

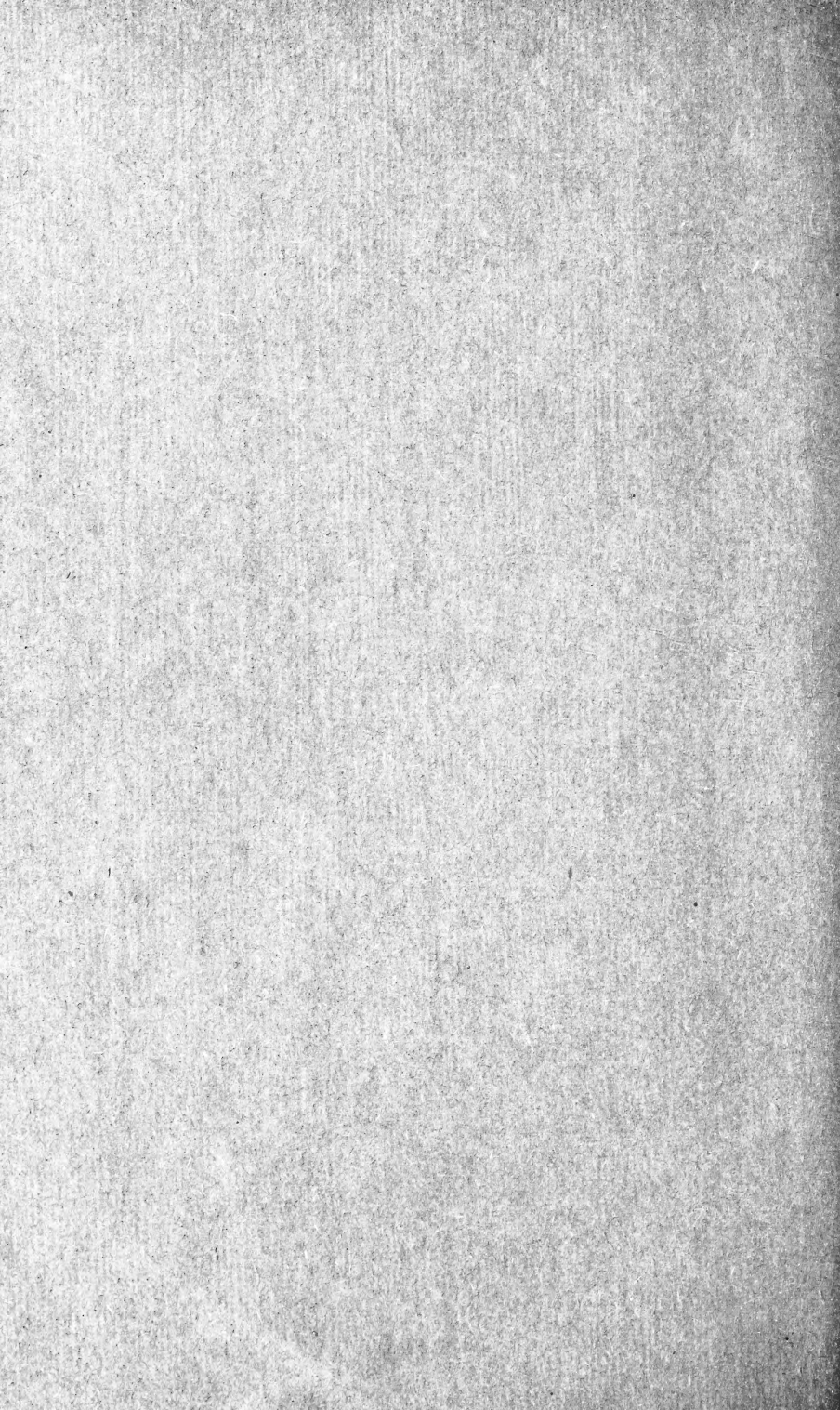


BRITISH
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NATURAL
HISTORY.

PROCEEDINGS
OF THE
Bournemouth
Natural Science
Society.

—
VOL. XV.
—

SESSION 1922-23.



PROCEEDINGS of the

Bournemouth
Natural Science Society.

VOL. XV.
SESSION 1922-23.

PUBLISHED BY THE SOCIETY AT ITS HOUSE,
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Introductory Note.

THE Bournemouth Natural Science Society was founded in 1903, being the successor to an older society which was formed in 1883 and dissolved in 1897. The early meetings of the Society were held in a room hired from time to time for the purpose, but the need of some fixed quarters was soon felt. To meet this need a small room was taken at 122, Old Christchurch Road, and, as this proved inadequate, in February, 1909, better accommodation was secured at Granville Chambers and retained for four years. In March, 1913, the Society took on lease from the Education Committee a large room on the ground floor of the Municipal College. In 1919 this also had to be given up, and the Society succeeded in acquiring a house of its own, 39, Christchurch Road. The formal opening was on February 7, 1920. It is hoped that the possession of this freehold house will enable the Society to offer its members many new advantages and to extend its activities in such directions as may seem advisable.

The objects of the Society are declared by the second of its rules to be "the promotion of the study of Science in all its branches by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable."

The Sections at present working are as follows:—**Archæological and Historical, Astronomical, Botanical, Entomological, Geographical, Geological, Mathematical, Microscopical, Photographic and Record, Physical, and Zoological.**

During the **WINTER SESSION**, from October to April, **GENERAL** and **SECTIONAL MEETINGS** are held. **TWO GENERAL MEETINGS** are usually held in each month, comprising Lectures and Demonstrations on various subjects of scientific interest, illustrated by lantern slides, diagrams, specimens or experiments.

SECTIONAL MEETINGS.—Each Section usually holds a meeting once a month. At these meetings which, equally with the **General Meetings**, are open to all members of the Society, the papers read are more specialised and technical.

Throughout the **SUMMER SESSION**, **EXCURSIONS** to places of interest in the neighbourhood are arranged and indoor or garden meetings occasionally held.

The management of the Society is vested in a Council, which is elected at the **Annual General Meeting**, held in October.

The Society possesses a Library available for the use of members. This is yearly becoming more extensive and valuable by the acquisition of standard text books and of books dealing with matters of local scientific interest. Books may, under certain conditions, be borrowed by members and there is a Reading Room in which works of reference may be consulted.

The Society's collections of archæological, botanical, geological, zoological and other specimens are now arranged in the MUSEUM. Articles on the collections were contributed to Vol. V. and Vol. X. by Sir Daniel Morris and Mr. W. G. Wallace respectively.

Members are elected by the Council and pay an annual subscription of £1 for full membership (admitting to all meetings and excursions for the year), a subscription of £2 covers four adult members of the same family residing in the same house.

A MONTHLY NOTICE, giving full details of all meetings, etc., is posted to every member before the beginning of each month, and a volume of Proceedings is published every year.

Application Forms for Membership, and further particulars, can be obtained from the

HON. SECRETARY,

Bournemouth Natural Science Society.

39, Christchurch Road,

Bournemouth.

Bournemouth Natural Science Society.

OFFICERS AND COUNCIL FOR 1922-23.

President:

DR. F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.V.

Vice-Presidents:

HENRY BACKHOUSE, F.R.H.S.	CLAUDE LYON
G. E. J. CRALLAN, M.A., M.B., M.R.C.S.	HUBERT PAINTER, B.SC., F.C.S.
FIELD-MARSHAL LORD GRENFELL, G.C.B., G.C.M.G., LL.D., F.S.A.	DR. F. G. PENROSE, F.R.C.P., F.Z.S., M.B.O.U.
REV. E. F. LINTON, M.A., F.L.S.	R. V. SHERRING, F.L.S.
	REV. HY. SHAEN SOLLY, M.A.
SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.	

Chairman of Council:

J. H. RALPH SMYTHE, J.P.

Deputy-Chairman of Council:

REV. C. O. S. HATTON, B.A., F.L.S.

Council:

THE OFFICERS AND CHAIRMEN OF SECTIONS (ex-officio)

HENRY BACKHOUSE	J. H. SCOTT, M.E., M.I.M.C.E.
MRS. CURME	R. V. SHERRING, F.L.S.
COL. J. R. DODD, M.D., F.R.C.S.	REV. E. J. DOUGLAS SIMPSON, M.A.
HENRY J. ELLIS	J. H. RALPH SMYTHE, J.P.
J. M. FRENCH	J. F. SPENCER
MISS S. G. ROOKE	W. J. WOODHOUSE

Chairmen of Sections:

Archæological and Historical: REV. H. SHAEN SOLLY, M.A.
 Astronomical: COL. E. E. MARKWICK, C.B., C.B.E., F.R.A.S.
 Botanical: HOWARD LACEY.
 Entomological: JOSEPH NEALE, B.A.
 Geographical: CLAUDE LYON.
 Geological: W. J. WOODHOUSE, A.C.P., M.I.H.
 Mathematical: P. M. PEEK, M.A., F.R.A.S.
 Microscopical: F. B. TAYLOR, B.A.
 Photographical and Record: R. Y. BANKS.
 Physical: HUBERT PAINTER, B.SC., F.C.S.
 Zoological: F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Hon. Treasurer:

GEO. BRUMELL, "Maori," 15, Richmond Park Avenue.

Secretaries:

Hon. Secretary: R. A. DE PAIVA, San Remo, 13, Carysfort Road,
to whom all official correspondence should be addressed.

Hon. Assistant Secretary: W. J. WOODHOUSE, A.C.P., M.I.H., 35, Chatsworth Road.

Assistant Secretary: J. F. SPENCER, "Glenthorne," Richmond Park Road.

Hon. Librarian:

CLAUDE LYON, 9, Knole Road.

Hon. Assistant Librarian: MISS A. G. VEALE, 2, Richmond Park Crescent.

Hon. Editor:

F. B. TAYLOR, B.A., 55, Grand Avenue, W. Southbourne.

Hon. Curator:

REV. C. O. S. HATTON, B.A., F.L.S., Hinton Vicarage, Christchurch.

Hon. Auditors:

E. BICKER. C. H. BLACKETT.

Bankers:

NATIONAL PROVINCIAL BANK OF ENGLAND, BOURNEMOUTH.

Past Presidents:

1903-4	J. E. BEBLE (Mayor of Bournemouth).
1904-5—1905-6	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-8—1908-9	DR. A. RANSOME, M.A., F.R.C.P., F.R.S.
1909-10	DR. A. SMITH WOODWARD, F.R.S., F.L.S., F.G.S.
1910-11	DR. DUKINFIELD H. SCOTT, M.A., F.R.S., F.L.S., F.G.S.
1911-12—1912-13	.	.	SIR E. RAY LANKESTER, K.C.B., M.A., LL.D., F.R.S., F.L.S.
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1918-19 — 1919-20			FIELD-MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1920-21	LIEUT.-COL. SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S.
1921-22	DR. F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.

List of Members.

Revised to 7th January, 1924.

* HONORARY MEMBERS. † PAST PRESIDENTS. O ORIGINAL MEMBERS.

G MORRIS GOLD MEDALLIST. A ASSOCIATE MEMBERS.

Members elected since August 1st in Italics.

Members resigned since September 30th in brackets [.....].

The year of election is given before the name of each member.

A

1912	Alabaster, Lady	Dil Aram, 36, Sea Road, Boscombe
1905	Alder, Mrs.	East Grove, Lymington
1920	Alexander, J. A., F.R.G.S., F.R.S. (Edin.)	Waverley, Rossmore Avenue, Parkstone
1911	Allen, Rev. F. A., M.A.	Staffa, Wellington Road, Parkstone
1920	Anderson, Col. E. B., C.B.E.	Woodmanton, 35, Wellington Road
1922	Anderson, Col. R. F.	Glenalmond, 5, Madeira Road.
1923	Anderson, Mrs.	Ranfurlly, 18, "Dean Park" Road
1923	Anderson, Mrs. M.	Connaught Grange, 81, Alumhurst Road
1914	Andrews, W.	Studley Mount, 34, Tregonwell Road
1922	Andrews, Miss E. M.	Windlesham, 5, Braidley Road
1905	Archer, J. W.	10, Fortescue Road
1905	Archer, Mrs.	Insch, 4 Cromer Road
1911	Atkins, Mrs.	
1924	Austen, L. G.	

B

1906	Backhouse, Hy., F.R.H.S.	Yelland, 23, McKinley Road
1920	Ball, Arthur E.	104, Christchurch Road, Boscombe
1905	Banks, R. Y.	12, Portchester Road
1922	Barker, Saml.	66, West Cliff Road
1921	Barker, Miss W.	" "
1905	Barlow, E. W., B.SC., F.R.A.S., F.R. MET. SOC.	Greengates, Wadhurst, Sussex.
1921	Barnes, Wm. G., M.A.	Heathfield, Brangsgore, Christchurch
1912	ABarraclough, Aug., M.A. (Cantab), F.R.G.S.	173, Richmond Park Road
1909	Barratt, J. Hayes	Brundon, 2, Surrey Road
1923	Barraud, Miss L. M.	23, Hathaway Road, Southbourne
1905	Bartlett, H. F. D., F.E.S.	Island of St. Helena, South Atlantic
1920	Bartlett, P. R.	35, King's Park Road
1914	Bartlett, T. O.	Lloyds Bank, Westbourne
1923	Basebe, Mrs.	12, Portchester Road
1918	ABeaumont, Miss E. J.	12, Sunnyhill Road, W. Southbourne
1923	Bell, Major J. G.	Ivanhoe, Sandringham Road, Parkstone
1923	Benest, Mrs. A. S.	Tijuca, 54, Wellington Road
1920	Bennett, Risdon, M.A.	Yew Cottage, Broadstone
1905	Bennett, Miss E. C.	85, Talbot Road, Winton
1904	Bennett, H. Morden	Sweet Briar, 12, Derby Road.
1923	Best, T. J., M.A. (Cantab.)	Rangoon, 38, Richmond Park Road
1921	Bevan, F. M.	17, Stirling Road
1923	Bidwell, Miss A. E.	10, Granville Road, Boscombe
1913	Bilton, Miss C. E.	Dilkhush, 25, Parkwood Road, Boscombe
1923	Bishop, E.	Corner House, Westbourne Park Road

- 1912 Blackall, Miss E. E. 10, Harcourt Road, Boscombe Park
 1908 Blackett, C. H. Rosapenna, 16, McKinley Road
 1921 Blackett, Miss H. M. " "
 1916 Bloomfield, Rev. H., M.A. Moordown Vicarage
 1910 *Bond, F. Bligh, F.R.I.B.A. 454, Gloucester Road, Bristol
 1920 Borrett, Surgeon Capt., G. G., R.N. 62, Alum Chine Road
 1920 Bourne, Miss C. Moray House, 6, Percy Road, Boscombe
 1914 Bradbury, Miss La Bocca, 2, Portarlington Road
 1914 Bradbury, Miss A. " " "
 1914 Bradbury, Miss E. " " "
 1908 Brazier, J. J. Fairlawn, 48, Lowther Road
 1922 Brewitt-Taylor, Mrs. Ray Branksome Lodge, 6, Forest Road, Branksome Park.
 1920 Brierley, Rev. H. E. Garth Carbery, Stourcliffe Road, West Southbourne
 1921 Bromley, Miss 81, Lansdowne Road
 1917 Brown, Edward West Ridge, Chessel Avenue
 1917 Brown, Mrs. " " "
 1921 Brown, Miss B. L. Kismet, "Keswick" Road, "Boscombe
 1923 Browne, John Serantes, Glen Road, Boscombe
 1905 Brumell, Geo., A.R.I.B.A. Maori, 15, Richmond Park Avenue.
 1920 Brumell, Mrs. " " "
 1923 Brumell, F. " " "
 1920 Brumell, Miss M. " " "
 1920 Bryant, Miss M. Sunninghill, Hampden Lane, W. Southbourne
 1907 Bulfin, Ignatius, B.A. The Den, 26, Knole Road
 1908 Bulfin, Mrs. " " "
 1919 Burstal, Edwd., M.D., OXON. 46, Lansdowne Road
 1922 Burton, E. St. John, N.B.A., F.G.S. Melville, 4, Howard Road.
 1922 Bury, Rev. E., M.A. The Vicarage, Western Road, Branksome Park.
 1922 Bury, Henry, M.A., F.L.S., F.G.S. The Gate House, 17 Alumdale Road
 1922 Byrde, R. W. Bracken House, 1, Eracken Road, West Southbourne.
 1923 Byrde, Mrs. " " "
- ## C
- 1910 Cameron, Miss Little Forest House, 19, Bath Road
 1919 Cardew, R. K. Stafford Lodge, 26, Dean Park Road
 1920 Cardew, Mrs. " " "
 1922 Carter, Roderick Edmond Lawnswood, 12, Beechey Road.
 1922 Carter, Mrs. " " "
 1922 Carter, Miss M. L. " " "
 1912 Carus-Wilson, C., F.R.S., Edin., F.G.S. Altmore, Waldegrave Park, Strawberry Hill, Middlesex and Royal Societies' Club, S.W.
 1920 Cassel, Mrs. Branksome Dene, Alumhurst Road
 1923 Castle, Capt. R. A. E. Castlemount, Glenair Road, Parkstone
 1923 Castle, Mrs. " " " "
 1923 Castle, Miss J. L. " " " "
 1922 Caudwell, Wm., F.R.C.V.S. St. Gratien, 70, Lowther Road
 1923 Caudwell, Mrs. " " "
 1923 Chambers, Miss M. H., B.Sc. 8, Buchanan Avenue
 1909 Chandler, S. Whitty, B.A., J.P. St. George's, 4, Cecil Road, Boscombe
 1912 Charsley, Mrs. Camborne, 48, Belle Vue Road, Southbourne
 1912 AChilver, Miss K. M. 2, Shaftesbury Road

1922	Claridge, J. E. W., LL.C.M.	205, Old Christchurch Road.
1911	Clark, Walter Child	Michelgrove House, Boscombe
1920	Clarke, Miss E.	25, Florence Road, Boscombe
1905	Coddington, E. F.	St. Frideswide, 94, Southbourne Road
1921	Colborne, E. A.	11, Cambridge Road
1918	Colebrook, H. W. V.	Lynton, 64, Lowther Road
1911	Collins, W. F.	Vellore, Overcliff Drive
1922	Coltman, Mrs. A.	Burbush, Burley, nr. Brockenhurst.
1923	Cooke, H. H.	Mayeroft, 7, Beresford Road, W. South- bourne
1912	Cooper, Ernest	100, Old Christchurch Road
1909	Cooper, J. Omer, F.E.S.	6, Queensland Road, Boscombe
1908	Cooper, Rev. W. H. Windle, M.A., F.R.G.S., F.R.H.S.	Owthorpe, 21, Branksome Wood Road
1916	Cowell, G. E.	Hawthorns Hotel, West Cliff Road.
1921	Craddock, Rev. A. W.	67, Richmond Wood Road
1923	Craddock, Mrs.	" "
1903 ⁺	Crallan, G. E. J., M.A., M.B., M.R.C.S.	St. Cross, 13, Bodorgan Road
1922	Crallan, Mrs.	" "
1924	Crane, Mrs. E. C.	Devonshire House, Richmond Hill
1920	Cressy, Miss H.	Bramcote, 1, Glen Road, Boscombe
1922	Crowther, Miss V.	Berwyn Bank, Poulner Hill, Ringwood.
1913	Curme, D., Surg. Lt.-Col.	New Bohemia, 1, Nelson Road
1913	Curme, Mrs.	" " " "
1922	Curme, Miss E. M.	" " " "
1903	Curtis, W. Parkinson, F.E.S.	Drake North, Sandringham Road, Park- stone
1922	*Elected an Honorary member	
1919	Cutland, Walter	Kenilworth, 22, Middle Road

D

1914	*Dale, Wm., F.S.A.	St. Margaret's, Oak Mount Avenue, Southampton
1922	Dalton, Mrs. E.	Lindum Lodge, 10, Milton Road.
1923	Dalton, Miss A. E.	" "
1923	Dalton, Frank	" "
1923	Dalton, W. P.	" "
1920	Darke, Miss W. E.	25, Hawkwood Road, Boscombe
1922	Davey, J. Hingston	10, Studland Road
1921	^A Davies, Miss H. V., B.SC.	Municipal College
1919	Davison, Miss L.	15, Dean Park Road
1922	Day, Mrs. E.	Greencroft, 5, Argyll Road, Boscombe.
1910	de Castro, Mrs.	Sunnydene, 76, Drummond Road
1922	^A de Lunat, Mdlle. E.	Granville Chambers, Yelverton Road.
1918	Dence, Miss F. M.	Birk House, Wollstonecraft Road
1905	de Paiva, R. A.	San Remo, 13, Carysfort Road, Boscombe.
1914	Dickson, Col. W. D., J.P.	Southill, 32, Dean Park Road
1914	Dickson, Mrs.	" "
1922	Dickson, Miss N. C.	" "
1919	Dieselhorst, W., A.M.I.C.E.	50, Surrey Road
1903 ^o	*Dixon, J. R. L., M.R.C.S., L.R.C.P.	
1923	Dixon, Miss L. H.	12, Argyll Road, Boscombe
1920	Dodd, Col. J. R., M.D., F.R.C.S.	140, Richmond Park Road
1921	Dodd, Mrs.	" "
1921	Dodd, T. A.	" "
1910	Dodshon, E., L.L.B.	Lloyds Bank Chambers
1923	Dohoo, E. C.	64, Fitzharris Avenue
1923	Druitt, Alan	Willow Lodge, Mudeford, Christchurch
1923	Druitt, Mrs.	" " "

1904	Druitt, J., J.P.	Avebury, 10, Madeira Road
1922	Duncan, Hy. J.	The Mount, 17, Branksome Wood Road.
1922	Duncan, Mrs.	"
1920	Dundee, Col. W. J., C.I.E., R.E.	Gulmarg, Keswick Road, Boscombe
1921	Dunn-Gardner, Rt. C.	85, Cornwall Gardens, S. Kensington, S.W. 7

E

1917	Edwards, J. R.	The Woodlands, 5, Hayes Avenue
1923	Ellen, Miss D. M.	Staunton, Exeter Park
1922	Ellis, Hy., F.R.A.S.	Branksome Lodge, 6, Forest Road, Branksome Park.
1922	Ellis, Mrs.	" " "
1922	Ellis, Miss W. M.	" " "
1913	Ellis, Hy. J.	Chesterford, 86, Richmond Park Avenue
1920	Ellis, J. C.	Whyte Gables, Highcliffe, Christchurch
1921	Ellis, Mrs. L. M.	Holmdale, 38, Branksome Wood Road.
1923	Elrington, R.	Mavis Bank, 15, Bodorgan Road
1923	Elrington, Mrs.	"
1922	Elwes, Lt.-Col. L. C., D.S.O.	Burnt Hill, Broadstone, Dorset.
1922	Elwes, Mrs.	"
1924	Ensor, Major Fredk. Wm., M.A., B.C.L.	26, Frederica Road, Winton "
1924	Ensor, Mrs.	"
1909	Evans, P. H. L., M.A.	Stirling House, 28, Manor Road

F

1920	Fairbrother, Miss L.	Knole Hall High School for Girls, Knyveton Road
1920	Fairweather, Miss N. R.	19, Sunnyhill Road, W. Southbourne
1921	Fane, F. L.	13, Littledown Road
1921	Farmer, Miss D. A.	Dorset Lodge, 10, Suffolk Road
1919	Farmer, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmer, Miss E. A.	" " "
1920	Fawcoter-Farrell, Mrs.	94, Beaufort Road, W. Southbourne
1922	Fenwick, Edward, M.A., LL.D. (Cantab.), B.Sc. (Lond.)	The School House, Portchester Road
1918	Ffennell, Edwd. B., M.D.	West Heath, 23, Belle Vue Road, Southbourne
1914	Fielding, Thos., M.D.	Genesta, West Hill Road
1903	Firbank, Miss, LL.A., A.C.P.	5, Buchanan Avenue
1922	Fonblanque, Miss Ida	4, Gordon Road.
1917	Forrest, Mrs.	Hillsborough, 36, Westbourne Park Road
1922	Fowler, Arthur R. W., B.A. Cantab.	St. Ina, Beechwood Avenue
1922	Fowler, Mrs. E. M.	" " "
1919	Fowler, Miss M.	Lerryn, Chessel Avenue
1910	Frean, Mrs.	Cranicombe, Branksome Avenue
1915	Frean, Miss E.	"
1920	Freeman, Miss L. H.	75, Paisley Road, W. Southbourne
1909	French, J. M.	Jumpers House, Christchurch
1923	Fryer, Miss C. H.	Moulton, 46, Wellington Road

G

1922	Gardiner, Miss F. M.	3, Adeline Road, Boscombe.
1921	Gardner, Eric, M.D., F.S.A.	Portmore House, Weybridge, Surrey

- 1917 Garnett, H. A.
 1917 Garnett, Mrs.
 1920 Garnett, Mrs.
 1922 Gatty, Lady K.
 1922 Gatty, Miss H.
 1922 Gatty, Oliver
 1922 Gatty, Richard
 1923 *Geake, Miss A.*
 1918 Gent, Wm. Hy.
- 1923 *Gepp, Rev. Edwd.*
 1921 Geoghegan, Mrs.
 1923 Gibbs, F. L. A.
 1921 Gibbs, Geo. F.
 1923 *Giles, Mrs. E. A. B.*
 1914 Gill, Edwin R., A.R.C.A.
 1922 Gill, Major Wm. Robt.
 1923 *Gill, Mrs.*
 1922 Gilmour, Mrs. W. M.
 1921 Gosse, Wm., M.D., D.P.H.
 (Camb.)
 1920 Granville, W. P.
- 1904 Gray, Arthur
 1920 Gray, Mrs. Chas.
 1911 Gray, Mrs.
 1921 Greg, P. H.
 1921 Greg, Mrs.
 1918 Grenfell, Field-Marshal Lord
 of Kilvey, G.C.B., G.C.M.G.,
 LL.D., F.S.A.
 1914 Greves, E. Hyla, M.D., F.R.C.P.
 1914 Greves, Stanley S. Hyla
 1917 Griffiths, Capt. David
 1917 Grindley, Miss E.
- 18, Campbell Road, Boscombe
 " " " "
 Haynes, Cliff Drive, Southbourne
 Ossemsley Manor, Christchurch
 " " "
 " " "
 " " "
 2, Lansdowne Grange, Lansdowne Road
 Holme Cote, 30, Montague Road, W.
 Southbourne
 163, Southcote Road
 25, Wimborne Road
 Hawthorns Hotel, West Cliff Road
 Fairview, 13, Herbert Road
 5, St. Winifred's Road
 Rosslyn, Seldown, Poole
 Priory Dene, 33, West Cliff Road.
 " "
 3, Hamilton Road, Boscombe.
 Hope Lodge, Belle Vue Road, Parkstone
 Kelvin Lodge, Browning Avenue, Bos-
 combe Manor
 Woodville, 26, Melville Road, Winton
 Elvaston, Beechwood Avenue Boscombe
 Darena, 15, Wellington Road
 Fuji Yama, 9, Hengist Road
 " "
 Foresters, Windlesham, Surrey.
 Rodney House, 19, Poole Road
 " " "
 Bakrota, 82, Belle Vue Road, Southbourne
 Riverbank, Brockenhurst

H

- 1923 Haigh, Aubrey Edward
 1919 Hall, J. T., L.D.S., R.C.S.
 1922 Hallows, Mrs. F. S.
 1922 Hamilton, Miss E. G.
 1923 *Harbit, Ralph A.*
 1923 Harding, Ralph
 1921 Hardwick, S.
 1913 Harris, Miss K.
 1912 Harrison, Henry
 1914 Hartley, Dr. J.
 1914 Hartley, Mrs.
 1922 Hartley, J. A.
 1921 Hassell, Miss A. C.
 1914 Hatton, Rev. C. O. S., B.A.
 (Camb.), F.L.S.
 1921 *Elected an Honorary Member.
 1921 Hatton, Mrs. M. B.
 1925 *Haughton, E. W.*
 1923 *Haughton, Mrs.*
 1920 Hawes, Miss
 1924 *Hawley, Miss H. M.*
- Exhall, 20, Christchurch Road
 Stoke Prier, 25, Poole Road
 3, Bodorgan Road,
 12, Oxford Avenue, W. Southbourne.
 12, Hathaway Road, Southbourne
 3, Portchester Road
 57, Poole Hill.
 Trescott Grange, Harvey Road, Boscombe
 Eden Lodge, 7, Surrey Road South.
 62, Portchester Road
 " "
 " "
 " "
 Avonwood, 20, Owls Road, Boscombe
 Hinton Vicarage, Christchurch
 " " "
 " " "
 Belmour, 26, Marlborough Road
 Sunridge, Seafield Road, Southbourne
 " " "
 " " "
 The Moorings, 27, Nelson Road
 Galloway Lodge, 21, Florence Road, Bos-
 combe

1917	Haydon, Clement J.	Ben Veula, 29, West Cliff Road
1923	Hayman, Wm. Speed, M.B. (Lond.)	Thorncliffe, Queen's Park South Drive
1923	Hayman, Mrs.	" " "
1923	Hayman, R. L.	" " "
1923	Hayman, Miss M. S.	" " "
1918	Haythorne, E. C. C.	Forest Lodge, Burton Road, Branksome Park
1924	Heath, Col. Edwd., C.M.G.	Ardmore Cottage, Ardmore Road, Parkstone
1919	Heathcote, Chas., F.R.I.B.A.	Charters House, Western Road, Branksome Park
1921	Hellyar, Miss E.	Cerne Abbas, 1, Belvedere Road
1921	Hellyar, Miss M.	" "
1923	Hellyar, Miss M. R.	" "
1917	Henderson, Miss A. J.	Springbank, 22, Fox Road, Greenock
1911	Henslow, Revd. Professor Geo., M.A., F.L.S., F.G.S.	Danehurst, 40, Branksome Wood Road
1918	*Elected an Honorary Member	"
1921	Heymann, B. M.	Greencroft, Alyth Road, Talbot Woods.
1921	Heymann, Mrs.	" "
1923	Hill, Clarence Sharp	Northfield, Chigwell Road
1904	Hinton, Miss	Welcombe, Wilfred Road, Boscombe
1922	Holden, Rev. E. H., M.A.	9, St. Swithun's Road
1922	Holdom, Mrs. Edwd.	Cranfield, Mansfield Road, Parkstone
1910	Holmes, C. F.	Brackenbourn, 37, Southern Road, West Southbourne
1909	Holmes, Mrs.	" " "
1911	Holmes, Miss S. C. M.	4, Beaufort Road, West Southbourne
1921	Homer, E.	Heatherlands House, Mansfield Road, Parkstone
1922	Homer, Mrs.	" "
1922	Homer, Miss I. V. B.	" " "
1922	Homer, Miss L. A. M.	" " "
1911	Homer, L. V. C.	Carron, 54, Southcote Road
1920	Horne, Miss J.	34, Alumhurst Road
1923	Howell, Mrs. O. B. A. R.	Cintra, 35a, Richmond Wood Road
1923	Hoyer, Miss M. A.	Sandycroft, Birds Hill, Poole
1911	Hudson, F.	Peñarol, Parkstone
1911	Hudson, Mrs.	" "

I

1905	Ibbett, F. W., M.A.	Town Hall
1920	*Elected an Honorary Member.	"
1922	Impey, Miss	6, Florence Road
1923	Isaacs, Geo. Hy., B.A.	Hillsley, Caledon Road, Parkstone
1923	Isaacs, Mrs.	" " "

J

1921	Jackson, Mrs. Gidlow	64, Portchester Road
1922	Jackson, Wm., M.A., B.C.L., F.R.G.S.	Newleaf, 58, Wellington Road
1922	Jacobs, Miss L.	34, Grosvenor Gardens, Boscombe
1912	James, T. B.	Trevenen, Howard Road
1912	James, Mrs.	" " "
1920	James, S.	" " "

1911 Jeffery, T. J. P.
 1923 *Jenkins, Miss B. M.*
 1922 Johnson, Mrs. E.
 1922 Jones, E. Marsden, F.L.S.
 1922 Jones, Mrs.
 1922 Jones, J. Williamson
 1908 Jones, W.
 1905 Jones, W.
 1923 *Jordan, Mrs. E. M.*
 1923 *Jordan, Miss E.*

Meldon, Ormonde Road
 7, Talbot Avenue
 23, Stourcliffe Avenue, W. Southbourne
 Church House, Potterne, Devizes
 " "
 Tyndal Lodge, Forest Road, Branksome
 Park
 3, Granville Road, Boscombe
 254, Old Christchurch Road
 124, Richmond Park Road
 " "

K

1910 Kay, A. J.
 1917 *Kelsall, Rev. J. E., M.A.
 1923 *Kenrick, Miss M.*
 1913 Killick, H. F.
 1919 Kilner, John
 1916 Kilner, Miss E. M.
 1919 Kilner, Miss R. M.
 1919 Kilner, Miss S.
 1920 Kingsmill, Miss A. T.
 1920 Kitching, Mrs.
 1923 Knight, Chas. Hy.
 1922 Knight, J. W.
 1920 Knowles, Rev. C. Q., M.A.

Valliscourt, 100, Lowther Road
 Milton Rectory, New Milton, Hants
 46, Alum Chine Road
 Rawdon, 9, Marlborough Road
 St. Mary's, Chessel Avenue
 " "
 " "
 " "
 2, Campbell Road, Boscombe
 Fernworthy, Brunstead Road
 Hawthorns Hotel, West Cliff Road
 The Yews, 2, Leigham Vale Road, W.
 Southbourne
 Stepaside, 4, Percy Road, Boscombe.

L

1919 Lacey, Howard
 1922 Lancaster, Walter
 1918 Langiey, Miss C.
 1919 La Touche, Miss
 1921 Latter, Mrs. A.
 1910 Lattey, W. F.
 1920 Law, Miss D. M.
 1922 Lawden, F.
 1922 Lawrence, Dr. Sidney C., M.B.,
 Ch.B., D.P.H.
 1923 *Lawrence, Mrs.*
 1918 Lee, E. Kenworthy
 1919 Leech, Miss M. E.
 1919 Leech, Miss M. M.
 1919 Leigh, Mrs. A. H.
 1919 Leigh, H.
 1910 Lendrum, Miss A. M.
 1922 Lewis, Miss C. E.
 1917 Ley, Dr. Hy. Jas., O.B.E., M.D.,
 C.M., M.R.C.S.
 1917 Ley, Mrs.
 1923 Lindholm, Einar
 1923 Lindholm, Mrs.
 1918 Lindsay, Miss L.
 1903 G^oLinton, Rev. E. F., M.A.,
 F.L.S.

50, Wellington Road
 66, Herberton Road, W. Southbourne.
 96, Richmond Wood Road
 Oakfield, Danecourt Road, Parkstone
 33, Portchester Road
 Linden House, 21, Hawkwood Road, Bos-
 combe
 Bridge End, 3, Parsonage Road
 83, Christchurch Road, Boscombe
 106, Richmond Park Road
 " "
 Rosebank, 39, Lansdowne Road
 Castle Bar, 32, Crabton Close Road, Bos-
 combe.
 " "
 24, Talbot Avenue
 80, Victoria Road
 San Remo, 13, Carysfort Road
 Ashdean, 17, Florence Road, Boscombe
 62, Herberton Road, W. Southbourne
 " "
 3, Adeline Road, "Boscombe"
 " "
 Seathwaite, Sandringham Road, Park-
 stone
 The Cottage, 79, Belle Vue Road, South-
 bourne

1922	ALittle, Edwd. Wm., B.S.C.	Marchwood, 5, Granville Road, Boscombe
1922	Littleboy, Miss E. S.	2, Bodorgan Manor, 12 Bodorgan Road
1923	Littlewood, <i>Engineer Capt</i> A. W., R.N. <i>retd.</i> , O.B.E., <i>Chevalier Legion of Honour.</i>	Hawthorns, Queen's Grove, Parkstone
1922	Logan, T. T.	10, Argyll Road, Boscombe
1916	Logan, Mrs.	" "
1922	Logan, Miss G. M.	" "
1922	Logan, Miss S. M.	" "
1922	Longstaff, Mrs. T. G.	Picket Hill, Ringwood
1920	ALove, Wm. J. E.	St. Clement's School House
1903	oLupton, Miss	Bolingbroke, Knole Road
1909	Lyon, Claude	9, Hengist Road

M

1908	AMackay, Miss	492, Holdenhurst Road
1911	McBean, Miss J.	Inglenook, 29, Parkwood Road
1909	McBean, Miss S.	St. Michael's, Buxton
1923	McDonald, Miss M.	Heatherfield, 15, Gerald Road
1920	McNulty, Rev. Thos. J., M.A.	St. Alban's, 4, Heathcote Road, Boscombe
1920	Male, H. C., M.D., M.R.C.S.	35, Irving Road, W. Southbourne
1922	Mangin, Saml. Hy.	Burton, Christchurch
1905	*Markwick, Col. E. E., C.B., C.B.E., F.R.A.S.	The Knowle, West Moors, Dorset
1922	Marsh-Edwards, Bede R.	Church House, Ringwood
1917	Marston, Miss G.	Bourne Hall Hotel
1913	Martin, Miss F. G.	32, Southbourne Road
1923	Martin, W. H. N.	Castlemount, Glenair Road, Parkstone
1911	Martland, T., L.R.C.P., M.R.C.S.	Standish House, 3, Fitzharris Avenue
1921	Massingberd, A. K.	14, Crescent Road
1921	Massingberd, Miss A. A.	" "
1914	Mate, Sidney J.	10, Landseer Road
1921	Mate, Mrs.	" "
1918	Matthews, Mrs. J. P.	11, St. Katharine's Road, Southbourne
1919	Matthews, Miss A.	11a, " "
1921	Mattocks, Mrs. E. C.	Meyrick "Cliffs Hotel, Beacon Road
1922	Mattocks, T. E. T.	" "
1920	Miller, Miss E.	21, Cecil Road, Boscombe
1922	Moore, Major Thos. C., I.M.S.	Verwood, Dorset
1919	Moorhead, Mrs	Brightlands, 34, Crabton Close Road
1908†	*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.Sc., D.C.L., LL.D., F.L.S.	14, Crabton Close Road
1911	Morris, Lady	" "
1921	Morse, Chas. G. H., M.A., M.R.C.S.	Sherborne, Chessel Avenue
1922	Morse, Mrs. A. Y.	" "
1922	Morse, F. A.	" "
1908	Moss, Miss	The Grange, 52, Westby Road

N

1919	Nankivell, B. W., M.R.C.S., (Eng.), L.R.C.P. (Lond.)	Woodstock, 2, West Cliff Road
1922	Nanson, Mrs. C.	2, Grand Avenue, W. Southbourne
1903	oNeale, J., B.A.	Clonenagh, 7, Montague Road, W. South- bourne
1910	Neale, Mrs.	" "
1918	Neale, Miss J.	" "

1912	Neave, Miss	Lingdale, 73, Lansdowne Road
1921	Neve, Miss G.	Coolavin, 18, Hawkwood Road
1921	Ninnes, Geo. I.	St. Ives, Watcombe Road, West South- bourne
1914	Norton, John J., J.P.	Ashton Court, Branksome Park
1914	Norton, Mrs.	" "

O

1920	Oaten, Mrs.	19, Sunnyhill Road, W. Southbourne
1922	Odell, Miss M. E., B.Sc.	Sandecotes School, Parkstone
1910	Oke, A. W., B.A., LL.M., F.G.S., F.S.A.	32, Denmark Villas, Hove, Brighton
1920	Osborne, John H.	Woodside, Kinson
1920	Osborne, Mrs.	" "
1920	Osborne, Eric A.	" "
1919	Ottaway, W. E.	East Street, Corfe Castle
1922	Ousby-Trew, Rev. C., M.A.	Overthorpe, 19, Florence Road, Boscombe
1922	Ousby-Trew, Mrs.	" "
1922	Ousby-Trew, Miss	" "

P

1903	Painter, Hubert, B.Sc., F.C.S.	29, Talbot Road, Winton
1904	Painter, Mrs.	" "
1923	Park, James	Broughty Ferry, 34, "Sea Road, Boscombe
1919	Parker, Jas. A. D.	22-23, Chiswell Street, London, E.C. 1.
1919	Parker, Miss M.	The Cliff, 13, Southwood Avenue, W. Southbourne
1922	Peek, Bertram M., M.A., F.R.A.S.	Coarse Cliff School, 8, Boscombe Spa Road
1923	Peel, F. W.	13, Portarlington Road
1923	Pennefather, Miss E.	Tir-nanag, Woollaston Road, Southbourne
1923	Pennefather, Miss F.	" "
1915	Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.	Woodbury, 9, Grove Road, East Cliff
1916	Penrose, Mrs.	" "
1916	Penrose, Miss F.	" "
1916	Penrose, Miss M.	" "
1912	Pestell, Miss	Engelberg, 92, Surrey Road
1911	Phillips, Mrs.	43, Alumburst Road
1921	Phillips, Rev. C. A.	Walton House, Richmond Hill
1921	Phillips, Miss C. E.	" "
1912	Philpott, Mrs.	58, "Barkstone Gardens," S. Kensington. S.W. 5.
1920	Pilkington, Mrs. K. C. S.	The Steyne, 9, Manor Road
1920	Pilkington, Miss K. D.	" "
1920	Pilkington, Miss L. D.	" "
1919	Pirie, Miss P.	Fairleigh, Warren Edge Road Southbourne
1914	Pollock, Mrs.	Stoneleigh, Old Dover Road Canterbury
1921	Pontifex, R. D.	Dalton House, 68, Christchurch Road
1921	Pontifex, G. K. D.	" "
1920	Pontifex, Mrs. Dalton	" "
1922	Potter, H.	19, Studland Road
1921	Pugh, Miss E.	Grey Cottage, 14, Milton Road
1911	Pullman, A.	Wonersh, Hathaway Road, Southbourne
1918	Punch, Cyril	60, Wellington Road

1920	Purchas, T. J.	Morningside, 44, Southern Road, W. Southbourne
1921	Purchas, Mrs.	" " "
1921	Purchas, Miss D.	" " "

Q

1922	Quick, Richd., F.S.A. (Scot.), M.J.S.	Russell-Cotes Art Gallery and Museum
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R

1923	Radford, Miss A.	46, Alum Chine Road
1920	Ramsbotham, Miss M.	Beaulieu, 46, Westby Road, Boscombe
1912	Rankin, W. Munn, M.Sc. (Leeds), B.Sc. (Lond.)	Municipal College, Burnley, Lancs.
1920	*Elected an Honorary Member	
1916	Rankin, Mrs. Munn	Stoneleigh, Heron Court Road
1917	Ranshaw, Miss E. M.	9, Warren Road
1918	Ratcliffe, Mrs.	Brooklands, 32, Branksome Wood Road
1924	Ray, Miss I. E.	Mizpah, 35, Nelson Road
1919	Rayner, Miss F.	The Homestead, 9, St. John's Road, Boscombe
1905	*Rayner, J. F., F.R.H.S., M.B. MYC. SOC.	Swaythling, Southampton
1922	Rebbeck, Sub.-Lt. L. E.	Stafford Lodge, 26, Dean Park Road
1922	Rebbeck, Major Thos. Victor	Chota Koti, 7, Stoke Wood Road
1923	Reeves, Miss S., M.B.E.	St. Cross, 13, Bodorgan Road
1924	*Reid, Mrs. E. M., B.Sc., F.L.S.	Pinewood, Milford-on-Sea
1922	Rentoul, Miss E.	Brightlands, 34, Crabton Close Road, Boscombe
1920	Restall, W. T.	26, Seaward Avenue, W. Southbourne
1919	Richards, Miss E. E. B.Sc. (Lond.)	West Cliff Towers, 12, Priory Road
1922	Richardson, Ernest	Wontfitchet, Leigham Vale Road, W. Southbourne
1922	Riding, Miss M.	Glengarry, 46, Drummond Road
1922	Risdon, Wm. Elliott, M.D., M.R.C.S., L.R.C.P.	Merivale, St. Alban's Avenue
1916	Roberts, Hy. Astley, B.A. (Lond.)	Shalvah, Wilfred Road, Boscombe Manor
1918	Roberts, Mrs.	" "
1921	Robins, Miss E.	11, Richmond Wood Road
1923	Roden, Miss E. M.	14, Campbell Road Boscombe
1920	Rogers, Miss C. M.	4, Hengist Road
1905	Rogers-Barns, Miss	Vergers Mead, Corfe Castle
1914	Rooke, Miss S. G.	Norbury, 53, Paisley Road
1914	*Roper, Miss Ida M., F.L.S.	4, Woodfield Road, Redland, Bristol
1922	Rosling, Alfred W.	85, Wimborne Road
1922	Rosling, Mrs.	" "
1922	Rosling, Miss D. M.	" "
1922	Rosling, Miss M. G.	" "
1911	Ross, Rev. T. S.	Lennox, 16, Foxholes Road, Southbourne
1916	Rothwell, Mrs.	Mellstock, Montague Road, W. Southbourne
1913	Russell-Cotes, H. V. M.	8, Meyrick Park Crescent
1912	Rutherford, R. C.	Bourne Hall Hotel
1916	Ryley, S. Clement, J.P.	The Square, Wimborne

S

1917	Saunders, Mrs.	c/o Dr. Ley, 62, Herberton Road, West Southbourne
1919	Savage, J. W.	12, Pinecliffe Avenue, W. Southbourne
1922	Savery, Wm. H., J.P., C.C.	6, Owl's Road, Boscombe
1912	Scarlett, Miss A.	Fermoy, 4, St. Alban's Avenue
1912	Scarlett, Miss K.	" "
1912	Scarlett, Miss M.	" "
1908	Scattergood, J.	Alma Road Council School
1914	Scholes, Denton	The Holme, 16, Cambridge Road
1915	Scholes, Mrs.	" "
1922	Scholes, Raymond Denton	" "
1922	Scholes, Miss V. O. M. Denton	" "
1921	Schott, Miss H. C., M.R.I., F.R.G.S.	The "White Cottage", 1, Southern Road, W. Southbourne
1919	Scott, G. B., C.I.E.	Glencoy, 80, Surrey Road
1924	Scott, H. V.	Homelands, 38, Poole Road, Branksome
1904	Scott, J. H., M.E., M.I.M.C.E.	Kirkby, 22, Linwood Road
1923	Scott, Thos. Bodley, M.R.C.S., L.R.C.P.	Aldington, 7, Poole Road
1905	Scott, W. H., M.A.	Hendall, 15, Herbert Road
1916	Seevour, G. C., A.C.P., F.R.H.S.	St. Peter's School House
1914	Sharp, Chas.	Langdon, Parkstone
1919	Sharp, Miss E.	" "
1919	Sharp, Miss F.	" "
1923	Shaw, Mrs. P.	Highlands, "Howard Road
1923	Sherrin, T. M., M.A.	5, Landseer Road
1903	Sherring, R. Vowel, F.L.S.	Hallatrow, near Bristol
1907	Sherring, Miss O. L.	" "
1916	Simpson, Rev. E. J. Douglas, M.A.	Maesbury, 3, Cavendish Road
1920	Simpson, Norman Douglas, B.A., F.R.M.S., F.L.S.	" "
1918	Smith, Horace, M.A., M.D., (Cantab.)	Sunnyhurst, 7, Dean Park Road
1918	Smith, Miss M. A.	Woodside, St. Alban's Crescent
1918	Smith, T. Templeton, B.Sc.	Pine Glen, 7, Spencer Road
1918	Smith, Mrs.	" "
1923	Smith, Mrs. E.	Woodcroft, Gervis Road East
1923	Smith, Miss L.	C/o Lloyds Bank, Lower Parkstone
1923	Smith, Rev. C. Fullerton	46, Christchurch Road
1914	Smyth, W. Johnson, M.D. (Edin.)	Pirbright, West Cliff Gardens
1922	Smyth, Mrs.	" "
1922	Smyth, Miss M.	" "
1923	Smyth, Miss Kathleen	27, "Spencer Road"
1915	Smythe, J. H. Ralph, J.P.	Willstead, 22, Cavendish Road
1915	Smythe, Mrs.	" "
1920	Smythe, Miss D.	" "
1916	Smythe, Miss K. M.	" "
1919	Snell, Dr. Sidney Herbert	Purewell Hill, Christchurch
1919	Snell, Mrs.	" "
1919	Snell, Wm. Edwd.	" "
1912	Solly, Rev. Hy. Shaen, M.A.	5, Denewood Road
1923	Solly, Mrs.	" "
1922	Solly, R. Harrison, M.A.	Kingscote, 6, Berkeley Road
1921	Sowton, Miss E. M.	57, Southbourne Road, W. Southbourne
1922	Speakman, M. M.	13, Milton Road
1922	Speakman, Mrs. E.	" "
1923	Speller, Miss M. F., B.A.	Parkstone School, Dorset

1909	Spencer, J. F.	Glenthorne, 73, Richmond Park Road
1917	ASpry, Miss A. G., LL.A.	12, Sunnyhill Road, W. Southbourne
1923	Stables, A. D.	Saxthorpe, St. Osmund's Road, Parkstone
1923	Stables, Mrs.	"
1921	Starr, E. J., L.C.P.	Merly Tower, 15, Knole Road
1923	Starr, Col. W. H., C.B., C.M.G., C.B.E.	Nikko, Foxholes Road, Southbourne
1920	Stay, Edwin	Wimbledon Hall, Derby Road
1921	Stevens, Chas. S.	Goodwin, Howard Road
1923	Stevens, Mrs.	"
1916	Stiff, Sydney Jas., B.Sc.	Norden House, Corfe Castle
1916	Stiff, Mrs. F. L.	"
1916	Stiff, Miss M. J.	"
1921	Stigant, Miss E.	11, Gerald Road
1922	Stone, Mrs.	Fordwich, Brunstead Road
1922	Stone, Miss E. E.	"
1920	Stoney, Miss F. A., O.B.E. M.D., B.S.	Ardvoulan, 29, Poole Road
1923	Sturges, Rev. T. W., M.A.	64, Drummond Road
1923	Sturges, Mrs.	"
1923	Sturges, E. L., B.A.	"
1918	*Sumner, Heywood, F.S.A.	Cuckoo Hill, South Gorley, Fordingbridge.
1911	Swain, H. E.	Sorrento, Studland Road
1922	*Elected an Honorary Member	
1906	Swallow, E.	Westridge, Sandbanks, Parkstone
1922	ASymes, H., M.A.	29, Grand Avenue, W. Southbourne

T

1918	Tanner, Mrs. Edwd.	Drimagh, Surrey Road South
1911	Tatchell, Leonard, F.E.S.	Swanage, Dorset
1915	Taylor, F. B., B.A. Camb.	Claregarth, Montague Road, W. South- bourne
1916	Taylor, Mrs.	"
1916	Taylor, Miss M. A.	"
1916	Taylor, Miss M. W.	"
1922	Taylor, Mrs. R.	7, Berwick Road
1921	AThackeray, Miss E. E.	4, Pine Tree Glen
1923	Thill, J. A.	8, Colville Road, Boscombe
1923	Thill, Mrs.	"
1922	Thomas, Hanbury	Glenlyon, 13, Dean Park Road
1922	Thomas, Mrs.	"
1918	Thomson, Alfred S.	Sunnybrae, East Avenue, Talbot Woods
1922	Thomson, A. W. Ferguson	Ailsa, Erpingham Road
1911	Thomson, Mrs. Roberts	Monkchester, 17, Manor Road
1923	Thomson, Mrs. V.	12, Portchester Road
1923	Thompson, Jas. H.	12, Grand Avenue, W. Southbourne
1919	Thoroton, Rev. E. W.	Hill House, Spencer Road, Canford Cliff
1911	Tickell, Miss S. M.	Pinewood, 56, Stourcliffe Avenue, W. Southbourne
1921	Tolson, Miss A.	Brandwood, Commercial Road, Parkstone
1921	Tolson, Miss L. R.	"
1921	Tolson, Miss M.	"
1920	Townesend, Mrs. G. B.	31, Hamilton Road, Boscombe
1911	Towsey, Miss E. L.	10, Ophir Road
1922	Trask, Mrs. S.	42, Hawkwood Road, Boscombe
1922	Trestrail, Major A. E. Y., M.A., D.S.O.	Far Dene, New Milton
1922	Trestrail, Mrs.	"

1920 A Troath, W.
 1911 Turner, J. E.
 1923 Turpin, Miss A.
 1914 Twemlow, Miss E. E.

Langley, 55, Chatsworth Road
 Bramley, 94, Surrey Road
 Sorrento, 12, Seaward Avenue, W. South-
 bourne
 Devon Lodge, 83, Alumhurst Road

U

1923 Urc, Mrs. A. R.
 1923 Uhthoff, J. C., M.D., F.R.C.S.
 1923 Uhthoff, Mrs.
 1923 Uhthoff, Miss C.
 1923 Uhthoff, Miss R.

19, Talbot Avenue, Bournemouth
 7, Branksome Wood Road
 " "
 " "
 " "

V

1913 Veale, Miss A. G.
 1923 Veale, Miss B.
 1923 Veale, Miss C. M.
 1923 Veale, Miss L. H.
 1908 Vernon, Lieut.-Col., A. H.,
 L.R.C.P., F.R.C.S.
 1918 Vickers, Herbert U.
 1918 AVorse, John

2, Richmond Park Crescent
 " "
 " "
 " "
 1, Carnarvon Crescent, Boscombe
 32, Lowther Road
 School House, Hinton Admiral, Christ-
 church

W

1903 G^o*+Waddington, H. J.
 1918 *Elected an Honorary Member
 1922 Wainwright, W. F.
 1916 Walby, A. E.
 1921 Wales, Miss

Moreton, 107, Lowther Road
 Shortwood, 41, Stirling Road
 Netherton, 2, Dean Park Road
 The Nook, 4, Ormonde Road, Branksome
 Park

1921 Wales, Miss N.
 1918 Walker, Robt. S.

" " " "
 Ellesborough, Ormonde Road, Branksome
 Park

1921 Walker, Miss Royston
 1913 Wallace, W. G.
 1912 Walter, Mrs. G. P.
 1923 Walter, Thos. James
 1923 Wanhill, Miss A. M.
 1920 Wanstall, Wm. S.
 1920 Wanstall, Mrs.
 1909 Warr, Miss A.
 1905 Waters, A. W., F.L.S., F.G.S.
 1906 Waters, Mrs.
 1923 Watts, Wm. Hy.
 1918 Webb, Mrs. Nasmyth
 1914 Webber, A. E.
 1909 Webster, Rev. T. S.
 1917 Webster, Mrs.
 1920 Wells, Rev. Edwd., M.A.
 1913 Wetherell, Miss M.
 1920 Wetherell, Miss S.
 1918 Whitaker, S.
 1922 White, Lt.-Col. J. C., M.A.,
 D.P.H., C.M.G.
 1920 White, J. R., M.A.
 1920 White, Mrs.

17, Portman Crescent, W. Southbourne
 Doveshill Cottage, Ensbury Mount
 Rusholme, 10, St. Anthony's Road
 101, Lowther Road
 9, Kingsbridge Road, Parkstone
 Del Monte, 6, Roslin Road
 " "
 Cottesmore, Pokesdown Hill
 Alderley, 2, McKinley Road
 " "
 4, Stourwood Road, W. Southbourne
 Bibury, Wilderton Road, Branksome Park
 28, Tower Road, Boscombe
 Devonian, Glenmore Road
 " "
 Glen Roy, 22, Studland Road
 Triana, 21, Harvey Road, Boscombe
 " "
 22, Somerset Road, "Boscombe"
 Chewton Farm, Highcliffe
 Whitecot, 15, Linwood Road
 " "

1921	White, Mrs. F. Sinclair		70, West Cliff Road
1922	Whittaker, H.		Wheaton Lodge, 16, Branksome Wood Road
1922	Whitting, A.		83, Poole Road
1920	Whittle, Mrs. E.		Doveshill Farm, Ensbury Mount, Bourne-mouth
1916	Whyte, A. C.		Byberry, 5, Roslin Road
1916	Whyte, Mrs.		" "
1916	Whyte, Miss M. C.		" "
1916	Whyte, Miss M. N.		" "
1923	Wickenden, Miss F.		Boscombe Spa Hotel, Boscombe
1913	Willes, W. A.		Elmwood, Cranborne Road
1920	Willes, Mrs.		" "
1919	Williams, John		Brynmill, 68, Southcote Road
1917	Wingfield, T. R.		12, Suffolk Road
1921	Wood, Mrs. Brindley		Cimella, 32, Alum Chine Road
1914	Wood, W. H.		Arosa, Tower Road, Branksome Park
1920	Woodhouse, Rev. A. P.		Deanhurst, 5, Littledown Road
1905	Woodhouse, W. J.,	A.C.P.,	35, Chatsworth Road, Malmesbury Park
	M.I.H.		
1918	Woodhouse, Mrs.		" "
1923	Woodhouse, Wm. Reginald		" "
1923	Woodhouse, Miss M. M.		" "

Y

1917	AYoung, Miss A.		6, Salisbury Road, Boscombe
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RULES OF THE

Bournemouth Natural Science Society.

Amended 13th May, 1922.

1.—The title of the Society shall be THE BOURNEMOUTH NATURAL SCIENCE SOCIETY. Title

2.—The objects of the Society shall be :

(a) The promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable.

Objects

(b) The making of reports on any animal, plant, or object of interest, and the carrying out of the recommendations contained in such reports.

3.—The Society shall consist of Ordinary, Life, Honorary and Associate Members.

4.—Ordinary Members shall pay an Annual Subscription of One Pound, due on the first day of October in each Year. The inclusive Annual Subscription for Adult Members of the same family, not exceeding four and residing in the same house, shall be Two Pounds, each Member being elected in the usual manner and each receiving a card of membership. Persons living outside a radius of six miles from the Square at Bournemouth may be elected Country Members, and pay one half the above rates of subscription.

Ordinary
Members

5.—The Subscription for Life Members shall be Ten Pounds. Any Ordinary Member who shall have commuted his Subscription, as provided for in this Rule, shall become a Life Member, but shall not by reason thereof have any rights differing from those of an Ordinary Member.

Life
Members

¶ Rules 5a and 5b referred to in the Trust Deed are Rules 19 and 20.

6.—Any person distinguished in Science or who has rendered any special service to the Society, may be elected an Honorary Member. Honorary Members shall be proposed and elected in the same way as Ordinary Members.

Honorary
Members

7.—Persons may be admitted Associate Members by the Council on account of their scientific attainments or because they are likely to prove useful working Members of the Society. This privilege will usually be granted to School Teachers.

Associate
Members

The annual subscription for Associate Members shall be seven shillings and sixpence. They shall be entitled to all the privileges of Membership except that they shall have no power of voting on the affairs of the Society or of holding office.

8.—The Ordinary, Life, and Associate Members of the Society shall be proposed by a Member to whom they are known personally or to whom they have presented adequate credentials, and seconded by another Member, and the proposal, in the form following these Rules, shall be sent to the Honorary Secretary. The name of any such proposed new Member shall be posted on the Notice Board of the Society for a period of not less than seven days, after which such name shall be voted upon at the next ensuing Council Meeting, and if two-thirds of the Council present and voting shall vote for the proposed New Member, such Candidate shall become a Member upon payment of the Annual Subscription and shall receive a Card of Membership which is not transferable. Any Member joining during August or September shall receive a Card of Membership to September 30th of the following year without further payment.

Proposal
and
Election of
Members

- Unpaid Subscriptions** 9.—Any Members whose subscriptions are unpaid at the end of the financial year (September 30th), after notice in writing to that effect has been given to them by the Honorary Treasurer, shall be reported to the Council, which shall have the power of removing their names from the list of members.
- Resignations** 10.—Resignations must be in writing and addressed to the Honorary Secretary. Members are liable for all subscriptions which may have fallen due prior to the date of resignation.
- Executive Officers.** 11.—The Executive Officers of the Society shall be the Chairman of Council, the Deputy Chairman of Council, Honorary Treasurer, and Honorary Secretary.
- The President** 12.—The President shall be elected annually and need not necessarily be selected from Members of the Society. He shall be invited to deliver an Address at as early a date in the Winter Session as can be arranged.
- Vice-Presidents** 13.—Any Member of the Society who, in the opinion of the Council, has rendered distinguished service to Science or to the Society, shall be eligible for election as a Vice-President at the Annual Meeting and, if elected, shall retain office as long as he remains a Member of the Society.
- Chairman of General Meetings** 14.—The President or a Vice-President shall take the Chair at all General Meetings other than the Annual and Special Meetings. At these the Chairman of Council or Deputy Chairman shall preside.
- Honorary Secretary** 15.—The Honorary Secretary shall perform all the usual secretarial work, shall keep minutes of all Council Meetings, and of the Annual and Special Meetings, and make a synopsis of all other General Meetings. He shall cause the agenda of the Annual and Special Meetings to be sent to every Member seven days at least before each such Meeting. He shall make all preparations for General Meetings and General Excursions, in respect of which he shall collect from each Member his share of the expenses, and therefrom defray all costs of the Meetings or Excursions. Any surplus of such collections shall go to the General Fund, and any deficit be defrayed out of that Fund. He shall keep an account of all out-of-pocket expenses. He shall give notice of their election to all new members, and register the Sections, if any, to which they ask to belong. He shall furnish copies of the Annual Reports published during their membership, to all Members who have paid their subscriptions, to Honorary Members, and to such Scientific Societies as the Council may from time to time appoint to receive them.
- Honorary Treasurer** 16.—The Honorary Treasurer shall have the custody of the General Funds of the Society. He shall receive and acknowledge all Subscriptions, and shall issue tickets of Membership to all persons who are duly elected and have paid their Subscriptions. He shall bring before the Council any accounts that are due for payment. He shall prepare a financial Statement at the end of each Financial Year to be presented to the Council at the Meeting next preceding the Annual Meeting. After presentation of the Financial Statement to the Council, he shall submit it to the Auditors and lastly to the Annual Meeting of the Society.
- Council** 17.—There shall be a Council of the Society consisting of the Vice-Presidents who have filled the office of President, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, the Chairmen of Sections, not more than ten Members elected by the Society and not more than two co-opted Members.
- 18 (a).—The Council shall have the general management of the Society and the control of its funds. At all Meetings of the Council, five shall form a quorum. The Council shall elect its own Chairman and Deputy Chairman for the Year, shall have power to fill up vacancies in its number, and to co-opt not more than two additional

members. The Council shall have power to appoint Committees to deal with any business that may be delegated to them.

(b) The Chairman, or in his absence the Deputy Chairman, shall have an original and a casting vote at all Meetings of the Council.

(c) The Council shall arrange all Lectures, Papers, Demonstrations and Exhibitions of Specimens, etc., for the General Meetings and Excursions of the Society, and shall approve of all arrangements for Sectional Meetings and Excursions before they are included in the monthly programme.

(d) If any elected or co-opted member of the Council shall fail to attend four consecutive Meetings of the Council, his seat shall become vacant unless the Council shall decide otherwise.

19.—The property of the Society shall be vested in Trustees who shall be elected by the Council. The number of Trustees shall be not more than nine or less than three, and they shall respectively hold office until death or resignation, unless removed from office by a resolution of the Council. The Trustees shall from time to time deal with the property of the Society as directed by resolution of the Council (of which an entry in the minute book shall be conclusive evidence), and they shall be indemnified against all liability whatsoever out of the property for the time being of the Society. Trustees

¶ This Rule is referred to in the Trust Deed as Rule 5a.

20.—If at any time the Society in general meeting shall pass a resolution authorising the Council to borrow money, the Council shall thereupon be empowered to borrow for the purposes of the Society such amount of money, either at one time or from time to time, and at such rate of interest, and in such form and manner, and upon such security as shall be specified in such resolution, and thereupon the Trustees shall make all such dispositions of the property of the Society or any part thereof, and enter into such agreements or arrangements in relation thereto, as the Council may by resolution direct for giving security for such loan or loans and interest thereon at the agreed rate. All members of the Society, whether voting on such resolution or not, and all persons becoming members of the Society after the passing of such resolution shall be deemed to have assented to the same as if they had voted in favour of such resolution. Borrowing Power

¶ This Rule is referred to in the Trust Deed as Rule 5b.

21 (a).—A Member may introduce friends who accompany him to all parts of the Society's premises except those which are let or in use for a Lecture or Meeting. The Member must enter the names and addresses of such Visitors in the Visitors' Book and sign the entry. Strangers cannot be admitted on presenting a Member's card or letter. Visitors

(b) A Member may introduce two Non-Members, who accompany him, to any Lecture or Excursion of the Society, but no Non-Member may be thus introduced to more than two Lectures in the Winter Session and two Excursions in the Summer Session, even though introduced by different Members. In the case of Lectures, the introducing Member must enter the names and addresses of the Visitors in the Visitors' Book and sign the entry. In the case of Excursions, the introducing Member must send the names and addresses to the Organiser of the Excursion.

(c) A Member introducing a Visitor is responsible for ascertaining that the Visitor has not been introduced twice previously in that Session and also that the privilege is not used for commercial purposes.

(d) A Visitor to Bournemouth may, with the approval of the Council, be granted a ticket enabling him to attend the Meetings and Excursions of the Society for a period not exceeding six months at a charge of Fifteen Shillings.

(e) The Council shall have power to extend the hospitality of the Society to distinguished Visitors.

(f) The Council shall have power temporarily to alter or suspend this Rule or any part of it.

Charges
for
Meetings

22.—The Council shall have power to make a charge to Members for admission to any Meeting the holding of which involves special expenses, and may arrange for the admission of Non-Members.

Expulsion

23.—The power of expulsion of a Member from the Society for objectionable conduct shall be vested in the Council and exercised at a Special Meeting called for that purpose. Notice of the proposed expulsion must be given on the circular convening the Meeting. The expulsion must be carried by a majority of two-thirds of those present.

The Member affected shall have power to appeal to a General Meeting of the Society to act by the like majority.

the
Annual
and
Special
Meetings

24 (a).—The Annual Meeting shall be held in the month of October.

(b) At this Meeting the President, the Chairmen of Sections, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, not more than ten Members of Council and two Auditors for the ensuing year shall be elected, either Auditor having the power to audit the accounts in the absence of the other.

(c) At this Meeting the Council's Report for the past year, and the Honorary Treasurer's statement of accounts duly signed by the Auditors, shall be submitted.

(d) Notice convening an Annual or Special Meeting, together with the agenda and details of any proposed alterations in the Rules, shall be given to Members at least seven clear days before such Meeting is held. Notice of General Meetings shall be given at least seven clear days beforehand.

(e) On a written Requisition, signed by at least ten Members of the Society, the Council shall call a Special Meeting to consider any question as to the affairs of the Society, such Meeting to be called within three weeks of the Council Meeting next following the receipt by the Honorary Secretary of the Requisition, and at least seven clear days' Notice shall be given to the Members. At such Meeting no other business than that mentioned on the Requisition, and on the notice convening such Meeting, shall be considered.

(f) At the Annual Meeting and at all Special Meetings of the Society, not less than twenty-five Members shall form a quorum.

Sections

25 (a).—The Council shall have power to form a Section for the study of any special subject deemed within the scope of the Society's work, and shall appoint the Chairman for the first year.

(b) The Chairman of each Section shall appoint a Secretary for the Section, who, in addition to the ordinary secretarial duties, shall keep a list of the Members of the Section.

(c) A Section shall consist of those Members who have signified to the Honorary Secretary or the Secretary of the Section their wish to belong to that Section.

(d) The Members of each existing Section shall, at a Meeting held before the last week in July in each year, nominate the Chairman of the Section for the ensuing year to come into office after the Annual Meeting. The Secretary of the Section shall send such Nomination to the Honorary Secretary in time to present it at the Council Meeting held on the last Monday in July.

(e) If the Council approve of the Nomination, it shall recommend the person nominated for Election at the Annual Meeting, otherwise it shall refer the matter back to the Section. In the event of a Section failing to nominate a Chairman, the Council shall have the right to do so. The final Election shall take place at the Annual Meeting.

(f) At the request of the Sectional Chairman the Secretary of a Section may attend Meetings of the Council, but without the power of voting .

(g) Each Sectional Chairman shall be responsible for the preparation and arrangement of each Sectional Meeting and Excursion, and shall furnish details of the same to the Honorary Secretary for submission to the Council. At the end of each Session he shall render to the Honorary Treasurer an account of his receipts and payments for the Section.

(h) A Minute Book for each Section shall be kept in which shall be entered details of the Section's work and an account of all Sectional Meetings, with the number of Members attending and notes on any matters of interest observed or discussed. Such book shall be submitted to the Council whenever required. The Chairman of each Section shall send to the Honorary Secretary a report of the Section's work for the year in time for it to be epitomised in the Council's Report to the Annual Meeting.

26.—Alterations in the Rules must be sanctioned by a majority of not less than two-thirds of the Members present and voting at the Annual Meeting, or at a Special Meeting called for that purpose, and no alterations shall otherwise be made. Alterations
in Rules

To the Honorary Secretary,

Bournemouth Natural Science Society,
39, CHRISTCHURCH ROAD, BOURNEMOUTH.

Dear Sir,

I beg to propose that

M.....

(Please give Christian name in full, and state title—Mr., Mrs., Miss, etc., and any degrees or qualifications.)

Address.....

.....

*who is personally known to me be elected an *Ordinary
*who has produced satisfactory credentials to me *Associate

Member of the Society.

Date..... Member's Signature.....

I beg to second the above proposal

Date..... Member's Signature.....

*Delete word not applicable. See extract from Rules on reverse of this form.

Annual Meeting, 1923.

THE TWENTIETH Annual Meeting was held at 39, Christchurch Road, on Saturday, October 13th, at 3 p.m. In the absence of Mr. J. H. Ralph Smythe, the Rev. C. O. S. Hatton occupied the chair. Sixty-six members were present.

After the Minutes of the last Annual Meeting had been read, the Council's Report for the past year was read. It recorded another year of success. There had been a small decrease in the membership from 640 on September 30th last year to 624 on the same date this year. There had been an increase in the number of lectures and excursions.

The Hon. Treasurer then presented his Annual Statement of Accounts, which showed Receipts £676 11s. 11d. with £221 8s. 4d. brought forward from last year, together £898 0s. 3d. Payments £702 11s. 3d., leaving a balance of £195 9s. 0d. It was explained that a £50 Debenture had been paid off, otherwise the balance would have been greater by that amount.

Dr. Crallan, commenting on the satisfactory Accounts and the continued progress of the Society, proposed the adoption of the Report and Accounts, which was seconded by Col. E. B. Anderson and carried.

Sir Daniel Morris proposed that Sir Frederick William Keeble, K.B.E., D.Sc., F.R.S., Sherardian Professor of Botany, University College, Oxford, be elected President of the Society for 1923-24. This was seconded by Mr. F. B. Taylor, B.A., and was carried unanimously.

The officers of the Society were then re-elected on the proposition of Mr. Wm. Caudwell, seconded by Mr. J. Rowland Edwards, and the Council, proposed by Dr. Gosse, seconded by Mr. J. Williamson Jones. Mr. T. J. P. Jeffery proposed and Dr. Hartley seconded the election of the Chairmen of Sections. Mr. Hy. Bury, M.A., F.L.S., F.G.S., was elected Chairman of the Geological Section in the place of Mr. W. J. Woodhouse, the others being the same as last year. The Hon. Auditors, Mr. E. Bicker and Mr. C. H. Blackett, were re-elected on the proposition of Mr. Arthur Gray, seconded by Mr. T. J. Purchas, and a vote of thanks was passed to them for their past services.

Sir Daniel Morris then presented the Morris Gold Medal to the Rev. E. F. Linton, M.A., F.L.S., for his distinguished services to Science generally and to the Bournemouth Natural Science Society.

Sir Daniel said: Mr. Linton, the Council of the Bournemouth Natural Science Society has this year awarded you the Morris Gold Medal in recognition of the valuable services rendered by you during a long period of years in advancing a critical study of the Botany of the Bournemouth area and in view of the many interesting researches you have carried on in the domain

of Natural Science. More than a quarter of a century ago, in association with the Rev. W. Moyle Rogers, the Rev. R. P. Murray and your brother, the Rev. W. R. Linton, you specialised in the study of the extensive group of plants included in the genus *Rubus*, comprising the Bramble, Blackberry, Raspberry, Dewberry and Cloudberry. The plants in this group, growing in all situations and in every kind of soil, vary greatly and are regarded as among the most perplexing of any to the British field botanists. You undertook a systematic study of these plants and eventually brought out and distributed, carefully named sets with one new species named by you *Rubus Rogersii*. In 1898, in association with your brother, you made a study of another special group of plants, the British Hieracia, familiarly known as Hawkweeds, which are commonly met with in our hedges, woods and pastures; of these you described several new species and varieties. You afterwards took up another very difficult problem, the study of the British Willows, and in 1915 wrote a comprehensive monograph of the genus *Salix*, which was published in the *Journal of Botany*. You have been universally acknowledged as the highest scientific authority in this country on Willows. In this connection you cultivated a number of Willows and crossed several species in order to produce hybrids under control. In connection with the study of Willows I am reminded of Sir Herbert Maxwell, who in his 'Woodland Note Book' mentions that a certain botanist of distinction, being consulted by an amateur about some variety of Willow, exclaimed 'Pray don't tempt me among Willows, that way lies madness.' Sir Herbert added, 'the Willows are indeed a most complex family consisting of no fewer than one hundred and sixty recognised species. The British species, 15 to 16, with innumerable hybrids, range from *Salix herbacea*, the dwarfiest of British species, humbly crouching on bleak mountain crests and seldom rearing its fairy branchlets to a greater height than a couple of inches, to the massive White Willow (*Salix alba*), which may tower to the height of 100 feet.'

In the year 1900 you published your *Flora of Bournemouth*, comprising the plants to be met with in a district extending for a distance of twelve miles from Bournemouth into the adjoining counties of Hampshire and Dorset. In 1919 you issued an Appendix to the *Flora of Bournemouth*, containing the localities for many species and varieties met with since the publication of the original work. You acknowledged that you had received cordial assistance in the preparation of this Appendix, among others, from the Rev. C. O. S. Hatton, Miss Firbank, the Rev. J. E. Kelsall, the late Mr. C. B. Green and Mr. W. Whitwell F.L.S., while the Rev. W. Moyle Rogers supplied you with new localities for more than twenty species of *Rubus*. In 1905 you contributed a list of additional species and varieties of plants as a supplement to the *Flora of Dorsetshire*, published by Mr. Mansel-Pleydell in 1874, with a second edition in 1895. Further, you were

kind enough, on my invitation, to write a popular account, running over thirty pages, relating to the Botany of Bournemouth, for the Natural History of Bournemouth and District, published by this Society in 1914. In this, as illustrating the rich character of the flora especially in the outlying portions of the Bournemouth area, you mentioned that 'your village flower-class, children of 11 to 14 years of age, in the second year of collecting brought in some 500 species of wild flowers; and later on reached a climax of 640 species, including a few, but not many, critical species.' This recalls the very active part taken by one of our members, Miss Firbank, in interesting her pupils at Boscombe in Natural History subjects with such excellent results that her school has twice won the Hampshire Silver Shield in competition with all schools in the county.

In 1914-15 you contributed two papers on East Dorset Fungi to the Proceedings of the Dorset Natural History and Antiquarian Field Club and you afterwards condensed the information into one paper, published in the Journal of Botany. In this also you acknowledged the cordial assistance you had received in the preparation of those papers from the late Mr. C. B. Green, of Swanage, and Mr. J. F. Rayner, F.R.H.S., of Southampton. In regard to the latter you said, 'the neighbouring county of Hampshire contains one of the best worked and also the richest districts for Fungi in the British Isles, and it is fortunate in having for its exponent such an accomplished adept as Mr. Rayner, whose elaborate guide to the Fungus flora of the New Forest has been published in Vol. III. of the Proceedings of the Bournemouth Natural Science Society.' I may here be permitted to express the deep obligation we owe to Mr. Rayner for conducting his Annual Fungus Forays in the New Forest in connection with this Society. They are most interesting and educative.

In addition to the sympathetic Memoirs you wrote of the Rev. E. S. Marshall and the Rev. W. Moyle Rogers (the latter the recognised authority on British Rubi), you also wrote one of your brother, the Rev. W. R. Linton, the author of the Flora of Derbyshire—all three were notable British Botanists.

Besides Botany, I may add that you have also paid some attention to Geology and gathered many specimens in the Dorset area. Perhaps the most interesting were the fossil remains of a Turtle (*Chelone*), a rare genus not hitherto found in Dorset. Also a specimen of one of the unguis phalanges of an *Iguanodon*, a gigantic reptile, calculated to have been 70 feet in length from the snout to the end of the tail, with a body circumference of 14½ feet. This was first discovered by Mr. Mantell in the Wealden formations of the south of England. These and other specimens you have kindly presented to the Museum of the Natural Science Society.

In concluding this brief and imperfect review of your scientific labours and activities, I wish to add that you were one

of the original members of this Society and were elected an Honorary Member just twenty years ago. You have always taken a keen and abiding interest in the progress of the Society. As an instance of this, I would mention that the botanical collections made by the Rev. Thos. Purchase were presented to the Natural Science Society largely through your influence, and these now form a considerable portion of our excellent Herbarium.

I have, therefore, much pleasure, on behalf of the Council, to present you with the Morris Gold Medal bearing the appropriate legend, 'Scientiis Naturalibus Feliciter Excultis' (Natural Science worthily adorned)."

Sir Daniel then hung the Medal, which was attached to a broad red ribbon, round Mr. Linton's neck and also presented him with a framed souvenir recording that he is a Gold Medallist.

Mr. Linton replied. He expressed his great obligation to the Council of the Society for having singled him out for receiving the great honour of the Morris Gold Medal, and to Sir Daniel Morris for having presented the Medal with such flattering remarks. He was more inclined to remember his failures than his successes. It was true, he had joined in bringing out sets of specimens of the difficult genera of *Rubus*, *Hieracium*, and *Salix*, and he had published the Flora of Bournemouth, but in preparing the latter he had hoped to publish some new county records and had only added two or three new species for Dorset, e.g., *Carex montana*, Linn. and *Orchis ericetorum*, the latter a new species allied to *O. maculata* L, and often passed over previously as that species. Then he had undertaken to prepare a new Flora of the British Isles, as stated in the Journal of Botany, but after writing much of the MS. he had to retire from his rectory and relinquish his large Herbarium, without which it was impossible to prosecute his work and finish the Flora.

But he was talking too much and forgetting the motto he had in mind:

"A wise old bird lived in an oak;
The more he saw, the less he spoke;
The less he spoke, the more he heard;
I take a hint from that wise old bird."

A vote of thanks to the Chairman closed the meeting.

Council's Report, 1923.

THE TWENTIETH Annual Report enables the Council to record another year of activity and usefulness. There was a small decrease in the Membership from 640 on September 30th to 624 on the same date this year.

During the year General and other Meetings have been held as follows :—

- Annual Meeting
- Presidential Address
- 6 General Lectures
- 69 Sectional and other Meetings
- 9 General Excursions
- 35 Sectional do.

making a total of 119 Meetings and Excursions.

The General Lectures were :—

*Illustrated by lantern slides.

1922.

Oct. 21.—Presidential Address by Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U. Subject, "The Conservation of Wild Life and the local conditions in connection therewith."

Nov. 11.—"Memories of New Zealand," by Rev. W. H. Webster.

*Dec. 2.—"The New Discoveries at Mycenæ," by Mr. A. J. B. Wace, M.A.

1923.

*Jan. 24.—"Some account of Work on Fossil Seeds with the results that have accrued therefrom," by Mrs. Eleanor Mary Reid, B.Sc., F.L.S.

*Feb. 28.—"Pasteur and his Work," by Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U.

*April 14.—"Experiences of a Big Game Hunter in Africa," by Mr. W. Trayner.

April 25.—"The Origin of Surnames," by the most Rev. Hy. Lowther Clarke, D.D., D.C.L., formerly Archbishop of Melbourne.

Sectional Lectures.

In the Archæological and Historical Section.

1922.

Nov. 28.—"A Talk on Folk-lore," by Rev. Hy. Shaen Solly, M.A.

Dec. 7.—"The Mystery of Easter Island," by Rev. F. A. Allen, M.A.

*Dec. 9.—"Cornish Mystery Plays," by Dr. T. F. G. Dexter, B.A., B.Sc., Ph.D.

1923.

*Jan. 20.—"The Victoria Falls and the Pre-historic Remains in Rhodesia," by Rev. H. E. Brierley.

Jan. 25.—"Ecclesiastical Heraldry," by Mr. Geo. I. Ninnis.

*Feb. 7.—"The History of England as seen from the Windows of the London City Guildhall," by Mr. W. H. Savery, J.P., C.C.

*Feb. 24.—"The History of Ancient Egypt," by Rev. Hy. Shaen Solly, M.A., and

"The Recent Discoveries in the Valley of Tombs," by Mr. Claude Lyon. Archæological and Geographical.

March 8.—"Topography," by Mr. Heywood Sumner, F.S.A.

*April 12.—"At Home." Recent lantern slides and visit to the new Museum Room.

In the Astronomical Section.

1922.

Oct. 30.—"Account of the Conference of the International Astronomical Union at Rome," by Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.

Nov. 27.—"Light Curves of Six Cepheids," by do.

1923.

- Jan. 2.—“The Position Micrometer,” by Mr. B. M. Peek, M.A., F.R.A.S.
 *Jan. 29.—“Comets and Cosmogony,” by Dr. A. C. D. Crommelin, B.A., D.Sc., F.R.A.S.
 Feb. 28.—“An Informal Talk on Some Observations, Old and New,” by Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
 *March 26.—“Life in other Worlds,” by Mr. Claude Lyon.
 April 10.—A Conversation Meeting. Sun Spot Cycle was discussed, by Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.

In the Botanical Section.

1922.

- *Dec. 6.—“Notes on the Life History of the Indian Plague,” by Mr. J. A. Alexander, F.R.G.S., F.R.S. (Edin.)
 1923.
 Jan. 6.—“At Home.” Books, Specimens, etc., of Botanical interest shown.
 Jan. 17.—“The interest of Plant Breeding,” by Mr. E. Marsden Jones, F.L.S.
 Jan. 31.—“Some recent attacks on the Darwinian Theory,” by Mr. Hy. Bury, M.A., F.L.S., F.G.S. Botanical and Zoological.
 *Feb. 3.—“The Distribution of the British Flora,” by Mr. W. Munn Rankin, M.Sc., B.Sc.
 Feb. 21.—“Babington, the Botanist,” by Miss Ida M. Roper, F.L.S.
 *March 7.—“The British Oak,” by Rev. Geo. Sampson, M.A.
 March 27.—“What is a Wild Flower?” by Mr. J. F. Rayner, F.R.H.S., M.B. Myc. Soc.
 April 6.—Meeting to discuss Summer Excursions.

In the Entomological Section.

1922.

- Nov. 15.—“Bees and Bee Management,” by Mr. H. P. Young.
 Dec. 8.—“Humming and Buzzing in Insects,” by Dr. Crallan.

1923.

- Jan. 19.—Exhibition of Objects of Interest.
 Feb. 23.—Do.
 Mar. 23.—Do.
 April 16.—“Melanism in Lepidoptera,” by Dr. Crallan, and Exhibition of Butterflies and Moths taken on the mountains and in the valleys of Switzerland, showing the difference in the same insects, by Rev. R. Paterson.

In the Geographical Section.

1922.

- *Nov. 22.—“Java and the Volcanic Eruption of Krakatoa, 1883,” by Mr. Williamson Jones, and a short account of an Earthquake in Japan, by Mrs. Greg.
 *Nov. 29.—“Algeria,” by Miss E. E. Twemlow.
 *Dec. 11.—“Oberammergau and its Passion Play,” by Dr. T. F. G. Dexter, B.A., D.Sc., Ph.D.

1923.

- *Jan. 13.—“Across Canada in Summer and Winter,” by Mr. John Williams.
 *Jan. 18.—“Baghdad,” by Major Galloway, B.Sc., F.R.G.S., F.R.C.I.
 *Feb. 10.—“Beautiful Naples,” by Mr. Claude Lyon.
 *Feb. 24.—“The Recent Discoveries in the Valley of Tombs,” by Mr. Claude Lyon. Geographical and Archæological.
 *Mar. 17.—“From Pompeii to Pæstum,” by Mr. Claude Lyon.
 *April 7.—“Some Beauty Spots of England,” by Mr. F. J. Middleton.

In the Geological Section.

1922.
 *Nov. 18.—“The Story of the Earth’s Crust,” Part 3. The Palæozoic Period, by Mr. W. J. Woodhouse, A.C.P., M.I.H.
 1923.
 Jan. 23.—Meeting to inspect a collection of Minerals presented by Mrs. Pontifex.
 Feb. 17.—“The Ice Age,” by Mr. Wm. Gosse, M.D., D.P.H.
 Mar. 10.—“Gems, real and artificial,” by Mr. R. H. Solly, M.A.
 *April 28.—“The Story of the Earth’s Crust,” Part 4. The Jurassic and Cretaceous Periods, by Mr. W. J. Woodhouse, A.C.P., M.I.H.

In the Mathematical Section.

1922.
 Nov. 8.—“Axioms of Euclid,” by Mr. B. M. Peek, M.A., F.R.A.S.
 Dec. 13.—“The Theory of Errors,” by Mr. W. H. Unthank.
 1923.
 Feb. 1. “Relativity,” Introduction, by Mr. B. M. Peek, M.A., F.R.A.S.
 Feb. 22.—“Zero and Infinity,” by Mr. Hubert Painter, B.Sc., F.C.S.
 Mar. 1.—“Relativity” continued, by Mr. B. M. Peek, M.A., F.R.A.S.
 Mar. 15.—“Extension of Lagrange’s Interpolation Hypothesis,” by Mr. W. H. Scott, M.A.
 April 19.—“Relativity,” continued, by Mr. B. M. Peek, M.A., F.R.A.S.

In the Microscopical Section.

1922.
 Nov. 15.—Exhibition of Objects of Interest.
 Dec. 20.—Do.
 1923.
 Jan. 17.—Do.
 Feb. 21.—Do., and Demonstration of method of Mounting Microscopical Slides, by Capt. Griffiths.
 Mar. 21.—Exhibition of Objects of Interest and a Paper on Diatoms, by Mr. F. B. Taylor, B.A.
 April 18.—Exhibition of Objects of Interest.
 May 16.—Do.
 Sept. 19.—Arranging the Collection of Slides.

In the Photographic and Record Section.

1922.
 *Nov. 7.—“Rambles among ruined Abbeys,” by Mr. W. Cecil Collinson.
 1923.
 *Mar. 24.—Exhibition of Lantern Slides showing Members’ work on Summer Excursions, 1922.
 *April 21.—“Rochester Cathedral and Castle, St. Ives, Cornwall, etc.,” by Mr. E. Dodshon, L.L.B.
 *May 10.—Exhibition of “Amateur Photographer” Prize Slides, by Mr. R. Y. Banks.

In the Physical Section.

1922.
 Nov. 25.—“Air,” with Experiments, by Mr. Hubert Painter, B.Sc., F.C.S.
 1923.
 Jan. 27.—“Further Notes on Air,” with Experiments, by do.
 *Feb. 27.—“Ice and Snow,” by Dr. Crallan.

In the Zoological Section.

1923.

- Jan. 31.—“Some recent attacks on the Darwinian Theory,” by Mr. Hy. Bury, M.A., F.L.S., F.G.S. Zoological and Botanical.
 *Mar. 28.—“Wild Life on a Texas Ranch,” by Mr. Howard Lacey.

The General Excursions and their conductors were:—

1923.

- May 26.—Cranborne Manor and Edmondsham House, Rev. H. S. Solly, M.A., and Col. J. R. Dodd, M.D., F.R.C.S.
 June 7.—Royal Gardens, Kew, Sir Daniel Morris, K.C.M.G., J.P.
 June 27.—Zoological Gardens, Regent's Park, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U.
 July 7.—University College, Southampton, Mr. Hubert Painter, B.Sc., F.C.S.
 July 14.—Athelhampton Hall and Puddletown Church, Mr. J. H. Ralph Smythe, J.P.
 Aug 11.—Charborough Park, Mr. Claude Lyon.
 Sept. 8.—The Gardens and Grounds of Kingston Lacy, Sir Daniel Morris, K.C.M.G., J.P.
 Sept. 10.—S.S. Majestic, Mr. J. H. Ralph Smythe, J.P.
 Sept. 20.—Rhinefield House, Rev. C. O. S. Hatton, B.A., F.L.S.

The Sectional Excursions and their conductors were:—

1923.

- Mar. 1.—Studland (Botanical).
 Mar. 26.—Ashley Wood, Miss Rooke (Botanical).
 April 19.—Ensbury and West Parley, Miss Rooke (Botanical).
 April 27.—Wareham, Mr. Howard Lacey (Botanical).
 May 5.—Corfe and Kingston, Miss Rogers-Barns (Botanical and Entomological).
 May 8.—Verwood, Major T. C. Moore, I.M.S. (Botanical and Entomological).
 May 11.—Tuckton Creeks, Capt. Griffiths (Microscopical).
 May 12.—Tramways Generating Station, Mr. Hubert Painter, B.Sc., F.C.S. (Physical).
 May 16.—Rushmore, Mr. Claude Lyon (Geographical).
 May 17.—Sway, Mr. John Vorse (Botanical).
 May 23.—Cowgrove and Bailey Gate, Mr. R. K. Cardew (Botanical).
 June 13.—Beech House, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical).
 June 14.—Totland Bay and Downs, Col. W. J. Dundee, C.I.E., R.E. (Botanical).
 June 15.—Mudeford, Mr. F. B. Taylor, B.A. (Microscopical).
 June 16.—Glastonbury Abbey, Col. J. R. Dodd, M.D., F.R.C.S. (Archeological and Historical).
 June 19.—Garden Party (Botanical).
 June 21.—Breamore Wood, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U. (Botanical).
 June 30.—Wool, Mr. R. K. Cardew (Botanical and Entomological).
 July 4.—Denny Bog, Mr. J. F. Rayner, F.R.H.S., B. Myc. Soc. (Botanical).
 July 10.—Worbarrow Bay, Mr. W. Munn Rankin, M.Sc., B.Sc. (Geological).
 July 11.—Tuckton and Wick, Mr. H. A. Garnett (Botanical and Entomological).
 July 17.—Worth and Chapman's Pool, Mr. W. Munn Rankin, M.Sc., B.Sc. (Geological).
 July 18.—St. Catherine's Hill, Capt. Griffiths (Microscopical).
 July 21.—Shapwick, Mr. R. K. Cardew (Botanical).

- July 26.—Breamore and the Moot, Downton, Mr. Claudé Lyon and Mr. Heywood Sumner, F.S.A. (Geographical and Archæological).
 July 28. Holmsley to Sway, Mr. John Vorse (Botanical).
 July 31.—Osmington Mills and Ringstead Bay, Mr. W. Munn Rankin, M.Sc., B.Sc. (Geological).
 Aug. 15.—Godlingstone Manor and Whitecliff Farm, Col. J. R. Dodd, M.D., F.R.C.S. (Archæological and Historical).
 Aug. 17.—Mudford, Capt. Griffiths (Microscopical).
 Aug. 22.—Hinton Admiral Gardens, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical).
 Sept. 6.—Wareham to Trigon, Mr. Howard Lacey (Botanical).
 Sept. 12.—Studland, Miss Rooke and Mr. S. Whitaker (Botanical and Microscopical).
 Sept. 13.—The Site of a Roman Villa near East Grimstead and Dean's Hill, Rev. H. Shaen Solly and Colonel J. R. Dodd, M.D., F.R.C.S. (Archæological and Historical).
 Sept. 15.—Ringwood, Mr. R. K. Cardew (Botanical).
 Sept. 28.—Fungus Foray to Lyndhurst, Mr. J. F. Rayner, F.R.H.S., M.B. Myc. Soc. (Botanical).

Among the General Lectures were four of special interest, viz., "The Recent Discoveries at Mycenæ," by Mr. A. J. B. Wace, M.A. "Some account of the work on Fossil Seeds, with the results that have accrued therefrom," by Mrs. Eleanor Mary Reid, B.Sc., F.L.S. "Pasteur and his Work," by Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U., and "The Origin of Surnames," by the most Rev. H. Lowther Clarke, D.D., D.C.L., formerly Archbishop of Melbourne.

Among the Sectional Lectures was one given in the Archæological Section on "The Victoria Falls and the Pre-historic Remains in Rhodesia," by the Rev. H. E. Brierley; in the Astronomical Section, "Comets and Cosmogony," by Dr. A. C. D. Crommelin, B.A., D.Sc., F.R.A.S., one of the chief authorities upon the subject of comets; and "The Position Micrometer," by Mr. B. M. Peek, M.A., F.R.A.S., based on actual experience with this appliance; in the Botanical Section, "The Interest of Plant Breeding," by Mr. E. Marsden Jones, F.L.S.; and in the Zoological and Botanical Sections, "Some recent Attacks on the Darwinian Theory," by Mr. Hy. Bury, M.A., F.L.S., F.G.S.

The General Excursions have been of great interest, viz., to Cranborne Manor and Edmondsham House; the Royal Gardens, Kew; the Zoological Gardens, Regent's Park; Athelhampton Hall, by kind permission of Mr. George Cochrane, J.P.; Charborough Park by kind permission of Capt. the Hon. R. A. R. Plunkett-Erle-Drax, D.S.O., R.N.; the Gardens and Grounds of Kingston Lacy, by kind permission of Mr. Ralph Bankes; and the White Star Liner, "Majestic," in Southampton Docks; and to Rhinefield House, near Brockenhurst, by kind permission of Mrs. Walker Munro.

Among the Sectional Excursions the visits to Rushmore, the Moot at Downton, the Site of a Roman Villa at East Grimstead, Beech House and Lyme Regis were the most interesting.

Of the 35 Sectional Excursions 22 were undertaken by the Botanical Section.

At the last Annual Meeting, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U., was unanimously re-elected President of the Society for 1922-23. He gave his Presidential Address on October 21st, the subject being "The Conservation of Wild Life and the local conditions in connection therewith."

It is a pleasure to be able to state that Sir Frederick William Keeble, K.B.E., D.Sc., F.R.S., Sherardian Professor of Botany, University of Oxford, has kindly consented to be nominated as President for 1923-24.

At the Annual Meeting the award of the Morris Gold Medal was made to Mr. H. J. Waddington, F.L.S., for 1922-23, and presented by Sir Daniel Morris, K.C.M.G., J.P., the donor of the medal, which bears his name.

The Rev. E. F. Linton, M.A., has been elected as the recipient of the Medal for 1923-24.

Mr. H. E. Swain, who has devoted a large amount of time in arranging the Society's Herbarium, has been elected an Honorary Member of the Society in recognition of his valuable work.

A special feature of Vol. XIV. of the Proceedings is an account of the Excavations of six Barrows on Ibsley Common, with a plan and beautiful diagrams by Mr. Heywood Sumner, F.S.A.

The Exhibition of Wild Flowers at the Lansdowne Public Library was opened on March 1st and continued till November 1st. During March and April many species and varieties of cultivated trees, shrubs and flowers were shown. The exhibition was much appreciated by both residents and visitors, as evinced by the numerous specimens brought for identification.

The interest taken in this show appears to increase every year, and it has again been visited by large numbers of Students and Teachers for educational purposes. One of the chief points of interest has been the large number of rare plants sent from distant counties and the alien flowers and grasses found in this locality.

The success of the Exhibition is largely due to the kind and energetic services of Miss Rooke, the Rev. C. O. S. Hatton, Mr. Hy. Backhouse and three lady members of the Botanical Section.

The show has again had the support of the Education Committee.

On June 19th the Botanical Section held an "At Home" in the Society's Garden, at which a large selection of flowers was shown, and Mr. E. Marsden Jones, F.L.S., showed and described a number of wild flowers which he had cultivated in one of the borders.

The Council regret the loss by death of Miss Chapman, who had been a member for 14 years, also of Mrs. Bain, Mrs. Blondel, Mr. W. S. Haig, Miss K. A. Pears and Mr. Wm. Woodhouse.

Among the principal donations to the Society, besides a number of books, were two large Cabinets of Lepidoptera, presented by Dr. Crallan, to be known as the Crallan collection, a collection of Heaths for the garden by Messrs. Maurice Prichard and Sons, a framed Map of Ancient Earthworks drawn by Mr. Heywood Sumner, F.S.A., and presented by him, and 20 pairs of Horns presented by Mr. L. P. Newbery.

In conclusion, the Council desires to express its best thanks to all who have given lectures and conducted excursions, and especially to owners and occupiers who have kindly given permission to visit the several places of interest.



Summary of Accounts for Year ending September 30th, 1923.

General A/c.	RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Members' Subscriptions	...	509	7	6	Rates and Taxes	...	195	3
Voluntary Additions	...	13	11	0	Interest on Debentures	...	47	18
Sale of Natural History	...	0	5	0	Less tax	...		9
Sale of "Proceedings,"	...	0	5	0				
Surplus from Lectures and Excur- sions (nett)	...	21	8	9	Salaries, Wages and Insurance	...	85	3
Rent from Tenants	...	123	15	0	Printing and Stationery	...	48	11
Letting of Hall	...	0	10	0	Volume XIV. of Proceedings	...	56	17
Donation towards cost of "Pro- ceedings	...	6	0	0	Postage	...	30	15
Education Committee, refund of cost of Wild Flower Exhibition	...	1	9	8	Coal, Gas and Electricity	...	42	4
		<u>£676 11 11</u>			Subscriptions to other Societies	...	1	18
					Furnishing and Maintenance	...	87	9
					Insurance	...	9	6
					Museum and Collections	...	4	6
					Library, Papers, etc.	...	11	12
					Subscription to Salisbury Museum	...	1	1
					Debenture Redeemed	...	50	0
					Sundries	...	3	13
Balance brought forward from last year	...	221	8	4	Balance carried forward to next year	...	702	11
		<u>£898 0 3</u>					195	9
						<u>£898 0 3</u>		
Balance brought forward from last year	...	32	4	3½	Expended on Repairs and Decorations	...	32	4
		<u>£32 4 3½</u>						
						<u>£32 4 3½</u>		

Summary of Accounts for Year ending September 30th, 1923.

	£	s.	d.		£	s.	d.
RECEIPTS.				PAYMENTS.			
Debiture A/c Balance brought forward from last year	104	6	10	Balance on Deposit at Bank	106	18	8
Interest on Deposit	2	11	10				
	£106	18	8		£106	18	8

We have examined the above Account with the Books of the Society and the Vouchers for payment, and certify the same to be correct.

BICKER & PETTIT,
Incorporated Accountants.
C. H. BLACKETT,
Hon. Auditor.

Bournemouth, 29th October, 1923.

Report of Summer Excursions, 1923.

Cranborne Manor.

The first General Excursion of the season, in which rather over 100 Members took part, took place on May 26th to Cranborne Manor, by the kind permission of Viscount Cranborne.

The party drove first to Castle Hill at Edmondsham, where the Rev. Hy. Shaen Solly, M.A., gave an address describing this Earthwork as a feudal Norman stronghold, an example of the "Motte and Bailey" Castle with its inner Keep, the Motte, and its outer Courtyard, the Bailey, all surrounded by a ditch and bank. It is a typical residence of the Norman Baron, who dwelt amid a hostile Saxon peasantry, and who wished to be able to defend his inner tower, if need be, against the retainers and others admitted to the courtyard.

The Saxon Church at Cranborne was replaced by a Norman structure which, in turn, has disappeared with the exception of an arch, which is a fine specimen of Norman work. The present Church dates from 1252 and is Early English Gothic architecture.

At the time of the Domesday Survey the Manor of Cranborne belonged to Maud, wife of William the Conqueror. It passed to his nephew, who founded the Abbey of Tewksbury. There was a Norman house where King John stayed at least 14 times for the sake of the hunting. This house was replaced by the present building early in the 16th century. The Jacobean loggias, designed by Inigo Jones, are the best features of the external architecture. Queen Elizabeth's hunting saddle and two figures, one representing Justice, the other Mercy, or as some think, Peace and Plenty, are also among the noted features of the place.

The party then went to Edmondsham House, the residence of Mr. H. E. Monro, J.P., and were allowed to ramble about in the beautiful gardens and grounds and were most hospitably entertained to tea by Mr. and Mrs. Monro.

Royal Gardens, Kew.

On June 7th a small party made an excursion to the Royal Gardens, Kew, and were conducted by Sir Daniel Morris, K.C.M.G., J.P. The various glass houses, two of the Museums, and the Rock Garden were all visited. In the Succulent House, containing cacti and aloes, is a plant of an Agave, named *A. Morrisii*, after Sir Daniel Morris, a new species discovered by him in the Blue Mountains of Jamaica in 1886. An important addition to the attractions of Kew is the North Gallery, which contains 800 beautiful paintings of trees, plants and flowers by Miss Mariana North, made usually on the spot where the plants actually grew.

The tall flagstaff, 214 feet in height, weighing more than 18 tons, erected in 1919, is a notable feature. It stands on the site of what was known as the Temple of Minden to commemorate

the victory of British Arms in 1759. It is due to the generosity and imperial spirit of the Government of British Columbia. The original tree from which it was obtained was a Douglas Fir, estimated to have been 400 years old, measuring 6 feet in diameter at the base.

The party went to London by the 8.45 a.m. train and returned by the 6.45 p.m. train.

Zoological Gardens.

On Wednesday, June 27th, twenty-one Members went to the Zoological Gardens, Regent's Park, by the 8.45 a.m. train and were met at the entrance by Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U., President of the Society, and Fellow of the Zoological Society, who conducted them throughout the day and pointed out some of the recent arrivals and many specially interesting animals and birds and, owing to his presence, they were enabled to see more than would otherwise have been the case. In the Reptile House the keeper took out a "Blue Snake" fully 6 feet long, which was handled by some of the Members. This snake is quite harmless and is sometimes made a pet of. Dr. Penrose pointed out the delicate feather like edges of the scales of the skin. In the Insect House, species showing protective mimicry, resembling twigs, leaves, flowers, etc., were objects of great interest.

Amusement was caused by the antics of a Chimpanzee with a tin tray, which he dragged along the floor of his cage, enjoying the noise it made; he eventually sat on it, balancing himself on a log.

The party returned by the 6.45 p.m. train.

University College, Southampton.

On Saturday, July 7th, by the kind invitation of Principal Vickers, a visit was paid to the University College at Highfield, Southampton. The excursion was conducted by Mr. Hubert Painter, B.Sc., F.C.S.

The 26 Members who made this excursion were received by Dr. W. Rae Sherriffs, M.A., F.L.S., Professor Stansfield, and other members of the staff.

A tour was made of the science departments, geography, geology, botany, chemistry, physics and zoology under the guidance of the professors attached to their several departments.

Among the many interesting objects shown were a large collection of beautiful maps, and a clock which controls all the clocks in the college, giving a half minute record in each room and recording every second in the Professor's laboratory. Such is the accuracy of this clock that it is never more than two seconds out in the day.

The Members then went to South Stoneham House, the men's hostel, where they were hospitably entertained at tea by Professor

Cook (Warden of the Hostel), and a very pleasant hour was spent in the lovely grounds, visiting the rock garden, the church and the salmon pool.

Athelhampton Hall.

On Saturday, July 14th, about 100 Members paid a visit to Athelhampton Hall, conducted by Mr. J. H. Ralph Smythe, J.P.

The origin of Athelhampton or Athalhampstan is uncertain, but it is composed of the Saxon words Athel (noble), Ham (habitation) and Stan (denoting the superlative degree) to indicate a sufficient degree of eminence. The hall with its minstrel gallery is 50 feet in height, the roof being ornamented with gilded bosses. Two original doors are of the date of Edward IV., as also is the Buttery Hatch. In a small frame is preserved a pair of boots worn by Charles I. when a boy. The long drawing room or great parlour with the library above, were built in the time of Henry VIII. In the former room a piece of the dress of Queen Elizabeth is kept in a glass case, and a pair of bellows made for Marie Antoinette. There is a secret stairway in the thickness of the wall communicating with these two rooms.

The "King's Way" is an interesting stone and oak spiral staircase; the blocks of solid oak which form the upper portion terminate in a newel post and do not rest on each other.

Special features of the gardens are the numerous glades bordered with tall yew hedges that lead from the central lawn to pleasant by-paths. The herbaceous borders were bright with beautiful flowers and the majestic trees form a worthy background to the numerous flowering trees and shrubs.

The old "culver" or pigeon house contains the original "potence" or revolving ladder, which is almost unique.

Puddletown Church was afterwards visited, where the Vicar, the Rev. A. L. Helps, M.A., pointed out the fine monuments of the Martins in the Athelhampton Chapel and the notable glass windows.

Charborough Park.

On Saturday, August 11th, 110 Members made an excursion to Charborough Park, conducted by Mr. Claude Lyon.

Part of the drive was through the beautiful grounds of Kingston Lacy, by the kind permission of Mrs. Bankes. Having walked through the gardens and seen the chapel and the "grotto," in which the arrangements were made for inviting William of Orange in 1686, the party took lunch near the Tower, known as the "Charborough Tower," the subject of Thomas Hardy's novel, "Two on a Tower." Here Mr. Lyon gave an interesting account of its history. The original building was struck by lightning and was rebuilt in 1839; it is now 120 feet high, being 40 feet higher than the former one.

Sir Daniel Morris, K.C.M.G., J.P., described some of the numerous handsome trees on the estate and afterwards pointed out many of them. A remarkably fine Lebanon cedar with a girth of over 18 feet and 72 feet in height stands near the house and is braced with strong supports. One of the Chile Pines, known as the "Monkey Puzzle," was loaded with massive cones. The "Tree of Heaven" (*Ailanthus*) attracted special attention as it possessed the gift of producing a multitude of suckers in all directions, some even at a distance of 20 feet from the main stem. There were five different kinds of trees bearing mistletoe, viz., a lime tree, a common maple, a white beam, a common thorn and a black poplar.

One of the finest walnut trees in the country reached a height of 60 feet, with wide spreading branches covering an area of 70ft. in diameter. It was bearing a large crop of nuts.

Mrs. Drax, in a very charming manner, received the party in the grounds near the house and personally conducted them through the handsome rooms.

Before leaving Mr. Lyon asked for a vote of thanks from the numerous Members to Capt. and Mrs. Drax for the kindness shown to them, which was carried with enthusiasm.

Gardens and Grounds of Kingston Lacy.

On Saturday, September 8th, 70 Members, conducted by Sir Daniel Morris, K.C.M.G., J.P., paid a visit to the

Gardens and Grounds of Kingston Lacy.

The house was built by Sir Ralph Bankes in 1660 on the supposed site of a palace of the West Saxon Kings, after designs by Inigo Jones, and many of the very valuable pictures contained in it once adorned the now shattered walls of Corfe Castle, where the brave Lady Bankes made such an heroic defence of that stronghold in 1643 on behalf of the King against the Parliamentarians.

In front of the house on the terrace are two fine bronze lions which had come from Herculaneum and some well-heads from Venetian palaces.

A short distance off stands the Egyptian Obelisk from the island of Philæ. It is 30 feet high and all four sides from top to bottom are covered with hieroglyphics, recording the dedication of the obelisk and pedestal to King Ptolemy Euergetes II. and two Cleopatras, his Queens, who authorised the priests of Isis to erect them about 150 B.C. as a perpetual memorial of exemption from taxation. At the bottom are four inscriptions in metal, one recording that the foundation stone of the base was laid by Arthur Duke of Wellington in 1827. Another relates to the removal of the Obelisk and platform from the ruins of Hierosycamia in Nubia.

A tour of the beautiful grounds was made, when Sir Daniel pointed out many fine trees. There are several memorial trees,

a Lebanon Cedar, planted by Arthur, Duke of Wellington, in 1827, now 70 feet high. Another memorial tree is a Cedar (Atlantic) planted by King Edward VII. and a liquidambar tree, planted by the Princess of Wales in 1908, the present Queen.

There is a fine avenue of limes which is remarkable from the fact that all around the trees numerous suckers have grown up which give a massive appearance to the stems of the trees.

S.S. Majestic. On Monday, September 10th, a very large party visited the Majestic in the Southampton Docks. One hundred and thirty-two went in Messrs. Elliott's chars-a-banc, 18 in private cars, and several joined the party at the docks, in all about 160, being a record number for the Society.

Lunch was taken en route in the New Forest, when Mr. J. H. Ralph Smythe, J.P., the conductor of the excursion, gave an account of the White Star Line and of the Majestic. The tonnage is 56,551 tons, length 955 feet, width 100 feet, depth 102 feet, 32 feet being below and 64 feet above water. It has nine decks, covering an area of $7\frac{1}{2}$ acres. The engines are 100,000 horse power. It can carry 3,016 passengers, and crew 1,000. Its speed is 26 miles per hour, and it can make the journey to New York in $5\frac{1}{2}$ or 6 days.

The first class dining room is 100 feet long and can seat 600. The ship is so steady that no racks are needed for china or glass; bottles will stand upright and full glasses will not spill. The lounge occupies 4,000 square feet (a larger space than three ordinary houses), with five large windows and a large stage for concerts. The ceiling is 26 feet high; it and the walls are beautifully painted. Adjoining the lounge on the promenade deck is the restaurant, which is approached through the palm court, filled with flowers and graceful palms. There is an uninterrupted view through these apartments of 250 feet. The smoking and reading room has plate glass windows on three sides, and there is a fine swimming bath. There are 1,011 state rooms, of which 470 are first class. The vessel itself is "loot" from the war, being originally the "Bismarck."

The large party was conducted over the ship by stewards.

Tea was taken at Ciro's Restaurant in High Street, Southampton, and Bournemouth was reached at 7 o'clock.

Rhinefield House.

The last General Excursion of the season took place on Saturday, September 20th, to Rhinefield House, near Brockenhurst.

Lunch was taken en route under the trees in the New Forest. The party was met by Mr. Alan Stewart, Agent to the Rhinefield Estate, who first showed the Church which was built by Mrs. Walker Munro about 20 years ago to fulfil a long felt want in Brockenhurst, the Parish Church being some distance away on the south side of the railway.

On arriving at the house Mr. Stewart showed the principal rooms. The large hall has a lofty vaulted roof; at one end is a minstrel gallery with an organ above. The mantelpiece is of carved stone with the family coat of arms in carved oak over the portrayal of a ship. In the dining room is a fireplace with carved panel above it, made of a slab of New Forest oak. The drawing room is in Louis XV. style.

A special feature of the house is the smoking room, known as the Moorish Room, which is a true model of the Mosque in the Alhambra Palace at Granada. There are 37 bedrooms and bathrooms in the house.

In the basement is the dynamo which supplies the electric power and lighting, and also the boilers, etc., for heating, everything being up to date on the most economic principles.

The gardens and grounds cover an area of 70 acres. There are three separate water supplies, one being drawn from a long distance. A notable feature in the garden is the Haddon terrace, along the wall of which trailed an Ampelopsis in its brilliant autumnal tint. The numerous glass houses contained a beautiful show of fruit and flowers.

It is interesting to note that it was at Rhinefield that the specimen trees were cultivated which were removed to the Ornamental Walk in the New Forest.

Rushmore. On Wednesday, May 16th, a party of nearly 80 Members made an excursion to Rushmore, at the kind invitation of Mr. and Mrs. Pitt-Rivers. The excursion was conducted by Mr. Claude Lyon, Chairman of the Section.

On arrival they first went to Woodcutts, the site of a pre-historic village, explored by the late General Pitt-Rivers, and then went round the gardens and grounds and took lunch in one of the glasshouses, as the weather was somewhat cold and uncertain. After lunch they were received at the house by Mrs. Pitt-Rivers, who personally led them through the rooms, which contained a great variety of interesting objects, among them family and other portraits and pictures, many of them by old masters; suits of armour, weapons of various kinds, fine old furniture and curious objects from the far East. Particularly interesting was a beautiful bedspread, designed by Mrs. Pitt-Rivers and worked by her in her leisure moments.

The large party was entertained at an excellent tea by the hospitality of Mr. and Mrs. Pitt-Rivers.

**Breamore
and the Moot
Downton.**

On Thursday, July 26th, a visit was paid to Breamore, and the Moot, Downton. Breamore was reached at 11 o'clock and the Church was first visited. Mr. Heywood Sumner, F.S.A., then led the party through the woods to the Miz-maze, of which he gave an interesting description.

The device of a labyrinth first appeared in the 5th or 6th century B.C. on Cretan coins. The Cretan Labyrinth was made by Dædalus by command of King Minos in imitation of a more ancient one in Egypt. It served as a prison for the monster Minotaur, the legend connected with which was related by Mr. Sumner. The Miz-maze on Breamore Down is similar to that shown on a 13th century map in Hereford Cathedral, on which is figured the Island of Crete and a labyrinth plan. It is similar also to grass-cut mazes at Altborough, Broughton Green (Northants), Hinton (Hunts), Wing (Rutland) and Ripon Common, and to pavement mazes in Churches at Chartres and St. Quentin in France. Such labyrinths were used as instruments of penance for non-fulfilment of vows of pilgrims to the Holy Land and were called "Chemins de Jerusalem." The pilgrims followed the winding of the maze on their knees. The Breamore Miz-maze is attributed to the Priory of St. Michael's, Breamore, which was founded for Austin Canons about 1129. In Elizabethan times onwards, grass-cut mazes appear to have been used for recreation for the fun of threading the maze. It should be noted that traditional labyrinth or maze plans, such as this at Breamore, have no false paths. If you follow the windings persistently you must arrive at the centre, but the Renaissance garden mazes were complicated by cul-de-sac misleading paths. The miz-maze is formed by shallow paths cut down to the chalk in the grass of the open down.

Lunch was taken here on the top of the down, from which an extensive view is obtained. A short distance off is "The Giant's Grave," a long Barrow, which was described by Mr. Sumner.

By the kind permission of the Hon Lady Hulse, the Members were allowed to enjoy the beautiful gardens at Breamore House.

Driving on to Downton, the Church was shown by the Rev. J. Robinson. Then the 60 Members were hospitably entertained at tea in the garden by Mrs. Carver, the owner of the Moot. Mr. Claude Lyon, conductor of the excursion, having expressed the thanks of the party to Mrs. Carver, a move was made to the Moot, which is on the other side of the road just opposite to the house, and Mr. Sumner gave an address there.

Möt is the Saxon word for an assembly—a moot, and this unique earthwork at Downton was used as the open air Court of Justice for the Hundred of Downton. The original entrenchment was probably thrown up in pre-Roman times and guarded the fordway across the Avon Valley. The earthworks consist of a large artificial mound to the south-west, 45 feet in height, with six grass covered terraces on its western slope; it was on these terraces that the Courts of Justice were held. At the bottom of the slope are a grass platform and a fish pond in which beautiful varieties of water lilies may be seen. On the north-

eastern side is a half-moon shaped outwork that appears to have defended the entrance. The whole site contains about $7\frac{1}{2}$ acres and was laid out as a garden and planted with timber trees in 1690-1705.

Report of the Astronomical Section.

On January 29, 1923, a most interesting lecture on "Comets and Cosmogony" was given by Dr. A. C. D. Crommelin, B.A., D.Sc., F.R.A.S. The lecturer being undoubtedly the greatest authority on Comets in England, probably in the world, every word uttered by him on the subject which he has made particularly his own, may be taken as authoritative.

Another interesting discourse was that given by Mr. B. M. Peek, M.A., F.R.A.S., on "The Position Micrometer," based on actual experience with this appliance, so necessary in double-star work, etc.

Report of Botanical Section.

The Botanical Section has again had a very satisfactory year; the lectures and excursions have been interesting and well attended although unfavourable weather interfered with some of the latter. Very good field work has been done by some of the most energetic members of the Section and their careful searching has been rewarded by the discovery of a large number of rare and interesting alien plants. The majority of these aliens were found on a tongue of land formed by a loop of the river Avon. It is probable that foreign seeds from an adjacent mill found here soil and conditions favourable for them to establish themselves, and it is to be hoped that such of them as are not pernicious weeds will increase and multiply.

Miss Rooke and Mr. N. Douglas Simpson, M.A., F.L.S., and Mr. Vorse have been the chief discoverers of these interesting invaders. Besides the *aliens* some rare *native* plants have been collected, and new stations found for others.

List of Rare and Alien Plants for the District.

- Lon. Cat. Ed. 10.
- | | |
|-----|-----------------------------------|
| 57 | <i>Papaver Rhæas</i> . L. |
| | <i>Var strigosum</i> . Boenn. |
| | <i>Var Pryorii</i> . Druce. |
| 121 | <i>Hesperis matronalis</i> . L. |
| 124 | <i>Sisymbrium altissimum</i> . L. |
| — | <i>Erysimum repandum</i> . L. |
| 142 | <i>Brassica Erucastrum</i> . L. |

- 164 *Raphanus Raphanistrum*. L.
 166 *Reseda alba*. L.
 329 *Impatiens biflora* Walt (new station).
 330 *Impatiens parviflora*. D.C.
 359 *Melilotus alba*. Desr.
 360 *Melilotus arvensis*. Wallr.
 361 *Melilotus indica*. All.
 380 *Trifolium resupinatum*. L.
 — *Trifolium Michelianum* Savi.
 — *Vicia villosa*. Roth.
 — *Vicia tenuifolia*. Roth.
 557 *Potentilla norvegica*. L.
 — *Oenothera sinuata*. L.
 — *Benthamia lycopsoides*. Lindl.
 1150 *Anagallis femina*. Mill.
 1219 *Verbascum Blattaria*. L.
 1352 *Stachys annua*. L.
 — *Chenopodium ambrosioides*. L.
 1843 *Phalaris canariensis*. L.
 1844 *Phalaris minor*. Retz.
 1869 *Polypogon monspeliensis*. Desf.
 1940 *Festuca Myurus*. L.
 1951 *Bromus madritensis*. L.

Species marked with — instead of a number are as yet not numbered in the London Catalogue.

**British Association for the Advancement of
 Science, St. George's Hall, Liverpool.
 Conference of Delegates.**

Delegate from the Bournemouth Natural Science Society,

MISS IDA M. ROPER, F.L.S.

The British Association meeting took place this year in Liverpool and was one of the largest and most successful on record. The meetings lasted from September 12th to 18th inclusive.

At the Adjourned Conference on Tuesday, September 18th, the following Resolutions drafted by the Corresponding Societies' Committee were submitted for adoption and adopted in full:—

(1) To recommend that the publications of Scientific Societies should conform so far as possible to a standard size of page, for convenience in dealing with offprints; and that for

octavo publications the size of the British Associations Report be adopted as the standard.

(2) To urge the adoption by Scientific Societies' of the bibliographical recommendations contained in the current Report of the Zoological Publications Committee.

(3) To represent to His Majesty's Government, in view of recent proposals to utilize for naval, military, or commercial purposes sites of historic or scientific interest or of natural beauty, such as Avebury, Holmbury Hill, and *Lulworth Cove* and its neighbourhood, the urgent need of more effective protection of such sites from damage, disfigurement or obstruction.

(4) To request the Minister of Agriculture and Fisheries to reconsider his decision to discontinue the issue by the Ordnance Survey of quarter sheets of the six-inch map on the ground that, if quarter sheets are not available, teachers, students, and others engaged in various kinds of research on local and regional distributions will be put to expense and inconvenience in providing themselves with the sheets necessary for their work.

(5) To represent to His Majesty's Government the urgent need for more ample provision for the Science Museum, and for closer co-ordination between the principal national collections of scientific material.

(6) To call the attention of local scientific societies to the need for prompt and systematic supervision, in the interest of scientific record, of all sections and other excavations which were opened during the construction of new roads or other public works.

(7) To recommend the General Committee to accept the invitation received from the President of the Museums Association to hold the Conference of Delegates in connection with that Association's Meeting at Wembley on July 10th—17th, 1924; without prejudice to any provision which may be possible for a Conference of Representatives of local societies at the Toronto Meeting.

(8) To apply to the Committee of Recommendations for the renewal of the usual grant of £40 to the Corresponding Societies Committee for the preparation of its report and Bibliography.

Library Report.

The Library becomes more useful and popular each year. To provide additional space for the constantly increasing number of volumes more shelves have been put up. Most of the shelves have been lined with red baize which, while improving the appearance of the Library, will to some extent protect the edges of the books.

The following are among the recent additions:—

*Donors.**Works.*

Mr. H. F. Bartlett,	Volumes on Entomology.
Dr. G. E. Craigan, M.A., M.B., M.R.C.S.,	A number of volumes on Astronomy, Botany, Entomology, etc.
Mr. H. J. Ellis.	Nelson's History of the War in 24 volumes.
Mr. Arthur Gray.	Pamphlets on Natural History.
F. M. Lord Grenfell, G.C.B., etc.,	Works on Egypt.
Mrs. Liddiard,	Various volumes.
Mr. Lyon,	Volume on Ancient Britain.
Mrs. Mattocks.	Works by H. W. Bates and Sven Hedin.
The Royal Colonial Insti- tute, Bournemouth Branch,	Volumes on Canada and South Africa.
Mr. H. Russell-Cotes,	A work by Sir M. Russell-Cotes.
Mr. R. V. Sherring, F.L.S.,	Botanical works and local plans.
Mr. Heywood Sumner, F.S.A.,	Maps of Ancient Sites in the New Forest.
Mr. F. B. Taylor, B.A. (Camb.),	Volumes on Entomology, etc.

Among the Works purchased may be mentioned:—

The Dorset Coast,
Insect Enemies,
Index to the Victoria History of Hampshire.

The Hon. Librarian has been greatly helped by Miss Alice Veale, the Hon. Assistant Librarian.



Presidential Address.

"Plant Sensitiveness."

BY SIR F. KEEBLE.

No less than the individual animal the individual plant orders its household and although composed of legions of cells, each of which has a measure of independence, behaves as an individual.

In the animal the central nervous system manifestly plays a large part in effecting general control, and hence it is natural that botanists should have sought for something corresponding to that system in plants. In this they could scarcely fail to find encouragement from the fact that among primitive unicellular Algæ are forms which appear to possess a rudimentary nervous system.

Species of *Chlamydomonas*, for example, possess an eye spot and flagella. They orientate themselves and move under the directive influence of light. The essential parts of a central nervous system are receptor apparatus, i.e., sense organs which undergo excitation as the result of specific stimulation, conductor apparatus which transmits, and motor or other responding apparatus which executes a motor or other response as the result of the excitation transmitted to it. Hence botanists have sought to discover in plants corresponding components. In this they have achieved a certain measure of success. They have produced good evidence to show that the "perception" of the stimulus of gravity is due to the presence of mobile starch grains (statoliths) in sensitive cytoplasm. They have also claimed to show that certain of the epidermal cells of leaves with domed outer walls behave as "ocelli," and by focussing light on restricted areas of the cytoplasm induce the excitation which result in the diaheliotropic movement of the leaves. Similarly the exquisite sensitiveness of certain tendrils to contact stimulus appears to be due to the existence of special sense organs. But search for specific conducting strands of protoplasm similar to the nerves of animals has not proved successful. Claims have been made that the fine connecting strands of cytoplasm which put neighbouring protoplasts in organic communication with one another serve as channels of conduction of the consequences of excitation; but evidence in favour of this view is by no means convincing. A new impulse was given to the subject by the discovery that the control of the animal body is effected only in part by the nervous system and that beside this mode of control there exists another—that by means of specific chemical stimulators or hormones. To each of these hormones some part of the body is, as it were, attuned. Hence if a given hormone is distributed via the blood stream it produces a specific local effect. Evidence accumulates that a similar mechanism exists:

It has been shown, for example, that the movement of the leaves of the sensitive plant are brought about by a hormone which produced as the result of stimulation is carried in the transpiration stream and serves to stimulate successively the leaves of the plant. Evidence has also been adduced which serves to indicate that heliotropic and geotropic stimulation result in the production of specific substances which, travelling through the conducting region, stimulate the motor region to grow asymmetrically, thereby effecting a response by curvature, the direction of which bears a definite relation to that from which the stimulus was applied. The receptive region, e.g., tips of cotyledonary leaves of grasses, cut off and re-attached by means of gelatine, still undergoes excitation when illuminated unilaterally and still gives rise to the appropriate positively heliotropic curvature of the motor region. Similar experiments have been made successfully with geotropic roots. From these amputation experiments it seems probable that the motor response is due to excitation in the cells of the motor region set up by a specific hormone liberated in the receptive region as the result of stimulation.

Wherefore it seems probable that whereas animal individuality is maintained by a system of dual control—part physical through the nervous system and part chemical through specific hormones—that of the plant is maintained with no less efficacy by a system of single control, by hormones.



A Selection from the Lectures and Papers given before the Society.

“The Study of Fossil Seeds and the Story they have to tell : with special reference to Hampshire.”

BY MRS. ELEANOR M. REID, B.Sc., F.L.S., F.G.S.

The subject of my paper is the study of fossil fruits and seeds, and the story they have to tell of the past history of this part of the world.

If you examine the specimens laid on the table you will see that very often the seeds are so beautifully preserved that, except for their dark colour, they might almost, at a first glance, be mistaken for living seeds. But the living germ was killed countless ages ago. The whole substance has become carbonised, that is turned into material resembling charcoal; or it may even be mineralised, turned into iron-pyrites, so that, though a solid lump of pyrites, it yet retains its original form in every minute detail.

This iron-pyrites is a very unstable body, and upon exposure to the air becomes oxidized, causing the seed to disintegrate and crumble to dust. To prevent this happening, special precautions have to be taken, which will be stated, after first describing the way in which the fossils are separated from their matrix.

The material suspected to be seed-bearing is collected and broken small, then boiled with sufficient common soda to disintegrate the matrix. The whole turns into a coffee coloured fluid with a thick sediment of finely-divided mud. In this sediment are suspended shells, seeds, bones, and fragments of stone and vegetable matter. The whole is then strained into basins through a graded series of sieves, beginning with the coarsest. The fine mud and water stream away, leaving the stones and fossils in the sieves. It will be understood that the mud strained from each sieve must be passed through the next finest in succession. This somewhat laborious process must be repeated again and again, care being taken not to lose any of the fossil material, until the fossils are perfectly free from clinging matrix, and the water is without trace of colouration. The contents of the sieves are then tipped into separate vessels with a little water. They are next examined, a small quantity at a time, in a paint saucer under a dissecting microscope. Everything which shows a definite form or pattern is kept, and placed in water. Whilst still wet they are tied, about as much as would go into a thimble at a time, in small muslin or silk bags, and suspended during a

few days, at first in paraffin, next in petrol, and finally in paraffin-wax dissolved in petrol. Between each change they are allowed to dry very slightly. Finally they are allowed to dry very slowly, and may then be exposed to the air, and studied individually under the microscope, as opaque objects. The object of this treatment is to impregnate them with wax, and so prevent the air from oxidizing the iron-pyrites.

We have now learned how to collect and treat our fossils. The next thing is to describe the place in geological history of the seed deposits which it has been our good fortune to study. It happens that this can be done very clearly by reference to your own local geology. All the geological horizons on which we have worked have been newer than your Bournemouth beds. On these we have not worked, but upon the Hordle Beds, which are the next younger seed-bearing beds in Britain, we have. Including the Hordle Beds we have worked on many horizons from the top of the Eocene onwards; the latest of all being the Roman horizon.

The period divides itself very conveniently into two parts; a part which belongs to the Tertiary Period, and a part which belongs to the Pleistocene and Historic Periods. For our present purposes these begin, the one with the Hordle Beds, and the other with the gravels which cap your cliffs and overlie so large an area of Tertiary strata in our county. In the earlier part the existence of man has yet definitely to be proved; in the later the evidence of his existence is conclusive. The two parts mark also a difference in climate, and, as we shall see later, in vegetation. In the earlier part the climate was throughout warmer; and at the time when our story begins, much warmer, than at present. In much of the later part it was intensely colder, though there was certainly one temperate interval, and more probably three, when it was as warm, or even a little warmer than it is now. As to the actual lapse of time since the beginning of our story, a measurement has been made which can give us some idea of it. The present Lord Rayleigh, by a study of radium and helium in basalt from the north of Ireland, reached the conclusion that 30,000,000 years had passed since its formation. The geological position of the Eocene basalt is somewhat doubtful; but it is older than the Bournemouth Beds. Therefore the Bournemouth Beds are something less than this age, and the Hordle Beds are younger still. We cannot as yet get nearer than this, but at least we must realise that our story covers many millions of years. As to the second period; its duration has been variously estimated from about 100,000 to 700,000 years. The first estimate is probably too short and the latter may be too long; but one thing is certain, that it was a much shorter period than is covered by the Tertiary. There is one very definite estimate regarding it which was made by the Swedish geologist, Baron de Geer, who actually counted the annual layers left by the retreating ice-sheet after the last glaciation of Sweden, and came

to the conclusion that the country became ice-free 12,000 years ago. That is, 12,000 years ago marks the beginning of our present day more temperate conditions.

We have now some knowledge of the material studied, the way in which it is obtained and treated; and its place in geological time. It remains to learn how the fossils can be used as an aid to the study of the earth's history; and what are the conclusions arrived at.

Suppose I were to give any of you a mixed handful of wheat grains, raspberry and wallflower seeds, orange and apple pips, hawthorn, buttercup, celery and dandelion seeds. Without much difficulty you would be able to sort them into little heaps of different kinds, though you might not know precisely what they were. But suppose you had a collection of seeds in which all these were represented. Then by taking one kind at a time and going carefully through the whole collection you would in the end be able to tell to what plant each of your heaps belonged. This is exactly what we do in our study. We collect our fossil "handfuls" in the way I have described. Then science says: "Now tell me what they are." To find out, we follow exactly the method related above, sort them into little heaps in small bottles, then take these one by one and compare microscopically with all the species in my collection of living seeds, getting as near to the living species as we can. Of course one learns short cuts by experience. If the species is still uncertain, we then continue the research in Kew Herbarium. In this way we learn what plants were living at various periods, and their relation to living plants, botanically, geographically, and climatically.

And what does this plant study teach us of the events of these vast ages?

We will begin at *our* beginning, with the Upper Eocene plants of Hordle Cliffs. I cannot tell you as much about these as I should wish because Miss Chandler's work upon them is not yet published, but it supports the results reached by earlier workers in indicating that in these remote days there was a great river in this part of the country, flowing in all probability, as Sorby showed, from the west. On its banks were dense sub-tropical jungles in which grew fan and feather palms, a Sequoia related to the great redwoods of California, and other forest trees, all wreathed with vines and lianas. Elder trees grew along its banks; sub-tropical ferns fringed the shores; a tangle of blackberries or raspberries and other low-growing shrubs formed an undergrowth; and in the quiet reaches of the river were quantities of water-lilies, water-soldiers, pondweed and other water plants. None of the actual species are now living, but their relationship to living plants is, in many cases, sufficiently marked for us to know what kind of plants they were. On the banks of the river crocodiles basked; and in the warm sea, not far away, were sharks. We might perhaps picture to ourselves such a scene as one would find on a river in Burma to-day.

As to conditions prevailing in the succeeding Oligocene and Miocene periods we have, as yet, no great amount of evidence to offer,* for we have examined very little material of this age. It is true that in 1910 Mr. Reid and I made a study of the Oligocene flora of Bovey Tracey; but the study was much circumscribed by the fact that the pits were flooded at the time, so that only the surface bed were accessible, these being some of the poorest and worst-preserved beds in the section. But there was another reason which militates against the full use of the material we did obtain. The study of the Bovey Beds came before we knew much of Tertiary floras, and before we had fully grasped the clue to their interpretation. Had we obtained a larger flora from Bovey I think we should have found this clue, as we did find it shortly after when we began the investigation of the great Reuverian flora. Looking back after thirteen years upon our Bovey work I see plainly that not only was the evidence there, but that we published it, without realising its significance. I refer to the fact that the greater number of species determined by us belong to genera now confined to the Far East and North America. The genera I allude to are *Calamus*, *Sequoia*, *Taxodium*, *Magnolia*, *Nyssa* and *Mastixia*; and there are others which at the time we did not recognize.

It was this relationship of West European Tertiary plants to plants now inhabiting the mountains of the Far East and of North America, which was to be the clue that led to the determining and understanding of the Tertiary floras examined by us, and it was found whilst we were study the Reuverian flora from the borders of Holland and Prussia.

When first we looked at the material sent to us for study by the Dutch Geological Survey our feeling was one of being lost. "There is nothing here we have seen before. We are in a new world." But gradually as we sorted we found that together with so much that was new a few familiar genera were recognised, even though the species were unknown. Pondweeds, blackberries, grapes, *Magnolia*, *Euryale* and others, we could place in their genera; but the majority of species—scores and scores of them—were quite unknown. We had no conception to what plants they belonged. We asked various botanists, but no one could help us, for the seeds of plants are comparatively little known, and in Britain we have no adequate carpological collection. There was nothing for it but to find out for ourselves what the unknown species were by an organised search through the sheets of Kew Herbarium, making drawings of fruits and seeds as we went along. At first we confined our study to the temperate and warm-temperate plants of Europe and Asia, and as the work proceeded we began to discover one and another and another of

*We hope in due course to have more as we are at present studying the A' Court Smith Collection from the Bembridge Beds of the Isle of Wight, now in the possession of the British Museum.

the unknown species. By far the greater number proved to be related to plants of China, Japan, the Himalaya, and, as we found later, of North America. With these were a considerable number of Central and South European species. There were also a very few Australian species.

And now the clue was found, and following it we were able to identify a large number of our fossils. To name a few:—We found *Magnolia*, *Liriodendron* (the tulip tree), aralias, many extinct waterlilies related to Chinese species, Japanese plums and raspberries, forest trees of China such as *Meliosma* and *Phellodendron*, climbers such as *Wistaria* and *Menispermum* (the moon seed), rambling plants such as *Actinidia* (the Chinese gooseberry), a hawthorn related to American species, *Nyssa* (the American gum tree), hickory, and other trees and shrubs, having similar affinities, too numerous to name here.

There could be no doubt that we were on the track of a flora closely related to the forest-belt flora of the Chinese and Japanese mountains and the Himalayas, and with relations in North America; and that this flora had once flourished in Western Europe, but for some reason had been exterminated here, though it had lived on in the Far East and North America.

At the end of the Miocene and beginning of the Pliocene our country, with its wealth of trees and shrubs must have possessed forests almost as varied in character as are found now in the forest-belt of China, where the most wonderful temperate forests in the world occur.

As the climate of the Pliocene cooled a change slowly came to pass. Side by side with these strangers of the Far East and North America we find other plants appearing. These are the forerunners of our present West European flora. At first they came in strange guise; many are now extinct, and others, though not extinct, no longer grow in West Europe, but have been forced to retreat to Central and Southern Europe, by later cold. Still this European flora, as we may call it, in contradistinction to the Chinese—North American flora, came on. Gradually the country lost its dominant East Asian aspect and took on its present aspect until, at the end of the Pliocene, in the Cromerian, the country must have looked almost exactly as it does now in the native parts of the New Forest.

We are now at the end of the first part of the history we are considering, the Tertiary part, and before we pass on to the second part we may stop for a moment to consider what is the meaning of the facts we have recorded. Why did this Chinese-North American flora, as I have named it, come to Europe at all? Why was it killed out here? And why did it survive in the Far East and North America?

The explanation we found came from the consideration of certain well-known facts as to climate in the past, and plant-life in the present, together with the consideration of suggestions that

had been made by earlier botanists with regard to these. The basis of our argument was this:—

It was known from previous studies of fossil plants and animals that the climate of the Northern Hemisphere had slowly cooled during the period we have been considering.

It was known that there is a close relationship between the living plants of parts of North America and Eastern Asia; and it had been suggested that this relationship was due to both floras being migrants from some common polar source, driven southwards in two streams by the increasing cold, and later, when land connection was cut near the poles, isolated on the two continents. That such a polar source may have existed is known to be possible; for the fossil remains of many plants found in Tertiary deposits of West Europe, sequoias, palms, cinnamons, ferns, etc., have been found in Greenland and Spitzbergen.

The explanation of our questions which suggested itself was, that the West European fossils represented a third stream of migrants from the same source; but that whereas the European branch had been destroyed, the other two had survived. Why?

The answer was that whilst in the Far East and North America the mountain chains run north and south, opposing no barrier to the north and south migration of plants, throughout the whole of Europe and all but the extreme east of Asia stands, in the Temperate Zone, an impassible barrier of east-west mountain chains. Driven southward by the increasing cold against this mountain barrier, the plants perished. That this is the true explanation is shown to be probable by the conclusion reached from a comparative study of five large Pliocene floras, that the extermination of the Chinese-North American flora and the incoming of the present European flora coincided very approximately with the uplift of the great trans-Continental mountain chains. It has of late received further confirmation from Miss Chandler's study of Hordle plants and our joint study of Bembridge plants. Both these horizons belong to a time earlier than the great mountain uplift; and in them we have no trace of European plants among the land plants, and but very slight trace among water plants.

And now we are at the beginning of the Pleistocene. We have passed through the time when our country was as warm or warmer than it is at present. It is now becoming colder. During the earlier part of the period we are now entering upon there was immense precipitation of snow on the frozen land, so that the whole of Scotland, Ireland and Wales and the North and Middle of England were buried under an ice-cap, from which only the highest peaks projected as nunataks. The South of England was ice free and there was probably a vegetation such as we see in sub-Arctic lands to-day, but we have not much evidence on this point. Over the frozen land roamed animals which could withstand cold, and man lived and hunted them; for now we have

reached that important phase in the Earth's history when man is known to have lived. Henceforth the interest of the study of seed centres in the relation of man to plant life.

But before we enter upon this branch of our subject we must mention one interesting piece of evidence as to climate furnished by the study of fossil seeds. The climate was not wholly cold during the Pleistocene, a period which in its entirety is sometimes spoken of as The Glacial Period. That there was certainly one interval when the climate of England was as warm as, or possibly warmer than, it is now, shown very clearly by the Interglacial fossil floras of Clacton and West Wittering; though the warmth was probably of a more Continental type with warm summers and cold winters. Later the cold returned, and we have evidence from the Late Glacial deposits of the Lea and Cam valleys of a herbage of sedges and dwarf Arctic willows and birch, rendered gay by numbers of bright little Arctic and Alpine flowers. Besides this warm interval spoken of above there were probably others. Man the hunter lived in our country throughout all this long time; not the same race, but a succession of Palæolithic races marked by the use of a diversity of stone implements.

Following the Palæolithic races, we find one more civilised in possession; Neolithic man, who used polished stone implements. Of this race our study gave an interesting little glimpse. A Neolithic deposit in Belle Ile en Mer, an island off the mouth of the Loire, yielded, together with many seeds of no particular interest; the remains of insects. These were sent to M. Lesne, of the Musée Nationale in Paris, who pronounced some of them to be the elytra of dung-beetles and of beetles living on grassy turf, and said they pointed to the presence of large herbivorous animals. Thus we obtained indirect evidence as to the life and occupation of Neolithic man, the herdsman.

But we pass on. Neolithic man, the user of polished stone implements, has gone from our country, and we find the land now in possession of Bronze Age man, who had advanced so far in the arts and crafts of civilisation that he was able to smelt bronze, but not iron. We are now close upon the dawn of the Historic Period. Of this age our study gives a glimpse of extraordinary interest. Glastonbury Lake Village belongs to the transition period when the Bronze Age was passing into the Iron Age. It was built on a marsh for safety. To keep the huts dry, logs were laid criss-cross as a foundation. Upon these brushwood was strewn, and then the whole was plastered down with clay to make a floor or "hearth." As one hearth got sodden another was built on top of it, so that sometimes there was a series one on top of another. Around the village, for further safety, was a wooden palisade, and outside this palisade the people threw their rubbish. This rubbish, and that which was found on the various hearths, brought to light extraordinarily interesting objects, showing that

these people had many of the arts of civilisation, such as weaving, pottery, and working in bronze. Together with such objects were the remains of seeds, mostly weeds, of no particular interest; but just two things were of extraordinary interest, the remains of beans and of corn, both wheat and barley. There was even found a little cake of crushed corn, supposed to have been a votive offering. So here we have direct evidence that Bronze Age man cultivated the ground not very far from our own neighbourhood. This race of cultivators was believed by Prof. Boyd Dawkins to be related to the Basques as well as to the short, dark people seen in parts of Wales and Cornwall. The inhabitants of the Glastonbury village would appear to have been slaughtered or massacred, for many bodies were found huddled together, many showing deep cuts, and one head being completely severed from the body.

Next we find ourselves among the conquering "civilising" Romans, in our own county, at Silchester. Here we found evidence of the plants eaten and cultivated by the Romans, some of which were introduced by them. It was found that wells were dug near the Roman houses, and that as they became contaminated the old ones were used as dumping places for rubbish, new wells being dug. The rubbish was cleaned and examined by the explorers. Together with pottery, broken tools, cooking utensils, and so forth were the remains of fruits and seeds. We found peas, radishes, apples, blackberries, strawberries, quantities of sloes, damsons and other plums, mulberries, figs, and grapes. Whether all of these fruits were grown in the country, or some were imported dry, we cannot tell. We know, however, that all will grow in the South of England at the present day; and it is probable that mulberries, figs, and grapes were introduced by the Romans, for prior to their occupation we have not found them in deposits known to be contemporaneous with man.

And now our long journey through the ages has reached an end. We have passed from the days when the banks of our great river were clothed with sub-tropical forests, through the days when our country was clothed with the marvellous wealth of the warm temperate forest belt of China; on, to the time when we should have felt quite at home in a country very much like the New Forest of to-day, only the animals would have been strange and man was possibly not there; on to the days when land-ice hugged our shores, and wild Palæolithic men hunted over the frozen wastes; still on to a time when the country grew warmer and drier and other animals and hunters took the place of those that had been. Yet again the country grew cold, and Arctic and Alpine flowers came down to our southern plains, and other animals lived on them and were hunted by other races of Palæolithic men. Still on, through the days when Neolithic man kept his flocks and herds on the salt marshes and the grasslands; through the days when Bronze Age man cultivated his beans and

his corn, and lived in fear of his stronger enemies; down to the days when the conquering, civilising Roman came to our shores, bringing with him his finished arts, walled and drained towns, warmed houses, and delicate fruits; and inaugurating for us the civilisation in which we now live.

The tale is not one of imagination, although imagination has played its part, but is based on sober fact towards which the study of fossil seeds has contributed its quota.

“Some Recent Attacks on the Darwinian Theory.”

BY HENRY BURY, M.A., F.L.S., F.G.S.

There is still a good deal of confusion in the public mind between Evolution and Darwinism; and that confusion is not likely to be lessened by an article which appeared in the “Nineteenth Century” for August, 1922, entitled “Is Darwinism at the Dawn or the Dusk?” For in that article no less an authority than Sir A. Keith uses “Darwinism” and “the Darwinian Theory” as synonymous with Evolution.

That is not the general use of the words among scientific men, and it is not the sense in which they are used in the following pages. By Evolution I mean that “Descent with Modification” which many lines of evidence compel us to believe in, whether we can understand it or not; while by the Darwinian Theory I mean that theory of Natural Selection, by which Darwin sought to explain the mechanism of evolution.

Every trained naturalist, now that Darwin has shown us the way, believes in evolution; and no one doubts that a certain amount of natural selection has taken place; but whether that selection is really the key to the Origin of Species, is still a matter of dispute. Here again, however, there is much confusion, and the exact bearing of Darwin’s theory is so often misrepresented that, before discussing the latest criticisms of it, it will be well to spend a little time in examining its foundations.

Everyone knows the general outline of the theory. First of all there is the struggle for existence; secondly there are the facts of variation; and thirdly there is Darwin’s inference that these two factors, acting on one another, would give rise to natural selection, and the “survival of the fittest.” So far both parties are in general agreement: but Darwin’s further inference that natural selection would lead to the production of new species has given rise to a great deal of controversy.

Let us examine the question of variation. There are many classifications, but the simplest for our purpose is into (1) continuous, and (2) discontinuous variations. As an example of the former we may take human stature: there are tall men and short

men in each generation, with fairly wide fluctuations on either side of the mean; and if a long enough series is taken, we find every gradation between the two extremes. An example of discontinuous variation is seen in the colour of human eyes. Nearly all can be referred to either a brown or a blue category, and although there are variations in both groups, yet strictly intermediate colours are very rare, and ordinarily the transition from one to another is sudden. It is important to observe that this distinction between continuous and discontinuous variations is not merely one of degree. The former commonly extends 10 per cent. or more on either side of the normal; while discontinuous variations may be extremely small, as in some factors, recently discovered, connected with the coagulation of blood. The essential difference lies in the fact that intermediate stages are the rule in continuous, and absent or rare in discontinuous variation. Darwin recognised both forms of variation, and so, in spite of statements to the contrary, did A. R. Wallace; but both considered that natural selection was concerned mainly with continuous variations. De Vries, on the other hand, in his "Mutation Theory," gives reasons for thinking that no amount of selection of continuous variations can ever produce new species: and although that is possibly too sweeping a generalisation, yet the balance of opinion is that discontinuous variations are of vastly more importance. Darwin's view was that the passage from one species to another is usually so gradual as to be represented by an inclined plane. But this is not, as Dr. Willis (whose views we shall consider later) calls it, "evolution by infinitesimal variations"; for it is not the variations which are infinitesimal, but the stages of transition from one species to another. De Vries, on the other hand, believes that the transition has been effected by a series of steps—new varieties, or "mutations," as he calls them, arising suddenly. How many such steps there may be between one species and another he does not pretend to say; but some of his followers, notably Dr. Willis, are confident that new species may, and commonly do, arise by a single mutation.

Darwin, as I have already said, imagined natural selection as acting on both forms of variations; and although as time went on he was more and more disposed to regard continuous variation as the more important, yet even in the sixth edition of the *Origin of Species* we find him saying: "Everyone who believes in slow and gradual evolution, will of course admit that specific changes may have been as abrupt and as great as any single variation which we meet with under nature, or even under domestication." By "single variation" he means discontinuous variation; and since some of these are practically of specific rank, it is evident that the sudden production of a new species was not regarded as impossible, but only improbable. Those mutationists therefore who, like Dr. Willis, imagine that natural selection is

concerned with continuous variations alone, are obviously not representing Darwin's views; for although he thought it unlikely that large mutations would survive, yet, if they did survive—and it is the essence of the mutation theory that they do survive—then natural selection must act upon them.

There is, therefore, no necessary antagonism between Darwin's theory of natural selection and De Vries' mutation theory; all we have to do to reconcile them is to abandon continuous variation as a factor in evolution, and make natural selection act on discontinuous variations alone. Of course, if new species can arise at a single bound, so to speak, then the mutation theory lessens the part played by natural selection in the origin of species; but it is far from destroying it altogether. It still acts in determining whether a mutation shall be killed out at once or not; and it still kills out old and obsolete forms when better ones arise.

There is, however, one important point in which the Darwinian outlook differs from that of the mutationist. Variations must be either (1) advantageous, or (2) disadvantageous, or (3) neutral. Now even Dr. Willis, though professing utter disbelief in Darwinism, admits that disadvantageous forms will be eliminated by *natural selection*. When we come, however, to the "neutral" group there is a difference of opinion. De Vries and his followers believe that these forms survive in considerable numbers; but Darwin, on the other hand, was convinced that they would soon be swamped out by intercrossing. It is the essence of his theory that each step in the formation of a new species—each variety as it arises—must be better adapted to its environment than the parent species; and the fact that so many animals and plants are very perfectly adapted to their mode of life was long held to be one of the strongest arguments in favour of the Darwinian theory. But it has been pointed out that these adaptations commonly attach to genera and even families rather than species. Let us take, as a familiar instance, the woodpeckers. The strong wedge-shaped beak; the long thin tongue, with its beautiful mechanism for protrusion; and the stiff tail-feathers, which form a sort of prop to the bird, are all "adaptive" characters; but they are common to the whole genus *Picus*, and, I believe, to the whole family of *Picidæ*; while when we come to species, who can point to a single adaptive feature in which the green woodpecker differs from its spotted cousins?

And this brings us to one of the oldest, and still one of the most formidable objections to the Darwinian theory — the apparent uselessness of specific characters. Darwin was fully alive to this difficulty and in his reply to it relies mainly on supposed correlations between the visible useless characters and some more obscure useful ones—particularly physiological characters. We are all familiar enough with such physiological distinctions between allied species. Take for instance our common heaths,

Erica cinerea and *E. tetralix*. They may live side by side, but on the whole *E. tetralix* is better suited to boggy ground and *E. cinerea* to dry soil: while *E. ciliaris* can often be seen near Arne occupying an intermediate belt between the two commoner species. The external distinctions between them are, as far as we can judge, useless; but if it could be proved that they are correlated with the physiological differences, they would fall in well with the Darwinian theory. That, however, is an important "if," and I know of no evidence bearing on it. Perhaps the most difficult cases connected with these useless specific characters are those in which several allied species, with similar habits, occupy the same area without, seemingly, interfering with one another. A striking case of this is given by Dr. Willis in the genus *Doona*, a genus peculiar to Ceylon. There we find one species, *D. zeylanica*, occupying the whole area of the genus; and the others occupying smaller circles which frequently overlap. Yet he assures us that soil, temperature and other conditions are practically uniform throughout the area. And this form of distribution, he tells us, is common in tropical countries.

Here in England examples of it are perhaps harder to find, but as mere suggestions I would ask lovers of birds to consider the different forms of tits and of warblers. The external differences are not adaptive; but are the slight differences in habit sufficient to account for the production of new species by natural selection? Have they, in other words, "survival value?" Entomologists may be asked the same question about the different species of white butterfly; while botanists may have their attention called to the various forms of wild rose, and of brambles—bearing in mind that whether we regard them as species or varieties, we ought, according to Darwin, to find some fresh adaptation to surroundings in each new form that arises.

Quite recently Dr. Lang has raised a point of some difficulty and interest in connection with what Eimer calls "Orthogenesis," that is that variation does not always proceed in every direction, but often runs along definite lines, determined by some forces within the organism itself. That this is true in certain cases is not disputed, and we may take as examples the tendency of butterflies to produce tails to the hind wings; and the tendency of ferns to give rise to "crested" varieties. Dr. Lang instances a form of fossil oyster, *Gryphæa*, in which the development of a large curved knob (umbo) near the hinge of the left valve is carried so far that it prevents the proper opening of the shell; and he asks how natural selection can carry variation so far as to be actually injurious. I should like to add two cases which have long interested me, namely the fossil "Sabre-toothed" lion, *Machairodus*; and the whale *Mesoplodon Layardi*. In the former the canine teeth are so long that the mouth could hardly open wide enough to make use of them; and in the latter two teeth in the lower jaw frequently grow right over the upper jaw and

so lead to starvation. There are several possible explanations, but perhaps it is enough to say that in all cases the injurious condition seems to be associated with rather a late stage in life; and while the animals are otherwise well suited to their surroundings, the premature death of a few aged individuals may be no disadvantage to the race. There are those who suggest that the human race would be better off if all those over 50 were knocked on the head, and although those of us who have passed the age limit are not likely to agree, yet it would not lead to extermination.

I should like next to direct your attention to a recent book called "Age and Area," in which Dr. Willis upholds the mutation theory, and condemns natural selection on the strength of evidence taken from the geographical distribution of plants.

His fundamental postulates are simple enough—namely, that each species starts from a single spot and spreads outward from it in such a manner that—other things being equal—the area occupied is a measure of its age. Of course "other things" are not equal; but Dr. Willis declares that by the use of statistical methods it can be shown that the main factor in distribution is time and that natural selection has had little or no influence. It is not pretended that the rule holds good in all cases, but only if sufficiently large groups are taken, and especially groups of allied species.

In order to understand his criticisms we must bear in mind that his ideas on the subject of evolution are peculiar. He believes natural selection to be concerned with continuous variations alone and persists in calling it "Evolution by means of infinitesimal variations"—an error on which I have already commented. As regards mutations he goes far beyond de Vries, for the latter believed that several varieties ("elementary species") would usually intervene between one "Linnean" species and another, but Dr. Willis declares that new species usually arise at a single bound. He instances *Coleus elongatus* occupying only a few yards of ground on Mount Ritigala in Ceylon, with its nearest ally *C. barbatus* all round it. There is no room for intermediate forms, which indeed Dr. Willis declares to be in several respects impossible; and he is confident that *C. elongatus* is a new species which has arisen by mutation directly from *C. barbatus*: but when it is added that the two differ from one another in no less than 12 characters, those who know anything of modern genetics, will realise that his proposition is what we may call a "tall order."

However that may be, Dr. Willis is convinced that species with a small range are usually new ones, and those with a wide range old ones, and he gives particulars of the flowering plants of Ceylon in support of his thesis. First of all he divides them into five groups: Common (C), Rather Common (RC), Rather Rare (RR), Rare (R), and Very Rare (VR), and he gives the number of species in each group in the following table, in which

E means endemic species (i.e., those peculiar to Ceylon); I species common to India and Ceylon; and W. widespread species common to tropical Asia and Africa :—

	E.	I.	W.
C.	90	118	462
R.C.	139	103	313
R.R.	136	84	209
R.	192	64	159
V.R.	233	78	144

We see that a common species is more likely than not to be one with a very wide range, while a very rare one is usually an endemic one; and that the figures are distributed with curious regularity, so that, if we represent the endemics, read from top to bottom, by an upward curve, the widespread species form a descending curve; while the Indian species form a similar curve, but much more nearly horizontal.

Dr. Willis soon satisfied himself that this distribution was true not only of Ceylon, but of other areas where endemics were plentiful; and further that it was true not only of the flowering plants as a whole, but of separate genera and families, wherever the number of species was sufficient to allow of statistical treatment.

The extraordinary uniformity of these results appeared to him to require some mechanical explanation. Natural selection, he thinks, could not act with such uniformity; and the only explanation possible seemed to be that *age* was the principal factor—that the widespread species were on the whole the oldest, while the very rare endemics were the newest species which had not yet had time to spread. That is what he means by age and area. But before accepting this theory it is necessary to examine two different explanations of the rare endemic species which might be given under Darwin's theory of natural selection.

First of all there is the possibility that these species are specially adapted to the areas in which they grow. Dr. Willis admits that such adapted forms may occur, but he declares that they are the exception, and that in the majority of cases there is no trace whatever of any local conditions to which the species in question could be adapted.

Returning to the case of *Coleus elongatus* we find it occupying only a few square yards, but all round it, under absolutely identical conditions, is found *C. barbatus*, which spreads all over tropical Asia and Africa. There is certainly no sign of special adaptation here. Or take again the genus *Doona*, where the whole genus is confined to Ceylon. Here one species occupies the whole area of the genus, and the others occupy areas of varying size within the outer circle. Over and over again these smaller rings overlap, so that two or more species occupy the same area; and here again special adaptation would be difficult to establish. The figures already given form another strong

argument, for why should such an enormous proportion of the endemic species be adapted to very small areas?

Then there is a second Darwinian explanation to be considered, namely, that these rare endemics may be relics of an older flora, which is now dying out.

The fact that so many of them occupy the tops of mountains strongly suggests this, since in Europe and North America we know of many instances where, at the end of the Glacial Period, arctic plants retreated up mountains to escape from the increasing heat of the plains, and became, so to speak, marconed there. But although Dr. Willis admits the existence of such cases in the northern hemisphere, he assures us that they are the exception. In coming, however, to this conclusion he is apparently influenced by a belief that the Glacial Period had no effect on tropical regions, in which geologists would not altogether agree with him.

Here again he lays great stress on the statistics of distribution, and asks why, if endemic species are dying out, there should be so many more rare ones than common ones? I do not think it would be difficult to find an answer to that question: but it would take too long to argue it here; and it may in fairness be admitted that the regularity of the figures, both in Ceylon and elsewhere, is very striking, and points to factors which have not hitherto been properly appreciated.

We must next say a word about another principle which arises out of Dr. Willis' statistical inquiries, and which he calls "Size and Space." I may remark in passing that this is an example of his want of precision in the use of terms: for "Space" in this formula means exactly the same as "Area" in "Age and Area"; and the use of two words in place of one, for the mere sake of alliteration, is hardly conducive to clearness. But clearness is not a conspicuous feature in Dr. Willis' writings.

The essence of this principle is that, on the average, the size of a genus (that is the number of species it contains) is in direct relation to the area it occupies; and since there is a similar relation between area and age, it follows that the size of a genus is also a measure of its age. In a general way this conclusion does not seem in the least opposed to the theory of natural selection; but it has one puzzling feature. The monotypic genera (those with only one species) form nearly 40 per cent. of all the genera of flowering plants. In some cases, as for example *Stratiotes*, the "Water Soldier," recently investigated by Miss Chandler, the genus is an old one which has lost most of its species; but Dr. Willis insists that such cases are exceptional, and that the great majority of these genera are new. Whether he would admit the killing out of intermediate forms between them and allied genera, or whether he wishes us to infer that new genera have arisen by single mutations from older ones, is by no means clear; but the latter seems to be implied, and to be the logical outcome of his methods of reasoning, since the distribution of monotypic

genera resembles that of endemic species. As, however, he promises us a further work dealing more directly with the problem of evolution, we may be content to wait for further enlightenment on this point.

So far we have concerned ourselves solely with plants; but Dr. Willis has examined a number of cases of animals, especially insects, as well; and finds that exactly the same rules of age and area, size and space apply to them also: but time does not allow me to go into them.

Nor have I time to deal with the curious "hollow curves" which apply to so many features of distribution. They certainly appear to support his contention that there is some mechanical factor at work, and that that factor is probably "time": but how far this is really incompatible with the view that natural selection has played a fairly large share in that distribution, I am not prepared to say. His statistics do not seem necessarily to bear the interpretation he places upon them, and they will require long and detailed examination before their exact bearing can be recognised.

In conclusion we must briefly consider Professor Bateson's suggestive address at Toronto in 1921. We need not follow him through the old objections to Darwin's views—the impossibility of obtaining new species by the selection of continuous variations; the rarity of intermediate forms; all that is ancient history; but what is new, at any rate in form, is his challenge to Darwin's belief that our domestic varieties may be regarded as incipient species; for that, he says, ignores one of the principal characteristics of species—namely, that they are usually infertile when crossed.

Darwin, as you all remember, was at great pains to prove that a fair number of species would breed freely together: and he thought that in this way he was answering the objection: but Bateson says that this misses his point, which is that if domestic varieties are incipient species, they ought to show, at least in an incipient form, some of that sterility which is so nearly universal among true species. And although we may suggest explanations of this (as Professor Lotsy has recently done) yet until we have actually produced, from the same stock, varieties which are sterile *inter se*, Bateson seems justified in saying that our domestic breeds throw no real light on the Origin of Species. But Bateson also points out the weakness of the mutation school. It has long been recognised that in all our mendelian experiments with discontinuous variations we rarely if ever produce a new character: we simply shuffle the old ones, and deal them out in new combinations. For example, if two brown-eyed parents produce a blue-eyed child, we can at once be sure that one at least of the grandparents was blue-eyed; the factor for blue has simply been latent, and not destroyed, and nothing really new has been produced. For a long time the nearest approach to a new

character seemed to be when one of the original factors dropped out altogether; and so impressed was Bateson with this fact, that in 1914 he even suggested the possibility that the evolution of new species might depend mainly on this loss of factors. But that was really a *reductio ad absurdum*, and he now admits that new characters must have arisen, both in wild species and in domestic varieties; but he declares that, in all his long years study of genetics he has never seen any such new character arise, or at least not in any form that had any chance of survival; and he therefore concludes that all these breeding experiments, helpful though they are in many ways, afford no real clue to the baffling problem of evolution.

It does indeed seem certain that the case of *Oenothera lamarckiana*, from which De Vries supposed himself to have produced new species, will not stand the test of criticism, but it is only fair to add that Morgan and others of the American school of genetics, disagree with Dr. Bateson, and claim that new characters have several times arisen in their experiments. Most of their specimens, however, are so obviously pathological that one may reasonably doubt whether their results in any way represent what occurs in nature.

With regard therefore to the whole question of how species have originated, Professor Bateson declares that we are still utterly ignorant; and in the midst of so much doubt and difficulty such an agnostic position is doubtless scientifically correct; but agnosticism is usually somewhat tempered by faith—Dr. Bateson himself admits to faith in the truth of evolution—and those of us who have been impressed with the immense volume of facts which natural selection seems to explain, may perhaps be allowed to retain some belief that the Darwinian theory may yet prove to have more importance than its modern critics admit.

“Comets and Cosmogony.”

Abstract of DR. A. C. D. CROMMELIN'S Paper.

Dr. Crommelin dwelt at some length on Halley's Comet, full particulars of every apparition being detailed visibly, by means of lantern slides, from over 200 B.C., to A.D. 1910. For a knowledge of a large number of the early returns we are indebted to the Chinese observers, who must be some of the most patient in the world. An imaginary picture of the comet hanging over Jerusalem was shown: the portent gave (to people of those times), the certain anticipation of the fall of the sacred city under the iron hand of Rome. The comet also heralded (to weak minds) the capture of Constantinople by the Turks.

Coming to the apparition of the comet in 1910, it was pointed out that it passed in an exact line between the Earth and Sun, and must therefore have been projected on our luminary, as seen from a particular hemisphere of the Earth. Such, however, was

the tenuity of the comet, that it was perfectly transparent, and not the least sign of it could be detected on the face of the Sun.

Stress was then laid on the fact that the Sun, in addition to its gravitational power also exercises a repellent action on the tenuous part of a comet, driving it out in streams, so that at each time of perihelion passage, a comet loses something of its interior economy, and in the end is reduced literally to a shadow.

The long period comets vastly outnumber the short period ones; their number may be at least a million. It appeared very probable from various evidence, that comets have been originally expelled by either the giant planets Jupiter and Saturn, or even by the Sun.

An account was then given of Laplace's Nebular Theory, and of the Planetismal Theory. Under the latter the formation of the Solar System is supposed to have been due to the close approach of two stars or suns to one another, and the consequent enormous actions and movements due to the raising of great tides in each body.

The general conclusion as to comets was, not that they came to us from the stars, as the nature of their orbits or tracks in space is not that which would be due to such an approach (the hyperbolic path); but that they once formed part of the original nebula of our system, or were evolved during the cataclysms due to the close approach of two suns in space.

A Discovery of Urns at Moordown.

While digging post-holes for a fence at Redbreast Plantation, Moordown, in November, 1923, two workmen found five urns, probably of the Bronze Age, containing fragments of burnt bones, but owing to the restricted nature of the excavations and to the very fragile condition of the material of which the urns were formed it was impossible to preserve them. No objects of metal or of stone were found in the contents, but flint flakes were picked up near by.

The discovery is noteworthy because in 1873, when the plantation was being made,* ninety-six urns were found at this spot associated with a barrow which formerly existed there. [See Hants Field Club Proceedings, Vol. I.]

As in the case of many of the barrows in this neighbourhood, the site is on a projecting spur of the plateau and commands an extensive outlook over the river valley. The fact that over one hundred funerary urns were deposited there seems to indicate that the spot was especially venerated or that some disastrous event occurred in the vicinity.

W. G. WALLACE.

* The plantation was cut down some years ago.



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