two fine specimens of the fossil Lamellibranchiate, *Corba* (*Sphaera*) *corrugata* from the Lower Greensand.

On behalf of Mr. C. W. Sperring, Mr. Hy. J. Turner exhibited a very large collection of *Polyommatus icarus* from the West of Ireland, Sligo, 1925-6, Clare and Galway, 1926; and read notes on the general characteristics of the species in the district. (See page 82).

INDEX.

Arachnida.

Batrachians and Reptiles.

Bryophyta.

Coleoptera.

RHYNCHOTA.

NOT CLASSIFIED.

THE A[illegible] PROCEEDINGS

For 1886, 18[illegible], 1888-9 (1 Vol.),
1890-91 (1 Vol.), 1892-3 (1 Vol.),
189[illegible], 189[illegible], 1896, 18[illegible], 1898, 1899, 1900, 1901,
190[illegible], 1903, 1904, 1905, 1906, 1907, 1908, 1909,
19[illegible], 1911, 1912, 1913, 1914, 1915, 1916, 1917,
1918, 1919, 1920, 1921, 1922, 1923, and 1924.

Are still in print, and may be had on application to the Librarian.

1886, price 1/6; 18[illegible], price 2/6; 1888-9 and
1890-91, price 2/[illegible] each; 1892-3, price 3/-;
189[illegible], price 2/6; 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/-;
1902, price 2/6; 1903, price [illegible]/-; 1904, price 2/-;
1905, price 2/6; 1906, price 2/6; 1907, price [illegible]/6;
1908, price 2/6; 1909, price 5/-; 1910, price 4/6;
1911, price 4/6; 1912, price 4/-; 1913, price [illegible]/-;
19[illegible], price 4/-; 1915, price 5/-; 1916, [illegible] 3/6;
1917, price 3/6; 1918, price 4/-; 1919, price 5/-;
1920, price 5/-; 1921, price 6/-; 1922, price 10/6;
19[illegible], price [illegible]/6; 19[illegible], price 12/6; and
19[illegible], price 12/6.

[illegible] of the above [illegible] half price.

CONTENTS

MEETINGS OF THE SOCIETY.

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

1927-1928.

1927:—May 26th; June 9th, 23rd; July 14th, 28th; August 11th, 25th; September 8th, 22nd; October 13th, 27th; November 10th, 24th; December 8th.

1928:—January 12th, 26th; February 9th, 23rd; March 8th, 22nd; April 12th, 26th; May 10th, 24th; June 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 all 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.

m Ent. Soc

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01267 1814