



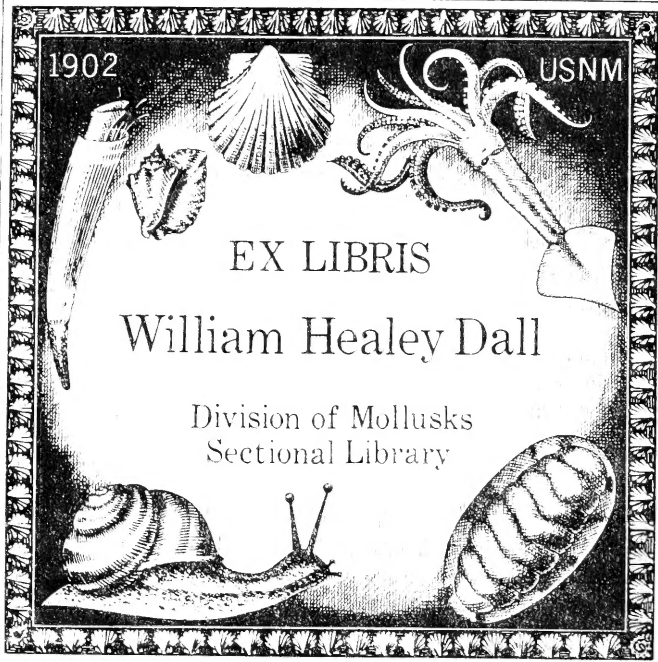
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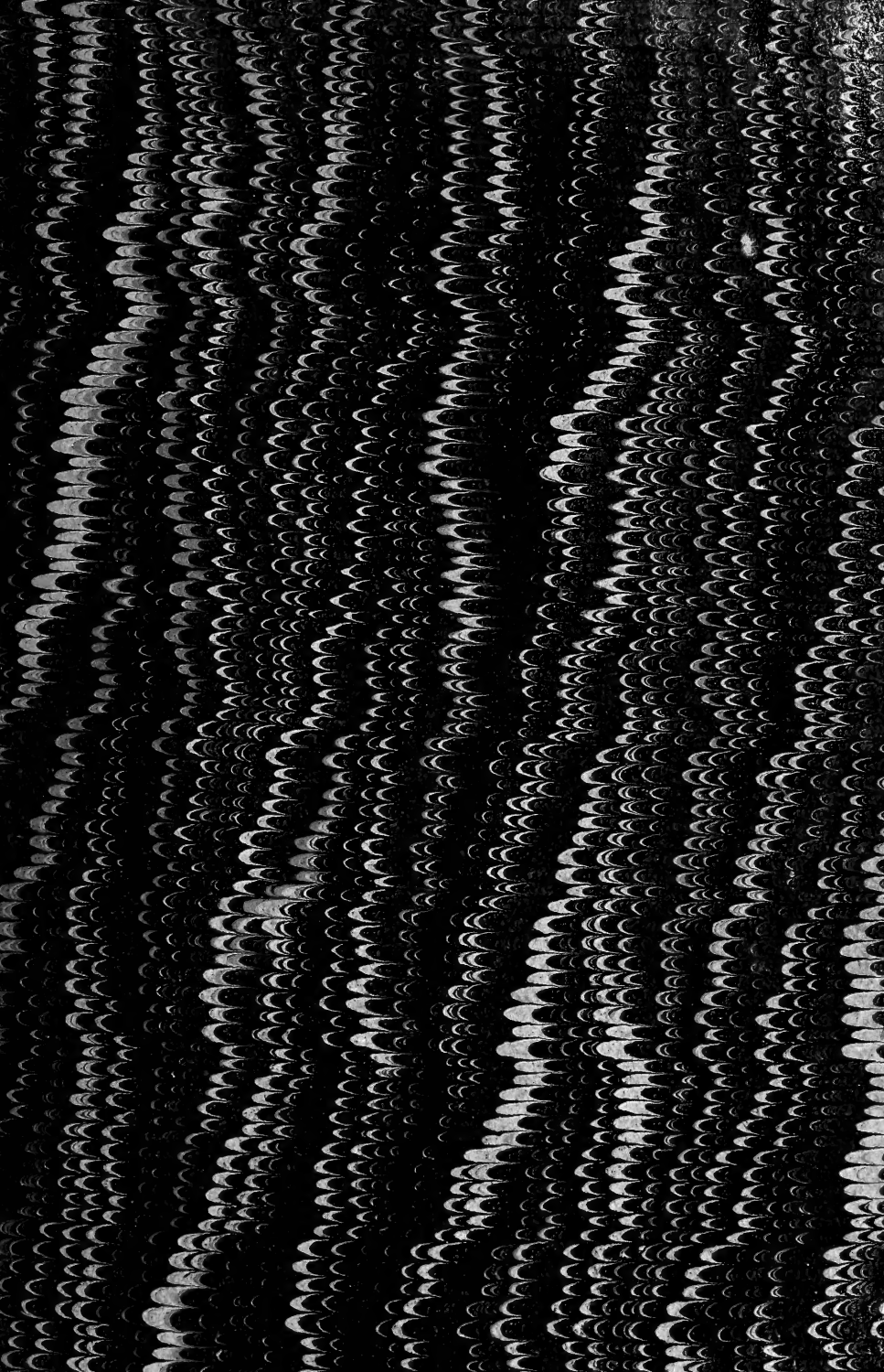
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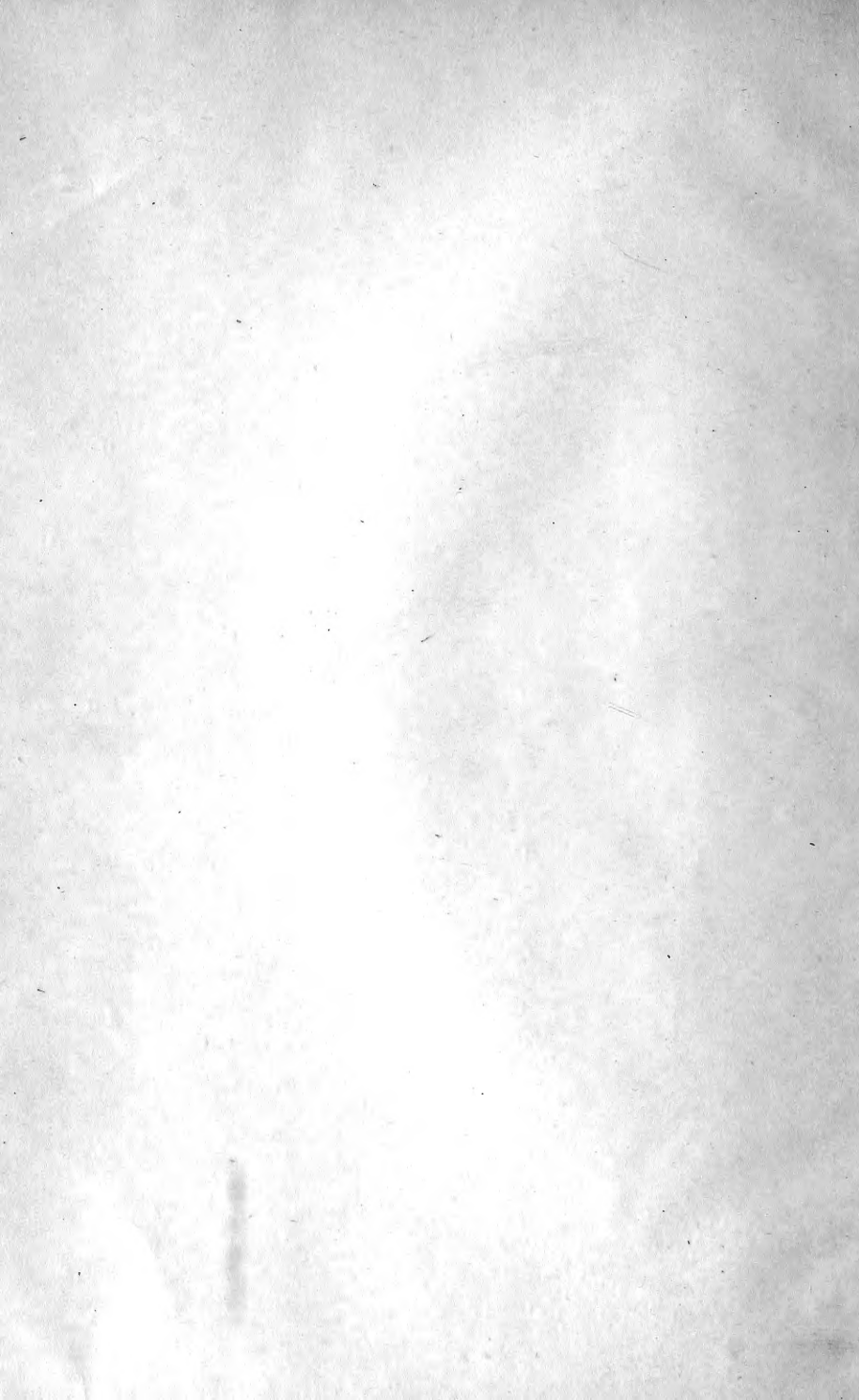
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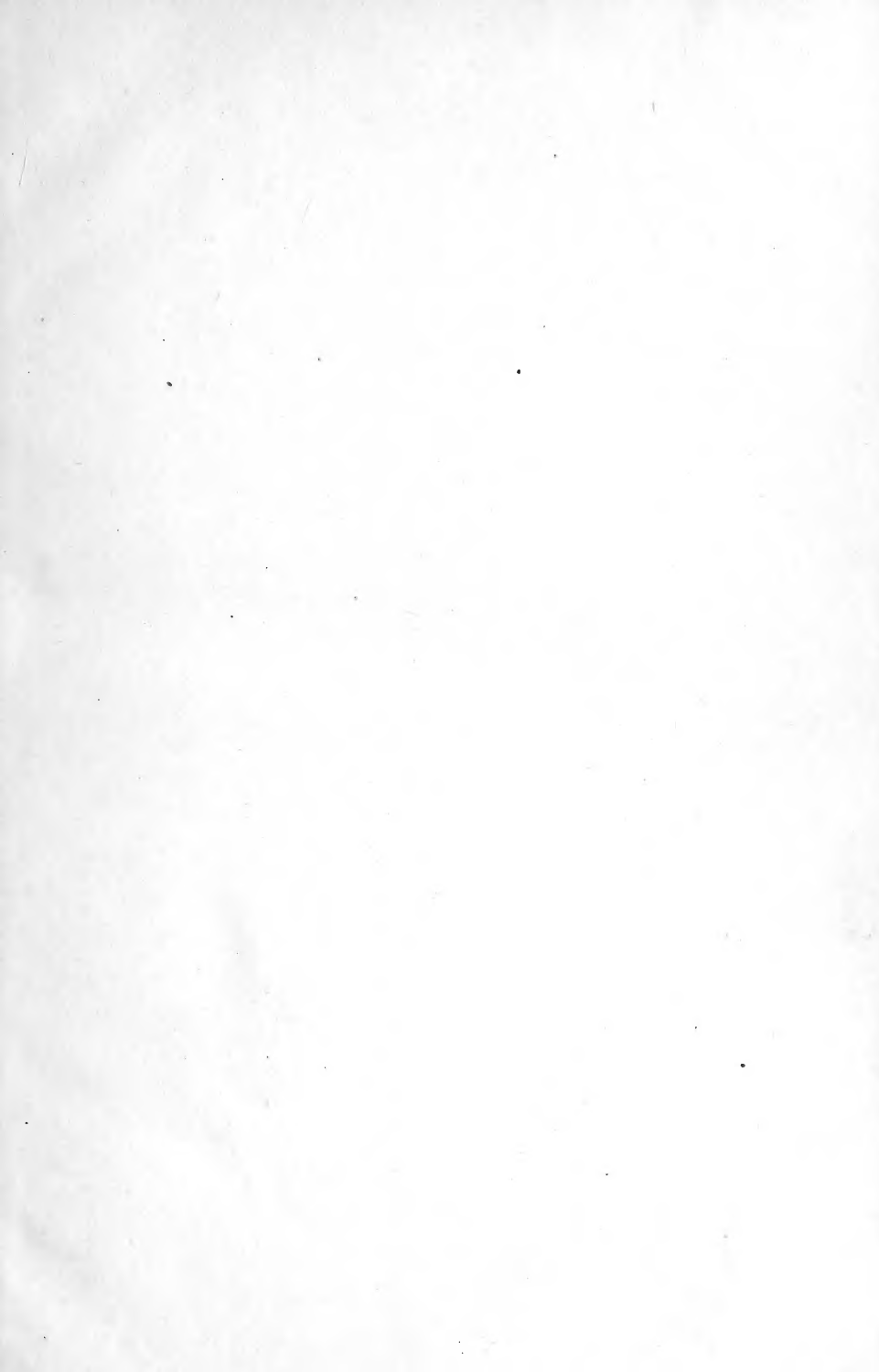
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BEING THE ORGAN OF THE
CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

EDITED, UNDER THE DIRECTION OF THE COUNCIL,

BY

WILLIAM E. HOYLE (1907),

AND

J. R. LE B. TOMLIN (1908-9).

VOL. XII.

1907-1909.



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ERRATA.



Page 169, line 4, for "Post-Glacial" read "Glacial."

Plate 2, for "aculcata" read "lamellata."



Vol. 12].

JANUARY 1st, 1907.

[No. 1.

THE
JOURNAL
OF
CONCHOLOGY.

*BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.*

PUBLISHED QUARTERLY.

HON. SECRETARY:
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- 1.—This Society shall be called “The Conchological Society of Great Britain and Ireland.”
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 1899. Brooksbank, Hugh, M.B., College Road, Windermere.
 1905. Bromehead, G. N., Merton College, Oxford.
 1897. *L* Bullen, Rev. Robert Ashington, B.A., F.G.S., etc., Englemoor, Heathside Road, Woking, Surrey.
 1896. Burgess, Wm. Valentine, Davenham, Wythenshawe Road, Northenden, Manchester.
 1897. Burnup, Henry Clifden, Box 182 P.O., Maritzburg, Natal.
 1879. Butterell, J. Darker, Manor House, Wansford, Hull.
 1905. Butterfield, W. Ruskin, Corporation Museum, Hastings.
 1902. Button, Fred. L., Bacon Building, Oakland, California.
 1888. Byne, Loftus St. George, M.Sc., Fairmount, Priory Road, Bournemouth.
1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne, Lancs.
 1906. Carpenter, Geoffrey D. H., B.A., 73, Elsham Road, Kensington, London, W.
 1893. Carphin, Mrs. Janet, 7, Lockerbie Cottages, Liberton, Edinburgh.
 1901. Carter, Chas. S., 8, Bridge Street, Louth, Lincs.
 1878. *P* Cash, William, F.G.S., F.R.M.S., 35, Commercial Street, Halifax
 1903. Cattell, W. Chas., The Poplars, Montagu Street, Kettering.
 1901. * Chadwick, Wm. H., Harrogate, Nether Street, North Finchley, London, N.
 1892. Champ, Hy., c/o S. & J. Watts & Co., Portland Street, Manchester.
 1905. Charnley, Jas. Roland, F.Z.S., F.E.S., The Avenue, Moor Park, Preston.
 1895. *P* Chaster, George Wm., M.R.C.S., 42, Talbot Street, Southport, Lancs.
 1904. Chichester, Rev. Charles, Shirwell Rectory, Barnstaple.
 1889. Christy, Robert Miller, F.L.S., The Blue House, Chignal St. James, Chelmsford, Essex.
 1904. Clapp, Geo. H., 325, Water Street, Pittsburgh, Pa., U.S.A.
 1906. Climenson, Mrs. E. T., Shiplake Grange, Henley-on-Thames.
 1886. Coates, Henry, F.R.S.E., Pitcullen House, Perth.
 1880. Collier, Edwd., Glen Esk, Whalley Range, Manchester.
 1898. Collinge, Walter Ed., M.Sc., Department of Economic Zoology, 55, Newhall Street, Birmingham.
 1897. Cook, Rev. Thomas, Cliff College, Calver, near Sheffield.
 1901. Cooke, Rev. Alfred H., M.A., Aldenham School, Elstree, Herts.
 1892. Cooper, James Eddowes, 68, North Hill, Highgate, London, N.
 1895. Corker, Jas. S., Rose Lea, Mellor Road, Mellor, near Marple.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1899. Crowther, J. E., Portland Street, Elland, Yorks.
 1906. Crowther-Beynon, V. B., M.A., F.S.A., The Grange, Edith Weston, Stamford.
 1879. Cundall, Jas. W., 3, Orlando Road, Clapham Common, London, S.W.
1886. DaCosta, Solomon I., 9, Gloucester Square, London, W.
 1897. Dacie, John Charles, 30, Montserrat Road, Putney, London, S.W.
 1904. Dalgliesh, Gordon, 29, Larkfield Road, Richmond, Surrey.
 1903. Darbshire, A. D., M.A., B.Sc., Royal College of Science, London, S.W.
 1886. *L* Darbshire, Robert D., High Elms, Victoria Park, Manchester.
 1899. Darnbrough, Frederick, Croft Villa, Eaglescliffe, Yarm-on-Tees.
 1897. Dautzenberg, Ph., 213, Rue de l' Université, Paris.
 1898. Dean, J. Davy, 84, Dale Street, Lancaster.

1892. Dixon, James Bassett, Ribblesdale House, Preston, Lancs.
 1901. Drummond, Robt., 20, Upper Talbot Street, Blackpool.
1895. Edwards, Thos., Cliftonville House, Equity Rd., Narborough Rd, Leicester.
 1901. Edwards, W. H., Hastings Museum, Victoria Institute, Worcester.
 1891. Elgar, Hubert, Museum and Public Library, Maidstone, Kent.
 1904. *L* Eliot, Sir Chas., K.C.M.G., Endcliffe Holt, Endcliffe Crescent, Sheffield.
 1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
 1901. Ensor, A. R., 60, Lumley Road, Skegness, Lincolnshire.
 1894. Evans, Wm., F.R.S.E., 38, Morningside Park, Edinburgh.
1897. *L* Farquhar, John, 3, Rose Terrace, African Str., Grahamstown, Cape Colony.
 1891. Farrer, Captain Wm. James, Chapel House, Bassenthwaite, Keswick.
 1897. Fielding, Clement, M.P.S., Clover Hill, Halifax, Yorks.
 1890. Fierke, Frederick Wm., 73, Redbourne Street, Hull.
 1884. *L* Fitzgerald, Rev. H. Purefoy, Wel'ington College, Berks.
 1898. Fitzsimons, J. B., M.D., 14, Owen Street, Hereford.
 1906. Fogerty, Harry, 21, Henry Street, Limerick.
 1905. Foster, Miss Amy C. S., 45, Belsize Square, London, N.W.
 1905. Freeman, William, Hawkhurst, Milton Road, Oundle.
 1904. Frew, Dr. Alexander, 12, St. James' Terrace, Hillhead, Glasgow.
 1906. Freyberg, Cuthbert, 27, Hawker Street, Wellington, New Zealand.
 1892. Fulton, Hugh, Kew Gardens, near London.
1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., Meadow Bank, Accrington
 1898. Glover, Miss Maria, 124, Manchester Road, Southport, Lancs.
 1906. Godfrey, Rev. Robert, M.A., 46, Cumberland Street, Edinburgh.
 1886. *L* Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1897. Godwin-Austen, H. H., Lt.-Col., F.R.S., etc., Nore, Hascombe, Godalming, Surrey.
1906. Gomez, A. da Costa, 427, Lafayette Avenue, Brooklyn, New York.
 1902. Gower, Harry D., 55, Benson Road, Croydon.
 1904. Gravely, F. H., Dalton Hall, Victoria Park, Manchester.
 1904. Gray, Arthur A., 509, Exchange Buildings, Boston, U.S.A.
 1905. Green, Wm. A., 4, Salisbury Terrace, Chichester Park, Belfast.
 1886. * Greene, Rev. Carleton, M.A., Gt. Barford Vicarage, St. Neots, Huntingdon.
 1904. Grierson, P. H., Land Commission Office, Dublin.
 1906. Grint, Miss Grace M., 33, Goring Road, Bowes Park, London, N.
 1901. Gubbins, Mrs., Westwood Ho!, N. Devon.
 1890. Gude, G. K., F.Z.S., 114, Adelaide Road, Hampstead, London, N.W.
 1886. Gwatkin, Rev. Prof. H. M., D.D., M.A., 8, Scrope Terrace, Cambridge.
1905. Hainsworth, Sam, 60, George Street, Saltaire.
 1897. Hall, Thos. Bird, Larch Wood, Rock Ferry, Cheshire.
 1902. Hall, W. J., Manchester Museum, University, Manchester.
 1906. Hall, C. M., 33, Goring Road, Bowes Park, London, N.
 1905. Hamling, J. G., F.G.S., The Close, Barnstaple.
 1902. Hampson, Travis, Nuthurst, Hartopp Road, Four Oaks, Sutton Coldfield.
 1895. Hann, Rev. Adam, Wesley House, Rochdale.
 1895. Hardy, John Ray, Manchester Museum, University, Manchester.
 1895. Hardy, John, 11, Stockton Road, Chorlton-cum-Hardy, near Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough, Yorks.
 1897. Harrison, Miss G. M., 14, Queen's Road, Southport, Lancs.
 1904. Harrison, Russell C., 17, Tooting Bec Rd., Upper Tooting, London, S.W.

1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorks.
 1887. Harvard, T. Mawson, 23, Northbrook Road, Lee, London, S.E.
 1903. Hawkins, John, J.P., 35, Avenue Road, Grantham.
 1887. Heathcote, Wm. Henry, F.L.S., 119a, Fishergate, Preston, Lancs.
 1896. Herdman, Prof. W. A., D.Sc., F.R.S., The University, Liverpool.
 1887. Hey, Thomas, 8, Bloomfield Street, Derby.
 1895. Hibbert, Charles R. C., Riccard's Down, Abbotsham, Bideford, Devon.
 1895.^P Hickson, Prof. Sydney J., D.Sc., M.A., F.R.S., University, Manchester.
 1893. Hill, John, Little Eaton, near Derby.
 1886.^L Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1906. Hirase, Y., Karasumaru, Kyoto, Japan.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.
 1891. Horsley, Rev. Canon J. W., St. Peter's Rectory, Walworth, London, S.E.
 1884. Howell, George O., 210, Eglinton Road, Plumstead, Kent.
 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.R.S., etc., 30, Collingham Gardens, London, S.W.
 1886.^P Hoyle, W. E., M.A., D.Sc., Director of the Manchester Museum, University, Manchester.
 1895. Hudson, Rev. Hy. A., 445, Stretford Road, Manchester.
 1905. Hutton, W. Harrison, 44, Dial Street, Leeds.
1901. Jackson, J. Wilfrid, 113, Sewerby Street, Alexandra Park, Manchester.
 1891. Jenner, James Herbert Augustus, F.E.S., 209, School Hill, Lewes, Sussex.
 1904. Jennings, F. B., 152, Silver Street, Upper Edmonton, London, N.
 1906. Johnson, Chas. W., Boston Society of Natural History, Boston, Mass., U.S.A.
 1894. Jones, Kenneth Hurlstone, M.B., F.L.S., R.N. Barracks, Chatham, Kent.
 1901. Jukes Browne, A. J., F.G.S., Floriston, Cleveland Road, Torquay.
- 1897.^L Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902. Kensett, Percy F., Broadmeadow, Coombe Lane, Wimbledon, London, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 1887. Kew, H. Wallis, F.Z.S., 9, Queen's Road, Bromley, Kent.
 1905. Kimber, W. J., Aldinga, South Australia.
 1889. Knight, Rev. G. A. Frank, M.A., F.R.S.E., St. Leonard's Bank, Perth.
1901. Laidlaw, F.F., M.A., Cranston's Ivanhoe Hotel, Bloomsbury St., London, W.C.
 1899. Lancaster, Ernest Le Cronin, B.A., M.B., Winchester House, Swansea, S. Wales.
 1879. Laver, Henry, M.R.C.S., F.L.S., Head Street, Colchester, Essex.
 1894. Lawson, Peter, Jesmond Dene, 87, Finlay St., Fulham, London, S.W.
 1905. Laycock, John, 30, Herries Street, Ashton-under-Lyne.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1878. Leicester, Alfred, 148, Liscard Road, Liscard, Cheshire.
 1906. Letson, Miss E. J., Sc.D., Buffalo Society of Natural Sciences, New York, U.S.A.
 1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1903. Linter, Miss J. E., Saville House, Twickenham.
 1896.* Linton, John, 25, Wordsworth Road, Small Heath, Birmingham.
 1897.^L Lodder, Miss Mary, Bank of Australasia, Launceston, Tasmania.
 1895. Loydell, A., 36, Milton Road, Acton, London, W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire, S. Wales.

1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire
 1903. McClelland, Hugh, Bryn, Somerville Road, Sutton Coldfield.
 1885. McKean, Kenneth, The Homestead, Monkton Combe, near Bath.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1905. Macindoe, Dr. A., D.P.H., Sidmouth, Devon.
 1884. Madison, James, Turves Green, West Heath Rd., Northfield, Worcestershire.
 1885. Marquand, Ernest D., A.L.S., Knyghtwood, St. Martin's, Guernsey.
 1887. Marshall, J. T., Herbert Villa, Prince of Wales Road, Bournemouth.
 1906. Marshall, Arthur G., 66, Victoria Street, Westminster, London, S.W.
 1887.^P Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
 1904. Massy, Miss A. L., 9, St. James's Terrace, Malabide, Dublin.
 1905. Maxwell, Mrs. Miller, Bangholm Bower, Goldenacre, Edinburgh.
 1897. May, William Lewis, F.R.S. Tasm., Forest Hill, Sandford, Tasmania.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880.^P Melvill, James Cosmo, M.A., F.L.S., Meole Brace Hall, Shrewsbury.
 1891. Middleton, Robert, Sheepsca Foundry, Leeds.
 1898.* Milne, J. Grafton, Holly House, Plaistow, London, E.
 1904. Milne, James N., Foylemore, St. Jude's Avenue, Belfast.
 1879. Milnes, Rev. Herbert, M.A., Darley House, Berkeley St., Cheltenham.
 1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
 1906. Monterosato, Il Marchese di, 2, Via Gregorio, Ugdalena, Palermo, Sicily.
 1902. Moore, Chas. H., 5, Mill Street, Stocks Lane, Stalybridge.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
 1906. Murdoch, R., Wanganui, New Zealand.
1905. Napier, H. C., Headington Hill, Oxford.
 1903. Nash, P. B., 135, Melfort Road, Thornton Heath, Surrey.
 1899. Neild, J. E., Merlewood, Queen's Road, Urmston, near Manchester.
 1887. Newstead, A. H. L., B.A., 38, Green Street, Bethnal Green, London, E.
 1891. Newton, Richard Bullen, F.G.S., 11, Twyford Crescent, Acton Hill, London, W.
- 1891.^P Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., etc., The Red House, Berkhamstead.
 1903. Northey, Rev. A. E., M.A., Lisworney, Torquay.
 1901. Norton, Miss E. M., 20, Eastfield Road, Westbury-on-Trym, near Bristol.
1901. Oelrichs, W., 22, Hackins Hey, Liverpool.
 1887. Oldham, Charles, Brook Cottage, Knutsford, Cheshire.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, Innisfallen, Highbridge Road, Wylde Green.
 1905.^L Owston, Alan, Yokohama, Japan.
1903. Pace, S., Marine Station, Millport, N.B.
 1900. Pannell, Chas., 13, East Street, Haslemere, Surrey.
 1904. Parritt, H. W., 8, Whitehall Park, Upper Holloway, London, N.
 1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
 1902. Pattison, Ernest, 52, Saxe Coburg Street, Leicester.
 1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
1901. Penrose, G., Royal Institution of Cornwall, Truro.
 1906. Plant, James R., M.R.C.S., L.R.C.P., 107, Hinckley Road, Leicester.
 1904. Platt, Thos. H., 73, Clarendon Road, Manley Park, Manchester.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1905. Poole, W. G., South Lawn, Godalming, Surrey.

1898. Poore, Arthur S., Heather View, West Heath Road, Bostall Heath, Abbey Wood, Kent.
1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
1903. Preston, Henry, F.G.S., Hawthornden Villa, Spittlegate, Grantham.
1897. Preston, Hugh Berthon, F.Z.S., 53, West Cromwell Road, London, S.W.
1906. Pritchard, G. B., F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.
1906. Radley, Percy E., F.R.M.S., 30, Foxgrove Road, Beckenham, Kent.
1896. Ragdale, John Rowland, The Beeches, Whitefield, near Manchester.
1899. Ramanan, Vedaraniam Venkata, M.A., F.Z.S., 12, Sami Pillai Street, Triplicane, Madras, S. India.
1904. Redding, J. R., 17, Victoria Villas, Clontarf, Dublin.
1906. Reynell, Alexander, 152, Selhurst Road, South Norwood, London, S.E.
1905. Reynolds, Laurence R., 233, Aspinwall Avenue, Brookline, Mass., U.S.A.
1896. Rhodes, John, F.E.S., 360, Blackburn Road, Accrington, Lancs.
1900. Richards, C. P., Mission House, Stenalees, St. Austell, Cornwall.
1906. Ritchie, John, jr., Box 2795, Boston, Mass., U.S.A.
1898. Roberts, A. William Rymer, The Common, Windermere.
- O P* Roebuck, Wm. Denison, F.L.S., 259, Hyde Park Road, Leeds.
1901. Rooth, J. A., M.R.C.S., 14, St. George's Place, Brighton.
1905. Rope, Geo. T., Blaxhall, Tunstall, Suffolk.
1893. Roseburgh, John, Market Square, Galashiels, Roxburgh.
1892. Rosevear, John Burman, 109, New King's Rd., Fulham, London, S.W.
1906. Salisbury, Albert E., 64, Pemberton Gardens, Highgate, London, N.
1877. *P* Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
1906. Schepmann, M. M., Rhoon, near Rotterdam, Holland.
1895. *L* Schill, C. H., The Elms, Byrom Lane, Macclesfield.
1904. Scott, Miss Gwynedd, 4, The Terrace, Riding Mill-on-Tyne.
1886. Scott, Thomas, LL.D., F.L.S., 280, Victoria Road, Torry, Aberdeen.
1893. Shackelford, Rev. Lewis John, Lambeth Street, Queen's Park, Blackburn, Lancs.
1906. Sharp, C. J., M.R.C.S., 2, Wellington Avenue, Liverpool.
1904. Shaw, Rev. W. A., Haselbeeche Rectory, Northampton.
1906. Sheppard, T., F.G.S., Municipal Museum, Hull.
1904. Sherrin, W. R., 38, Fielding Road, Chiswick, London, W.
1906. Shopland, Commander E. R., Weeting, Sheringham, Norfolk.
1895. Sich, Alfred, F.E.S., Corney House, Chiswick, London, W.
1896. Sidebotham, Dr. E. J., Erlesdene, Bowdon, Cheshire.
1906. Sikes, F. H., M.A., 13, Mornington Avenue, West Kensington, London, W.
1905. Simpson, James, c/o G. Sin, Esq., A.L.S., 52, Castle Street, Aberdeen.
1884. Skilton, Mrs. Mary, 21, London Road, Brentford, Middlesex.
1902. Smallman, Raleigh S., Wressel Lodge, Wimbledon Common, near London.
- 1903.* Smallwood, Henry W., Holly Mount, Church Road, Moseley, Birmingham.
- 1903.* Smallwood, Jas. Clarence, Holly Mount, Church Rd., Moseley, Birmingham.
1886. *P* Smith, Edgar A., I.S.O., F.Z.S., Natural History Museum, Cromwell Road, London, S.W.
1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth St., Topsham, Exeter.
1899. *L* Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, London, S.W.
1896. Smith, Wm. Rayson, Harleston, Norfolk.
1906. Soames, Rev. H. Aldwin, Lyncroft, Otford, Sevenoaks.

1900. Solly, E. H., 3, South Street, Deal, Kent.
 1886. *L P* Somerville, Alex., B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow.
 1902. Sorby, Henry Clifton, LL.D., F.R.S., Broomfield, Sheffield.
 1886. Sowerby, Geo. Brettingham, F.L.S., Riverside, Kew, near London.
 1892. Span, Bartlet, Woodlands, Tenby, South Wales.
 1900.* Stacey, John, 22, Nithdale Road, Plumstead, Kent.
 1906. Stalley, Henry J., Thornton House, Christ's Hospital, West Horsham, Sussex.
 1886. Standen, Robert, 113, Sewerby Street, Alexandra Park, Manchester.
 1903. Stelfox, A. W., Oakleigh, Ormeau Road, Belfast.
 1906. Step, Edward, F.L.S., Oakwood House, Ashstead, Surrey.
 1904. Stone, R. E. T., Asliffe, 78, Woodstock Road, Oxford.
 1896. Stonestreet, Rev. W. T., B.D., F.R.S.L., Arnside, Prestwich Park, Manchester.
 1885. *L* Storey, J. A., B.A., Mafeking Villa, Locking Road, Weston-super-Mare.
 1897. Stracey, Bernard, M.B., Sutton Bonnington, Loughborough.
 1890. Stubbs, Arthur Goodwin, The Meads Cottage, Hailey Lane, Hertford.
 1893. Stump, Edward Consterdine, Polefield, Blackley, Manchester.
 1906. Suter, Henry, Haslett Street, Eden Terrace, Auckland, New Zealand.
 1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
 1888. *P* Sykes, Ernest Ruthven, B.A., F.L.S., etc., 3, Gray's Inn Place, Gray's Inn, London, W.C.
 1895. Taylor, Frederick, 32, Landseer Street, Park Road, Oldham, Lancs.
 1897. Taylor, Rev. George W., F.R.S. Canada, etc., St. Matthew's Rectory, Wellington, British Columbia.
 1904. *L* Taylor, Gerald Medland, Rossall School, Fleetwood.
 O P Taylor, John W., North Grange, Horsforth, Leeds.
 1901. Taylor, Thos., Tainui Street, Greymouth, New Zealand.
 1903. Thaannum, D., 5, Church Street, Hilo, Hawaiian Islands
 1886. Tomlin, J. R. le Brockton, M.A., Mathon Lodge, W. Malvern.
 1898. Turner, E. Hartley, A.C.A., 42, Spring Gardens, Manchester.
 1906. Turton, Lt.-Col. W. H., D.S.O., R.E., Harley House, Clifton Down, Bristol.
 1899. Vaughan, J. Williams, J.P., The Skreen, Erwood, R.S.O., Radnorshire, S. Wales; winter address: St David's, London Road, Guildford.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
 1902. Wadsworth, J. T., Highfield, Palatine Road, Northenden, Manchester.
 1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea, S. Wales.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan, U.S.A.
 1905. Walton, H. Maurice, Goodburne House, Richmond, Yorks.
 1902. *L* Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1886. *P* Watson, Rev. R. Boog, LL.D., F.L.S., etc., 11, Strathearn Pl., Edinburgh.
 1900. Webb, Walter F., 202, Westminster Road, Rochester, N.Y., U.S.A.
 1895. Webb, Wilfred Mark, F.L.S., Odstock, Hanwell, London, W.
 1902. Weeks, Wm. H., jr., 508, Willoughby Avenue, Brooklyn, U.S.A.
 1895. Welch, Robert John, M.R.I.A., 49, Lonsdale Street, Belfast.
 1897. West, H. J., 167, Goodrich Road, East Dulwich, London, S.E.
 1905. Whitehead, William, 26, High Street, Stalybridge.
 1886. Whitwell, Wm., F.L.S., 2, Arden Grove, Dorridge, Birmingham.

1889. Williams, John M., 31, Grove Park, Liverpool.
 1906. Williams, Mrs. A. L., 593, Jackson Boulevard, Chicago, Ill., U.S.A.
 1906. Winkworth, John F., 290, Burdett Road, London, E.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1901. *L* Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1898. Woods, Henry, M.A., F.G.S., Sedgwick Museum, Cambridge.
 1886. *L* Woodward, Bernard B., F.L.S., etc., 4, Longfield Rd., Ealing, London, W.
 1903. Worsdale, R., 163, Dudley Road, Grantham.
 1906. Wragge, Clement L., F.R.G.S., etc., 26, Jasper Road, Upper Norwood, London, S.W.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

PROCEEDINGS OF THE

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

354th Meeting, September 12th, 1906.

Mr. R. D. Darbishire (vice-president) in the chair.

Donations to the Library announced and thanks voted :

“Pocket Guide to the British Non-Marine Mollusca, by E. W. Swanton;” “On “Chloritis, parts 1 and 2,” by G. K. Gude; “Beiträge zur Kenntniss der Mollusken-Fauna der Magalhaen-Provinz, no. 4,” by Hermann Strebel; “Lanzaia, eine neue Gasteropoden-Gattung der Adria,” by Prof. Sp. Brusina; “Systematisches Conchylien Cabinet, no. 500” (*from the respective authors*); “The Conchologist, vol. 1, nos. 1-4” (*from Mr. A. Leicester*); and the usual periodicals received in exchange

New Members Elected.

A. G. Marshall, Clovelly, Park Road, Wallington, Surrey.

George Baxter Pritchard, F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.

Henry Suter, Haslett Street, Eden Terrace, Auckland, New Zealand.

Candidates Proposed for Membership.

Cuthbert Freyberg, 27, Hawker Street, Wellington, New Zealand.

A. da Costa Gomez, 427, Lafayette Avenue, Brooklyn, New York.

Y. Hirase, Karasumaru, Kyoto, Japan.

Miss E. J. Letson, Sc.D., Director of Museum, Buffalo Society of Natural Sciences, New York, U.S.A.

R. Murdoch, Wanganui, New Zealand.

T. Sheppard, F.G.S., Municipal Museum, Hull.

Rev. H. Aldwin Soames, Lyncroft, Otford, Sevenoaks.

Geoffrey D. H. Carpenter, B.A. (Oxon), 73, Elsham Road, Kensington, London, W.

Resignation.

The Rev. J. E. Somerville.

Papers Read.

“The genus *Doriopsilla*,” by Sir Charles Eliot.

“*Acicula lineata* v. *alba* at Grange-over-Sands,” by F. Booth.

“*Vertigo moulinsiana* in Middlesex,” by J. E. Cooper.

Exhibits.

By Mr. Chas. Oldham : *Loligo media* taken in June, 1906, in a fish-garth in the estuary of the Esk at Ravenglass, Cumberland, where it is known to the fishermen as “Ink-spue.” Also specimens of *Opeas goodalli* from greenhouse at Chester.

By Mr. J. E. Cooper: *Agriolimax levis* and *Planorbis albus*, Criccieth, Carnarvonshire (new county records); *Vertigo moulinsiana*, near Colnbrook, Middlesex, to illustrate his note.

By Dr. A. Frew: *Subulina octona*, Glasgow Botanic Gardens.

By Mr. H. Fogerty: *Anodonta cygnea* (new county record), and *Limnaea stagnalis*, Crogannowen Lake, co. Clare.

By Mr. C. H. Moore: *Jamiania cylindracea* var. *albina* from Tenby; *Ancylus fluviatilis* var. *albida*, Waterwinch, near Tenby, and *Littorina rudis*, very red form, from near Tenby.

By Mr. J. T. Wadsworth: *Arion subfuscus*, light var., from Northenden, Cheshire.

By Mr. Laycock: *Dreissensia polymorpha*, Foss Dyke, Torksey, Lincolnshire.

By Mr. Wm. Whitehead: *Jamiania cylindracea* var. *albina*, and a large series of shells from Tenby.

By Mr. Fred Booth: *Acicula lineata* and var. *alba*; *Acanthinula lamellata* from Grange-over-Sands, to illustrate his note.

By Mr. T. H. Platt: *Unio (Metaptera) delphinus* from Singapore, and *Margaritana complanata* Brs., Ill., U.S.A.

355th (Annual) Meeting, October 20th, 1906.

Dr. G. W. Chaster (president) in the chair.

Donations to the Library announced and thanks voted:

"Uber clado- und holohepatische nudibranchiate Gastropoda," by R. Bergh (*from the author*), and the usual periodicals received in exchange.

Donations to Cabinet announced and thanks voted:

Collection of shells from C. H. Morris, Lewes, Sussex.

Appointment of Auditors.

Messrs. Chas. Oldham and Fred Taylor were appointed Auditors.

Appointment of Scrutineers.

Messrs. C. H. Moore and J. Davy Dean were appointed Scrutineers.

Election of Honorary Member.

On the nomination of the Council the following gentleman was unanimously elected an Honorary Member of the Society:

Mr. H. A. Pilsbry, of the Academy of Natural Sciences, Philadelphia.

New Members Elected.

Cuthbert Freyberg, 27, Hawker Street, Wellington, New Zealand.

A. da Costa Gomez, 427, Lafayette Avenue, Brooklyn, New York.

Y. Hirase, Karasumaru, Kyoto, Japan.

Miss E. J. Letson, Sc.D., Director of Museum, Buffalo Society of Natural Sciences, New York, U.S.A.

R. Murdoch, Wanganui, New Zealand.

T. Sheppard, F.G.S., Municipal Museum, Hull.

Rev. H. Aldwin Soames, Lyncroft, Otford, Sevenoaks.

Geoffrey D. H. Carpenter, B.A. (Oxon), 73, Elsham Road, Kensington, London, W.

Candidate Proposed for Membership.

John T. Winkworth, 290, Burdett Road, London, E.

Resignation.

Major E. F. Becher.

Member Deceased.

J. C. Eccles.

Annual Report and Balance Sheet.

The Annual Report of the Council (see p. 14), and the Treasurer's Report, including the Balance Sheet for 1905 (see vol. 11, p. 316), and the Interim Balance Sheet up to October 13th, 1906 (see p. 16), and the Recorder's Report (see p. 16), were presented and adopted.

Report of the Leeds and London Branches.

The Reports of the Leeds Branch, and of the London Branch for 1905 (see p. 16, 17), were presented and read.

Election of Officers and Council.

The Scrutineers reported that forty-six valid papers had been received, and that all had voted for the entire list as nominated by the Council. The Officers and Council on the list (see p. 2) were therefore declared to be duly elected.

President's Address.

Dr. G. W. Chaster then delivered his Valedictory Address (see p. 20), on

"Species and Varieties,"

on the conclusion of which a cordial vote of thanks was tendered to him on the motion of Mr. Edward Collier, seconded by Mr. F. Booth.

Exhibits.

By Dr. G. W. Chaster: *Buccinum undatum*, a series of specimens shewing range of variation in a single species; *Clausilia bidentata* to illustrate range in colour and form variation in a single species; Sports in *Limnæa peregra*; *L. stagnalis* var. *albida*, a very beautiful form from Lough Ree, co. Roscommon; *Sphaerium lacustre* var. *brochoniana*, Ballindooley Lough, co. Galway, and a white variety of *Pyramidula rupestris*, very trochoid in form, from Inishmore, Aran Islands, and Ross, co. Galway.

By Mr. R. Drummond: Sinistral *Helicella virgata* taken recently at Cleveleys, near Blackpool.

By Mr. Ed. Collier: A fine series of exotic Land Operculates belonging to the genera *Cyclophorus*, *Leptopoma*, *Leucoptychia*, *Megalomastoma*, *Schistoloma*, *Cataulus*, *Pupinella*, *Pupina*, *Choanopoma*, *Cyclotopsis*, *Ctenopoma*, *Adamsiella*, *Otopoma*, and *Cyclostomus*.

By Mr. J. Davy Dean: A series of land and freshwater species from Lancaster and district, including *Zonitoides excavatus*, type, from Gowbarrow Park, Grisedale, near Scorton, and Dolphinholme, near Lancaster; *Helicigona arbustorum* from Kirkby Lonsdale and Burton-in-Kendal; *Hygromia granulata*; *Pomatias elegans* and vars. *ochroleuca* and *violaceus* (De Moulins) from Silverdale; *Azeca tridens* and var. *crystallina* from Kirkby Lonsdale; *Aeroloxus lacustris* var. *albida* from the Lancaster canal; *Planorbis crista* and monst. *scalariforme* from Garstang; and several other species and varieties.

By Mr. B. R. Lucas: A collection of land shells from N. Devon, including *Succinea oblonga* and *Vertigo moulinsiana* from Braunton; *Pyramidula rotundata* var. *alba*, *Helicella barbara*, *H. caperata*, *H. virgata* var. *alba*, *Helicigona lapicida* var. *alba*, *Hygromia rufescens*, *Helix aspersa*, *H. hortensis*, and *Ena obscura*, all from Lynmouth.

By Mr. T. H. Platt: A fine series of North American Unionidæ, with examples of the chief groups into which they are divided.

By Mr. J. M. Williams: A collection of *Olivella*, including many rare species and varieties of this attractive group, which is noted for the brilliancy of polish and variation in marking shewn in most of its members.

By Mr. W. Hy. Heathcote: Sinistral specimens, including, *Helicodonta obvolvata* from Ditcham; *Helix nemoralis* from Bundoran; *H. pomatia*; *H. aspersa* from Bristol; *Limnaea peregra* from near Leeds; and *Buccinum undatum* from the East Coast. Photographs of *Arion ater* var. *alba*, Fern Hill, Grange-over-Sands. *Helicella cantiana* collected as young shells at Bletchley in April last, and fed up. A specimen of *Planorbis corneus* collected in 1904 when $\frac{1}{4}$ -in. across, and since then kept alone in a small tank; last year it deposited infertile ova, but this year the ova were fertile, and a number of the young ones were shewn with the parent, all quite healthy and active.

By the Rev. Canon Horsley: Series of marine shells from lagoons, Cette, France; *Candidula caperata* var. *julva*; *Helix pisana* var. *tenuior*, Tenby; *Helicella virgata* var. *radiata*, Rye; *Helix arbustorum* var. *alpicola*, Wengern Alp, Switzerland; *H. nemoralis* var. *albolabiata* of various banding and colouration; a very beautiful white form of *Limnaea stagnalis* with transparent bands, from River Lea; a curious turreted form of *Planorbis complanatus* from Minster; *Physa heterostropha*, Guide Bridge; *Hydrobia similis*, Belvedere; *Physa fontinalis* from Plumstead, Herne Bay, Shortlands, and near Esher, Erith; *Aplecta hydnorum* from Tenby, Bickley, Ansdale, and Plumstead Marsh; *Physa acuta* from Dundee, Kew Gardens and other localities, also a dextral example bred in St. Peter's Rectory, Walworth, from Kew parents; *Stenogyra octona* from the Tropical Fern House, Kew.

By Mr. R. Standen: (a) Two drawers of *Dreissensia polymorpha* with locality sets from the principal British stations for this species, shewing variation and influence of environment on growth of the shell, also a series of enlarged drawings of the veliger stage of *Dreissensia* (after Korschelt and Heider), by Mrs. J. Wilfrid Jackson. (b) 152 locality sets of the British Vertiginidae, including fine examples of *Vertigo liljeborgi* from Ballinahinch Lough (Jeffreys' historic 1845 locality); *V. angustior* found alive and in beautiful condition at Roundstone, Connemara, during September last. (c) A number of photographs of typical habitats of *Pupa* and *Vertigo*, and photo-micrographs of all the dentate *Vertigines*, by Mr. J. Wilfrid Jackson. (d) Exceptionally beautiful specimens of *Strombus thersites* Gray, from Society Islands (e coll. R. D. Darbishire); *Voluta sophia* Gray, from Thursday Island (e coll. B. R. Lucas); and *Trochophora standeni* Strebel, from Falkland Islands (coll. R. Vallentin). (e) *Glochidia* of *Anodonta cygnea*, with photo-micrographs of same by Mr. J. Wilfrid Jackson; also a fine series of young shells of this *Anodonta*, 6 mm. to 15 mm. across, from canal at Marple, Cheshire, and Dixon's Hole, Caton, near Lancaster. (f) *Pedicularia rubida*, Samoa; *P. elegantissima*, Ile de la Réunion; *P. pacifica*, Kingsmill Islands; *P. sicula*, *in situ* on coral, Hyères, France; *P. californica*, *in situ* on Gorgonia and Allopra (e coll. F. L. Button).

By Mr. J. Wilfrid Jackson: (a) Growth-stages of *Unio pictorum* from the canal at Marple, Cheshire, illustrated by photographs of the habitat. (b) Photo-micrographs of *Vallonia costata* and *V. excentrica*. (c) *Unio margaritifera* from the Lune, at Caton, near Lancaster, with photograph of the habitat. (d) *Helicigona lapicida* from numerous localities. (e) Series of *Paludestrina jenkinsi*, *P. taylori*, *P. confusa*, etc., for comparison with North American, New Zealand, and European *Annicola*, *Hydrobia*, *Bythinella*, *Potamopyrgus*, etc.; also photo-micrographs of newly-hatched fry of *Paludestrina* (? *Annicola*) *taylori* shewing the intorted condition of the apex. (f) Holocene and Pleistocene Mollusca from various localities, including series from Swanscombe, Ilford, Grays, Copford, etc., etc. (coll. A. S. Kennard). *Helix nemoralis* from bone cave, Deep Dale, near Buxton, Derbyshire; *Pomatias elegans*, *Helix nemoralis*, *Helicella itala*, *Hygromia hispida*, etc.,

from brick earths near Rochester, Kent; series of Chara-marl shells from the lacustrine deposit at Hawes Water, Silverdale, Lancashire; *Hygromia rufescens*, *H. hispida*, *Succinea oblonga*, etc., from the deposit at Hale Moss, Westmorland, (all coll. J. W. J.). A very fine series of the large heavy forms of *Helix nemoralis* and *H. aspersa* from the famous deposits at Dog's Bay, Roundstone, Connemara (coll. Mr. R. Standen, September, 1906). *Helix nemoralis*, *Helicella itala*, etc., from Rosapenna dunes and Tranarossan, Ireland (coll. R. Welch).

By Mr. C. E. Wright: *Helix nemoralis* from Inish Mac Dara, Killinure, Maumeen Lough, Dog's Bay, Claregalway, Aranmore, and Drogheda; *H. aspersa* var. *tenuis* and *major* from Roundstone; *Helicella virgata* and var. *alba* (two examples with extended lips) from Dog's Bay; *H. barbara* and var. *alba*, and *H. pisana* var. *alba*, from Drogheda; *H. itali* and varieties from many Irish localities, including a very beautiful form, with the shell rose-pink in colour, from Roundstone.

By Mr. Thos. Edwards: A series of *Helices* from Leicestershire, including *Helix nemoralis* vars. *hyalozonata*, *olivacea*, *bimarginata*, *roseolabiata*, *rubella*, with white band round periphery, and a six-banded form; *H. aspersa* var. *exalbida*; *Helicella virgata*, a series varying from very large to the smallest forms, and *H. itala* var. *lutescens* both from Kent. *Unio tumidus* var. *ponderosa* Pascal, from a pond at Wistow Park, Leicestershire, also *Anodonta cygnea* from the same place.

By the Manchester Museum: (a) Selections from the Townsend collection of Persian Gulf Mollusca, including the fine collection of Cypræidæ, *Conus clytospira* Melv. and Stand., *Pecten townsendi* Melv., *Rostellaria delicatula* Nevill, and many other rare forms. (b) Series of *Acaus*, *Chloræa*, *Corasia*, *Papuina*, *Amphidromus*, *Partula*, *Eucalodium*, *Helicarion*, and *Vitrina*; European locality sets of *Helix nemoralis*, *H. hortensis*, *H. arbustorum*, *H. pisana*, and the section *Pomatia* (e coll. R. D. Darbishire). (c) The fine collection of Tasmanian Marine Mollusca received (per Miss M. Lodder) from the Victoria Museum, Launceston. (d) A small collection of land shells found underneath the foundation walls of the Roman Castrum, Deansgate, Manchester, in 1898, by Mr. Charles Roeder, also some from excavations at Hanging Bridge, near Chetham's College; the shells are in good preservation and interesting historically, as they date back to the first century A.D.

ANNUAL REPORT.

It is with great satisfaction that the Council records the fact that during the past year there has been an increase of twenty-two in the Society's roll of members.

On the date of the last Annual Meeting there were 288 members on the Society's list; between that date and the end of the year six new members were elected, three resigned, and three were struck off the list for the non-payment of their subscriptions, so that the list published on the 1st of January last contains 288 names. Since then twenty-nine new members have been elected, four have resigned, and three have died, leaving on the list at the present time 309 names.

During the past year ten meetings of the Society have been held, from October 21st, 1905, to September 12th, 1906.

The proceedings at these meetings are recorded in our numbers of the *Journal*, containing 126 pages and three plates, as well as the title-page and table of contents to complete the eleventh volume. An index has, as usual, been compiled by the editor.

Among the honorary members the Society has to deplore the loss of its veteran colleague, Mr. Wm. Nelson, of Leeds. He was one of the original founders of the

Society, and or some time a co-editor of the *Journal*, and more than once he filled the Presidential chair. As an appreciative memoir of him has already appeared in our pages, it is unnecessary to say more, but those who took part in the Annual Meeting two years ago, will recall with pleasure tinged with melancholy the presence among us for the last time of his genial personality.

Among the ordinary members Mrs. J. Fitzgerald, Mr. R. C. Chaytor, and Mr. J. C. Eccles have been lost by death, to the regret of their friends and colleagues.

John Christopher Eccles, of Preston, and Ventnor (Isle o. Wight), passed away on October 13th, in his 69th year, after a long and painful illness. Until failing health compelled him to give up the pursuit he was a most ardent and enthusiastic collector of British mollusca, and also a large collector of foreign shells, especially land shells. He also did very good work in the fossil molluscan fauna of the Isle of Wight. He was for many years associated with the Rev. J. Shortt, B A., in the formation of the Free Public Museum in Preston, more especially in the Geological and Natural History branches.

Donations to the Cabinet have been received from Messrs. J. C. Dacie, Bartlet Span, and A. G. Stubbs. Mr. C. H. Morris, of Lewes, has sent a considerable collection of shells, part of which has been placed in the Society's cabinet, part presented to the Manchester Museum, and the remainder distributed by Mr. Morris' desire among the members of the Society.

The Library continues to increase owing to the generosity of various Societies and Academies, which send their publications in exchange for the *Journal*. In addition very acceptable gifts have been received from Miss E. J. Letson, the Marchese di Monterosato, Professor Spiridion Brusina, Dr. W. H. Dall, Dr. H. Strebel, Dr. A. S. Jensen, and Messrs. P. Bartsch, H. Fulton, G. K. Gude, A. Leicester, G. B. Sowerby, and E. W. Swanton.

A very welcome contribution towards the Illustration Fund has been received from Sir Charles Eliot, K.C.M.G.

The Council has much pleasure in reporting that the revision and completion of the Library Catalogue, to which reference was made in the last report, has been carried out by Mrs. J. Wilfrid Jackson (*née* Standen) to whom the best thanks of the Society are due for her zeal and devotion. It is hoped that the printing of the Catalogue may be undertaken at an early date.

Special Exhibits have been held at different meetings of Species of the section *Chloræa* of the genus *Cochlostyla*, white varieties of British Non-Marine Mollusca, and the British species of Vertiginidæ, and have excited considerable interest among the members present.

The Interim Balance Sheet of the Hon. Treasurer and the Report of the Hon. Recorder are appended to this Report, and the Council feels justified in congratulating the members on a year of harmonious and satisfactory work in furtherance of the objects for which the Society exists.

Treasurer's Report.

The statement of Income and Expenditure for the year 1905 was presented and adopted at the meeting held on February 14th, 1906, and is to be found printed on page 316 of Volume 11, hence no good purpose will be saved by repetition here, beyond the fact that there was a balance carried forward of £10 5s. 5d. to the next year's account. In bringing before you the interim statement of accounts from January 1st, 1906, to October 13th inclusive, the Council is pleased to point out that the finances of the Society continue to be found in a very satisfactory condition, there being in hand at the present moment a cash balance of some £21, with outstanding liabilities of about £20.

Statement of Income and Expenditure

From January 1st to October 13th, 1906.

| Receipts. | | | Expenditure. | | |
|-------------------------------|-------|-------|--------------------------------|-------|-------|
| | £ | s. d. | | £ | s. d. |
| Cash in hand Jan. 1, 1906... | 10 | 5 5 | Library Cards | 2 | 8 3 |
| Subscriptions | 54 | 0 0 | Specimen Boxes | 0 | 12 0 |
| Three Life Composition Fees | 9 | 9 0 | Bookbinding... .. | 0 | 16 4 |
| Sale of Publications... | 5 | 9 0 | Advertisement | 0 | 5 6 |
| Donations towards cost of | 1 | 6 0 | Taylor's Monograph, part xi | 0 | 5 3 |
| Illustrations—Sir C. Eliot f. | 1 | 5 0 | Printing Journal for Jan. 1906 | 20 | 4 0 |
| | | | " " Apr. " | 14 | 11 8 |
| | | | " " July " | 11 | 11 8 |
| | | | Reprints | 5 | 9 10 |
| | | | Stationery | 3 | 7 10 |
| | | | Treasurer's Expenses ... | 0 | 16 3 |
| | | | Balance in hand | 21 | 5 10 |
| | <hr/> | | | <hr/> | |
| | £81 | 14 5 | | £81 | 14 5 |

RECORDER'S REPORT.

During the past year 280 new country records have been registered, an increase of 61 over the previous year. In response to the appeal made in last year's report a number of Scottish shells have been submitted for registration, but much remains to be done before even an approximate idea of the distribution in Scotland of many species can be formed. From England, Wales and Ireland many consignments of shells have been examined and a considerable advance in our knowledge of some species has resulted. It is hoped that during the ensuing year other gaps may be filled, and with this end in view the co-operation of every member is invited. For assistance during the past year the Recorder is particularly indebted to Messrs. J. E. Cooper, J. C. Dacie, J. D. Dean, A. Frew, P. H. Grierson, J. W. Jackson, A. Mayfield, J. Roseburgh, E. W. Swanton, J. W. Vaughan, and R. Welch.

Oct. 15, 1906.

CHAS. OLDHAM.

ANNUAL REPORT OF THE LEEDS BRANCH,

For the Year Ending December 9th, 1905.

The President for the year was Mr. A. H. Pawson, J.P., F.L.S., F.G.S., with Messrs. F. Booth and J. E. Crowther as joint Hon. Secretaries. An increase of one member elected, brought the number on the books up to twelve.

Eleven meetings were held during the year, five in the Institute of Science and Art, Leeds, and the Church Institute, Bradford, respectively, and six meetings held in the field, the average attendance of members being six. The enforced absence of Mr. W. Denison Roebuck, F.L.S., who was abroad the whole year, and the President's removal from the district, affected the average, which was very good considering the wide range of places visited in the Summer for the field Meetings, and the difficulty members had in getting there.

In regard to the six meetings held in the field, the first one was held at Salterhebble for an investigation of the Salterhebble Canal. The members on this occasion had the pleasure of adding another locality to the few Yorkshire ones, by securing specimens of *Sphaerium pallidum*.

The second meeting was held at Shipley, for an investigation of the Leeds and Liverpool Canal, between that town and Apperley Bridge.

The third meeting was held at Nostel, near Wakefield.

The fourth was held at Keighley, for visitation to the old river bed, from which *Planorbis umbilicatus* was reported the previous year.

The fifth took the form of an excursion to Cark and Grange-over-Sands, and the sixth and last meeting was held at York, for an inspection of the river Foss.

The important feature of the meetings held in-doors, was the plethora of varied and instructive exhibits by the members, and the consignments of specimens sent by Mr. Roebuck from time to time from abroad, for distribution amongst the members.

The club has been officially represented as usual at the meetings of the Yorkshire Naturalists' Union, and reports on investigations made on these occasions have appeared in *The Naturalist*, the organ of the Union.

Since this report was given, the club has had to mourn the loss through death of one of its oldest and most honoured members, in the person of Mr. W. Nelson, of Crossgates, Leeds, one of the founders of the parent society and honorary member.

F. BOOTH,
J. E. CROWTHER, } *Hon. Secs.*

ANNUAL REPORT OF THE LONDON BRANCH.

Since the last annual report six ordinary meetings of this branch have been held, at which many interesting shells were exhibited.

On March 2nd, 1906, Mr. J. C. Dacie, very kindly entertained the London members, when he showed an extensive series of British *Littorinæ* and other shells.

The usual field meetings were held during the summer. On May 12th we visited High Beech, Epping Forest, and collected *Sphyradium edentulum*, *Acanthinula aculeata*, *Vitrea radiatula* and its var. *viridescens-alba*. The June meeting was on the extreme west border of Middlesex, near Colnbrook and Runemede, thirty-four species of mollusca were noted, the best finds being *Zonitoides nitidus* and fine specimens of *Vivipara contecta*. On July 14th we tried the River Brent, near Hendon, but found nothing worth noting. The August meeting was at Bushey Park, where a fair number of fresh-water mollusca were collected, including *Pisidium subtruncatum*, *P. pusillum*, *P. pulchellum*, *P. henslowianum*, and *P. gassiesianum*, also fine *Sphærium vivicola* from the Thames. A well-attended meeting was held at West Drayton on Sep. 8th; some thirty-six species of mollusca were collected, the most noteworthy being *Zonitoides nitidus*, *Hygromia granulata*, *Eucomulus fulvus* and a faintly-banded form of *Vivipara vivipara*. The last field-meeting of the season was held at Chipstead and has been reported on separately. During the past year the membership of the Branch has increased slightly.

12th Oct., 1906.

J. E. COOPER, *Hon. Sec.*

London Branch.—Report on the Chipstead Field-Meeting, Sept. 29th, 1906.

Owing to the prolonged drought, this ramble, though it took us over some promising ground amongst the beautiful Surrey Downs, did not produce so many interesting finds as might otherwise have been expected. Of *Helix pomatia* only a few dead shells turned up, and only one example of *Acanthinula aculeata* was met with. On a grassy bank near Smitham we found *Asca tridens* with its

var. *crystallina*, also *Cochlicopa lubrica* var. *lubricoides* and var. *hyalina*. Near Chipstead Station a large number of *Helicella caperata* occurred on a stone wall: these included, besides the type, the varieties *alba*, *ornata*, *lutescens* and *fulva*; also some interesting specimens showing a distinct approach to a "*radiata*" form such as occurs in *H. virgata*. A flat strong-ribbed form of *Hygromia hispida* was met with occasionally, and a few each of *Vallonia pulchella* and *V. costata* were taken. The total number of species noted was twenty-four. Nine members were present.

3rd Oct., 1906.

J. E. COOPER, *Hon. Sec.*

356th Meeting, November 14th, 1906.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted:

The usual periodicals received in exchange.

Donations to Cabinet announced and thanks voted:—

By Mr. Thomas Edwards: Specimens of *Unio tumidus* var. *ponderosa* Pascal, from Wistow Park, Leicester.

New Member Elected.

John F. Winkworth, 290, Burdett Road, London, E.

Resignation.

T. A. Appleton.

Names Struck Off.

It was reported that the names of

Mr. J. W. Wild, and the

Rev. C. A. Williamson

had been struck off the list in accordance with Rule 4.

Papers Read.

"A Bibliography of Lancashire Mollusca," by J. Wilfrid Jackson.

"The Land and Freshwater Shells of Morecambe, Lancaster, and District," by J. Davy Dean.

"An Interesting Association of Species of Land Mollusca," by F. B. Jennings.

"Snails in Captivity," by the Rev. A. H. Cooke.

"*Testacella haliotidea* v. *flavescens* Moq.-Tand. in Surrey," by Lionel E. Adams.

"On the Occurrence of *Vertigo pusilla* Müll. in Cheshire," by R. Standen.

"*Unio tumidus* var. *ponderosa* Pascal in Leicestershire," by Thos. Edwards.

"Notes on the Land Mollusca of Grange-over-Sands," by J. W. Baldwin.

"*Helicella barbara* (L.) in Lancashire," by J. Wilfrid Jackson.

"*Ena montana* in Northamptonshire," by the Rev. W. A. Shaw.

"Sinistral *Helicella virgata* in West Sussex," by the Rev. W. A. Shaw.

"*Limnaea glabra* and *Clausilia rolfhii* in Hertfordshire," by Walter G. Poole.

"The Prevention of Corrosion," by L. St. G. Byne.

Exhibits.

By Mr. Lionel E. Adams: Living *Testacella haliotidea* to illustrate his note, and also a specimen of *Milax gagates*.

By Mr. J. D. Dean: A fine series of shells and photographs of localities to illustrate his paper.

By Mr. C. H. Moore: *Helix nemoralis*, *H. hortensis*, *Helicella itala* and *Vitrea lueida* from Tenby; *Pisidium pulchellum* and *P. subtruncatum* from Droylsden; also *Vitrea radiatula* var. *viridescens-alba* and *Vertigo antivertigo* from Shipley Glen, Yorkshire (coll. F. Booth).

By Mr. Walter G. Poole: *Limnaea glabra* and *Clausilia rolphii* to illustrate his note.

By Mr. J. W. Baldwin: A beautifully mounted set of land shells from Grange-over-Sands. Mr. Baldwin gave an interesting account of his collecting experiences at Grange, during August last, when, during a short holiday, he obtained nearly all the species reported from that locality.

By Mr. J. Ray Hardy: *Vertigo pusilla* from Marple, Cheshire, to illustrate Mr. Standen's note.

By Mr. F. Booth: A beautiful series of *Cypraea bregeriana* (Crosse) and its var. *rossiteri* Dautz. from Manac Island, New Caledonia (coll. Brazier, 1903); *Cyp. interrupta* var. *rhinoceros* (Souv.) from Noumea, New Caledonia; and *Cyp. punctata* L., from Loyalty Islands.

Mr. R. Standen showed (on behalf of the Manchester Museum): *Paludestrina jenkinsi* Smith, described by Mr. Edgar A. Smith as having been found in a four-inch main waterpipe in Grummont Road, Peckham, S. London; the shells are beautifully clean, and apparently have thriven well in their unusual habitat. Also *Amnicola panamensis* Tryon and *A. vulcani* Martens, both from Lake Amatitlan, Guatemala, and sent by Mr. A. da Costa Gomez.

A fine selection of the Lewes mollusca, presented to the Society by Mr. C. H. Morris, has been mounted by the Curator, and arranged in the Cabinet, and was exhibited at the meeting. A number of duplicates from this donation were distributed amongst the members present, and were much appreciated.

It was decided to have the following

Special Exhibits at Future Meetings:

January 9—*Planorbis spirorbis* and *P. vortex*.

February 13—*Helicella itala* and *H. caperata*.

March 13—The Genus *Opisthostoma*.

***Vertigo mouliinsiana* in Middlesex.**—I took this *Vertigo* early in August this year, near Colnbrook, within the Middlesex boundary. It was in its usual habitat, a bed of reeds. So far as I know this species has not previously been noted for Middlesex.—J. E. COOPER, 16th August, 1906 (*Read before the Society*, September 12th, 1906).

***Acicula lineata* var. *alba* at Grange-over-Sands, Lancs.**—In August last, along with Mr. F. Rhodes, I paid a short visit to Grange, and spent some little time in Eggerslack Wood prospecting for mollusca. Amongst the many species collected or observed we were fortunate in verifying Messrs. R. Standen's and J. Wilfrid Jackson's records for *Acicula lineata*, of which we secured a dozen examples, along with six specimens of the beautiful var. *alba*, the latter being an addition to the Grange list. The shells were all living, and occurred fairly deep down amongst the leaves and soil. We were also successful in finding some thirty examples of *Acanthinula lamellata* amongst the fallen beech leaves in the wood. This latter find is highly interesting since it confirms Mr. J. W. Jackson's record of October, 1905, when only one specimen was taken (see *J. Conch.*, vol. 11, p. 361, 1906). Mr. Jackson informs me that the colonies of *Acicula lineata* and *Acanthinula lamellata* must be extremely local, since he has heard of the non-success of more than one of our members this summer.—FRED BOOTH (*Read before the Society*, September 12th, 1906).

SPECIES AND VARIATION.

(Presidential Address delivered at the Annual Meeting, October 20th, 1906).

BY DR. G. W. CHASTER.

PERHAPS the greatest difficulty with which a President has to contend in respect of the honourable office he is elected to fill is the choice of a subject for his address. In my case this difficulty has been exceptionally great, for, in the province of natural history which constitutes the speciality of the Conchological Society, my little investigations have been limited to the mollusca of our own country and the neighbouring seas. It is obviously therefore out of the question for me to venture to speak upon purely conchological matters to an audience including students of far greater and wider knowledge than myself. I crave your indulgence, then, if I address to you a few remarks upon a series of matters that form, so to speak, a bye-path of all natural history work. This bye-path is apparently too often untrod, or at most is but casually and superficially passed through, although its thorough investigation is a matter of prime importance to the naturalist.

One has not far to seek in order to discover the reason of this seeming neglect. The naturalist as a rule is far more interested in the objects of his study than in philosophical enquiries: his preferences are for the visible and tangible rather than for the abstract and theoretical. The mountain, the river, and the wood, with their varied forms of life attract him far more than do the study and the bookshelf. Nothing could be farther from my purpose than to underrate the value of these instinctive attractions and feelings. It is through their agency alone that students of nature have been led to investigate the varied forms of living creatures and plants; it is to them that we owe our knowledge of the subject. But we ought at times to pause and reflect upon what Oliver Wendell Holmes called the order of things. We cannot rest content with the mere accumulation of specimens or of facts: our items of knowledge require collation and arrangement, so that we may endeavour to gain some insight into their true significance.

The usefulness of this process is in no way impaired if we find in the end that we are unable to frame rules and formulæ of mathematical exactitude. The mere establishment of the fact that we are dealing with variable and varying quantities is important: the recognition of the fact that precise and explicit terminology is unattainable is a great and real gain. Moreover we may, during our investigations, discover collateral issues of no little interest and importance.

As naturalists we are constantly speaking and writing about species, so that it surely behoves us to gain as clear an idea as possible of what the word really signifies. Let us first consider what ideas have held currency.

We may take Linnæus as the pioneer of all systematic biological work and as the first to recognize in a really comprehensive manner the idea of species from a scientific standpoint. To Linnæus, as in a more or less definite form to his predecessors, a species represented the direct descendants of certain original prototypes that had been produced by special creation. Throughout all the successive generations each species had retained and reproduced its original distinctive characters. This theory of special creation was of course based upon the cosmogonies contained in the first two chapters of Genesis. We do not propose to undertake any laboured consideration of this theoretical idea, which prevailed long after the days of Linnæus.

Let us look at a few definitions of the word that have been given in more recent times. Huxley in the Smithsonian Reports for 1869 defines a species as "the smallest group to which distinctive and invariable characters can be assigned." A very casual examination will show that this definition is valueless. In *Helix nemoralis* L., for example, each "band formula" constitutes a group to which distinctive and invariable characters can be assigned, and yet these groups cannot be looked upon as worthy of more than a minor varietal rank.

In the "Century Dictionary" there is given this definition of the word as used in biology:—"that which is specialized or differentiated recognizably from anything else of the same genus, family, or order; an individual, or collectively, those individuals which differ specifically from the other members of the genus, etc.; and which do not differ from one another in size, shape, colour and so on, beyond the limits of (actual or assumed) variability, as those animals and plants which stand in the direct relationship of parent and offspring, and perpetuate certain inherited characters intact or with that little modification which is due to conditions of environment." I have no intention of taking a definition so prolix as this for a text upon which to base my remarks upon species. But it is worthy of note that even this definition is largely based upon a series of assumptions each of which in certain cases may be found incapable of demonstration. The limits of variability in a species are stated to be actual or assumed. How are we to ascertain these limits if they actually exist, and if they are merely assumed how are we to ensure the reasonableness of the assumption? Again, the members of a species stand in the relationship of parent and offspring according to this definition.

Now it is obviously impossible to do more than postulate theoretically a common origin for all the individual members of a species. The publication of Darwin's "Origin of species" revolutionized our ideas on the subject of phylogeny, and now that the evolutionary theory is universally accepted by biologists we assume a common origin, not merely for the members of a species but for those of genera, families, etc.—perhaps for all organized beings.

The "Standard" Dictionary gives the following:—"A classificatory group of animals or plants subordinate to a genus, and having members that differ among themselves only in minor details of proportion and colour, and are capable of fertile breeding indefinitely." Here again we soon find ourselves in difficulties if we attempt to take the definition seriously. Who is to decide what are major and what are only minor differences? Botanists are in the widest disagreement as to the number of species of our British brambles just because some consider as insignificant differences to which others attach great importance. The "Standard" definition moreover, by stating that species are capable of fertile breeding indefinitely, suggests a resuscitation of the once prevalent idea that the hybrids resulting from the crossing of two distinct species are always sterile, whilst the production of fertile offspring proved that the parents belonged to the same species. When we learn that forms so distant as the ring-dove and the common pigeon have been crossed and produced fertile offspring we shall see that we must either give up any intelligible conception of species or dismiss the claim that hybrids are sterile. This case is by no means unique. There are numberless similar occurrences amongst both plants and animals. The subject of the sterility of some hybrids is too large to be discussed here, but it may be mentioned that it most probably results from what we might term a slight degree of protoplasmic incompatibility between the sexual elements that has been accidentally acquired during a prolonged period of disuse of interfertilization.

There is another conception of species that will be more readily understood if we take an imaginary case. Let us suppose that there were spread out before us all the various forms of the shells of one group—say *Clausilia*. These we imagine to comprise not merely such as have been collected or described, but every form that at present exists, including all the minor, scarcely recognizable modifications. We now proceed to sort out this assemblage of shells into groups, each group consisting of such forms as have uniform characters, or consisting of different forms connected with one another by a complete series of intermediate forms. Each group would be sharply marked off from any other. At first we should perhaps be prepared to assert without hesitation that each

of these groups would constitute a distinct species. Indeed from the purely morphological point of view this method of procedure is less open to objection than any other. It imposes no artificial limits on the degree of variability of a species, it postulates no conditions of ancestry, it makes no demands that are theoretically incapable of demonstration. In actual practice we might of course be liable to make several species out of a single group owing to the failure to obtain the connecting gradation forms.

But quite apart from this possibility we must constantly bear in mind the fact that intermediate gradations may no longer exist between two groups of one species. *Homo sapiens*, the best known and most attentively studied species of all organized beings, affords such an example. In the Inuit or Eskimo race we find a group of human beings quite distinct from any other. Even the affinities of this race are doubtful. If an analogous case occurred in the mollusca there would be no hesitation about recognizing a well marked specific, possibly a generic, distinction. But in the case of mankind I need not enter into any lengthy argument against specific subdivision. Man as a species often supplies admirable data for perfectly sound analogy and comparison when discussing such matters as these.

That within the limits of one species there may be forms sharply marked off from and quite unconnected by intervening gradations with this type need occasion little surprise if we give the matter a few moments' consideration. Were an area of land to be cut off from a continent or were an island to receive one single immigration of a species we should expect that in the course of time the different environmental conditions to which this colony is subjected would result in the production of differences constantly becoming more and more marked. The subject of island faunas is so interesting and so important that it demands more than a mere cursory mention. I cannot do better than quote in abbreviated form some of Darwin's classical observations on the fauna and flora of the Galapagos Islands. As everyone knows it was largely owing to a consideration of the remarkable conditions of animal and plant life he observed on these islands that he eventually produced his epoch-making book the "Origin of Species."

He wrote as follows: "The natural history of these islands is eminently curious . . . Most of the organic productions are aboriginal creations, found nowhere else . . . yet all show a marked relationship with those of America. Considering the small size of the islands we feel the more astonished at the number of their aboriginal beings. Seeing every height crowned with its crater, and the boundaries of most of the lava streams still distinct, we are led to believe that within a period, geologically recent, the unbroken

ocean was here spread out. Hence, both in space and time, we seem to be brought somewhere near to that great fact—that mystery of mysteries—the first appearance of new beings on this earth.

Of terrestrial mammals there is only one which must be considered as indigenous, namely a mouse . . . It belongs . . . to a division of the family of mice characteristic of America. At James Island there is a rat sufficiently distinct from the common kind to have been named, . . . but as it belongs to the old-world division of the family, and as this island has been frequented by ships for the last hundred and fifty years, I can hardly doubt that this rat is merely a variety, produced by the new and peculiar climate, food, and soil, to which it has been subjected.

Of land birds I obtained twenty-six kinds, all peculiar to the group and found nowhere else, with the exception of one lark-like finch from North America. The other twenty-five birds consist first of a hawk, curiously intermediate in structure between a buzzard and the American group of carrion-feeding Polybori . . . two owls . . . a wren . . . three tyrant flycatchers (two of them species of *Pyrocephalus*, one or both of which would be ranked by some ornithologists as only varieties) and a dove—all analagous to, but distinct from, American species. A swallow, which though differing from the *Progne purpurea* of both Americas, only in being rather duller coloured, smaller, and slenderer, is considered by Mr. Gould as specifically distinct . . . three species of mocking thrush—a form highly characteristic of America. The remaining land birds form a most singular group of finches. All the species are peculiar to this archipelago . . . one might fancy that from an original paucity of birds one species had been taken and modified for different ends. In like manner it might be fancied that a bird originally a buzzard had been induced here to undertake the office of carrion feeding.

Of waders and water birds only three are new species, one gull is peculiar, but allied to one from South America."

After describing the reptiles of the archipelago Darwin proceeds to state "the fifteen different kinds of sea-fish which I procured here are all new species. . . . Of land shells I collected sixteen kinds (and two marked varieties), of which with the exception of one *Helix* found at Tahiti, all are peculiar to the archipelago: a single fresh-water shell (*Paludina*) is common to Tahiti and Van Diemen's Land. Mr. Cuming, before our voyage, procured here ninety species of sea-shells, and this does not include several species not yet specifically examined, of *Trochus*, *Turbo*, *Monodonta*, and *Nassa*. He has been kind enough to give me the following results. Of the ninety shells no less than forty-seven unknown elsewhere. Of the forty-

three shells found in other parts of the world, twenty-five inhabit the western coast of America, and of these eight are distinguishable as varieties; the remaining eighteen (including one variety) were found by Mr. Cuning in the Low Archipelago, and some of them at the Philippines."

After an account of the remarkable flora of these islands Darwin summarizes his observations.

"A vast majority of the land animals and more than half of the flowering plants are aboriginal productions. It was most striking to be surrounded by new birds, new reptiles, new shells, new insects, new plants, and yet by innumerable trifling details of structure, and even by the tones of voice and plumage of the birds, to have the temperate plains of Patagonia, or the hot dry deserts of Northern Chile, vividly brought before my eyes. . . .

"I have not yet noticed by far the most remarkable feature in the natural history of this archipelago; it is, that the different islands to a considerable extent are inhabited by different species. I never dreamed that islands, about fifty or sixty miles apart, and most of them in sight of each other, formed of precisely the same rocks, placed under a quite similar climate, rising to a nearly equal height would have been differently tenanted; but . . . this is the case . . . in James Island, of the thirty-eight Galapageian plants, or those found in no other part of the world, thirty are exclusively confined to this island; and in Albemarle Island, of the twenty-six aboriginal Galapageian plants, twenty-two are confined to this one island . . . it is the circumstance that several of these islands possess their own species of the tortoise, mocking-thrush, finches, and numerous plants, these species having the same general habits, occupying analogous situations, and obviously filling the same place in the natural economy of this archipelago, that strikes me with wonder."

Well might Darwin wonder, for we must not forget that at the time when these observations were made by him, the only explanation of these distinct forms on these geologically recent islands was the supposition that they had been specially created. As we all know the wonder excited by these phenomena bore good fruit. After years of thought, observation, and experiment, he was able to revolutionize all our ideas so that now we confidently assume that these very distinct forms have descended from immigrants and have in course of time acquired new characters which distinguish them from the parental stock of the continent. Now I have quoted portions of this remarkable chapter of the "Naturalist's Voyage round the World" in order to clearly exhibit the problem which confronts us. The problem is—Why do we call these forms distinct

species? If we read over Darwin's remarks carefully we find that in several instances he is doubtful about the specific distinction of some forms that had been separated by specialists and that he points out in other cases that the differences are varietal. He was so struck by the resemblance to the continental types that he evidently thought it advisable for this resemblance to be recognized by a varietal appellation only.

Let me give a simple illustration of the difficulty. Lundy Island has two beetles peculiar to its small area and found nowhere else. These differ from their English congeners mainly in colour; in the one case it is the colour of the legs that is distinctive and in the other that of the wing-covers or elytra. One is accounted a species and the other a variety, although no valid reason can be given for the differentiation. At first it might be thought that minor differences should be considered varietal and more strongly marked ones specific in their value. But minor and major are at best merely comparative and who will be able to settle what are major and what minor in a particular case?

As an illustration of the great range of variation that may occur in a single species, I here exhibit a few forms of the common whelk, *Buccinum undatum* L., all of them adult specimens. These show great variation in every character of the shell, except the spiral striation. Size, thickness of the shell, strength of the longitudinal ribs, and proportionate length of the spire all show a far greater degree of variation than would often be observed between different species. And yet they are not in any way abnormal specimens, but average examples of well known racial varieties that occur in the comparatively small area of British waters. Many of us remember how in this room the Rev. Canon Norman exhibited his fine collection of *Buccina* and how, after pointing out one after another of several so-called species, he said "They are all one." The more we study the known variation of certain species the more hopeless do we find it to assign definite limits to the range of possible variation. Consequently we cannot say that two forms belong to separate species because they are unlike.

Selected series of *Clausilia bidentata* are also exhibited to illustrate the fact that in this species there is not even one constant character. Size, shape, texture, colour, number of whorls, sculpture, and the plication of the mouth all show great variability.

There is yet another fact to be considered and again we will take an exemplary case. Two of our British Mactræ, *Spisula solida* and *S. elliptica* usually inhabit different zones and are quite distinct, the first living on the shore or in very shallow water and the second being found in deeper water. No intermediate forms are ordinarily

found. But in some localities, *vide* Gwyn Jeffreys, all intermediate forms occur. Here we are confronted by a new problem :—Are we to rank these two mollusks as species or as varieties? Perhaps the simplest and most accurate answer is to say that they are two species usually but in certain localities a species and a variety only. Such apparent paradoxes must of necessity occur if we are to attempt to be absolutely accurate. In the study of the living beings that surround us we are dealing with objects that are constantly undergoing change; what to-day is a mere trifling variety may in the course of time become more and more strongly characterised, whilst the type form remains more or less stationary or alters in quite another direction. Obviously it is impossible to say with precision that the exact stage has been reached when two forms become worthy of separation. No two observers would ever agree upon all cases. The most accurate meteorologist could never say of a changing cloud that at one second it was cirrus and the next cumulus. Even if he adopts the intermediate cirro-cumulus accurate delimitation is rendered no more easy.

Nature never works by processes capable of complete expression in the arbitrary standards we set up. And all our standards are arbitrary. We have no knowledge of an absolute zero of temperature. Atomic weights are only comparative. Our units of weights and measures are purely arbitrary, and so on. And we must perforce recognize the fact that the term species is one which is capable neither of exact definition nor of exact application.

It is merely the name we give to a group of animals or plants which is sufficiently different from other groups as to be worthy of a separate designation by which we may refer to that group. It is a term of convenience to facilitate the interchange of ideas between workers.

Hence we must recognize the fact that different students will never agree upon the vexed subject of the validity of specific distinctions; one will be impressed by the marked differences between two forms; another, having made a series of different observations, will be struck by the occurrence of connecting links that make him uncertain as to whether he can effect a reasonable separation. Consequently we are always being impressed by the diversity that is observable in the valuation of the term species by different students or schools of students of the same group. We constantly refer to the hair-splitting propensities of our Continental co-workers. They in turn will doubtless consider that we are in a measure unobservant and fail to recognize differences unless they are very conspicuous. It cannot be said that one is right and the other wrong, each is acting in perfect accordance with his standard ideas: the only point that is

open to discussion is which standard affords the greatest opportunities for advantageous practical work. On the one hand there is the danger of losing sight of the close relationship existing between a number of forms by placing them separately as species amongst other and heterogeneous forms, whilst by grouping them as varieties of a single species we adopt a more cumbersome nomenclature.

Before leaving the subject of species I may point out that a very artificial system of separating species by adopting a wholly arbitrary standard was suggested by Edward Forbes and resuscitated by Bourguignat. It is that forms having constantly distinct characters are to be considered distinct, specifically provided that these distinct characters are not less than three in number. The folly of such a system was pointed out by Jeffreys, who commented on it as follows:—"it is notorious that the relative value and constancy of these characters have yet to be determined, and that there is no standard of reference by which naturalists can be guided in adjudging some forms to be species and others to be varieties in different genera."

I have incidentally referred to variation, and the time has now come for me to define a variety. A variety is a group of individuals which differs from the typical or normal form in more or less distinct characters which are transmissible to the offspring. These distinctive characters often though not invariably merge by insensible gradations into those of the type or of another variety: but sometimes the varietal form is found only in some special locality, where the type does not occur. When varieties are quite local and well marked they constitute a race or sub-species.

It is very necessary to emphasize the fact that variation affects not only the shells of mollusca but the soft parts as well. Year by year we are gaining a greater knowledge of the variation in the number and arrangement of the radular teeth. Consequently the mere fact that a certain amount of difference is observed in the anatomy of two forms by no means warrants any assumption that the two forms are specifically distinct. In addition to varieties proper there are several kinds of departure from the typical form that require mention.

Monstrosity is a term generally applied in a very loose way by conchologists, although the term has really a very definite significance. A monstrous form is one in which the characteristic peculiarity always appears during the embryonic stages of existence, and which is due to an altogether extraordinary or perverted course taken during the developmental processes. Reversion of the normal direction of the spiral growth in gastropods is of course the best known example. In early embryonic life the parts are bilaterally

symmetrical so that, were the embryo divided along the middle line, the two halves would correspond perfectly with one another. As growth advances however, certain organs tend to pass more and more to one side whilst others fall to the opposite side, so that they may be adapted to the spiral arrangement. In the course of generations it comes to pass that the process takes a definite course in each species so that the resulting shell is normally dextral or sinistral. Occasionally, however, a lapse occurs and a reversed specimen results.

There are numerous monstrosities recorded in which the soft parts are the ones presenting the abnormality. Jeffreys¹ states that Mr. Duprey found in Jersey a *Littorina obtusata* which had three tentacles and three eyes. The middle tentacle was bifid; and the eye belonging to it was double and presented two small points in juxtaposition. The other eyes were simple or regular.

Albinism is a condition dependent upon an innate inability of the animal to produce pigment. In conchology it must be borne in mind that the lack of colour in the shell is no more evidence of albinism than is the white skin of a European. In the true albino the normal colouring of the animal is absent, even the eyes being colourless. Several years ago I discovered a large colony of *Acme lineata* near Penmaenpool in Merionethshire, all the individuals of which were true albinos, none of the animals showing any trace of colour except in the liver, the colour of which belongs to a different class from that of a pigment inasmuch as it has not been produced for the sake of its colour but is dependent on and associated with the functions of a gland.

Atavistic reversion or the sudden re-appearance of a character which was possessed formerly by the species, but which has long been lost, is an occurrence that is so well known and so frequently observed in other groups that we may very safely assume that it occurs in the mollusca.

Individual abnormalities or sports—as they are called by gardeners—are remarkable forms that occur sporadically. The cause of their occurrence seems to be altogether unknown and inexplicable. Scalariform shells belong to this category. I have brought three specimens of *Limnæa peregra* which were all taken one summer in a small pond amongst the Birkdale sandhills. These serve to illustrate admirably different examples of these wild growing forms. Had they been captured in some little known country each might have been considered the type of some new species or genus, new species which would very likely remain for all time

represented each by a unique specimen. These sports really possess very little scientific interest in the present state of our knowledge. They are mere curiosities.

In some groups of animals and plants there exists yet another kind of abnormal forms—dimorphs. Individuals of the same species are found occurring in two forms, often very unlike each other. These are quite constant and no intermediate gradations occur; they pair together and produce both forms as their progeny. In the mollusca the banded and bandless forms of many land shells may be considered as a not very strongly marked form of dimorphism or polymorphism. I know of no more characteristic example, but the possibility of the occurrence of such must be borne in mind.

The various deviations from the normal that are produced by direct injury or by disease are worthy of mention. These we may perhaps call pathological. In the case of some long, slender shells the apex has so frequently and for so many generations been subjected to injury, that at length the species has acquired the habit of making preparation for it. In *Turritella* for example the apical one-fourth or so of the shell will be found to be unoccupied by the animal which has shut off the upper whorls by a series of successive septa occurring about every half-turn. In *Truncatella* and other forms the process is carried still further, for before the septum is made the shell about to be vacated is so thinned that it is soon broken off and the adult is always decollated.

Having now briefly considered the various groups under which may be classed the different modifications that are to be found within the limits of a species, there remain only a few practical points to be discussed.

A very important matter is the establishment of new species. A shell brought from some little known region, if only it shows some slight difference from forms already described is generally far too hastily assumed to be specifically distinct. I think that anyone who has carefully followed my remarks upon aberrant forms will see that it must always be a somewhat doubtfully justifiable proceeding to establish a species upon a single specimen. Even if a number of specimens showing constant characters are obtained, whenever these show a pretty close relationship to a known species from a neighbouring region, the probability is strong that it will prove ultimately to be only varietally separable. Each year our already heavily burdened lists are being increased by the addition of hundreds of so-called new species, many, perhaps most of which are stated to resemble other already known species. Although I have before stated that each writer must be allowed to have and to hold his own standard of the meaning and significance of the word species it by no means follows

that I agree with the process of multiplying species, that seems to be going on. Its disadvantages will be evident if I narrate an experience of my own. Some years ago I was so fortunate as to receive a considerable number of bags containing dredgings and anchor mud from many parts of the Mediterranean, Adriatic, and Ægean seas. Amongst the small mollusca obtained from these were thousands of specimens of *Turbonilla* of the *T. lactea* group. In sorting out this assemblage of shells it was at first quite easy to select specimens which agreed perfectly with typical examples of named species. But very soon this became increasingly difficult: a specimen would turn up which closely resembled some species, whilst presenting indications of a character not possessed by that species but by some other. There was always a great residuum of shells that it was utterly impossible to allocate. I may add that the Marquis of Monterosato, the greatest authority on the Mediterranean mollusca, once sent me a number of shells of the same group with a letter asking me to attempt to separate them into species. In such a group as this which we find widely distributed and very variable the logical or most scientific procedure seems to be to treat it as a species with a number of varieties. The varieties need not be very closely and rigidly limited. We thus permit of a separation and division of specimens sufficiently accurate for practical purposes. If we keep to a partition into species we can scarcely call a shell *Turbonilla acutissima* which might almost as well be classed with *T. delicatula*. But if we class all as *T. lactea* and note how, as we extend the area of our observations, the shell shows signs of varietal modification in different ways, we are gaining an insight into the influence of environmental conditions, which is of distinct value.

I open a book almost at random and find such a remark as this upon the distinctive characters of a new species of *Succinea*:—“Allied to *S.* — and *S.* —. From the latter it is quite recognizable, being of a warmer colour and less produced spire.” Or, again, concerning a new *Clausilia* we read:—“The single specimen is not in very good condition. It is a somewhat more slender shell than *C.* — and is noteworthy for its contracted and elongate mouth, which has quite a different appearance. The plicæ palatales in this species too, are more nearly equal than in *C.* — in which the first is much the largest. The specimen was picked out from amongst a number of *C.* —” Now I do not desire to mention the author’s names, for our literature is being flooded with just such descriptions. Nor do I dispute the possibility of these forms eventually proving good species. What I wish to emphasize is that no pains have apparently been taken to learn the range of variability of the forms from which these novelties

have been separated, and that there is no jot of evidence that they are more than varieties or in the last case perhaps a "sport." I have no hesitation in saying that, were the British Islands casually visited and batches of mollusca collected haphazard here and there, our molluscan fauna would have its species multiplied almost indefinitely if similar laxity prevailed.

The last matter I wish to urge is the need for systematic breeding in the case of species doubtfully distinct. The answer to the question—How many British species of *Vallonia* are there?—will I think be found in the results of carefully arranged experiment in breeding. If the various forms are bred separately and if successful crossings are secured we shall be far better able to state whether these forms are species or not.

I have only attempted to outline the main features of a subject full of interest and if I have succeeded in making clearer the intricacies of a difficult matter my object has been fully attained.



The Prevention of Corrosion.—In reply to Mr. Lucas I must state that the extensive use of corrosive sublimate in surgery as a sterilizer led me to suggest immersion in a solution of this substance as a remedy in preventing corrosion. In the paper of this title I have withdrawn this treatment in favour of the rubbing over of the surface of a shell with linseed oil. If a shell like *Ovula ovum* be not well washed beforehand then any dirt will show up.—L. ST. G. BYNE, Bournemouth, 14th October, 1906 (*Read before the Society*, November 14th, 1906).



An interesting Association of Species of Land Mollusca.—What I venture to think is a somewhat unusual association of land shells came under my notice recently while collecting near Woodford, Northamptonshire, with my friends, Messrs. C. E. Wright and W. C. Cattell, of Kettering, who drew my attention to it. In the particular spot I refer to, the limestone formation comes down almost to the edge of the river Nene, and on the sloping river bank are to be found flourishing colonies of *Helicella virgata* and its var. *lutescens*, *H. itala*, and *H. caperata*, all forms typical of dry places, living in company with the damp-loving *Helicigona arbustorum*, of which species, and *Helix nemoralis*, there are also large colonies on the bank, while on the reeds at its foot is *Succinea putris*. I do not remember having seen any previous record of *H. virgata* or its allies living with *H. arbustorum*. I may add that amongst the *H. itala* I found two specimens of the scarce var. *hyalozonata*, a form which Mr. Wright had previously met with there, but only in small numbers.—F. B. JENNINGS, 10th September, 1906 (*Read before the Society*, November 14th, 1906).



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THE
JOURNAL
 OF
CONCHOLOGY.

*BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
 OF GREAT BRITAIN AND IRELAND.*

PUBLISHED QUARTERLY.

HON. SECRETARY:
 W. E. HOYLE, M.A., D.Sc.,
 THE UNIVERSITY,
 MANCHESTER.

HON. TREASURER:
 E. D. BOSTOCK,
 HOLLY HOUSE,
 STONE, STAFFS.

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THE
JOURNAL OF CONCHOLOGY.

VOL. 12.

APRIL, 1907.

No. 2.

LATIRUS FUNEBRIS n.sp. FROM THE WEST INDIES.

By H. B. PRESTON, F.Z.S.

(Read before the Society, February 13th, 1907).

SHELL elongately fusiform ; dark purplish brown ; remaining whorls seven, slightly rounded, sculptured with closely-set transverse ribs, intersected by spiral grooves, giving the shell a cancellate appearance ; sutures impressed ; outer lip serrated by the termination of the spiral grooves ; aperture oval ; columella two-plaited ; canal moderately short.



Alt., 15 mm. ; diam. maj., 5 mm. Aperture, alt. 4 mm. ; diam., 2.25 mm.

Hab., West Indies.

Allied to *L. cayohuesonicus* Sow.,¹ from Florida, but differs from that species in its less pyramidal form and in the transverse ribs, which are much more numerous and finer than is the case with *L. cayohuesonicus*.

¹ *Proc. Zool. Soc.*, 1878, p. 796, pl. xlviii., f. 4, and *Mem. Manchester Soc.*, (4), vol. 4, p. 404, 1891.

THE LAND AND FRESHWATER SHELLS OF MORECAMBE,
LANCASTER, AND DISTRICT.

By J. DAVY DEAN.

(Read before the Society, November 14, 1906).

ALTHOUGH much has been written from time to time in the pages of the *Journal* concerning many of the species of mollusca to be found in the district, I venture to hope that the following notes and list will be of interest to collectors.

The distribution of the land shells is largely affected by the nature of the rock formation. Morecambe is built, partly on the alluvial deposits, and partly on the sandstones that appear at several points along the coast. Lancaster, the fertile districts to the south, and the villages mentioned in the Lune valley, largely owe the wealth of their agricultural products to the presence of a rich subsoil overlying the millstone grits and shales. "Lancaster stone" has been used almost exclusively on the buildings of the old town and neighbourhood.

The carboniferous limestone lies to the north, about six miles away, and the county boundary of Lancashire and Westmorland follows a line cutting through the richest part of the limestone district. A small triangular portion is in Lancashire West (v.c. 60), another portion is in Lancashire Furness, and a third and larger portion in Westmorland. The Furness section, having been assigned by the authorities to Westmorland, it will be seen at once where many of the rarer species, given in the West Lancashire List, are to be found. As this limestone area is so rich in land species, it will be as well to define it more exactly. It includes Grange-over-Sands, Arnside, Silverdale, the Yealands, Warton, Burton-in-Kendal, Milnthorpe, and intermediate villages. Grange is separated from the other districts by the broad estuary of the Kent. Mr. Standen's records for this locality are now well known, and the repetition of them in the following pages may seem to some superfluous; but while this may be so, it is necessary, in order to preserve a complete sequence, to consider the district as a whole.

Kirkby Lonsdale can perhaps be looked upon as a connecting link with Ingleton and the Craven Highlands, and here there is a somewhat isolated outcrop of limestone. Through this the river Lune has cut a narrow defile, which is spanned by the well-known Devil's Bridge. This is the only locality for *Azeca tridens* and one of the few for *Vertigo alpestris*.

To return to the Lancaster area: To the east of the county town are the Wyresdale and Littledale Fells. These desolate moors, covered with gorse and heather, must form a very definite barrier to dispersal. Five species only have been taken at altitudes of about

500 feet, but these are always in the wooded hollows between the moors. These are *Vitrea cellaria*, *V. alliaria*, *V. nitidula*, *Zonitoides excavatus*, and *Pyramidula rotundata*. The district is extremely bad to work, and some of the likely localities difficult of access. Dolphinholme Bottom is a nearer locality where these five and one or two other species occur together, and is fairly typical also. As a parallel instance, I may mention that close to the famous Aira Force in Gowbarrow Park, Ulleswater, Cumberland, the same five species occur together.

It follows, from the nature of limestone, that there is little to be got in the way of freshwater collecting, except at Haweswater Tarn at Silverdale. I should mention also Hale Moss as the habitat of some exceedingly fine *Succinea oblonga*, and I should like further to add that at both these localities are to be seen the Chara Marl deposits already mentioned in the pages of this *Journal*. For freshwater species there is no finer locality anywhere than the canal, especially at the aqueduct or at Deep-Cutting near Lancaster. Specimens of certain species are to be obtained at these two places, in the early months of the year, which are finer than those found anywhere else in the district.

I have given in the subjoined list in many instances the month of the year during which mature specimens are best obtained. Those taken later have, in several cases, proved to be smaller and more stunted than the earlier-matured specimens.

I have very great pleasure in tendering my best thanks to Messrs. A. S. Kennard, F.G.S., Robert Standen, H. Beeston, J. Wilfrid Jackson, C. H. Moore, and others, for the very kind assistance I have received during the preparation of these notes. To Mr. Kennard I am very much indebted for allowing me to make use of his information in regard to *Hygromia sericea*, and for his efforts which have led to the right identification of the Hale Moss *Succineæ*. I am also much obliged to Mr. Standen for allowing the insertion of the Grange and Caton records, which carry his initials; and also to Mr. Jackson for the identification of several of the slugs, and for many localities.

Limax maximus L.—Eggerslack Wood, Grange-over-Sands (J.W.J.), 1905.

L. arborum Bouchard-Chantereaux.—Several examples of this slug noted. Dolphinholme Bottom; Lancaster; Arnside (H. Beeston); Eggerslack Wood, Grange (J.W.J.), 1903.

Agriolimax agrestis L.—Occurs in great abundance throughout the district; profuse along the canal margins. Wyresdale; Quernmore; Lancaster; Caton; Warton; Silverdale (J.W.J.);

Burton-in-Kendal; Arnside; Grange-over-Sands (R.S.); Kirkby Lonsdale; Higher Newton; and the district to the north of Grange.

var. **albida** Picard.—Torrisholme near Morecambe (H. Beeston), 1905.

A. lævis Müller.—Frequent along the canal margins near Lancaster; noted also for Gallows Clough near Abbeystead, Lower Wyresdale.

Vitrina pellucida Müller.—Well distributed throughout the district. Quernmore; Lancaster; Caton (R.S.), 1887; the Yealands; Silverdale; Grange-over-Sands (R.S.), 1897; Holker (C. H. Moore), 1903; Higher Newton; Kirkby Lonsdale, etc. The best specimens, though not as a rule very large, may be taken during the winter months.

Vitrea crystallina Müller.—Apparently well distributed. Lancaster (David Dyson), 1850; Wyresdale; Warton, to the west of Warton Crag; Burton-in-Kendal; Silverdale (J. W. J.), 1904; Grange-over-Sands (R.S.), 1897.

Vitrea lucida Draparnaud.—Grange-over-Sands (J. Wilfrid Jackson), 1903. If reference is made to Mr. Jackson's recent note it will be seen that there is some doubt as to whether this species is indigenous or not (*J. of Conch.*, vol. 11, p. 361).

V. cellaria Müller.—Abundant throughout the district. Wyresdale; Lancaster; Caton; Warton; the Yealands; Kirkby Lonsdale; Grange-over-Sands (R.S.), 1887; etc.

var. **albina** Moquin-Tandon.—Kirkby Lonsdale, near the Devil's Bridge.

V. rogersi B. B. Woodward.—Woodwell, Silverdale (R.S.), 1905.

V. alliardia Miller.—Abundant throughout the district. Wyresdale; Lancaster; Warton; Burton-in-Kendal; Silverdale; Grange-over-Sands.

var. **viridula** Jeffreys.—Grange-over-Sands, and Woodwell, Silverdale (R.S.).

V. nitidula Draparnaud.—Abundant throughout the district. Wyresdale; Lancaster (David Dyson), 1850; Caton (R.S.), 1887; Warton; the Yealands; Grange-over-Sands (R.S.), 1897; Higher Newton; Holker (C. H. Moore); Kirkby Lonsdale; etc.

var. **nitens** Michaud.—Woodwell, Silverdale (R.S.), 1905.

var. **helmi** Alder.—Woodwell, Silverdale (R.S.), 1905.

V. pura Alder.—Occurs sparingly and is apparently local. Woodwell, Silverdale (R.S.), 1905; Grange-over-Sands (R.S.), 1897.

var. **nitidosa** Gray.—This is the more frequent form. Silverdale; Grange; Lancaster, in the vicinity of the canal; Caton.

V. radiatula Alder.—Occurs sparingly and is somewhat local. Lancaster, along the canal margins; Warton; Silverdale; Arnside Knott.

Zonitoides nitidus Müller.—Frequent along the canal margins north and south of Lancaster. Specimens taken in the summer months are usually immature; this, however, may be said of most of the Zonitidæ.

Z. excavatus Bean.—A decidedly local and scarce species. Caton, near Lancaster (R.S.), 1887; Dolphinholme Bottom in Lower Wyresdale; Scorton, near the Grizedale Brook, alt. 400 feet. These three habitats are all similar in character and may be worthy of a brief description. The defile through which the river or stream flows at these points is somewhat precipitous and well wooded. The shells are under the mossy stones, and at the roots of the male fern, where this plant occurs. The Dolphinholme and Scorton localities are in immediate proximity to the moors mentioned in the preface.

Euconulus fulvus Müller.—Well distributed throughout the district. Wyresdale; Lancaster; Caton (R.S.), 1887; Silverdale; Grange-over-Sands (R.S.), 1897; Higher Newton; etc.

Arion ater L.—The typical form is exceedingly common throughout the district. One or two outlying stations need only be mentioned.—Dolphinholme; Abbeystead; Kirkby Lonsdale; Hampsfell Hospice, Grange-over-Sands, alt. 727 feet; Higher Newton.

var. **alba** L.—White Scar, Haweswater, Silverdale (J.W.J.), 1904; Eggerslack Wood, Grange-over-Sands.

var. **succinea** Müller.

sub-var. **aurantia** (*vide* Taylor's "Monograph").—Arnside (H. Beeston), 1906.

A. intermedius Normand [= *minimus* Simroth].—In flower of *Oxalis* near Gibraltar, Silverdale; Eggerslack Wood, Grange (both records J.W.J.), 1905.

A. hortensis Férussac.—Apparently well distributed, and very abundant in some localities. Wyresdale; Dolphinholme; Lancaster, common on the canal margins; Grange-over-Sands (R.S.), 1897; Silverdale; Arnside. In the autumn, numbers of these slugs will be found on the underside of decaying sycamore leaves; Mr. H. Beeston, of Havant, drew my attention to this last August.

A. fasciatus Nilsson [= *bourguignati* Mabille].—Grange-over-Sands (R.S.), 1897 (*Arion circumscriptus*).

Punctum pygmæum Draparnaud.—Appears to be generally distributed, but is somewhat local. Lancaster (David Dyson), 1850; Caton and Brookhouse; the Yealands; Silverdale (J.W.J.), 1904; Grange-over-Sands (R.S.), 1897. Odd specimens only in some localities, probably overlooked on account of its small size.

Sphyradium edentulum Draparnaud.—Very local on the millstone. The Lancaster localities are Deep-Cutting Woods (J. W. Jackson), 1903; the Williamson Park, under laurel leaves. It is plentiful at the Yealands and Silverdale; Grange-over-Sands (R.S.), 1897.

var. **columella** E. von Martens.—Silverdale (J.W.J.), 1904; Lancaster, at Deep-Cutting.

Pyramidula rupestris Draparnaud.—This species is exceedingly common in the limestone district. Warton; the Yealands; Arnside; Kirkby Lonsdale; Grange-over-Sands (Jackson and Moore) 1903, etc. There is a large colony at Bolton-le-Sands on a limestone wall near the village, and also at other points where the limestone appears. In the millstone district there are several isolated colonies two of which have been obviously introduced through human agency: Limestone wall at Aldcliffe Hall, Lancaster; ornamental limestone gateway to "Under Crofts," near Dolphinholme; millstone wall at Stodday, near Lancaster; Ashton Hall, near Lancaster, one specimen on millstone; Caton (R.S.), 1887.

P. rotundata Müller.—Among the *Helicidae*, this species has the widest range, penetrating much further into the moorland districts east of Lancaster than *rufescens*. Abbeystead; Wyresdale; Grizedale; Lancaster and district; the Kelletts; the Yealands; Arnside; Kirkby Lonsdale; Grange-over-Sands (var. *turtoni*, R.S.); Higher Newton, etc.

Helicella itala L.—An isolated colony occurs to the east of Silverdale at Bank Well. Also at Warton Crag, and shore cliffs near Silverdale (J.W.J.).

H. caperata Montagu.—Local, but mostly abundant where it occurs. The largest specimens are to be taken at Yealand Conyers, and between that village and Borwick. The Lancaster specimens have often two narrow bands above the peripheral band; this locality is at Scale Hall on the Morecambe Road. Other localities are Silverdale Cove; at the top of Arnside Knott (J.W.J.); Windy Scout Brow, near Warton (J.W.J.); Grange-over-Sands, Windermere Road and Holme Island (Jackson and Moore).

var. **ornata** Picard.—Only at Grange-over-Sands.

var. **subscalaris** Jeffreys.—A few distinct specimens at the Lancaster locality.

Hygromia fusca Montagu.—Arnside Knott, south side (R.S.), 1905.

H. granulata Alder.—There are large colonies of this species throughout the limestone area. Warton, at the base of the crag; Silverdale, on the Arnside Road and at Woodwell (R.S.); Grange-

over-Sands (R.S.), 1897 ; Kirkby Lonsdale ; and also at the aqueduct and along the canal margins at Aldcliffe, Lancaster.

H. sericea Draparnaud (*non* Jeffreys).—

By the courtesy and on the authority of Mr. A. S. Kennard, F.G.S., I am able here to state that many of the records for the district of *Helix hispida* L. var. *hispidosa* Mousson [= *H. hispida* Jeffreys] should, beyond doubt, be referred to this species. This will seem to some a somewhat premature statement to make, but until Mr. Kennard's notes on his investigations see the light I trust that the above will be allowed to stand for the time being in deference to the authority. Lancaster ; Warton. (Specimens determined by A.S.K.). Common in the Silverdale district.

(?) **H. hispida** L.—The above remarks, of course, affect this species. "*Helix hispida* and var. *hispidosa*" has been a frequent record for the district. Mr. Kennard says : "The true *hispida* is the shell that used to be called *concinna*."

H. rufescens Pennant. — Exceedingly abundant everywhere throughout the district. Lancaster (David Dyson, 1850) ; Lower Wyresdale ; the Yealands ; Arnside ; Grange-over-Sands ; Staveley to Newby Bridge ; etc.

var. **rubens** Moquin-Tandon.—Common everywhere with the type.

var. **alba** Moquin-Tandon.—Scarce. Odd specimens at Lancaster ; Kirkby Lonsdale ; Warton ; Grange-over-Sands.

FOSSIL at Hale Moss, Burton-in-Kendal.

Acanthinula aculeata Müller.—Lancaster (David Dyson) 1850. This record has acted as an incentive to diligent search, but nothing has come of such. A later record is Deep-Cutting (J. W. Jackson, one specimen), 1903. Common in the limestone area ; Warton ; the Yealands ; Silverdale ; Grange-over-Sands (R.S.).

A. lamellata Jeffreys.—Grange-over-Sands (J. W. Jackson), 1905. See *Journ. of Conch.*, vol. 11, p. 361. A later record is—About thirty specimens, among leaves, in the Eggerslack Wood (F. Booth), 1906.

Vallonia costata Müller.—Distributed throughout the limestone district on mossy stones or on the top of walls ; generally under trees. Grange-over-Sands (Jackson and Moore), 1903 ; Arnside ; Milnthorpe ; the Yealands ; etc. ; and south as far as Warton Crag.

V. excentrica Sterki.—Occurs generally at the base of a wall or under stones lying among grass. Not confined to the limestone area. Cockersand Abbey ; Lancaster, west of the town ; Bolton-le-Sands ; Yealand Conyers ; Silverdale (R.S.) ; Arnside Park ; Grange-over-Sands (R.S.).

Helicigona arbustorum L.—Local, and by no means common. The general form is a small dark conical shell with an indistinct band. Caton, or rather, the old village Brookhouse, a lane near the church; at intervals to Claughton; Hornby (G. Roberts, *Journ. of Conch.*, vol. 3, p. 255); Bolton-le-Sands (H. Beeston); Hale Moss, Burton-in-Kendal; Woodwell, Silverdale (R.S.); Grange-over-Sands (J.W.J.).

var. **flavescens** Moquin-Tandon.—Bolton-le-Sands; Hale Moss, Burton.

var. **fusca** Férussac.—Kirkby Lonsdale (E. Collier), 1888. The type occurs near the Devil's Bridge, and this variety on the waste ground near the Lune.

Helix aspersa Müller.—Well distributed, but somewhat local. The general type is a dark shell, approaching in some cases to *nigrescens*, but more often to *albo-fasciata* or *flammea*. Hibernation continues to the end of April or the beginning of May. On May 3rd this year the thermometer dropped to 51 deg., and on May 5th rose to 61 deg. On May 7th seventy snails were counted at the base of a wall near Hest Bank, and all were engaged in copulation with the exception of a few with an unformed lip. Many had the remains of the freshly-broken epiphragm attached to the shells. Lancaster; Bolton-le Sands; Caton; Warton; Silverdale; Arnside; Grange-over-Sands (R.S.); etc.

var. **undulata** Moquin-Tandon.—A few typical specimens at Scotforth, Lancaster.

var. **flammea** Picard.—One finely-marked shell at Deep-Cutting, Lancaster.

var. **albo-fasciata** Jeffreys.—Torrisholme, Morecambe (H. Beeston).

monst. **sinistrorsum**.—Morecambe, 1841 (*vide* Standen, *Journ. of Conch.*, vol. 8, p. 23).

H. nemoralis L.—Not abundant, and somewhat local. Ellel and Scotforth Rise, Lancaster; a few along the canal banks; Heys-ham (H. Beeston); Hest Bank and towards Halton; Warton, dead shells at the foot of the crag; Silverdale; Burton-in-Kendal; Arnside; Kirkby Lonsdale; Grange-over-Sands (R.S.), and Hampsfell. In the limestone district the form seems to be principally the five-banded type. The numbers after the subjoined varieties show the approximate percentage as they occur in the Lancaster area:—

var. **rubella** Moquin-Tandon.—00000—15.

00300—1.

var. **rubella-undulata**.—12345—19.

Type, 12345—17.

var. (12345)—4.

var. **libellula**.—12345—15.

var. **libellula-undulata**.—12345—8.

var. **libellula** Risso.—00300—1.

00000—20.

EXCEPTIONAL FORMS :

var. **libellula**.—12045 (one specimen).

var. **rubella**.—00345 (one specimen).

H. hortensis Müller.—Very local ; most abundant in the Lune valley. Scotforth, along the canal bank near the aqueduct, and to the west of Lancaster ; on the Ingleton Road at Halton and Caton. Scarce on the limestone ; Arnside ; Silverdale.

var. **lutea** Moquin-Tandon.—Occurs with the type.

Ena obscura Müller.—A fairly frequent shell, and apparently well distributed. Conder Green ; Lancaster ; the Yealands ; Silverdale ; Arnside (H.B.) ; Grange-over-Sands (R.S.)

Cochlicopa lubrica Müller.—Common. Lancaster ; canal margins and along the road-sides ; Dolphinholme Bottom ; Warton ; the Yealands ; Caton (R.S.) ; Grange-over-Sands (R.S.) ; Kirkby Lonsdale ; etc.

var. **lubricoides** Férussac.—Near Morecambe (Roebuck, *J. of Conch.* vol. 3, p. 333, 1881). Lancaster ; common at Warton Crag ; Grange-over-Sands (J.W.J.) 1903 ; Cark and Holker (C. H. Moore), 1903.

var. **hyalina** Jeffreys.—Morecambe (Heathcote, *J. of Conch.*, vol. 5, p. 205, 1887).

Azeca tridens Pult.—A fair colony occurs near the Devil's Bridge at Kirkby Lonsdale.

var. **crystallina** Dupuy.—One specimen at above locality.

Cæcilioides acicula Müller.—Taken dead at Bankwell, Silverdale, 1904 ; Haweswater, Silverdale (H.B.), 1906. In the crevices of the limestone rocks.

Jaminia secale Draparnaud.—A colony occurs four miles from Grange, on the Kendal road, at the foot of a wall : at the top of the hill and facing the Derby Arms Hotel, Westmorland (F. Booth), 1890.

J. cylindræa DaCosta.—Widely distributed and very abundant. Wyresdale ; Lancaster and district ; the Lune valley ; the Yealands ; Arnside ; Grange-over-Sands ; Kirkby Lonsdale ; etc.

var. **curta** Westerlund.—Frequent ; Bolton-le-Sands (H. Beeston) ; the Yealands district ; etc.

var. **albina** Moquin-Tandon.—Grange-over-Sands (Jackson and Moore), 1903, and again taken by Mr. H. Beeston in 1906 on the wall near the fire-station.

J. muscorum L.—Somewhat local. Cockersand Abbey and along the coast; Silverdale; Arnside Tower; “along the cliffs from Arnside Knott to Jenny Brown’s Point” (R.S.).

Vertigo substriata Jeffreys.—Grange-over-Sands, in Eggerslack Woods (R.S.), 1897. Recorded first for Silverdale by Mr. J. W. Jackson, 1903; see also Standen *J. of Conch.*, vol. 11, p. 327, 1906.

V. pygmæa Draparnaud.—Warton, at the base of the crag; Silverdale, at Bankwell and Haweswater; Hazelslack; Far Arnside; Grange-over-Sands (R.S.). Not a very common species.

V. alpestris Alder.—This species is recorded from three localities only: Grange-over-Sands, Eggerslack Woods, and at intervals to Holker; Silverdale, in the vicinity of Haweswater (J. W. Jackson); and near the Devil’s Bridge at Kirkby Lonsdale in Westmorland. The first record of this rare shell for the district was that of Holker by Mr. C. H. Moore in 1902.

V. pusilla Müller.—This species was first recorded for Silverdale by Mr. F. C. Long in 1891. The southern limits of its range would appear to be Yealand Conyers. Other localities are Burton-in-Kendal and towards Beetham; Arnside; Grange-over-Sands (R.S.); Holker (Jackson and Moore); Kirkby Lonsdale; and one specimen taken in very dry weather at Overtown would point to a connection with the Ingleton district.

Balea perversa L.—Local, but often very common. In the limestone area at Burton-in-Kendal; Yealand Conyers and Yealand Redmayne; Silverdale; Arnside; Grange-over-Sands (R.S.); Kirkby Lonsdale; Holker (C.H.M.). A fine colony occurs near Caton on a millstone wall, which has little or no vegetation upon it. These shells are curiously weathered, like some of the Ingleton specimens.

Clausilia laminata Montagu.—A fairly common species in the limestone area. Warton; Silverdale; Arnside; Grange-over-Sands (Jackson and Moore), 1903; the Yealands; Kirkby Lonsdale; etc. On the millstone: one specimen from the river bridge at Caton, others from the aqueduct, Lancaster (both records J. W. Jackson).

C. bidentata Ström.—An exceedingly common shell throughout the district. Lancaster and district; Warton; the Yealands; etc.; and throughout the limestone area.

var. **cravenensis** Taylor.—A well-marked form, occurring in colonies in the limestone area only. First recorded for Silverdale by Mr. J. B. Dixon (as *C. dubia*, *J. of Conch.*, vol. 7, p. 136, 1892); Grange-over-Sands (R.S.); Arnside, near the station (H. Beeston); the Yealands; walls above Deepdale; Woodwell (R.S.); Humphrey Head (Jackson and Moore). One Silverdale locality,—rocks at the north end of Haweswater.

Succinea putris L.—Not very common. In some of the ditches in the Lancaster district ; also at the Leighton Beck at Hale ; finest at the aqueduct near Lancaster in June or July.

var. **albida** Mörch.—The aqueduct, Lancaster (J.W.J.), 1903.

S. elegans Risso.—More general than the last. Specimens do not apparently reach the average size ; those from the aqueduct, which is again the best locality, average ten millimetres in June or July.

S. oblonga Draparnaud.—Early in 1903 I noticed a number of fossil *Succineæ* at Hale Moss, and a later investigation revealed numbers of the living specimens crawling on the surface of the marl. Examples of these fossil *Succineæ* were submitted by Mr. A. S. Kennard, F.G.S., to Dr. O. Bœttger, of Frankfort, who pronounced them to be *Succinea oblonga*, the nearest living form being var. *agonostoma* Kobelt. On comparing the shells from Haweswater, Silverdale, both recent and fossil, with the Hale Moss shell, there can be no doubt that they are the same species, the only difference being that of size.

Carychium minimum Müller.—Records are incomplete for this species. Common in the Lancaster area ; Warton ; Silverdale and district ; Caton (R.S.), 1887 ; Grange-over-Sands (R.S.).

Ancylus fluviatilis Müller.—Common in several of the becks in the district. Fine at Brantbeck, Ellel, Lancaster ; in the river Lune at Caton and Kirkby Lonsdale. Fine specimens can be taken in April.

var. **gibbosa** Bourgeois.—Beck at Caton (R.S.) ; also in beck at Melling, higher up the valley.

var. **albida** Jeffreys.—Ayside, near Higher Newton (C. H. Moore), 1902 ; beck near Cark Station (Jackson and Moore).

Acroloxus lacustris L.—In the canal at Lancaster.

var. **albida** Jeffreys.—Several from near the aqueduct were of this form. Mature in June and July.

Limnæa auricularia L.—“ In some pits near Lancaster, it is of a very elegant shape, far surpassing any found elsewhere ” (David Dyson, 1850). These pits I have never been able to find. It occurs locally in the canal, Garstang, Broken-Back Bridge, and at the aqueduct, near Lancaster, but is of a small size. It also occurs sparingly in the Lune, with *L. pereger*, above the aqueduct. In May and June, after which time it seems to disappear.

L. pereger (Müller *em*).—Everywhere, seemingly, in pond, ditch, canal, or river. This species varies so much that a full list would take up far too much space. Maturing time is given in each case.

TYPE.—Nice specimens in the Torrisholme district, between Lancaster and Morecambe, in the ditches which there abound ; July. Brantbeck near Lancaster ; May and June.

var. **oblonga** Jeffreys.—Woodwell, Silverdale; June. Peat drains, Storrs Moss, Yealand; April and May.

var. **lutea** Montagu.—River Lune above the aqueduct; June and July.

var. **lacustris** Leach.—River Lune at Kirkby Lonsdale; August.

var. **patula** DaCosta.—In the canal (exceptional form, a shell approaching var. *ovata* plentiful); May.

var. **acuminata** Jeffreys.—Leighton Beck, Hale; June to July. Ditch above Halton; April to May.

var. **ovata** Draparnaud.—In a pond above Halton (exceptional form, a shell approaching var. *ovata* plentiful); April to May.

var. **pulchella** Roffian.—At the east end of the ditch at Lady's Walk, Lancaster; May to August.

var. **lineata** Bean.—Fine at Tunstall in the beck near the village; August.

FOSSIL at Haweswater and Hale Moss.

monst. **sinistrorsum**.—One small shell, remarkably perfect, from the Chara Marl at Hale Moss, 1906.

L. palustris Müller.—Common in some of the ditches, *e.g.*, Lady's Walk, Lancaster, and others to the west of the town; in the canal (small); at Haweswater; also in the Leighton Beck at Hale.

var. **obesa** Taylor.—Lady's Walk Ditch (exceptional form, the type plentiful).

var. **elongata** Moquin-Tandon.—Most of the Leighton Beck specimens are of this form; July and August.

L. truncatula Müller.—Common in many of the ditches. Ellel and Scotforth, near Lancaster; Halton; the Kelletts; also noted on Hale Moss; a few in the canal; Woodwell and Haweswater, Silverdale; Cark (J. & M.).

var. **elegans** Jeffreys.—Ditch above Halton (between Halton and Slyne, at the Four-Cross-Roads). Specimens measure 12 m.m.; April.

Planorbis albus Müller.—Recorded for the canal; ditch Lady's Walk, Lancaster; Bankwell and Haweswater, Silverdale; brook at Cark (Jackson and Moore).

FOSSIL at Haweswater.

P. crista L.—Common in a pond near Garstang station. Records for this group of species may prove to be incomplete.

monst. **scalariforme**.—One specimen at the above locality at Garstang.

FOSSIL at Haweswater.

P. umbilicatus Müller.—Frequent in the canal at Aldcliffe, Lancaster, in very fine condition. In several ditches to the west of Lancaster, this shell is very common. Also at the Leighton Beck, Hale; ditches, near Heysham (H.B.); and in 1904 I noticed some specimens among some refuse on the banks of the river Beeta at Milnthorpe.

P. vortex L.—Very common in the canal at Lancaster, and in fine condition; ditches near Heysham (H. Beeston). Mature specimens taken in April and May.

P. spirorbis L.—Common in ditches at Torrisholme; Burrow Heights, Scotforth; Heysham (H. Beeston); Claughton near Hornby; very fine at the ditch above Halton on the Slyne Road; ditches at Storrs Moss (J.W.J.); and large tank at Woodwell, Silverdale; April.

P. contortus L.—The only localities recorded are Haweswater, Silverdale; brook at Cark (J. & M.).

P. fontanus Lightfoot.—Sparingly in the canal; ditch at Lady's Walk; Bankwell, Silverdale.

Physa fontinalis L.—Occurs in the river Lune at Caton; at Lady's Walk ditch, Lancaster; also extremely plentiful in the canal in the early months of the year. The finest specimens have been taken in April and May (10-11 mm. alt.). Also at Haweswater, Silverdale.

Aplecta hypnorum L.—Very local. In ditches at White Lund, near Morecambe; Burrow Heights, Scotforth, Lancaster; Halton, on the Slyne Road; Haweswater; Leighton Beck, Hale. Mature specimens taken at Halton in April.

Bithynia tentaculata L.—Finest in the canal at Aldcliffe, Lancaster; also at Lady's Walk; Haweswater. Mature specimens taken in large numbers in April.

FOSSIL at Haweswater (David Dyson), 1850; and at the Burton and Yealand Moss (David Dyson).

Valvata piscinalis Müller.—Finest at Lady's Walk ditch and Haweswater connecting drain; also in the canal and the river Lune; brook at Cark (J. & M.); river Winster near Grange (C. H. Moore). Specimens from Lady's Walk taken in March measure seven mm. alt.

var. **albina** Taylor.—Cark (C. H. Moore), 1903.

FOSSIL at Haweswater and Hale Moss.

V. cristata Müller.—Fairly common in the canal; and at Bankwell, Silverdale; April.

FOSSIL at Haweswater and Hale Moss.

Pomatias elegans Müller.—There have been several records for this species in the limestone area. The var. *ochroleuca* is the most frequent form. Silverdale:—Recorded first by Dr. R. F. Scharff in 1881;

Ford Lane by Mr. J. Ray Hardy; Haweswater by Mr. J. W. Jackson; the Cove by Mr. R. Standen. Arnside:—Top of the Knott, Mr. R. Standen. Several specimens were taken also last August by Mr. H. Beeston and myself at the foot of the Knott. Grange-over-Sands:—Humphrey Head by Mr. C. H. Moore; Low Meathop by Mr. C. H. Moore in 1903. The appearance of this shell in the spring corresponds with that of the larger *Helices* (see *Helix aspersa*). A hurried visit to Silverdale on May 9th showed most of the shells to be mature and copulation in active progress.

var. **ochraleuca** Moquin-Tandon.—At above localities.

Two specimens, taken by me in 1903 at Silverdale, correspond to the continental form—var. **violaceus** de Moulins.

Acicula lineata Draparnaud.—Grange-over-Sands (R. Standen) 1897, (C. H. Moore) 1903.

var. **alba** Jeffreys.—Grange (F. Booth), 1906.

Neritina fluviatilis L.—Common in the river Lune at Lancaster, Caton, and Kirkby Lonsdale (David Dyson) 1850. Also very common in the Lancaster Canal. Specimens here are often very much eroded (see note on *Dreissensia*). Recorded for the brook at Cark (Jackson and Moore), 1903. Also at Glasson Dock (J. R. Charnley), 1906. Mr. Charnley tells me that specimens here are much larger than any taken elsewhere in the district.

Dreissensia polymorpha Pallas.—In 1903 some fine specimens were taken in the canal, north of Lancaster, in the crevices of the stonework near the bridges. Unfortunately, all specimens taken recently are eroded to such an extent as to be worthless from a collector's point of view. Many of the larger *Neritina* are eroded to the same extent. Other species have not been affected. The introduction of some foreign substance, rather like paint, in 1904, may possibly have had something to do with it. Some very fine specimens are to be obtained at Glasson Dock (J. R. Charnley) 1906.

Unio margaritifer L.—In "The Land and Freshwater Shells of the Districts around Manchester," by David Dyson, there is an interesting account of what perhaps is the first record for this shell at the locality given. As the above little booklet is now somewhat scarce a short quotation may not be out of place:—"In the autumn of 1849 I visited the river Lune. At a place called Caton, about five miles above Lancaster, I found these shells in abundance. They can be seen from the banks of the river when the water is clear. They lie between the stones in the mud, with the ends pointing up. On taking a small stick and putting it between the valves, the animal will close the shell, and then it is easily lifted out of the water. But the better way is at once to go into the stream, as this will save time.

I stripped and entered, and by placing the eye near the surface saw the shells distinctly, and gathered them with ease. . . ." Several conchologists have visited this locality within recent years, and have found the shell equally abundant.

var. **sinuata** Lamarck.—The prevailing form.

var. **roissyi** Michaud.—Taken sparingly (J.W.J.).

Anodonta cygnea L.—Common in the canal throughout the Lancaster area. Also at Dixon's Hole, Caton (R.S.), 1887.

var. **anatina** L.—Frequent in the canal; Dixon's Hole, Caton.

Sphærium corneum L.—Very common in the canal; April to May.

var. **flavescens** Macgillivray.—Common with above.

FOSSIL at Haweswater, Silverdale.

S. lacustre Müller.—Very fine specimens can be taken in the Lady's Walk ditch; August.

var. **ryckholti** Normand.—Very common in a pond on the Marsh, near Lancaster; also at Conder Green in a pond on the Galgate Road.

Pisidium amnicum Müller.—Local in the canal; in the river Lune above the aqueduct (David Dyson), and at Caton; Dixon's Hole, Caton (R.S.), 1887.

P. henslowianum Sheppard.—Common in the canal at Lancaster (J. W. Jackson).

P. subtruncatum Malm.—Common in the canal at the aqueduct; also in the Lady's Walk ditch, Lancaster; March.

P. pulchellum Jenyns.—FOSSIL at Haweswater, Silverdale.

P. pusillum Gmelin.—Common in many of the ditches; Burrow Heights, Lady's Walk; above Halton on the Slyne Road; in the canal; also at Haweswater.

var. **grandis** Adams.—One specimen at Lady's Walk (J.W.J.).

FOSSIL at Haweswater.

P. nitidum Jenyns.—Exceedingly fine at a ditch near the Burrow Heights, Scotforth, Lancaster, and also in the ditch which connects Little Haweswater with the larger tarn. Specimens average five mm. broad; May and June.

var. **splendens** Moquin-Tandon.—Haweswater, as above given.

FOSSIL at Haweswater, and at Hale Moss, Burton.

P. obtusale Pfeiffer.—Common at Haweswater with above.

FOSSIL at Haweswater, and at Hale Moss.

P. gassiesianum Dupuy.—Common at Haweswater with above; occurs also at the aqueduct, near Lancaster, in the canal; June.

FOSSIL at Haweswater.

The localities given in the above list are contained within the two vice-counties 60 (Lancashire West) and 69 (Westmorland and Lancashire Furness). For the convenience of those engaged in the work of compiling faunas I have appended the following county index of places mentioned. All minor localities, not included in the index, are made relative in the text, except in those cases where constant repetition has removed the necessity for so doing. All records other than, or previous to my own, have attached to them the name or initials of the recorder, and in many instances the date also is given.

LANCASHIRE WEST, v.c. 60:—

| | | |
|-------------------------|---------------------|------------------|
| Abbeystead | Glasson Dock | Morecambe |
| Bolton-le-Sands | Grizedale | Overtown |
| Borwick | Halton | Quernmore |
| Brookhouse | Haweswater | Scorton |
| Caton | Hest Bank | Silverdale |
| Claughton (near Hornby) | Heysham | Torrisholme |
| Cockersand Abbey | Hornby | Tunstall |
| Conder Green | Jenny Brown's Point | Warton |
| Deepdale | Kelletts, The | Wyresdale |
| Dolphinholme | Lancaster | Yealand Conyers |
| Garstang | Melling | Yealand Redmayne |

WESTMORLAND AND FURNESS, v.c. 69:—

| | | |
|--------------------|----------------|-----------------|
| Arnside | Hale | Kirkby Lonsdale |
| Beetham | Hazelslack | Low Meathop |
| Burton-in-Kendal | *Higher Newton | Milnthorpe |
| *Cark | *Holker | *Newby Bridge |
| *Grange-over-Sands | *Humphrey Head | *Staveley |

NOTE.—Localities in the Furness portion of Lancashire are denoted by an asterisk.



Testacella haliotidea var. **flavescens** at Reigate, Surrey. — Among some specimens of *T. haliotidea* brought me from a neighbouring garden I have found a very pretty canary-coloured individual, the var. *flavescens* of Moquin-Tandon, recorded for the first time as British by Rev. S. Pearce (*J. Conch.*, vol. 11, p. 137). In the same spot from which the *T. haliotidea* are obtained there are also *T. scutulum*, among which the var. *albina* occurs.—LIONEL E. ADAMS (*Read before the Society*, November 14th, 1906).

Limnæa glabra and **Clausilia rolfii** from Hertfordshire.—In the summer of 1904, whilst searching on the Roman road near Hertford, I found several specimens of *Limnæa glabra* fixed to the rushes about fourteen inches above the ground, in a completely dried-up pond. On searching in the grass which had entirely covered the mud I found a considerable number more. I have not found this species in any of the surrounding ponds. In the spring of 1905 I found *Clausilia rolfii* at Gallows Hill, near Hertford; the spot is under elm trees near chalk, but not actually on it.—WALTER G. POOLE (*Read before the Society*, November 14th, 1906).

BIBLIOGRAPHY OF THE NON-MARINE MOLLUSCA OF LANCASHIRE.

By J. WILFRID JACKSON.

(Read before the Society, November 14th, 1906).

SOME time ago, with a view to working up the Non-Marine Molluscan Fauna of Lancashire, I commenced to hunt out records of previous work done in the county, and was astonished to find so many references scattered up and down in various publications and transactions of Societies, many of which go back almost to the commencement of last century. Finding so many useful notes in little-known publications, it occurred to me that a bibliography of them would not be out of place in the pages of our *Journal*, and furthermore might prove useful to those who, like myself, are interested in the conchological literature of the county.

Though somewhat startled at the outset at what appeared a formidable task, I persevered with the work, and, thanks to numerous friends, I have been able to compile a list, brought up to the end of 1906, which may be looked upon as fairly satisfactory and tolerably complete. The work entailed has been considerable, owing to the records being so scattered, and has necessitated the consultation of works both in public and private libraries, particularly that of my friend, Mr. Alfred Leicester, whose fine collection of local conchological literature has proved of the greatest service.

It is a matter for regret that some of the earlier Manchester collectors, such as F. Kenderdine, T. Glover, T. Peace, T. Kelsall, S. Brockbank, T. Morley, and others, did not leave behind them published records of their discoveries. One has only to turn to Miss Maria Glover's notes on her father's collection (*J. Conch.*, vol. 11, pp. 368-372) to show that the conchologists of his day were quite as active and enthusiastic as those of the present.

The first published record I can find is Kenyon's Preston list, 1829. Contemporary with him was Dr. Gilbertson, of Preston, who first discovered *Vertigo alpestris* in this country. Unfortunately he did not live to publish his MSS., which at his death went to the British Museum, along with his collection. These MSS. were evidently of great importance; Gray, Forbes and Hanley, and Gwyn Jeffreys all quoting from them. Kenyon and Gilbertson, therefore, might be looked upon as the pioneers of Lancashire non-marine conchology.

Of other collectors who have left little or no record behind them, beyond the acknowledgment of their work by contemporary writers, James Murton, of Silverdale (*circa* 1868), and J. Walling, of Warton (*circa* 1850), deserve mention.

In the arrangement of my titles I have followed on the lines employed by Mr. W. Denison Roebuck in his admirable faunal bibliographies published some years ago in the *Naturalist*. I have also followed his plan of treating the exhibits at the meetings of the Conchological and other Societies as published notes, since, in many instances, they constitute the sole published record for the county. In all cases I have followed the nomenclature employed by the authors. Newspaper records have not been taken note of.

In the compilation of this Bibliography I am especially indebted to Dr. W. E. Hoyle, Messrs. Alfred Leicester, R. Standen, W. Denison Roebuck, and A. S. Kennard, for their kind assistance and advice; also to numerous other friends and correspondents for their courteous co-operation, and take this opportunity of thanking them.

As it is possible that there may be still some further records hidden away in old or obscure publications, I should be very glad if any reader who knows of such would kindly communicate them to me.

1829. **Kenyon, Joseph.**—Remarks on British Land and Fresh-water Shells. *Mag. Nat. Hist.*, i., p. 425.

Noting *Limnea ovata* as abundant in Preston neighbourhood; and that he has taken sixty species in the neighbourhood.

1829. **Kenyon, Joseph.**—Land and Fresh-water Shells in the neighbourhood of Preston. *Mag. Nat. Hist.*, ii., p. 273.

Paludina impura, similis (Zool. Jour.), *acuta* (Zool. Jour.); *Valvata piscinalis*, *Lymnea fragilis* Flem., *palustris*, *auricularia*, *ovata*, *peregra*, *lutea* Flem., *leucostoma*, *minuta*; *Physa fontinalis*, *hypnorum*; *Planorbis marginatus*, *spirorbis*, *vortex*, *contortus*, *hispidus*; *Planitidus* (*Nautilus lacustris* Turt., etc.), *complanatus*, *imbricatus*; *Auricula minima*; *Succinea amphibia*; *Achatina acicula*; *Bulimus hordeaceus*, *lubricus*; *Clausilia bidens* Drap., *rugosa*; *Pupa fragilis*, *britannica* (*Turbo tridens* of authors), *umbilicata*, *muscorum*, *antivertigo*, *pygmæa*, *vertigo* Drap., *edentula* Drap.; *Helix aspersa*, *arbustorum*, *nemoralis*, *hortensis*, *fusca*, *cellaria*, *nitida*, *rufescens*, *hispidula*, *sericea*, *rotundata*, *trochilus* Flem., *crystallina* Drap., *aculeata*, *pulchella*; *Vitrina pellucida*; *Limax cinereus*, *agrestis*; *Ancylus fluviatilis*, *lacustris*; *Anodon cygneus*, *anatinus*; *Cyclas cornea*, *lacustris*, *obliqua*, *fontinalis*, 1828.

1837. **Alder, Joshua.**—Notes on the Land and Freshwater Mollusca of Great Britain, with a revised list of species. *Mag. Zool. Bot.*, ii., pp. 112 and 117.

At p. 112, first record for *Vertigo alpestris* in Lancashire. Found at Clithero (*sic*) by Mr. Gilbertson. At p. 117, specimens of *Valvata depressa* Pfr. sent to Alder from Lancashire by Mr. Kenyon—not considered more than a variety of *V. piscinalis*.

1837. **Thorner, William.**—[Mollusca] History of Blackpool, Poulton, 1837, p. 253.

The author says:—"The land and freshwater kinds are here omitted, but it may be worthy of notice that the *Valvata depressa* of Pfeiffer, and not hitherto described as a British species, is found about Blackpool; as well as the rare *Planorbis nitidus* of Muller, identical with the *Nautilus lacustris* of Dr. Turton's 'Conchological Dictionary' and described by him in his more recent Manual of Land and Fresh Water shells under the name of *Segmentina nitida*." Information supplied by Mr. Kenyon of Preston.

1838. **Hall, T. B.**—Conchology of the neighbourhood of Liverpool. *Naturalist*, iii., p. 323.

Embodies a list of shells and remarks on the localities, furnished by Thomas Glover, Esq., of Manchester.—*Limnæus stagnalis*, *L. elongatus*, *L. palustris*; *Physa fontinalis*; *Aplexa hypnorum*; *Planorbis carinatus*, *P. vortex* (ponds about Liverpool); *Paludina vivipara* (Southport), *P. impura* (Leeds and Liverpool Canal); *Cyclas cornea* and *Anodon cygneus* (in almost all the ponds).

1838. **Alder, Joshua.**—Supplement to a Catalogue of the Land and Fresh-water Testaceous Mollusca, found in the Vicinity of Newcastle. *Trans. N.H.S. of N., D., and Newc.-on-Tyne*, vol. ii., part 2, pub. 1838, p. 340.

Casual reference to *Vertigo alpestris* at Clitheroe.

1840. **Forbes, Edward.**—Report on the distribution of Pulmoniferous Mollusca in the British Isles. *Report, British Association* (Birmingham Meeting, Aug., 1839), pp. 127 to 147.

Mention made of *Acme lineata* and *Paludina vivipara* at Preston; *Pupa alpestris* in Lancashire.

1840. **Gray, John Edward.**—A Manual of the Land and Fresh-water Shells of the British Islands (by William Turton, M.D.), London, 1840.

Lancashire localities at pp. 37, 38, 98, 203, and 291.

1840. **Hincks, William.**—On Mr. Gray's Edition of Turton's Manual. *Ann. Nat. Hist.*, v., pp. 366-7.

A criticism; with note anent *Cyclas rivicola* in Lancashire.

1840. **Thompson, Wm.**—Catalogue of the Land and Freshwater Mollusca of Ireland. *Ann. and Mag. Nat. Hist.*, vi., pp. 112 and 201.

Records for *Pupa anglica* and *Vertigo alpestris* in Lancashire.

1844. **Brown, Captain Thos.**—Illustrations of the Recent Conchology of Great Britain and Ireland, 2nd edition, London.

Paludina vivipara (near Southport); *Lymnæa peregra* var. (Bury); *Vertigo sexdentata* (= *substriata*) (Preston); *Helix alliaria* (near Lancaster); *Ancylus lacustris* (pond near Eccles station on Liverpool and Manchester Railway); *Dreissena polymorpha* (Bridgewater Canal); *Anodon cygneus* var. *cellensis* (Smedley Hill near Manchester, Thos. Glover, Esq.; Infirmary Pond, Manchester), *A. cygneus* var. *anatina* (Southport), *A. cygneus* var. *stagnalis* (canal wharf at Bolton Bridge, Lancashire), *A. cygneus* var. *ponderosa* (Otterspool, Aigburth, Henry Johnson), var. *subrhombea* (in the Irwell, near Manchester, Samuel Gibson), var. *rostrata* (doubtful at Liverpool); *Unio ovalis* (canal at Burnley); *Alasmodon margaratiferus* (Lune, Lancashire), var. *olivacea* (in the Leven, a little below Windermere, Thos. Glover); *Cyclas calyculata* (near Manchester); also many other species common in the north of England.

1845. **Brown, Captain Thos.**—Illustrations of the Land and Freshwater Conchology of Great Britain and Ireland. London, 1845.

Same localities given as in "Recent Conchology," 2nd ed., 1844.

1850. **Dyson, David.**—The Land and Freshwater Shells of the District around Manchester.

This is one of the most important and interesting works in existence relating to the mollusca of Lancashire, giving records of thirty-five land and thirty-seven freshwater species; dealing more especially with localities in the immediate neighbourhood of Manchester, many of which, e.g., Beswick Water Works; Hough End Clough; Ardwick Green Pond; Moss Lane pits and ditches, Greenheys; Nine Pits, Chorlton Fields; are now either "historic" or rapidly becoming so. Many localities in the Liverpool, Warrington, Southport, Burnley, Preston, and Lancaster districts are also enumerated.

1851. **Woodward, S. P.**—A Manual of the Mollusca, Lond., 1851.

Spiral form of *Planorbis marginatus* from Rochdale, cited at p. 45, and figured at p. 172. This is also repeated in subsequent editions.

1852. **Holme, William.**—Freeman's Life of William Kirby. 1852, p. 362.

Letter to Mr. Kirby, written from Preston, about 1821, anent occurrence of *Tellina cornea*, *Physa fontinalis*, *P. hypnorum*, *Bythinia tentaculata*, *Planorbis planorbis*, *Pl. fossaria*, and *Succinea putris*, all presumably near Preston.

1853. **Lowe, E. J.**—The Conchology of Nottingham. London.

Contains numerous references to Lancashire localities, e.g., Manchester, Lancaster, Preston, Liverpool, Lytham, Blackpool, Thornley and Chaigeley, near Clitheroe, chiefly the records of Winstanley, Kenyon, Gilbertson, Brown, Howitt, and himself.

1853. **Forbes, Edward, and Sylvanus Hanley.**—A History of British Mollusca and their Shells, London.

Lancashire references at pp. 115, 118, 124, 126, and 130, vol. ii.; pp. 10 and 18, vol. iii.; pp. 18, 88, 172, and 180, vol. iv.; and appendix, vol. iv., p. 261.

1854. **Byerley, Isaac.**—The Fauna of Liverpool [Mollusca]; *Proc. Lit. Phil. Soc., Liverpool*, viii., pp. 38, 40, 41, 46-50.

Cyclas rivicola (canal near Liverpool); *C. caliculata* (pits near Zoological Gardens); *Anodonta cygnea* (Otterspool, Aigburth); *Dreissena polymorpha* (Leeds and Liverpool Canal); *Paludina listeri* (Southport); *Zonites nitidus* (Huyton); *Z. excavatus* (Dingle, Aigburth, and Garston); *Helix nemoralis* var. *hortensis* (Huyton); *H. caperata* (near Wavertree); *Planorbis contortus* (near Warrington); numerous other species mentioned as common in the district. Author acknowledges valuable assistance from Messrs. Cameron, Webster, Whitehead, S. Archer, and others. Published in book form in 1856.

1857. **Gray, John Edward.**—Manual of the Land and Freshwater Shells of the British Islands (by Wm. Turton), 2nd edition, London.

Lancashire mentioned at p. 163 (*Pupa anglica*), and at p. 172 (*Vertigo substriata*).

1858. **Dixon and Watson.**—A Descriptive Manual of British Land and Fresh-water Shells, Darlington.

Pisidium cinereum (Preston); *Unio tumidus* (S. Lancs.); and *U. margaritiferus*, referred to.

1858. **Bellars, Henry J.**—Illustrated Catalogue of British Land and Freshwater Shells, Chester.

Limax flavus (Warrington); *Helix hortensis* vars. (Warrington); *Succinea oblonga* (on aquatic plants; river Lune, near Lancaster); *Unio margaritiferus* (river Lune, near Lancaster); *Cyclas caliculata* (ditches, near Lancaster); mentioned.

1859. **McNicoll, David H.**—Land and Freshwater Shells [of Southport]; *Handbook for Southport*, London, 1859, pp. 142, 144, 145-147.

Cyclas cornea; *Anodonta cygnea*; *Paludina vivipara*, *P. listeri*; *Bithinia tentaculata*; *Valvata piscinalis*, *V. cristata*; *Pisidium amnicum*, *P. nitidum*, *P. pusillum*; *Helix aspersa*, *H. nemoralis*; *Carychium minimum*; *Clausilia nigricans*; *Zua lubrica*; *Succinea putris*, *S. oblonga* (!); *Physa fontinalis*, *P. hypnorum*; *Pupa muscorum*, *P. edentula*; *Planorbis alba*, *P. vortex*, *P. contortus*; *Limneus stagnalis*, *L. palustris*, *L. pereger*; *Ancylus fluviatilis*; *Limax flavus*, *L. cinereus*, *L. agrestis*; *Arion ampuricorum*; with

localities, author having been assisted in the list by James Glover, and Mr. Robinson.

1860. **Grindon, Leo Hartley**.—Mollusca, or Shell-Bearing Creatures. *Manchester Walks and Wild Flowers*, pp. 163-168.

A list of twenty-four land and twenty-nine freshwater species found in the neighbourhood of Manchester. Dyson's list cited and many additions made in species and localities.

1861. **Anon.**—Manchester Field Naturalists' Report, 1861, p. 23.

Reference made to recent additions to Manchester Fauna, viz. :—*Limax flavus* and *Sphærium pallidum*.

1861. **McNicoll, David H.**—Mollusca of Southport [Land and Fresh-water Shells]. *Handbook for Southport*. London, 2nd edition, 1861, pp. 129-135.

Gives the following species as additions to his 1859 list :—*Cyclas rivicola*, *C. calyculata* ; *Vitrina pellucida* ; *Zonites alliarius*, *Z. nitidulus*, *Z. purus* ; *Helix caperata*, *H. hispida*, *H. pulchella*, and var. *costata*, *H. rotundata*, *H. pygmaea* ; *Planorbis spirorbis* ; and *Limnæus truncatulus*. Habitats given and fuller remarks than in the above list. *Paludina vivipara* ; *Helix aspersa* ; *Carychium minimum* ; *Clausilia nigricans* ; *Succinea oblonga*, and *Limax flavus* deleted. Author much indebted to Mr. Charles H. Brown.

1862. **Walker**, — Junr.—British Fresh-water Shells. *Minute Book, Manch. Nat. Hist. Club*, p. 24. (In Manch. Mus. Library).

Records for *Planorbis imbricatus* in pit between Eccles and Swinton ; also *Velletia lacustris* and *Cyclas lacustris* from pits at Swinton.

1862. **Darbishire, R. D.**—*Velletia lacustris*. *Minute Book, Manch. Nat. Hist. Club*, p. 31. (In Manchester Museum Library).

Reference to its occurrence in pits at Moss Lane, near Manchester.

1862. **Darbishire, R. D.**—*Cyclas pallida*. *Minute Book, Manch. Nat. Hist. Club*, p. 76. (In Manchester Museum Library).

Notes its occurrence in the Ashton canal in 1860.

1862. **Alcock, T.**—*Paludina listeri* from Beswick. *Minute Book, Manch. Nat. Hist. Club*, p. 100. (In Manchester Mus. Library).

Specimens exhibited including a young sinistral example.

1862. **Jeffreys, J. Gwyn.**—British Conchology, i. London.

Lancashire references at pp. 43, 114, 163 and 260.

1862. **Wigglesworth, R.**—Occurrence of *Cyclas pallida* in Lancashire. *Zoologist*, xx., p. 8172.

Found in Sept., 1861, in Leeds and Liverpool Canal, with *Pisidium amnicum* : first record for Lancashire and second in British Isles.

(To be continued).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

357th Meeting, December 12th, 1906.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

Zoological Record, Brachiopoda, by E. R. Sykes and E. A. Smith ; Mollusca, by E. R. Sykes and E. A. Smith ; Mollusca of " Porcupine " Expedition, 1869-70, by E. R. Sykes ; " On dates of Publication of Sowerby's Mineral Conchology," etc., by E. R. Sykes (*from the respective authors*); and the usual periodicals received in exchange.

Donations to Cabinet announced and thanks voted :

Jamnia cylindracea var. *albina* from Grange-over-Sands, by J. W. Baldwin ; *Jamnia anglica* and *Vertigo antiwertigo* from Dog's Bay, Roundstone, Connemara, by Edward Collier ; *Vertigo angustior* (taken living) from Dog's Bay, Connemara, by R. Standen.

Candidates Proposed for Membership.

Joshua L. Bailey, jr., Haverford, Pa., U.S.A.

A. Bavay, 82, rue Lauriston, xvi^e, Paris.

Evenor Dupont, Mauritius.

C. Dayton Gwyer, 303, Putnam Avenue, Brooklyn, New York, U.S.A.

Rev. C. E. Y. Kendall, 48, West Road, Lancaster.

Hermann Rolle, Königgratzes Str, 89, Berlin, S.W.

Maxwell Smith, 417, West 120th Street, New York, U.S.A.

Papers Read.

" Note on *Paludestrina confusa* from Oulton Broad," by Edgar A. Smith, I.S.O.

" *Vivipara contecta* m. *sinistrorsum*," by R. Standen.

" *Helix cantiana* Montagu at Tooting Common," by J. Davy Dean.

Exhibits.

By Mr. J. Wilfrid Jackson : *Paludestrina (Pseudamnicola) anatina* Drap. from Oulton Broad, Suffolk ; *P. (Hydrobia) similis* (= *confusa*) from Erith, Kent, illustrating Mr. E. A. Smith's note.

By Mr. W. Whitehead : *Acroloxus lacustris* L. var. *compressa* Jeff., very fine clean specimens from Littlemoss, near Droylesden.

By Mr. F. Taylor : *Succinea elegans* from Birkdale, Southport.

By Mr. C. H. Moore : *Helix pisana* of unusual size, collected at Tenby, July, 1904.

By Mr. R. Standen : A collection of Non-Marine Mollusca from N.E. Rhodesia, made by Mr. S. A. Neave in 1904-5, and now in the Manchester Museum.

By Mr. J. Ray Hardy : *Vitrea lucida*, a fine set of unusually large specimens from "Gatley Dip," near Northenden. He had found the shell in great abundance underneath an immense pile of rotten timber in the rear of some greenhouses, and as he happened to be present when this timber was removed, he obtained over two hundred fully mature specimens.

358th Meeting, January 9th, 1907.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted :

"Molluscan Shells collected by Professor Herdman at Ceylon in 1902," by R. Standen and A. Leicester ; "Non-Marine Mollusca of Lincolnshire," by C. S. Carter ; "Illustrated Catalogue of the Mollusca of Michigan," by Bryant Walker ;

"A Molluscan Visit to some of the Inner Hebrides," by the Rev. G. A. Frank Knight (*from the respective authors*); and the usual periodicals received in exchange.

Letter Read

From Mr. H. A. Pilsbry acknowledging his election as an Honorary Member.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA,

LOGAN SQUARE, Dec. 5th, 1906.

DR. W. E. HOYLE,

Hon. Secretary of the Conchological Society of Great Britain and Ireland.

DEAR SIR:

It is a great pleasure to me to hear that I have been elected an Honorary Member of the Conchological Society. With some members I have enjoyed, personally or by correspondence, a friendship of many years' standing, and a larger number of members are well-known to me by their works. I keenly appreciate the the honor of association with these friends and co-workers, and will endeavour to advance, so far as I can, the aims and interests of the Society.

Very truly yours,

H. A. PILSBRY.

New Members Elected.

Joshua L. Baily, jr., Haverford, Pa., U.S.A.

A. Bavay, 82, rue Lauriston, xvie, Paris.

Evevor Dupont, Mauritius.

C. Dayton Gwyer, 303, Putnam Avenue, Brooklyn, New York, U.S.A.

Rev. C. E. Y. Kendall, 48, West Road, Lancaster.

Hermann Rolle, Königgratzer Str. 89, Berlin, S.W.

Maxwell Smith, 417, West 120th Street, New York, U.S.A.

Candidates Proposed for Membership.

Walter Gyngall, 13, Gladstone Road, Scarborough.

Silas C. Wheat, 987, Sterling Place, Brooklyn, New York, U.S.A.

Resignations.

J. G. Hamling

Lieut.-Col. G. S. Parry

Arthur S. Poore

W. R. Smith

Wilfred Mark Webb

H. J. West

Member Deceased.

William Baillie, Brora, near Golspie, Sutherlandshire.

Papers Read.

"On the Mollusca of a raised coral reef on the Red Sea Coast," by W. J. Hall and R. Standen.

"On the discovery of *Vitrea rogersi* in England," by J. Wilfrid Jackson and A. S. Kennard.

"Shells collected in Arran," by F. H. Sykes.

Exhibits.

By Mr. J. Wilfrid Jackson: A series of *Vitrea rogersi* from various British localities, including a large and distinctive form with wide umbilicus from Malham Cove, which appears to agree with *V. helvetica* Blum., rather than *V. rogersi*, in its general characteristics; *V. glabra* Studer from Budapest; and photograph of tablet of *V. rogersi* (labelled "*Hyalinia alliaria* var. *glabra*") in the Alder Collection in the Hancock Museum, Newcastle.

By Mr. A. W. Rymer Roberts: *Vertigo alpestris* from the Common, and St. Catherine's, Windermere, Westmorland.

By Mr. J. Ray Hardy: *Planorbis crista*, a pretty white variety, from near the old mill at Reddish; and very large *Acroloxus lacustris* from a pond off the Ashton Road, near Droylsden.

By Mr. F. Taylor: A large series of *Littorina rudis* from the Mumbles, Swansea Bay: males and females—as shewn by dissection, but not exhibiting any sexual distinction in the shells as is claimed by some observers.

By Mr. J. Davy Dean: *Linnæa pereger* monst. *sinistrorsum* from the Chara Marl deposit at Hale Moss, Westmorland.

A large series of *Planorbis spirorbis* and *P. vortex* was exhibited by Messrs. R. Welch, J. W. Jackson, E. C. Stump, J. Ray Hardy, J. Laycock, Wm. Whitehead, C. H. Moore, E. Collier, and R. Standen; and specimens from the collections of the Manchester Museum and the Society were also shewn. An interesting discussion followed.

359th Meeting, February 13th, 1907.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted:

“Franklin Bicentennial Celebration” (*from the American Philosophical Society*); “Outline of the Natural History of our Shores,” by J. Sinel (*from the publishers, per Mr. J. W. Taylor*); “Descriptions of Fifteen Terrestrial Mollusca from South Africa,” by J. C. Melvill and J. H. Ponsoy (*from the authors*); and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted:

Vertigo moulinsiana from Cothill, Berks., from Mr. H. C. Napier.

New Members Elected.

Walter Gyngall, 13, Gladstone Road, Scarborough.

Silas C. Wheat, 987, Sterling Place, Brooklyn, New York, U.S.A.

Candidate Proposed for Membership.

R. A. R. Priske, 9, Melbourne Avenue, West Ealing, Middlesex.

Resignation.

E. H. Turner, 42, Spring Gardens, Manchester.

Papers Read.

“Notes on the Mollusca of Wilts.,” and “Colonel George Montagu,” by E. W. Swanton.

“*Latirus funebris* n.sp., from the West Indies,” by H. B. Preston.

“The Land Shells of Lundy Island,” by J. R. le B. Tomlin.

“*Vertigo moulinsiana* in Berkshire,” by H. C. Napier.

Exhibits.

By Mr. J. R. le B. Tomlin: A series of shells from Lundy Island to illustrate his paper.

By Mr. H. B. Preston: The type specimen of the new species of *Latirus* described in his paper.

By Mr. C. H. Moore: Some unusually marked examples of *Gibbula umbilicata* from Lydstep, near Tenby.

By Mr. R. Standen: A series of Madeiran land shells recently presented to the Manchester Museum by Professor G. A. Wright, including many species described by Lowe.

Large and representative series of *Helicella itala* and *H. caperata* from many localities in the United Kingdom were shown as a special exhibit by Messrs. Edward Collier, C. H. Moore, B. R. Lucas, J. W. Jackson, J. W. Baldwin, W. Whitehead, C. T. Carter, and J. D. Dean; also examples from the Society's Cabinet.

Exhibits.

By Mr. J. Laycock: *Helix aspersa* and *Helicella virgata*, the latter showing much variation, collected at Southport, Sept. 16th, 1906.

By Mr. R. Cairns: *Achatina purpurea* and *A. variegata*, types and varieties.

By Mr. R. Standen: Sections of the shells of *Limnaea*, *Physa*, *Clausilia*, *Cerion*, *Sagda*, *Gibbus*, *Edentulina*, and *Placostylus*, cut variously to show the internal structure.

A series of species of *Opisthostoma* was shown as a special exhibit by Messrs. R. Cairns, Edward Collier, B. R. Lucas, and R. Standen; a total of twenty-two species being exhibited, including *O. laidlawi* and other recently described forms; also *O. fairbanki* (Cairns Collection).

It was decided to hold the following

Special Exhibits at Future Meetings:

| | | |
|------------------|-----|---|
| April 10th, 1907 | - - | The Genus Helicina and its Allies. |
| May 8th, 1907 | - - | The Genus Ariophanta . |
| June 12th, 1907 | - - | The Family Orthalicidæ . |

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBBARIAN).

“**Land and Freshwater Mollusks of Alaska and adjoining regions,**” by W. H. DALL (*Harriman Alaska Expedition*, vol. xiii., first portion) pp. 1—171; 2 pl., 118 text figs.

“Like all works emanating from the pen of Dr. Dall this contains a good deal more solid and interesting information than is suggested by the title. It was necessary for its production, on account of the uniformity of the boreal faunas of the northern hemisphere, to examine the entire boreal faunas of North America, Greenland, and the adjacent parts of eastern Siberia. The ‘general discussion and results’ of this investigation are compacted into the first seventeen pages, and include three extremely valuable tables, viz. :—‘I. Distribution of Freshwater Shells north of latitude 49°, according to the drainage systems now existing;’ ‘II. Distribution of American Land Shells north of latitude 49°;’ and ‘III. Distribution of north-east Asiatic Land and Freshwater Shells.’ The rest of the work is devoted to a ‘Systematic Catalogue of Land and Freshwater Mollusks of North America from the region north of the forty-ninth parallel.’ This area is, of course, synonymous with almost the whole of Canada and all Alaska. While vast territories therein are only partially or imperfectly explored for mollusks, portions of them are, nevertheless, tolerably well-known and the uniformity imposed on the fauna by its high northern position and unvaried conditions leads to the belief that while much is yet to be gathered in tracing out the details of distribution many new additions, save, perhaps, among the minuter forms are not to be expected. Altogether 214 species, with several varieties are, named in the tables for this area, described in the text and many of them figured. Only forty-eight of these are marked as occurring in Alaska though Dr. Dall later on states that sixty-five species occur in that area. This Alaskan fauna is composite. The fauna of boreal Canada is extended to the north-west, north of the Alaskan range to Bering Sea and the Arctic coast. The fauna of the Pacific slope extends into Alaska south of the Alaskan range. A few species came from eastern Siberia while the remainder belong to the Holarctic, or circumboreal, group. In the systematic part the author has treated certain genera, such as *Limnaea* and *Planorbis*, monographically, proposing new subdivisions, some

of which are unrepresented in the area under discussion. In a later paper in 'Nautilus' some of these terms have been modified and it is not impossible further changes will yet have to be made ere the classification of these groups is settled. This is not the time or place to cross swords with Dr. Dall over questions of nomenclature; but the remark may be permitted that, to this writer, some of the changes proposed savour more of ingenuity than of necessity, which alone should justify alteration. The difficulties that must have attended the compilation of such a monument of industry as this volume will be fully realised by all conchologists and they will find that Dr. Dall's hope is a fact and 'that this summary will make the path' very much (Dr. Dall says 'somewhat') 'easier for those who follow him.'—
B. B. WOODWARD.

The Nautilus, vol. 20, nos. 3-6, July-Nov., 1906.

"Notes on *Valvata*," by BRYANT WALKER [descriptions and figures of about six species and varieties]. "*Helix jejuna* Say transferred to *Praticolella*," by H. A. PILSBRY [genitalia figured and described]. "Some Shells of Mississippi and Alabama," by A. A. HINKLEY [list of 32 spp.].

"The West American Species of *Genota*," by W. J. RAYMOND [5 spp. figured and described]. "Note on the Genus *Glabaris* Gray or *Patularia* Swains.," by W. H. DALL. "Some Shells of Mississippi and Alabama," by A. A. HINKLEY [further list of 90 spp.]. "A New *Scala* [*S. loweri*] from California," by W. H. DALL. "Descriptions of two new *Cleopatra* and a *Pisidium*," by C. F. ANCEY [*Cl. multilirata*, *Cl. smithi*, and *P. planatum*]. "On the Habits of *Patricolella jejuna*," by C. W. JOHNSON. "*Chloritis edwardsi* Gude," by C. F. ANCEY. "Note on *Dyakis* and *Pseudopartula*," by H. A. PILSBRY. "A Synonym of *Brachypodella*," by H. A. PILSBRY [*Microstoma*].

"Two New American Genera of Basommatophora," by H. A. PILSBRY [descriptions and figures of *Amphigyra alabamensis* n.sp., and *Neoplanorbis tantillus* n.sp., both from Wetumpka, Alabama]. "Note on *Lepyrium*," by H. A. PILSBRY. "Some Shells of Mississippi and Alabama," by A. A. HINKLEY [further list of 95 spp.]. "*Lymnaea danielsi* sp. nov.," by F. C. BAKER [from Lake Maximkukee, Indiana, description only]. "Note on *Mitra picta* Reeve," by S. ROUS. "Note on *Vitrea approxima* and *V. vanattai*," by H. A. PILSBRY and B. WALKER. "Subspecies, Mutations, and Forms," by T. D. A. COCKERELL.

"A Healthy Colony of *Epiphragmophora tudiculata*," by F. W. KELSEY. "Remarks on certain New England Chitons with Description of a New Variety" [*Tonicella ruber* (Lowe) var. *index* nov.], by F. N. BALCH. "Some Observations on the ova of Unionidae," by L. S. FRIERSON. "*Spharium hendersoni* n.sp.," by V. STERKI [near Greeley, Colorado].

"On the Distribution of *Helix hortensis* Müller in North America," by C. W. JOHNSON. "A List of Shells from Nebraska," by B. WALKER [45 spp.]. "*Lymnaea megasoma*," by F. R. LATCHFORD.

The Naturalist, nos. 594-599, July-Dec., 1906.

"Notes on the Upper Chalk of Lincolnshire," by ARTHUR BURNET. "*Helix nemoralis* and *H. arbustorum* in North-West Lincolnshire," by T. L. WARNER.

"*Testacella scutulium* at Rastrick," by J. E. CROWTHER. "Fossil Molluscan Zones in the Carboniferous Rocks of the Midlands" [pt. 1], by WHEELTON HIND [2 plates].

"Notes on the Speeton Ammonites," by C. G. DANFORD. "Life-Zones in the British Carboniferous Rocks," by WHEELTON HIND. "The Fossiliferous Drift Deposits at Kirmington, Lincolnshire, and at various Localities in the East Riding of Yorkshire," by J. W. STATHER.

"On a Section in the Post-Glacial Deposit at Hornsea," by T. SHEPPARD.

The Irish Naturalist, vol. 15, nos. 7-12, July-Dec., 1906.

"New Marine Mollusca for Co. Dublin," by N. COLGAN [4 spp.].

"*Anodonta cygnea* in Co. Clare," by H. FOGERTY [Craganowen Lake].
 "New Localities for *Geomalacus maculosus*," by M. J. DELAP [Bolus Head, Co. Kerry, and Kilkeencragh Mountain]. "*Helix tonnensis* in Ireland," by R. F. SCHARFF [Roundstone, Co. Galway]. "*Succinea oblonga* in Antrim," by J. N. MILNE [shore of Lough Neagh, near Antrim].

"Marine Mollusca for South-East Wexford," by N. COLGAN. "*Anodonta cygnea* in Co. Clare," by H. FOGERTY.

The Annals of Scottish Natural History, no. 60, Oct., 1906.

"*Milax (Amalia) gagates* var. *rava* in South-West Perth," by W. EVANS [at Callander].

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"Notes on some British Nudibranchs," by Sir C. ELIOT [2 plates]. "*Hancockia eudactylota* Gosse," by Sir C. ELIOT.

Proceedings of the Royal Society of Victoria, vol. xix. (N.S.), part I, Aug., 1906.

"On some Victorian Marine Mollusca, New Species and others little-known," by J. H. GATLIFF [4 nn.spp. figured].

The North Staffordshire Field Club: Annual Report and Transactions, 1905-06, vol. xl.

"Contributions to the Geology and Paleontology of North Staffordshire, no. vi. Paleontology of the Cheadle Coalfield," by JOHN WARD [1 plate].

Memoirs and Proceedings of the Manchester Literary and Philosophical Society, 1905-1906, vol. 50, part 3, Aug., 1906.

"The Species of *Ctenopteryx*, a Genus of Dibranchiate Cephalopoda," by J. H. ASHWORTH and W. E. HOYLE.

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"Moluschs Marins de Catalunya, i., Cefalopodos," by D. J. MALUQUER and NICOLAU.

Annals of the Natal Government Museum, vol. 1, part I, June, 1906.

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Proceedings of the Academy of Natural Sciences of Philadelphia, vol. lviii., part I, Jan.-April, 1906.

"Mollusca of the South-Western States, II.," by H. A. PILSBRY and J. H. FERRISS. "Description of a New Australian *Glycymeris*" [*G. insignis*], by H. A. PILSBRY [Geographe Bay, W. Australia]. "On Hawaiian Species of *Sphyradium*," by H. A. PILSBRY and C. M. COOKE, jun. [2 nn.spp. figured].

Records of the Australian Museum, vol. 6, no. 3, June, 1906.

"Mollusca from Three Hundred Fathoms off Sydney," by C. HEDLEY and W. F. PETERD [11 nn.spp. figured].

La Feuille des Jeunes Naturalistes (4), vol. 36, 37, nos. 429-434, July-Dec., 1906.

"Destruction des Escargots," by H. DU BUYSSON.

"Destruction des Limaces," by H. DU BUYSSON.

"*Petricola pholadiformis*," by Dr. BOULY DE LESDAIN. "Note sur un gisement quaternaire de la Charente-Inférieure," by J. COURJAULT.

"Etudes Malacologiques sur quelques Espèces Asiatiques qui se sont repandues dans le sous-centre alpin et hispanique," by E. CAZIOT, "avec le concours de" M. FAGOT. "A propos de *Petricola pholadiformis* de Lamarck," by LOUIS GERMAIN. "*Cochlicella barbara* L.," by J. GODON.

Journal de Conchyliologie, vol. 53, no. 4, vol. 54, nos. 1, 2, June-Nov., 1906.

"Liste des Mollusques recueillis par M. H. Mansuy en Indo-Chine et au Yunnan et description d'espèces nouvelles," by PH. DAUTZENBERG and H. FISCHER [15 nn. spp. figured]. "Addenda au Relevé des Mollusques terrestres et fluviatiles de la péninsule Arabique," by C. F. ANCEY [3 spp.].

"Note au sujet de *Pecten* de la République Argentine," by A. BAVAY [plate]. "Rectification de Nomenclature," by A. BAVAY. "Sur divers Mollusques terrestres de la Chine et du Japon," by C. F. ANCEY [3 nn. spp. figured]. "Additions au Relevé des Mollusques terrestres et fluviatiles de la Peninsule Arabique," by C. F. ANCEY. "Liste de coquilles marines d'Ambodifontra (Côte-Est de Sainte Marie de Madagascar)," by PH. DAUTZENBERG. "Sur l'identité du grand Cône du Pleistocène Méditerranéen et du *C. testudinarius* Hwass," by PH. DAUTZENBERG [figures]. "Espèces nouvelles ou peu connues du Mésozoïque Portugais," by PAUL CHOFFAT [2 plates].

"Addition à la faune malacologique du golfe de Gabès," by PAUL PALLARY [plate]. "Description de deux espèces nouvelles d'*Helicina*," by C. F. ANCEY [figures].

Nachrichtsblatt der Deutschen Malacozoologischen Gesellschaft, parts 3, 4, July-Dec., 1906.

"Neue Formen und Fundorte der Genera *Pomatias* Studer und *Auritus* Westerlund," by A. WAGNER [2 plates]. "Beiträge zur Molluskenfauna des Kroatischen Karstes," by TH. KORMOS. "*Lanzaia*, eine neue Gasteropoden-Gattung der Adria," by SP. BRUSINA [figure]. "Kurze Bemerkungen zu der Arbeit von Baron Rosen : Beitrag zur Kenntniss der Molluskenfauna des Kaukasus," by H. SIMROTH. "Eine neue *Nanina* [*N. hageni*] von der Insel Banka," by A. WEBER. "Bemerkungen zu *Vallonia excentrica* Sterki," by V. STERKI. "Zur Conchylienfauna des Löss im Géobiete der Donau," by S. CLESSIN.

"Bemerkungen zum Genus *Daudebardia* Hartmann," by A. WAGNER. "Einige Bemerkungen über die Systematik der Valvatidæ," by W. A. LINDHOLM. "Beitrag zur Molluskenfauna von Littanen," by W. A. LINDHOLM. "Einige Seltenheiten aus meiner Sammlung," by C. BULOW [2 plates]. "Beiträge zur Kenntniss des Albinismus bei Schnecken," by H. HONIGMANN. "*Physa acuta* Drap. in Deutschland eingebürgert," by V. FRANZ. "*Physa acuta* Drap. bei München," by C. SIGL. "Zwei neue *Murella*-arten [*M. rovellensis* and *sybaritica*]," by W. KOBELT. "Über *Helix* (*Vallonia*) *saxoniana* Sterki," by E. WÜST. "Die Verbreitung von *Helix* (*Vallonia*) *excentrica* Sterki," by E. WÜST. "Aus dem Leben einer *Ampullaria*," by C. BOETTGER. "Zur Kenntniss der Molluskenfauna von Montenegro," by J. PETRBOK.

Sinistral *Helix virgata*.—Last September on the day after the manoeuvres on the West Sussex downs, whilst looking at the tracks worn by the guns down a steep pathway near Stoughton I found a sinistral specimen of *Helix virgata*. Many of the type there had yellow mouths.—[Rev.] W. A. SHAW (Read before the Society, November 14th, 1906).

ON THE DISCOVERY OF *VITREA ROGERSI* IN ENGLAND

BY J. WILFRID JACKSON AND A. S. KENNARD, F.G.S.

(Read before the Society, January 9th, 1907).

THE discovery of this species in this country is, in our recent Conchological Manuals, attributed to the late Thomas Rogers, his specimens being determined as *Zonites glaber* Studer, by J. Gwyn Jeffreys, who published the subjoined note.¹ It would, however, appear that the species had been noticed and determined over thirty years previously by Wm. Gilbertson, of Preston, and J. Alder, of Newcastle. The account is to be found in a paper by Alder.²

It should also be noted that this species was figured as a variety of *alliaris* in 1841, by Dr. J. E. Gray,³ and is also mentioned by him in his editions of "Turton's Manual," 1840 and 1857.

Through the courtesy of Mr. E. Leonard Gill, of the Hancock Museum, Newcastle-on-Tyne, where the Alder collection now is, one of the writers (J.W.J.) has been able to see and verify the specimens referred to in Alder's paper. The shells, five in number, are mounted on a white card 3 ins. × 1½ ins., and labelled in Alder's handwriting—"*Zonites alliaris* var. ? — *glabra* ? near Preston, Mr. Gilbertson."

They are identical with the Marple *Vitrea rogersi*, with the exception that they are somewhat paler in colour which may be attributed to the age of the specimens and exposure to light.

It is also interesting to know that there are specimens of this species from Preston—presumably Gilbertson's—in the British Museum.

How the species, having once been noted, should have been overlooked by subsequent writers is indeed curious, and in justice to the memory of a Lancashire worthy, Wm. Gilbertson, who, alas, is almost forgotten, and of one of the most careful and competent students of British mollusca, Joshua Alder, we have written this note.

¹ *Ann. Mag. Nat. Hist.* (4) vol. 5, p. 385. 1870:—"My correspondent, Mr. Thomas Rogers, of Manchester, has added another species to this well-worked department of our fauna. Specimens of a *Zonites* which he has now sent me, collected by him under stones at Marple Wood, in Cheshire, prove to be the *Helix glabra* of Studer, Fér. Prodr. No. 215. . . . I also found the same species in 1846 at Grasmere, and in 1857 at Barmouth, but had overlooked it."

² "Notes on the Land and Freshwater Mollusca of Great Britain with a revised list species," *Mag. Zool. Bot.*, vol. 2, p. 108. 1837, and is as follows:—"Alliaris Miller var. *H. glabra* Studer? Mr. Gilbertson finds what he considers to be a variety of this species much larger than the usual size. This variety appears to be the *H. glabra* of Studer (Férussac Tab. des Moll. No. 215) judging from specimens in M. de Férussac's cabinet."

³ L. E. Adams, "Manual Brit. Moll.," ed. 2, 1896.

On the occurrence of *Vertigo pusilla* Müll. in Cheshire.—Quite recently I have had my attention called to the "Report of the Manchester Scientific Students' Association" for 1864 (published 1865), wherein, at page 15, in an account of an excursion to Marple, Cheshire, on August 20th, 1864, mention is made of a number of shells taken on the aqueduct, and amongst these *Vertigo pusilla* is included. For some reason, however, this locality for *V. pusilla* is omitted in Hardy's "Synonymic List of British Mollusca," published further on as an appendix to this Report (pp. 30-52). In the account of the ramble the late Mr. John Hardy is stated to have given an address on the plants and shells collected, and as he was a keen conchologist, it occurred to me that he had probably been the finder of the *Vertigo*, and the specimen or specimens still existed in his collection. Accordingly I made enquiries, and found that his son, Mr. J. Ray Hardy, has in his possession the local portion of his father's land and freshwater shells, and on my requesting him to look he not only found two of the specimens taken on the above occasion, but also came across another he had himself got at Marple in 1860, when shaking moss for Coleoptera in the wood between the old mill and the aqueduct. He also informs me that the late Mr. James Walkden obtained four specimens from the base of the aqueduct; these are, or should be, in Vernon Park Museum, Stockport, where Mr. Walkden's collection went after his death. The locality where these specimens were taken is now practically destroyed; the workmen employed in the periodical cleansing of the canal having for many years made a practice of tipping the sludge over the parapet wall, thus spoiling what was formerly a capital collecting ground. In searching out these records I was reminded of an almost forgotten episode which happened to Mr. Edward Collier and myself in May, 1899. We were collecting shells at the historic locality near Marple Hall, where the late Mr. Thomas Rogers first discovered *Vitrea rogersi*, when we turned up a single dead specimen of *V. pusilla*. Unfortunately this was accidentally broken when corking the tube into which it had been put, but not before we had had ample time to carefully examine and verify it. All our efforts to obtain further examples, both at the time and since, were unsuccessful. The incident was reported at a subsequent meeting of the Manchester branch, but was never properly recorded, as it was expected other specimens would be found during some of the many excursions made by Manchester conchologists to this favourite hunting ground. As this has not been done, I think it as well to get what records we have together, the evidence in hand being quite sufficient to give *V. pusilla* a place in the Cheshire list.—R. STANDEN (Read before the Society, November 14th, 1906).

Shells collected in Arran.—The following list of species may be of some interest to the members of our Society. Those marked * are believed to be new records:—*Vitrina pellucida*, **Hyalinia lucida*, *H. cellaria*, *H. helvetica*, *H. alliaria*, and var. *viridula*, *H. nitidula*, *H. radiatula*, *H. pura*, *H. crystallina*, *H. fulva*; *Helix rotundata*, *H. pulchella*, *H. aspersa* and var. *nigrescens*, *H. nemoralis*, *H. arbustorum*, *H. hispida* var. *concinna*, *H. fusca*; *Pupa anglica*, *P. cylindracea*; *V. antivertigo*, **V. substriata*, *V. edentula*; *Clausilia bidentata*; *Cochlicopa lubrica* and var. *hyalina*; *Succinea putris*; *Carychium minimum*; *Limnaea truncatula*; *Pisidium pusillum*.—F. H. SIKES (Read before the Society, January 9th, 1907).

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THE
JOURNAL OF CONCHOLOGY.

VOL. 12.

JULY, 1907.

No. 3.

ON THE MOLLUSCA OF A RAISED CORAL REEF
ON THE RED SEA COAST.

BY W. J. HALL AND R. STANDEN.

(Read before the Society, January 9th, 1907).

DURING the year 1906, Mr. Arthur G. Marshall, C.E., of Wallington, Surrey, sent for identification to the Manchester Museum a collection of shells obtained by him at Port Sudan, the terminus of a newly constructed railway on the west coast of the Red Sea, near Suakim. These shells we have identified, and although they all belong to modern species at present inhabiting the Red Sea, Mediterranean, and Indo-Pacific region, they nevertheless possess considerable interest. Most of them belong to the larger forms, but on carefully crushing and disintegrating the matrix of comminuted shell and coral enclosed between the valves of some large *Cardium subrugosum* we obtained quite a number of minute species, some being of genera which appear to be absent from such lists as we have had an opportunity of consulting. This has principally induced us to write a short account of Mr. Marshall's find, in the hope that the record may be of useful interest to students of the subject.

According to Mr. Marshall's statements the local geological formation is a plateau composed of coral and coralline limestone, extending to a hilly country some fifteen miles inland. The shells—the majority of which, though bleached, are not at all wave-worn, and in some cases still retain traces of their original colour—were obtained from one to two miles from the present coast-line. They were either found lying loose on the weather worn surface of the coral reef, or excavated from the consolidated coralline limestone, masses of which

are attached to many of the shells. The plateau lies mostly from fifteen to twenty feet above sea-level, extending in places from forty to fifty feet. It evidently belongs to the younger series of raised coral reefs, described by Barron and Hume under the heading of Pleistocene and Recent. These authorities state that the younger raised beaches and lower coral reefs, which flank the coast, vary in height from near sea-level to twenty-five metres (about eighty feet) above. While a higher and older reef series occurring at various levels between 115 and 170 metres (about 370 to 570 feet), and from four to seven kilometres (from three to four miles) inland, is distinguished—together with other and still older series—by a more or less different fauna from that of the younger. The fragments of coral accompanying the shells appear to be identical with recent reef-building *Madreporaria* and include *Madrepora*, *Dendrophyllia* and *Fungia*. Associated with them also are the flattened and bleached tests of a recent echinoderm, *Laganum depressum*, Nummulites, and Serpulæ.

To those seeking further information on the subject of the raised beaches and coral reefs of the Red Sea coasts and their conchological fauna, we would advise reference to the following papers:—

BARRON, T. and W. F. HUME: "Notes on the Geology of the East Desert of Egypt," *Geol. Mag.*, 1901, p. 154-161.

NEWTON, R. B.: "Pleistocene Shells from the Raised Beach Deposits of the Red Sea," *Ibid*, 1900, p. 500-514, pl. xx-xxii., and p. 544-560; bibliography, p. 557-558.

NEWTON, R. B.: "On some Pliocene and Post-Pliocene Shells from Egypt," *Ibid*, 1899, p. 402-407, pl. xix. and xx.

LIST OF SPECIES.

| | |
|--|---|
| GASTROPODA. | CONIDÆ. |
| HELICIDÆ. | Pleurotoma garnonsi <i>Reeve</i> |
| Helix (Eremina) desertorum <i>Forskål</i> | Pleurotoma (Turris) violacea <i>Hinds</i> |
| TORNATINIDÆ. | OLIVIDÆ. |
| Tornatina persiana <i>Smith</i> | Ancilla eburnea <i>Deshayes</i> |
| Tornatina voluta <i>Quoy & Gaimard</i> | MITRIDÆ. |
| SCAPHANDRIDÆ. | Mitra (Costellaria) cadaverosa |
| Atys naucum <i>Linné</i> | <i>Reeve</i> |
| Atys succisa <i>A. Adams</i> | Mitra (Cancilla) solandri <i>Reeve</i> |
| TEREBRIDÆ. | FASCIOLARIDÆ. |
| Terebra subulata <i>Linné</i> | Fusus tuberculatus <i>Lamarck</i> |
| <i>var. consobrina</i> <i>Deshayes</i> | TURBINELLIDÆ. |
| CONIDÆ. | Vasum turbinellum <i>Linné</i> |
| Conus (Lithoconus) vitulinus | Pyrula (Melongena) paradisiaca |
| <i>Bruguère</i> | <i>Reeve</i> |

BUCCINIDÆ.

Latrunculus sp., *internal cast of*
(*probably*)

L. valentinianus Swainson

NASSIDÆ.

Nassa pulla Linné

Nassa (Niotha) stigmaria A. Adams

MURICIDÆ.

Murex (Phyllonotus) anguliferus
Lamarck

TRITONIDÆ.

Lotorium (Simpulum) beccari
Tapparone Canefri

Lotorium (Simpulum) pileare Linné

Lotorium (Gutturium) trilineatum
Reeve

DOLIIDÆ.

Malea pomum Linné

CYPRÆIDÆ.

Cypræa carneola Linné

Cypræa caurica Linné

Cypræa erosa Linné

Cypræa helvola Linné

Cypræa lynx Linné

Cypræa pantherina Linné

STROMBIDÆ.

Strombus (Monodactylus) tricornis
Lamarck

Strombus (Canarium) fasciatus
Born

Pterocera (Heptadactylus) lambis
Linné

Rostellaria curvirostris Lamarck

CERITHIIDÆ.

Cerithium cæruleum Sowerby

Cerithium erythræense Lamarck

Cerithium rüppeli Philippi

Cerithium scabriusculum Issel

Vertagus asper Linné

Vertagus vulgaris Schumacher

Triforis (Mastonia) perlatus Issel

CÆCIDÆ.

Cæcum arabicus Issel

LITIOPIDÆ.

Litiopa (Diala) martensi Issel

RISSOIDÆ.

Rissoina ambigua Gould

Rissoina bellardii Issel

AMPULARIIDÆ.

Lanistes bolteniana Chemnitz

NATICIDÆ.

Natica marochiensis Gmelin

Natica (Mamma) candidissima
Le Guill.

Natica (Mamma) mamilla Linné

PYRAMIDELLIDÆ.

Odostomia carinata H. Adams

Eulimella arabica Issel

NERITIDÆ.

Nerita (Thelicosstyla) albicilla Linné

TURBINIDÆ.

Turbo chemnitzianus Reeve
(*internal casts*)

TROCHIDÆ.

Trochus bellairdii Issel

Trochus nabatæus Issel

Gibbula (Forskälia) declivis Forskäl

Monodonta dama Philippi

Priotrochus obscurus Wood

HALIOTIDÆ.

Haliotis unilateralis (Lam.)
Wienkauff

SCAPHOPODA.

DENTALIIDÆ.

Dentalium bisexangulatum Sowerby

Dentalium octogonum Deshayes

PELECYPODA.

SPONDYLIDÆ.

Plicatula plicata Forskäll

Spondylus aculeatus Chemnitz

Spondylus flabellum Reeve

LIMIDÆ.

Lima multicostata Sowerby

PECTINIDÆ.

Pecten (Pallium) plica Linné

| | | | |
|-------------------------|---|--|--|
| | AVICULIDÆ. | | VENERIDÆ. |
| Meleagrina | occa <i>Reeve</i> | | Circe pectinata <i>Gmelin</i> |
| | ARCADÆ. | | Circe tigrina <i>Lamarck</i> |
| Barbatia | barbata <i>Linné</i> | | Dosinia erythrea <i>Römer</i> |
| Barbatia (Acar) | divaricata <i>Sowerby</i> | | Venus (Chione) marica <i>Linné</i> |
| Anomalocardia | uropygmelana <i>Bory</i> | | Lucinopsis elegans <i>H. Adams</i> |
| Scapharca | scapha <i>Chemnitz</i> | | Tapes (Hemitapes) furcata <i>Römer</i> |
| Axinea | arabica <i>A. Adams</i> | | CYRENIDÆ. |
| Axinea | pectiniformis <i>Lamarck</i> | | Corbicula zelebori <i>Jickeli</i> |
| | CARDITIDÆ. | | Corbicula fluminalis <i>Müller</i> |
| Cardita | antiquata <i>Linné</i> | | SOLENIIDÆ. |
| | KELLYELLIDÆ. | | Solenocurtus strigilatus <i>Linné</i> |
| Kellya | suborbicularis <i>Montagu</i> | | MYIDÆ. |
| | TRIDACNIDÆ. | | Corbula sulculosa <i>H. Adams</i> |
| Tridacna | elongata <i>Lamarck</i> | | TEREDINIDÆ. |
| | CARDIIDÆ. | | Teredo navalis <i>Linné</i> |
| Cardium | sueziense <i>Issel</i> | | LUCINIDÆ. |
| Cardium (Trachycardium) | subrugosum <i>Sowerby</i> | | Lucina divaricata <i>Linné</i> |
| Cardium (Trachycardium) | unicolor <i>Sowerby</i> | | Lucina semperiana <i>Issel</i> |
| Cardissa (Lunulicardia) | subretusa <i>Sowerby</i> | | TELLINIDÆ. |
| Lævicardium | vitellinum <i>Reeve</i> | | Tellina (Tellinella) perna <i>Spengler</i> |
| | CHAMIDÆ. | | Tellina]Tellinella) rastellum <i>Hanley</i> |
| Chama | cornucopia <i>Reeve</i> .— <i>Bored</i> by <i>Lithophagus sp. indet.</i> | | Tellina (Acropagia) perplexa <i>Hanley</i> |
| | VENERIDÆ. | | Tellina (Acropagia) savignyi <i>A. Adams</i> |
| Lioconcha | picta <i>Lamarck</i> | | ANATINIDÆ. |
| Circe | crocea <i>Gray</i> | | Thracia oblonga <i>Reeve</i> |

Vivipara contecta monst. **sinistrorsum**.—In connection with my note on this in *J. of Conch.*, vol. 11, p. 224, I have quite recently, in the Manchester Museum Library, come across the "Minute Book of the Manchester Natural History Club, 1862," and on p. 100 find a reference which will be of interest, both on account of its establishing the correct locality for the specimen alluded to, and as shewing that when exhibited by Dr. Thomas Alcock at a meeting of the club on October 27th, 1862, its peculiarity was noticed. The following is a transcript of the paragraph:—"Dr. Alcock shewed six young specimens of *Paludina listeri* from Beswick Reservoir, taken and cleaned immediately after they escaped from the parent, and he suggested that they and the old shell—which is a very fine one—would make a good family group, and an interesting memento of the Beswick locality, now destroyed. Mr. Kenderdine noticed that one of the young shells was reversed."—R. STANDEN (*Read before the Society*, Dec. 12th, 1906).

**BIBLIOGRAPHY OF THE NON-MARINE MOLLUSCA
OF LANCASHIRE.**

BY J. WILFRID JACKSON.

(Continued from page 54).

1863. **Reeve, Lovell.**—The Land and Fresh-water Mollusks indigenous to, or naturalized in, the British Isles, London.

At p. 195, casual reference to *Paludina contecta* in Lancashire.

1863. **Marrat, F. P.**—*Helix nitida*: white variety. *Naturalists' "Scrap Book," Liverpool District*, part 1, p. 6.

Sent to author from Crosby as *H. purus*; three specimens found.

1863. **Gibson, T.**—*Bulinus tridens*. *Naturalists' "Scrap Book," Liverpool District*, part 2, p. 30.

A single specimen near Hightown on the Lancashire coast—new to the neighbourhood.

1863. **Brown, Chas. H.**—Southport Shells. *Naturalists' "Scrap Book," Liverpool District*, pt. 1 (first of second series), p. 112-113.

Zonites nitidus (Birkdale); *Clausilia laminata* (Birkdale); *Planorbis nautilus* (Birkdale Park), being additions to the author's list in Dr. McNicoll's "Handbook for Southport," in 1861.

1863. **Weld, Walter.**—Shells in the Neighbourhood of Crosby. *Naturalists' "Scrap Book," Liverpool District*, pt. 1 (first of second series), pp. 113-114.

Limneus auricularius; *Valvata cristata*; *Balea fragilis*; *Helix rotundata* var. *alba*, *H. aculeata*, all new to district; *Cyclas ovalis* (canal at Crosby).

1863. **Gibson, Thos.**—*Cyclas ovalis*, etc.—*Naturalists' "Scrap Book," Liverpool District*, part 2 (second of second series), pp. 126-127.

Comments on W. Weld's record—canal at Crosby—saying he found it in 1862, and again in 1863, in the canal at Litherland, with *Cyclas cornea*; *Pisidium amnicum*; *Dreissena polymorpha*; *Lymnea auricularis*, *L. peregra*; *Paludina tentaculata*; and *Valvata piscinalis*.

1863. **Weld, Walter.**—Additions to Crosby List. *Naturalists' "Scrap Book," Liverpool District*, part 9 (third of second series), p. 141-142.

Helix pygmæa; *Zonites purus*.

1863. **Gibson, Thos.**—*Anodonta anatina* var. *complanata*. *Naturalists' "Scrap Book," Liverpool District*, part 9 (third of second series), pp. 142-143.

Specimens of above found, also a var. named by author *pictorides*, in pits at Crosby.

1863. **Marrat, F. P.**—Shell Collecting: Land Shells. *Naturalists' "Scrap Book," Liverpool District*, pp. 23, 24, 37 and 55.
Helix nemoralis var. *hortensis* (near Crosby and Hightown), *H. rufescens* (Woolton Road, Wavertree), *H. radiatula*, *H. fulva*, and *H. chrystalleria* (Speke woods), *H. lucidus* (in a pond (!) at Huyton); *Vitrina pellucida* (Crosby and Southport), and many other species.
1863. **Marrat, F. P.**—Shell Collecting: Fresh-water Shells. *Naturalists' "Scrap Book," Liverpool District*, pp. 73-74.
Physa fontinalis (pond behind Zoological Gardens, Liverpool); *Planorbis glaber* (ditches at Crosby), and several others.
1863. **Daniel, John E.**—*Cyclas pallida* Gray; *Sphaerium ovale* Fér. *Zoologist*, xxi., p. 83+1.
 Leeds and Liverpool Canal record referred to.
1863. **Anon.**—Report of the Manchester Scientific Students' Association for the year 1862 (published 1863).
 At p. 14, *Paludina vivipara* referred to as existing in great numbers at Beswick, and found at Cheetham Hill, in pond, by Mr. S. Robinson.
1865. **Hardy, J.**—A Synonymic List of British Mollusca, Terrestrial and Fluvial. *Report of the Manchester Scientific Students' Association for the year 1864* [Appendix].
 Pages 30-52; Sixty-four spp. mentioned as occurring in the Manchester neighbourhood—localities cited. Author acknowledges indebtedness to Messrs. J. Walkden, T. Peace, Brockbank, Kelsall, Morley, Wilson, Parker, and J. Ray Hardy.
1866. **Alcock, T.**—Zoology. *Science Lectures for the People*. Manchester. Lecture, viii., pp. 113-128.
 References to the Fresh-water Pearl Mussel in the Lune; *Dreissena*, formerly common at Beswick, and now common in canals in the district; common Pond Mussel, found in the neighbourhood, and *Cyclas pallida*, found by Mr. Darbishire about five years previously in the Manchester district; very fine also at Accrington.
1866. **Hardy, J.**—Report of the Manchester Scientific Students' Association for the year 1865, [Appendix].
 At pp. 23-24; nine additional localities added to the 1865 list on the authority of Messrs. T. Kelsall, J. Walkden, T. Morley, and J. Ray Hardy.
1866. **Tate, Ralph.**—A Plain and Easy Account of the Land and Fresh-water Mollusks of Great Britain. London.
 Lancashire mentioned at p. 36 (*Cyclas ovalis*); and at p. 161 (*Vertigo alpestris*).

1867. **Higgins** [Rev.], **H. H.**—Notes on the Local, Natural, and Geological History of Rainhill. *Proc. Lit. and Phil. Soc., Liverpool*, xxi., p. 72.

Reference made to *Zonites excavatus*, *Z. radiatulus*, *Planorbis imbricatus*; also to "wall snail" and "garden snail."

1868. **Roberts, George.**—Shells seen or collected, early in June, during a Four-days' Walk in Lancashire and Craven. *Zoologist*, iii., (second series), pp. 1381-1383.

Near Morecambe—*Pisidium fontinale* var. *cinerea*; *Planorbis marginatus*, *P. spirorbis*, *P. contortus*; near Hornby—*Helix arbustorum* (a conical variety); Poulton-le-Fylde—*Cyclas cornea*; *Physa fontinalis*; *Planorbis nautilus*. Many other shells noted as common in the localities visited.

1869. **Jeffreys, J. Gwyn.**—On some British Freshwater Shells. *Ann. and Mag. Nat. Hist.* (4), iv., pp. 341-342.

Planorbis dilatatus of Gould discovered in the Bolton and Gorton canals by Mr. Thomas Rogers. Description of shell and animal given, also probable means of introduction. *Sphaerium ovale* also noted as occurring in canals at Manchester.

1870. **Jeffreys, J. Gwyn.**—New British Shells. *Sci. Goss.*, 1870, p. 130.

Planorbis dilatatus from Bolton Canal, collected by Thos. Rogers; references also made to *Sphaerium ovale* in canals near Manchester.

1870. **Rogers, Thos.**—New Shells. *Sci. Goss.*, 1870, p. 138.

Planorbis dilatatus in canals near Manchester.

1872. **Anon**—Report, Bury Natural History Society. Appendix, p. 49.

Nine spp. noted with localities.

1873. **Hardy, John.**—On the Occurrence of *Unio tumidus* in the Manchester District. *Proc. Lit. and Phil. Soc. Manch.*, xii., p. 117.

Considerable numbers observed at Barton.

1874. **Rogers, Thos.**—On the introduction of *Planorbis dilatatus* (Gould). *Proc. Lit. and Phil. Soc. Manch.*, xiii., pp. 174-175.

Found in June, 1869, in the Bolton canal at Pendleton, and afterwards in the Gorton canal. Probable means of introduction given at length.

1875. **Anon.**—On the Introduction of *Planorbis dilatatus* (Gould) into the British Isles. *Quart. Journ. Conch.*, i., p. 81.

Extract from Proceedings Nat. Hist. Sect. Manch. Lit. and Phil. Soc., 1874.

1876. **Collier, Ed.**—A white variety of *Limnæa palustris* taken at Southport. *Quart. Journ. Conch.*, i., p. 139.

Mentions also *Physa hypnorum* as common.

1877. **Alcock, R. H.**—*The Naturalist* (n.s.), ii., p. 187.

Helix aspersa and *Clausilia nigricans* from Whalley, exhibited at the meeting of the Bury Nat. Hist. Soc.

1877. **Nelson, Wm.**—*The Naturalist* (n.s.), iii., p. 12.

Planorbis dilatatus from the canal at Manchester, exhibited at meeting of Leeds Naturalists' Club and Scientific Association.

1879. **Anon.**—Geological Ramble to Worsley. *Report and Proc. Manch. Sci. Students' Ass.* for 1878, published 1879, p. 72.

Anodon cygneus noticed in thousands on the lake margin, Worsley.

1879. **Scharff, Robt.**—Exhibits. *J. Conch.*, ii., p. 285.

Shells from Carnforth, collected in a dead and bleached condition, in great heaps at the margins of freshwater ponds, including *Limnæa peregra*; *Valvata cristata*, *V. piscinalis*; *Bythinia tentaculata*; *Sphaerium corneum*; and a species of *Pisidium*.

1880. **Grassham, John.**—*The Naturalist* (n.s.), vi., p. 63.

Clausilia laminata from Grange, exhibited at meeting of the Leeds Naturalists' Club and Scientific Association.

1880. **Rimmer, Richard.**—The Land and Freshwater Shells of the British Isles. London.

Lancashire records at pp. 5, 17, 47, 65, 102, 137 and 162.

1880. **Butterell, J. D.**—Exhibits. *J. Conch.*, iii., p. 126.

Pisidium fontinale var. *cinerea* from Manchester.

1881. **Nelson, Wm.**—Exhibits. *J. Conch.*, iii., p. 146.

Zonites cellarius, *Z. alliaris*; *Helix hispida*, *H. rotundata*, *H. pulchella*; *Clausilia rugosa*; *Pupa umbilicata*; *Cochlicopa lubrica* var. *lubricoides*, from Furness Abbey.

1881. **Scharff, R.**—*Cyclostoma elegans* (Müll.) in the Lake District. *J. Conch.*, iii., p. 178.

At Silverdale, Lancashire.

1881. **Taylor, J. W.**—Life-Histories of British Helices. *J. Conch.*, iii., p. 255.

Helix arbustorum at Burnley (Bailey); Bootle near Liverpool (Williams); Hornby (G. Roberts).

1882. **Donald, Miss.**—Notes on the Land and Fresh-water Shells of Cumberland. *Trans. Cumb. Ass. Adv. Lit. & Science*, pt. vii.

At p. 52 notes *Bulinus goodalli* as found near Manchester by Mr. Williamson.

At p. 59 *Helix pulchella* Müll. referred to as occurring among moss at Furness Abbey.

1882. **Anon.**—Report of the Lower Mosley Street [Manchester] Schools' Natural History Society.

At p. 7 mention made of *Planorbis dilatatus* (canals at Bolton and Gorton), and *Pisidium nitidum* var. *globosa* (Swinton), both collected by T. Rogers.

1882. **West, W.**—Exhibits. *J. Conch.*, iii., p. 333.

Clausilia rugosa, *Helix hispida*, *Balea perversa*, *Cochlicopa lubrica*, and var. *lubricoides*, from near Morecambe; *Helix aspersa* from Coniston.

1882. **Roebuck, W. D.**—Exhibits. *J. Conch.*, iii., p. 338.

Zua lubrica, *Pupa umbilicata*, and *Zonites crystallinus*, from the top of Grange Fell.

1882. **Cooke [Rev.], A. H.**—On the MacAndrew Collection of British Shells. *J. Conch.*, iii., p. 380, *et seq.*

Fresh-water and Land Shells. Lancashire localities noted: Liverpool and Rochdale.

1883. **Brown, Charles H.**—Mollusca of Southport: Land and Fresh-water Shells. *Handbook for Southport*. London, 3rd edition, 1883, pp. 132-139.

Gives as additions to the 1861 list: *Zonites nitidus*; *Clausilia laminata* (? introduced); *Planorbis nautileus*; and *Limnaeus glaber*.

1884. **Adams, Lionel Ernest.**—The Collector's Manual of British Land and Freshwater Shells. London.

Lancashire references at pp. 14, 19, 22, 24, 31, 33, 37 and 40.

1884. **Collier, Edward.**—Exhibits. *J. Conch.*, iv., p. 153.

Physa fontinalis from Moss Side near Manchester.

1884. [**Recorder of the Conchological Society**]. *J. Conch.*, iv., pp. 175, 179 and 180.

Limax agrestis from South Lancashire; also Census for Vice-Counties 59, 60 and 69.

1884. **Collier, Edward.**—*Planorbis dilatatus* Gould. *J. Conch.*, iv., p. 217.

Considered to be now naturalised in its Lancashire locality; the disappearance of *Sphaerium ovale* from the canal at Pendleton is also noted.

1885. **Oldham, Charles.**—Fresh-water Shells eaten by Rats. *Naturalist*, 1885, p. 274.

At Birch, near Manchester, the shells eaten being *Paludina conlecta* and *Planorbis corneus*.

1885. **Roebuck, W. D.**—Exhibits. *J. Conch.*, iv., p. 314.

Shells from Lindale near Grange: *Helix aspersa*, *H. arbustorum*, *H. sericea*, *H. caperata*, *H. hispida*, *H. rufescens*, *H. rotundata*, *H. aculeata*, *Clausilia rugosa*, *Cl. laminata*, *Zua lubrica*, *Pupa umbilicata*, *Zonites cellarius*, *Z. alliaris*.

1885. **Taylor, J. W., and W. D. Roebuck.**—County records. *J. Conch.*, iv., pp. 320, *et seq.*

Census of the Authenticated Distribution of British Land and Freshwater Mollusca.

1885. **Rogers, Thos.**—Exhibits. *J. Conch.*, iv., p. 365.

Pisidium nitidum var. *globosa* and *P. pusillum* from Swinton, near Manchester.

1885. **Standen, R.**—Paper-eating Molluscs. *Sci. Goss.*, 1885, p. 238.

In a sheet of water near Prestwich; five species.

1886. **Cockerell, T. D. A.**—A September Walk through Lancashire, etc. *Naturalist*, 1886, pp. 55-56.

Made in 1885. Liverpool to Prescott, fourteen species of land shells noted. Prescott to Rainhill, one species of land and one of fresh-water noted. Rainhill to Warrington, five species of land and five species of fresh-water noted.

1886. **Taylor, J. W.**—Exhibits. *J. Conch.*, v., p. 87.

Helix virgata from between Lytham and Fleetwood, collected by Mr. W. H. Heathcote.

1886. **Standen, R.**—Lancashire Helices. *Naturalist*, 1886, p. 80.

Being detailed notes on the occurrence of *H. nemoralis*, *H. hortensis*, *H. caperata*, *H. ericetorum*, *H. virgata*, *H. aspersa*, *H. rufescens*, *H. rotundata*, *H. arbustorum*, and *H. hispida*, in various localities round Preston, at Manchester, Blackpool and Formby.

1886. **Roberts, Geo.**—Lancashire Helices. *Naturalist*, 1886, p. 163.

Referring to published notes and lists, as Cockerell's, Standen's, and Dyson's, mentioning species, and urging publication of detailed and further information.

1886. **Cockerell, T. D. A.**—Some varieties of British Slugs. *Nat. World*, iii., p. 179.

Including *Arion ater* var. *atra* Dum. and Mort., near Warrington.

1886. **Darbishire, R. D.**—Report on the Testaceous Mollusca of the L[iverpool] M.B.C. District. *First Report, Fauna of Liverpool Bay*, 1886, p. 234.

Helix nemoralis decreasing in numbers at Southport.

1887. **Melville, J. Cosmo.**—Mollusca [of Manchester district]. *Handbook, Brit. Ass.*, Manchester, 1887, pp. 78-87.

Enumeration of eighty-three spp. in systematic order, with localities; many of these, however, are in Cheshire.

1887. **Heathcote, W. Hy.**—Lancashire Notes. *Nat. World*, iv., p. 38.

Made at Morecambe and Heysham, September 7th, 1886; *Helix aspersa* and var. *minor*, *H. rufescens*, *H. caperata* and vars. *ornata* and *gigaxii*, *H. nemoralis*, *H. hortensis*, *H. hispida*, *H. rupestris*, *H. pulchella* and var. *costata*, *H. rotundata*; *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*; *Vitrina pellucida*; *Cochlicopa lubrica* and var. *hyalina*; and *Pupa umbilicata*.

1887. **Roberts, George**.—Notes on Varieties of *Bythinia tentaculata*. *Naturalist*, 1887, pp. 19-20.

Monst. *decollatum*, from Prestwich (coll. B. Tomlin), referred to.

1887. **Tomlin, Brockton**.—Monstrosities of various Lancashire Shells. *Naturalist*, 1887, p. 20.

Terebrum of *Planorbis complanatus*, Rochdale; *sinistrorsum* and another monstrosity of *Helix aspersa* from Ulverston.

1887. **Standen, R**.—Lancashire Land and Freshwater Mollusca. *Naturalist*, 1887, pp. 155-176.

A detailed enumeration of the forty-one fresh-water and thirty-nine land shells and seven slugs recorded for Lancashire, based upon Dyson's 1850 and Hardy's 1865 lists, and upon the observations of the author and of W. H. Heathcote, F. C. Long, R. D. Darbishire, T. Rogers, and others; at p. 176 are noted intentional introductions of species into fresh localities.

1887. **Cockerell, S. C.**—Mollusca of Coniston and Carnforth, Lancashire. *Naturalist*, 1887, p. 190.

At Carnforth—*Limax agrestis*; *Vitrina pellucida*; *Zonites cellarius*, *Z. radiatulus*, *Z. purus*; *Helix aspersa*, *H. nemoralis*, *H. aculeata*, *H. ericetorum*, *H. rufescens*, *H. pulchella*, *H. rotundata*, *H. rupestris*; *Bulimus obscurus*; *Cochlicopa lubrica*; *Pupa umbilicata*; *Vertigo edentula*; *Clausilia rugosa*; and vars. *dubia* and *tumidula*; noted: At Coniston—*Valvata piscinalis*; *Physa fontinalis*; *Limnæa peregra* var. *lacustris*; *Ancylus fluviatilis*; *Arion ater* and var. *albolateralis*, *A. bourguignati*; *Limax agrestis*, *L. lævis*, *L. arborum*; *Vitrina pellucida*; *Zonites alliarius*, *Z. nitidulus*, *Z. radiatulus*, *Z. fulvus*, *Z. excavatus*, *Z. crystallinus*; *Helix aspersa*, *H. nemoralis*, *H. hispida*, *H. rotundata*; *Pupa umbilicata*; *Clausilia rugosa*; and *Cochlicopa lubrica* noted.

1887. **Taylor, J. W.**—Exhibits. *J. Conch.*, v., p. 134.

Planorbis dilatatus from Gorton Canal (coll. T. Rogers).

1887. **Taylor, J. W.**—Exhibits. *J. Conch.*, v., p. 140.

Planorbis spirorbis, distorted, found at Tarleton, S. Lancashire, by Mr. W. H. Heathcote.

1887. **Heathcote, W. H.**—*Physa fontinalis* var. *albida* at Farington, S. Lancashire. *J. Conch.*, v., p. 185.

Two found in 1887.

1887. **Collier, E.**—Exhibits. *J. Conch.*, v., p. 202.

Planorbis dilatatus from canal at Reddish, and *P. spirorbis*, curiously distorted, from a ditch at Rusholme, Manchester.

1887. **Bates, J.**—Additional note on *Planorbis dilatatus* and Pl. glaber at Burnley. *J. Conch.*, v., p. 221.

Discovered June, 1886, amongst *Valvata piscinalis*.

1887. **Heathcote, W. H.**—Exhibits. *J. Conch.*, v., p. 248.
Unio margaritifera from the river Lune at Halton.

1887. **Heathcote, W. H.**—Lancashire Notes. *Nat. World*, iv.,
p. 57.

Made at Tarleton, etc., near Preston ; twenty-seven aquatic species mentioned as taken in the canal and in the ponds and ditches in the district.

1887. **Wildman, J. Russell.**—Lancashire Notes. *Nat. World*,
iv., p. 79.

A list of twenty-six freshwater species found in the Leeds and Liverpool Canal at Burnley ; also of fifteen land shells found on the margin.

1887. **Bates, Joe.**—*Planorbis dilatatus* at Burnley. *Nat. World*,
iv., p. 83.

Shells identified by Mr. Rogers.

1887. **Wildman, J. Russell.**—Lancashire Notes : Conchology.
Nat. World, iv., p. 100, (Erratum), p. 116.

List of some twenty species of *Vittrina*, *Zonites*, *Helix*, *Bulimus*, *Ancylus*, *Limnæa*, *Sphærium*, and *Carychium*, besides varieties, taken at Whalley and Simonstone.

1887. **Long, Francis C.**—A Burnley Pond. *Nat. World*, iv.,
p. 130.

Containing *Sphærium lacustre*, *Valvata piscinalis*, *Planorbis albus*, and *Limnæa peregra* in abundance ; *Pl. nitidus* and *Pl. glaber* moderately plentiful ; a few *Sph. corneum* ; and *Pl. dilatatus* very plentiful and fine.

1887. **Long, Francis C.**—*Cochlicopa tridens* var. *crystallina*.
Nat. World, iv., p. 131.

On the Whalley Road, at Read, near Burnley, three found, June 4th, 1887 ; new for Lancashire ; type also found there, and *Zua*, *Helix nemoralis*, *H. arbutorum* and var. *pallida*, *H. rufescens* and var. *alba*, *Hyalinia cellaria*, *H. alliaria*, *H. fulva*, *H. nitidula*, *H. glabra*, *Vittrina*, *Bulimus obscurus*, and *Carychium*.

1887. **Cockerell, T. D. A.** *Proc. Zool. Soc.*, 1887, p. 362.

Arion bourguignati Mab. found at Coniston, Lancashire, by his brother.

1887. **Rogers, T.** *Conch. Exchange*, Philadelphia, i., p. 63.
Planorbis dilatatus Gould, in England.

1887. **Fischer, Paul.** *Man. Conch. et de Paléo. Conch. ou Hist.*
Nat. des Moll. Viv. et Fossiles. Paris, 1887.

P. 108. *Planorbis* from Rochdale, figured as in "Woodward's Manual."

1887. **Heathcote, W. H.**—Exhibits. *J. Conch.*, v., p. 205.
Bythinia tentaculata, curiously and extensively eroded, from Tarleton, S. Lancashire; *Helix hispida* and var. *albida* from Penworthan; *Cochlicopa lubrica* var. *hyalina* from Morecambe, W. Lancs.
1887. **Rogers, Thos.**—On *Planorbis dilatatus*, Pl. glaber and *Sphærium ovale*. *J. Conch.*, v., pp. 218-220.
 Their introduction into canals near Manchester and at Burnley, and the conditions under which they flourish.
1888. **Hanitsch, Richard.**—Contributions to the Anatomy and History of *Limax agrestis*. *Proc. Liverp. Biol. Soc.*, ii., 1887-8, publ. 1888, pp. 152-170, and plates 10-12.
 Based on examples from an old quarry near Liverpool, near the "Calderstones"; habitat stated and anatomy described.
1888. **Fitzgerald, F. R.**—Exhibits. *J. Conch.*, v., p. 272.
Limnæa stagnalis from Burnley and Manchester.
1888. **Taylor, J. W.**—*Unio pictorum* var. *latior* Jeffr. in Lancashire. *J. Conch.*, v., p. 331.
 One found in the canal at Burnley by F. C. Long.
1888. **Roberts, Geo.**—*Sphærium rivicola* var. *flavescens* Pascal. *Sci. Goss.*, 1888, p. 91.
 From Lancashire.
1888. **Cockerell, T. D. A.**—North of England Specimens in the British Collection at the British Museum. *Naturalist*, 1888, pp. 227-229.
 Includes *Helix nemoralis* vars. *libellula* and *petiveria* 12345 from Lytham; *H. rufescens*, *H. hispida*; *Zonites excavatus*, *Z. nitidulus* var. *helmii*, *Z. glaber*; *Vertigo edentula*, *V. substriata*, *V. pygmæa*; *Clausilia dubia*, *Acme*, and *Pisidium henslowianum* from Preston; *Planorbis marginatus* m. *terebrum*, and *Pl. fontanus* from Rochdale; *Pl. dilatatus* from Manchester; *Anodonta cygnæa* var. *zellensis* from Liverpool, with particulars.
1888. **Wildman, J. Russell.**—*Helix nemoralis* var. *scalariforme*. *Sci. Goss.*, 1888, p. 209.
 Near Burnley.
1888. **Wildman, J. Russell.**—*Planorbis dilatatus*. *Sci. Goss.*, 1888, pp. 209-210.
 In a pond and in the canal at Burnley, associated in the pond with *Planorbis glaber*, *P. albus*, and *Bythinia leachii*, and a growth of *Potamogeton crispus* and *Elodea cana.lensis*; details of habitats and opinions on the "introduction" question given at length.
1888. **Long, F. C.**—A Queer Place for Shells. *Sci. Goss.*, 1888, p. 281.

The engine-cistern at Gannow weaving-shed, Burnley, sixty feet above the canal, containing *Sphærium corneum*, *Sp. lacustre*, *Valvata piscinalis*, *Bythinia tentaculata*, *Limnæa peregra*, *Planorbis albus*, *Pl. corneus*, *Pl. nitidus*, *Pl. glaber*, and thousands of *Pl. dilatatus*.

1888. **Williams, J. W.**—The Shell-Collector's Handbook for the Field.

Planorbis dilatatus referred to at p. 70.

1888. **Rogers, Thos.**—*Proc. Manch. Lit. and Phil. Soc.*, Feb. 13th, 1888, ser. 4, vol. i., 1888, p. 99.

Pearl mussels (*Unio margaritifera*) exhibited from river Lune, where first discovered about forty years ago by David Dyson, and rediscovered in 1887 by Robert Standen.

1888. **Narramore, W.**—A Phenomenon. *Research*, July, 1888, p. 11.

With a passing reference to *Limnæa stagnalis* at Huyton, South Lancashire.

1889. **Roebuck, W. Denison.**—*Limax flavus* var. *rufescens* in West Lancashire. *J. Conch.*, vi., p. 52.

At Avenham Lane, Preston, not uncommon.

1889. **Heathcote, W. H.**—*Helix aculeata* Müll. in South Lancashire. *J. Conch.*, vi., p. 84.

At Farington, near Preston; only three previous records.

1889. **Taylor, J. W.**—Exhibits. *J. Conch.*, vi., p. 86.

Dreissena, *Neritina*, and *Ancylus fluviatilis*, from near Preston (for R. Standen); *Sphærium ovale* and *Planorbis dilatatus* from a new locality near Blackburn (for W. H. Heathcote).

1889. **Heathcote, W. H.**—Exhibits. *J. Conch.*, vi., p. 89.

Helix nemoralis var. *undulata* from Southport.

1889. **Taylor, J. W.**—Exhibits. *J. Conch.*, vi., p. 99.

Helix aculeata from Farington, near Preston (for W. H. Heathcote).

1889. **Anon.**—Manchester Conchological Society. *Research*, March, 1889, p. 157.

Peculiar forms of *Limnæa palustris*, Clayton-le-Moors; and labiate *L. peregra*, Burnley, shown.

1889. **Roebuck, W. Denison.**—*Limax agrestis* var. *albida* near Preston. *Naturalist*, 1889, p. 212.

One nearly adult at Walton-le-Dale, with abundance of the type and var. *sylvatica*; *Arion bourguignati* and *Limax maximus* also.

1889. **Heathcote, W. H.**—Darts. *Sci. Goss.*, 1889, p. 90.

Absent from a number of mature *Helix aspersa* found near Blackpool in 1888, but present in *H. nemoralis* at same place and time.

1889. **Cockerell, T. D. A.**—Variation in the Mollusca. *Sci. Goss.*, 1889, p. 212.
 Argumentation, supported by references to *Arion ater* var. *nigra* at Warrington, and *Amalia gigates* var. *rava* from Lancashire.
1889. **Wigglesworth, R.**—Discovery of Pupa cinerea in Lancashire. *Sci. Goss.*, 1889, p. 281.
 Near Accrington, where it has been taken four times in twelve years, in a well-wooded, out-of-the-way place, unlikely for introduction.
1889. **Cross, W. M.**—Among the Fylde Flowers. *Wesley Naturalist*, 1889, p. 5.
Physa hypnorum abundant in ponds among the dunes at Lytham and St. Annes.
1889. **Williams, J. W.**—Land and Freshwater Shells. London. *Planorbis dilatatus* cited at p. 68.
1889. **Taylor, John W. and Roebuck, W. Denison.**—Census of the Authenticated Distribution of British Land and Freshwater Mollusca. *Land and Freshwater Shells* (by J. W. Williams).
 County records, pp. 95-108.
1890. **Beaumont, C. R.**—A Ramble round Daisy Nook. *Trans. Rochdale Lit. and Sci. Soc.*, ii., 1889-90, publ. 1890, p. 67.
 Near Oldham; *Anodonta cygnæa*, *Unio*, *Lymnæa stagnalis* in the canal noted.
1890. **Cockerell, T. D. A.**—Varieties of Mollusca. *Sci. Goss.*, 1890, pp. 4-5.
Limnæa peregra var. *boissii* Dup., Tarleton; and *solemia* Zgl., Southport.
1890. **Williams, J. W.**—*Helix hortensis* var. *trochoidea* (Cless.) *Sci. Goss.*, 1890, p. 232.
 At Clayton-le-Moors (R. Wigglesworth); locality afterwards corrected to Simonstone by R.W.
1890. **Wigglesworth, R.**—Re *Helix hortensis* var. *trochoidea* (Clessin). *Sci. Goss.*, 1890, p. 263.
 Corrects locality; Simonstone, not Clayton-le-Moors, as stated by Williams.
1890. **Wigglesworth, R.**—Banded *Cochlicopa lubrica*. *Sci. Goss.*, 1890, p. 263.
 Found at Clayton-le-Moors.

(To be continued).

Note on *Paludestrina confusa* from Oulton Broad.—In the year 1903 Mr. J. R. Le Brockton Tomlin presented to the British Museum a series of specimens of a *Paludestrina* from Oulton Broad, in Suffolk, which were subsequently identified for him by Dr. Brettger as the *P. anatina* (Drap.)¹ They were all dead specimens. At the end of last September Mr. A. Mayfield very kindly sent me some living examples of this species, which he had collected in the same locality. Not being satisfied with the determination of these shells I have put together the following notes. Poiret in 1801² described very briefly a species under the name of *Bulimus anatinus* from "Les environs de Paris?" and a variety of it from the mouth of the river Somme in the north of France. As he gave no figure and his diagnosis consisted of only a dozen words, it is impossible to know what shell or shells he had before him. In 1805 Draparnaud³ published a *Cyclostoma anatinum* without mentioning any special locality, but merely stated that it lived in "les eaux douces." He made no reference to Poiret's *Bulimus anatinus*, and from his description and figure it is quite impossible to know with certainty whether he had Poiret's species or a different one before him. According to Jeffreys,⁴ who examined Draparnaud's "original types or specimens," it was the *Hydrobia ulvae*. This, however, must I think be a mistake, for Draparnaud's diagnosis certainly does not apply to that species. "Coquille ovale et un peu conique, blanchâtre, lisse, transparente. Spire de quatre demi-tours," etc. Contrast these words with Jeffreys' own description of *ulvae*,⁵ and it will at once be seen that different shells were before these authors, "shell oblong, rather solid, opaque and of a dullish hue: whorls 7-8," etc. Moreover, Draparnaud's figure is unlike any specimen of *ulvae* I have ever seen, and the size of the shell is much too small. I therefore feel convinced that Jeffreys was misled, or made a mistake in this instance. He also states⁶ that "the late M. d'Orbigny gave me, at Rochelle, in 1830, some shells which he had received from Draparnaud under the name of *Cyclostoma anatinum*." These he considered a small variety of *Bythinia leachii*. Moquin-Tandon⁷ considered "*C. anatinum* Drap. = *Bythinia anatina*, mollusque marin," and the *Bulimus anatinus* of Poiret⁸ he regarded as the same species. The latter, according to Küster,⁹ is the same as Draparnaud's *C. anatinum*, and Frauenfeld held the same view.¹⁰ The shell described and figured, however, by Küster, is quite distinct from the *Hydrobia ulvae*, with which Jeffreys united Poiret's species. Forbes and Hanley did not refer to the *Bulimus anatinus* of Poiret, but thought it probable that Draparnaud's *Cyclostoma anatinum* was the same as the British species which is now known as *Faludestrina confusa* (Frauenfeld). Jeffreys, differing where he possibly could with the authors of the British Mollusca, as I have already shown, held a different view respecting that species. Considering the doubt which surrounds both the *Bulimus anatinus* Poiret and the *Cyclostoma anatinum* Drap., it seems to me advisable to put them both aside as beyond recognition, unless the undoubted types can be studied and identified. The shells from Oulton Broad might, I think, be considered to belong to *P. confusa* (= *similis*, Auct.), for I cannot see that they are "abundantly distinct" from that species, as Mr. Tomlin suggests. Freshwater shells are eminently variable, and the differences cited by Mr. Tomlin are less than I find in a series of *P. jenkinsi* from different localities. The animal did not offer any features distinctive from those of *P. confusa* from the Thames.—E. A. SMITH (Read before the Society, December 12th, 1906).

1 *Journ. of Conch.*, vol. 11, p. 11.

2 "Coq. fluv. terr. Aisne et Paris, Prodrome," p. 47.

3 "Hist. Nat. Moll. France," p. 37, pl. 1, fig. 24.

4 "Brit. Conch.," vol. 1, p. 310.

5 *Op. cit.*, vol. 4, p. 52.

6 "Brit. Conch.," vol. 1, p. 62.

7 "Hist. Nat. Moll., France," vol. 2, p. 506.

8 *L. c.*, p. 314.

9 "Conch. Cab. Paludina," p. 76, pl. xiii., figs. 16, 17.

10 *Verhandl. zool.-botan. Gesell. Wien*, 1864, vol. xiv., p. 570.

NUDIBRANCHS FROM THE INDO-PACIFIC.

III.

By SIR CHARLES ELIOT, K.C.M.G.

(No. I., *Journal of Conchology*, Oct., 1905; No. II., ditto, April, 1906).

(Read before the Society, June 12, 1907).

THE present paper contains a description of a new Dorid from Zanzibar, and notes on a small collection of Nudibranchs from Singapore, as well as on living specimens of *Doridopsis gemmacea* and *Melibe pilosa*, which I was enabled to examine last year at the Biological Station of Misaki in Japan, thanks to the courtesy of Professors Mitsukuri and Ijima. The colour and shape of Nudibranchs vary so much and are so often changed or distorted in preserved specimens that no apology is necessary for an account of the external characters as they appear in life.

The data given here entirely support the idea that as far as Nudibranchs are concerned the whole Indo-Pacific area forms one province. The southern parts of Japan appear to be just on the border line. A northern element is visible there, but still several tropical forms extend at least as far north as Yokohama.

Many of the species described from the Indo-Pacific are probably mere varieties, but the synonymy of the group cannot be satisfactorily elucidated until we have much ampler records of the limits of variability in the external characters of living animals, and also in such internal features as the radula. To some extent the variations appear to be local. Thus, specimens of *Chromodoris quadricolor* (= *Chr. elizabethina*) and *Chr. runcinata* from East Africa show slight but consistent differences from specimens obtained in the Philippines. On the other hand, an inspection of a large number of living specimens captured in one locality hardly ever fails to discover considerable variation in coloration and some in shape; so that the tendency to vary is clearly found everywhere and is not merely the result of difference of locality.

A.—NUDIBRANCHS FROM ZANZIBAR.

Artachæa clavata sp. nov.

Artachæa, Bergh, "Beiträge zur Kenntniss der japanischen Nudibranchien, II.," *Verh. k. k. zool. bot. Gesellsch., Wien*, vol. 31, 1881, p. 231, pl. vii., figs. 16-21, viii., figs. 1-6.

Seven specimens from Kokotoni, Zanzibar, given me by Mr. Völtzkow. The largest is somewhat bent, but measures about 70 mm. in length, and 48 mm. in breadth. The shape is plump, the back

somewhat arched or dome-shaped, the dorsal-margin thick, and the whole surface hard and harsh to the touch. The back is covered with large flat warts, as much as 3 mm. in breadth, with intervals of 3-4 mm. between them. There are no small warts between the large ones, but near the mantle margin they become smaller and crowded. The warts are lighter in colour than the dorsal surface, which in all specimens shows traces of a considerable amount of deep violet colour. But this colour is not evenly distributed in any of the specimens, and one of them suggests that in life the animal is mottled with purple and yellow on both the upper and the lower surface. In some specimens, but not in all, there are traces of a whitish reticulation between the warts. The sheaths of the rhinophores are variously developed in the different specimens, but in all are raised and divided into three or four more or less distinct lobes round the opening. On the sides of the sheaths are small tubercles. The branchial pocket is also variously shaped; in most specimens it is crenulate, but in two it is circular and even. There are no tubercles on the edge, but below the edge are one to four rows of small tubercles on the sides. The branchiæ are eight in number, with a ninth extra plume in some specimens; they are tripinnate, but in places only bipinnate. The plumes are tall, with a very broad main rhachis, but rather thin and scanty. Those in front are ampler than those behind.

The integuments are full of spicules which are specially crowded in the dorsal tubercles; they are straight or slightly bent, and when perfect somewhat pointed at both ends, but they are never branched or jointed. The mantle margin overhangs the foot on all sides; it is thick and stiff, and bears on its underside small tubercles; they are most numerous near the edge, and contain agglomerations of spicules. The tentacles are large and flattened, though it is not clear if this flat shape is natural, or the result of compression. The anterior margin of the foot is grooved, and the upper laminæ appears to be notched, though it is hard to say if the notch is natural, since this part is much contracted and wrinkled in all the specimens.

The interior of the body is infested by enormous numbers of a nematode worm. It is twisted round the various organs, or coiled up in the spaces in tangles resembling bundles of thread; it is especially frequent in the pericardium, in the blood spaces, round the central nervous system, and in the genitalia. It is surprising that the animals can have supported such numbers of parasites in such important organs. Externally, they show no signs of disease, and though the internal tissues are not in good condition, this may be the result of decay as much as of the attacks of the worms.

When the body is opened the purple blood-gland is a conspicuous object. It is thick and very ample. The buccal parts are also

purplish. On the labial cuticle is a greyish armature composed of small rods, slightly bent; it is very faint and shadowy, but still a definite armature, and not merely scattered rods. The radula consists of thirty to thirty-five rows, containing from 120 to 150 teeth on either side of a rather broad rhachis. There is no central tooth. The innermost teeth are low and broad, with a prominence on the inner side, bearing about five denticles. On the outer side are five to six rather irregular denticles. The second tooth is also rather low, but has no denticles on the innerside; the denticles on the outside are strong, but set rather low down. The teeth become gradually taller, and have denticulations higher up the shaft, until the definite form is attained about the fifth tooth; after this the teeth have long and rather wavy bases and a slender shaft, hamate, but very erect. From many points of view they look smooth, but all are denticulate on the outer side; the denticles are as many as eighteen, but are sometimes very faint. The teeth increase gradually in size until almost the end of the row. The two or three outermost are shorter and degraded, with a wavy or spoon-like outline, but not denticulate on the top. The salivary glands are large flat bands, which enter the buccal mass without contracting into a thin duct. Their distal ends are expanded and foliaceous.

The central nervous system is with difficulty separable from its capsule and from the blood-gland which adheres to its upper surface. The main portion forms a continuous yellow mass, not divided into distinct ganglia, though the cerebro-pleural and pedal parts are indicated by lobes. The eyes are sessile. The common commissure is thick and short. The cerebro-buccal connectives are longer and thinner. The buccal ganglia are round and connected by a short commissure; the gastro-oesophageal ganglia are elliptical.

The oesophagus is thin. The small stomach is entirely enclosed in the dark-brown liver. The intestine issues about the middle of the liver, runs forward and then backward. The hermaphrodite gland forms a thin whitish layer—sometimes merely a dendritic pattern—on the surface of the liver. Its ampulla is long and bent two or three times on itself. On the male branch is a large prostrate gland, roughly triangular, and bent on itself, so as to appear bilobed; from it issues the very long, much coiled vas deferens, consisting of two parts: the upper, comparatively thick and large; the lower, which terminates in the verge, thin and muscular. This lower portion and the verge are armed with thick-set spines, which have a stout base, from which rises a thinner apex, sometimes irregularly bent. The spermatheca is large, with thin walls, and apparently of globular shape, but it is indented and broken in most specimens, and the contents are not compact. The spermatocyst is much smaller, ellip-

tical, and the contents are hard. The duct leading from the spermatheca to the external female orifice is long, convoluted in the upper part, but straighter and broader near the orifice. In this lower part are folds, tubercles, and prominences, which look like scales, but apparently no hard armature. Near the female orifice is a large vestibular gland, with a laminated interior, and (it would seem) another gland containing a hard stylet. These two glands appear to be separate, but owing to the hardened condition of the tissues and the presence of numerous parasites, their relations could not be determined with certainty. The mucus gland opens into a broad tube.

The chief characters of the animal described above seem clear. It is of hard consistence, with large simple tubercles or warts on the back and tripinnate branchiæ. The labial armature and radula, which has denticulate and differentiated teeth, are much as in *Chromodoris*. The stomach is enclosed in the liver, the male genitalia are armed with spines, and there is a prostate. The oral tentacles are large, and there are small tubercles on the lower side of the mantle.

These characters do not entirely coincide with those assigned to any of the established genera, but at the same time do not seem to me sufficiently divergent to justify the creation of a new genus. In many points the animal agrees with *Chromodoris*, but its general habitus is altogether dissimilar,¹ and it has also tripinnate branchiæ and an armature on the male organs. These two latter characters also distinguish it from *Spherodoris*, from which it further differs in the details of its dentition, and in having large tentacles. It has also many of the characters of *Cadlina*, but *Cadlina* has a median tooth, and though some of the species are tuberculate (especially *C. marginata* and *C. flavomaculata*) the tubercles do not assume the proportions shown by these specimens. On the whole it is perhaps best assigned to *Artachæa*. It differs from the only described species of that genus (*A. rubida* Bergh) in three chief points. Firstly, it has a labial armature, but it is inconspicuous and slightly developed. Secondly, not only are the teeth of the radula denticulate, but, as in *Chromodoris*, the innermost laterals are broad and denticulate on both sides, whereas in *A. rubida* only the teeth in the outer half of the rows are finely serrulated. But Bergh's plates (l.c.) represent the innermost teeth as having a projection on the inner side, although it does not bear denticulations as in these specimens. Thirdly, it has a prostate, which seems to be absent in *A. rubida*. I think the genera *Artachæa*, *Cadlina*, *Spherodoris*, and such forms as *Chromodoris scabriuscula* are more nearly allied than is suggested by Bergh's

¹ But the anomalous *Chr. scabriuscula* Bergh has a hard consistency and a tuberculate back.

arrangement, according to which they all come under different sub-families. Possibly *Aldisa* belongs to the same group. It is warty, not villous like *Thordisa* and *Diaulula*, with which Bergh associates it, and it has denticulate teeth of an unusual form; also an armature on the genitalia.

It is possible that this animal is the same as that described by me (*Proc. Zool. Soc. Lond.*, 1903, p. 363) as *Staurodoris depressa*, the small labial armature having been overlooked or being really undeveloped. But, besides anatomical discrepancies, the external appearance of the specimens does not suggest identity. It is probable, however, that the species *depressa*, doubtfully referred by me to *Staurodoris*, is really more nearly related to *Artachua*.

B.—NUDIBRANCHS FROM SINGAPORE.

When I visited the museum at Singapore last August (1906) the authorities most kindly gave me some specimens of Nudibranchs recently captured in or near the harbour. They are well preserved, and appear to have kept their original colour to a considerable extent. The species and the localities from which they have previously been recorded are as follows:—

- 1.—**Kentrodoris maculosa** (Cuv.), recorded previously from the Philippines, Ternate, Java, Ceylon, east coast of India, and (?) Vanikoro.¹
- 2.—**Chromodoris lineolata** (Van Hasselt), Java, Philippines, Borneo, Torres Strait.
- 3.—**Casella atromarginata** (Cuv.), Philippines, Persian Gulf, N. Australia, Polynesia, Zanzibar, Siam.
- 4.—**Phyllidia elegans** Bergh, Philippines, Amboina.
- 5.—**Placobranchus ocellatus** Van Hasselt, Java, Philippines, Siam, Zanzibar, Polynesia.
- 6.—**Elysia faustula** Bergh, Philippines, E. Africa.

This distribution is what might be expected. All the Singapore species are recorded from the Malay Archipelago and nearly all from other parts of the Indo-Pacific area. It is likely that they will all prove to be distributed over the whole of that area.

Many of the Singapore specimens (particularly those of *Kentrodoris maculosa*, *Casella atromarginata*, and *Placobranchus ocellatus*) seem to have a lighter and more uniform coloration than that which is usually ascribed to the species.

Kentrodoris maculosa (Cuv.).

Bergh, "Opisthobranchiaten," in Kükenthal, *Wissenschaftliche*

¹ I have some doubts as to whether the animal described by Quoy and Gaimard from this locality is really the same species.

Reiseergebnisse, 1897, p. 98, and references given there; Eliot, "Nudibranchs of Southern India and Ceylon," *Proc. Zool. Soc.*, 1906, pp. 649-651.

Two specimens, plump and soft; the larger is about 62 mm. long and 27 mm. broad. The colour is white, with black or brown rings on the back; the rings in the middle are larger but fainter. The pockets of the rhinophores are large, but the edge is only slightly raised. The stalk of the rhinophores is white; the perfoliate part at the tip deep black. The branchial pocket is a transverse slit; the margin is moderately developed and reflexed. The branchiæ are six, tripinnate, longish, but not very ample, whitish, with a good deal of black pigment. Probably the stem is black in all the smaller ramifications. On the margin of the foot is a rather irregular row of dark spots. As usual in the genus, the foot is slit transversely in front, and the upper lamina divided so as to form two ample lappets. The head is large; the oral tentacles are also large, white, tipped with black. A large number of specimens are preserved in the museum, and the species seems to be one of the commonest Dorids found near Singapore.

Chromodoris lineolata (Van Hasselt).

Bergh, "Siboga, Exp. Opisthobranchiata," 1905, pp. 148-150, and literature there cited.

= *Chr. striatella* Bergh in other papers.

= *Chr. funerea* Collingwood, "Nudibr. Moll. from Eastern Seas," 1878, pp. 131-2, and plate ix., figs. 30-33.

As far as can be judged from these two preserved specimens, Collingwood's figure of the living animal is probably good.

The shape is high and stout; length, 15 mm., breadth, 10 mm., height, 9 mm. The free portion of the tail is well developed, and about 4 mm. long. Though the colour is faded, it would appear from traces left here and there that the animals were brownish-violet with numerous white or yellowish lines. Between thirty and forty lines can be counted across the back; the outer ones appear to be complete ovals passing in front of the rhinophores and behind the branchiæ. Those in the middle, though sometimes anastomosing, are mainly longitudinal. The mantle margin is fairly ample, and the sides of the body are apparently coloured like the back, each bearing about ten lines. The branchiæ appear to be eighteen in number, but many are bifid or trifid, and the divisions might be counted as separate plumes.

The radula is as described by Bergh. The rhachis bears thin, triangular thickenings, and the lateral teeth are hamate with a varying number (generally seven to eight) of denticles.

Casella atromarginata (Cuv.).

Bergh, *Journ. Mus. Godeffroy*, vi., 1874, pp. 102-9; see also Eliot, "Nudibranchs of Southern India and Ceylon," *Proc. Zool. Soc.*, 1906, p. 644.

One fine specimen, closely resembling the animal figured by Bergh ("Mal. Unters.," *Semper's Reisen*, heft vi., pl. 33, fig. 1) under the name of *Casella philippensis*. It would appear that this name was only used provisionally, and the animal subsequently recognized as identical with *C. atromarginata*, which is the name used by Bergh in his later works.

The specimen is somewhat bent, but about 42 mm. long, 27 mm. broad, and 20 mm. high. It is of a stout shape, like some *Chromodorids*, but with an ample undulated mantle margin. The colour is uniform clear lemon-yellow, but the mantle margin is marked by a line of dark brownish-violet with a white band on either side. The rhizophore sheaths have a black or dark violet border round the edge but there is no border round the foot or branchial pocket. The branchiæ are twenty-two in number, set in a double spiral; both they and the rhizophores are lemon-yellow at the bottom and purplish-brown at the top. The anterior buccal chamber is very large and puckered internally, but the radula is minute, though it consists of many rows, each with many teeth. It is as described by Bergh. There are minute rhachidian thickenings, and the teeth which in spite of their small size are strong and distinct, bear four to five denticles. The labial armature is an incomplete ring, composed of minute bent rods, which sometimes show a slight bifurcation at the apex.

The species of *Casella* are very variable, not only in colour, but also in the number of branchiæ and the details of the radula. It would seem that the present specimen is a *C. atromarginata* with a clearer and brighter coloration than that usually recorded.

Phyllidia elegans Bergh.

Bergh, "Bidr. Monogr. Phyllidierne," p. 505, ff., Id., "Mal. Unters.," *Semper's Reisen*, heft. x., p. 381.

One beautiful specimen, 72 mm. long, 34 mm. broad. The ground colour is black, and the internal dorsal wall is almost uniformly black, but externally this black colour is largely hidden by yellowish areas, bearing tubercles, as in Bergh's figure (Mal. Unt., in *Semper's Reisen*, pl. xxv., fig. 6). There is a well-marked black line on the sole, and the expanded margin of either side of the foot bears another on its upper surface, accompanied by a row of dots on its outer side; these side lines and dots are not visible in the natural position of the animal. The margins of the foot are stiff and bear

several deep incisions, which are perhaps merely undulations. The rhinophores are yellow.

The intestines form an elongated compact bundle, and are entirely yellow, as is also the buccal mass, which is not very large. The pericardial lamellæ are distinct; the branchial lamellæ beneath the mantle edge are very numerous, and form a complete circuit, interrupted only by the head.

Placobranchus ocellatus Van Hasselt.

Bergh, "Danish Expedition to Siam, Opisthobranchiata," 1902, pp. 22-3, and references there quoted.

Two specimens. The general colour is whitish, with a faint green tinge on the dorsal surface; there are black or dark-brown dots on the sole of the foot, and a single line of black ocelli (only here and there doubled or irregular) on the under-surface, just about the part which may be considered to mark the division between the wings and the body. There are six black ocelli on the forehead, but no lighter ocelli or other markings are to be seen, and there is no special colour on the rhinophores or pericardium.

This appears to be a variety of *Pl. ocellatus*, with unusually simple coloration, unless the lighter markings have disappeared, which is possible.

Elysia faustula Bergh.

Bergh, "Mal. Unters.," *Semper's Reisen*, Heft iv., pp. 186-190; Eliot "Nudibranchs from East Africa and Zanzibar," *Proc. Zool. Soc.*, 1904, pp. 295-6.

Five specimens, all ample and foliaceous. If they could be spread out flat they would measure from forty to fifty millimetres in length and twenty to thirty in breadth. The ground colour varies from white to yellowish-green, with a border round the wings and tips of the rhinophores varying from yellowish-brown to black. On both the upper and lower surfaces are spots which also vary from yellowish-brown to black. On the lower surface they are smaller in the middle and larger towards the edge of the wings, but on the upper surface those in the middle are larger. The pericardium is distinct, oval, not elongate, spotted but not specially bordered. The rhinophores are large and distinctly auriculate. The raised veins on the back are very clear and prominent. Three start from each side of the pericardium and ramify, the lowest being more extensively branched than the others. The end of the body is variously shaped, being more pointed in some specimens than in others.

The radula is of the usual ascoglossan form. In the specimen dissected there are five teeth in the ascending series and seven in the descending. These are followed by two teeth in process of detachment from the row, and below lie about fifteen in a heap. The teeth

are quite smooth, without any trace of denticulation, and as in Bergh's figures of *Elysia faustula* ("Mal. Unters.," *Semper's Reisen*, Heft iv., plate xxii., figs. 15-17).

This form appears to be Bergh's *E. faustula*. It is distinguished from *E. grandifolia* by having an oval pericardial prominence and perfectly smooth teeth. The distinction from *E. marginata* (Pse.), *E. nigropunctata* (Pse.) and *E. punctata* Kelaart, which are probably all varieties of one species, is not so clear. All have smooth teeth, as far as is known, and a varying coloration. One of Semper's specimens of *E. faustula* was almost without markings and borders. It would seem that *E. faustula* is larger and more leaf-like in appearance than *E. marginata*, etc., and also has more distinct and more prominent veins.

C.—JAPANESE NUDIBRANCHS.

Melibe pilosa Pease.

Pease; "Moll. from Sandwich Islands," *Proc. Zool. Soc.*, vol. 28, 1860, p. 33. Cf. *Melibe papillosa*, Tapparone-Canefri, "Zool. della Magenta," *Mem. d. R. Accad. Torino*, 1876, pp. 219-222. Bergh, *Zeitschr. Wiss. Zool.*, 1885, pp. 145-154.

One specimen seen alive at Misaki. It was about sixty millimetres long, pellucid but mottled everywhere with opaque white and various tints of chocolate and yellowish-brown. Foot whitish. The upper surface, and especially the back between the cerata, is covered with short thread-like appendages which are white and bear thread-like branches. There are also soft irregular tubercles especially on the cerata. On the left side are six fan shaped cerata, convex externally and bearing similar branched thread-like appendages on the margin. On the right side are only three cerata; there are indications of two having been lost but it does not appear that there were more than five originally. The first pair are very large, the last very small. The tips of the rhinophores are yellow and perfoliated; considering the size of the animal the sheaths are not large or conspicuous. The hood is of moderate size and in the living animal the opening is ventral. Its edge is surrounded by three to four rows of tentacular processes two to three millimetres long and quite distinct from the thread-like appendages. The foot is pointed at both ends and projects slightly in front. It is very narrow but the animal can adhere strongly. It was not observed to swim but was perhaps moribund.

A rough dissection of the alimentary canal was made while the material was fresh. An unusually short tube leads from the bottom of the funnel-shaped hood into a small stomach. It is almost straight but contracts a little before entering the stomach. The lips and upper portion of this tube are black, the lower part is white and

slightly plicated. In the stomach is a girdle of about twenty plates, grey and hard. Their outline is roughly half an ellipse but sometimes irregular. In some cases at any rate they are divided by membranous partitions with indented edges. No jaws were found. The anterior portion of the digestive tract was removed and subsequently examined with greater care for traces of these organs but none could be discovered. The black colour of the lips and tube was found to be due to the presence of granular pigment, brown where diffuse and black where concentrated. The arrangement of the pigment is dentritic in places and the pigmented parts are not hard.

I think this animal is the *Melibe pilosa* of Pease (1860), and this specific name has priority should it prove to be identical with *M. papillosa* (de Filippi, 1874), or *M. vexillifera* Bergh (1880). The coloration is much as described by Pease and the following points of resemblance are noticeable. (1) The foot of *Melibe pilosa* is "linear, grooved . . . and acute at both ends." (2) The back bears "six pairs of thick tuberculate lobes . . . all easily deciduous, contracted at the base, truncate above, convex outside, and flattened on inner surface." (3) "Everywhere with small soft branched tentacular processes."

Melibe pilosa appears to be distinguishable from *Melibe fimbriata* which has (a) stouter filaments, not thread-like processes; (b) cerata of a different shape and longer; (c) no black pigment in the buccal parts and œsophagus.

As *M. vexillifera* (from Enoshima) and *M. papillosa* (from Yokohama) were captured in the same parts of Japanese waters as this specimen, the identity of all three species is highly probable, though it is difficult to demonstrate it from the descriptions. The papillæ are certainly not as described by Bergh for *M. vexillifera* (humiles, vexillo latiori dentato præditæ) but it is possible that they might assume such a shape if contracted in alcohol. Both *M. vexillifera* and the present species are described from single specimens and it is possible that the shape may vary even in the living animal.

Tapparone-Canefri stated that his *Melibe papillosa* had no jaws and I could find none in this specimen. Bergh, however, found them in the specimen which he described as *M. papillosa*. They are certainly difficult to discover in this genus and possibly there may be some variation even in the same species, that is to say the organs, which are always vestigial, are not developed at all in some specimens.

Alder and Hancock, Mr. Farran, Mr. Crossland and myself have reported that jaws are absent in *M. fimbriata*. I have, however, recently found them distinctly present in a specimen from Zanzibar.

At the bottom of the hood of this specimen are a pair of fleshy lips and just below these, at the beginning of the short tube leading to the

stomach, are a pair of yellowish, collar-shaped, transparent jaws. The consistency is horny but flexible and at the ends almost membranaceous. Each jaw is about 1.50 mm. long and 0.4 mm. broad. Near the hinges are a few transverse ribs. At the other end the margin is irregular and presents a wavy or roughly scalloped outline.

The specimen has lost all its cerata but its characters, as far as they can be ascertained, are those of *M. fimbriata*.

The jaws are embedded in the walls of the buccal tubes and are not visible when it is opened. Their function must be not to cut but simply to strengthen the prehensile and retentive action of the lips.

I can discover no jaws in Alder and Hancock's type specimen preserved at Newcastle but it is so decayed and fragmentary that a negative result cannot be regarded as conclusive.

Doridopsis gemmacea Alder & Hancock.

Alder & Hancock "Notice of a collection of Nudib. Moll. made in India," 1864; Hancock "Anatomy of Doridopsis," *Trans. Linn. Soc.*, vol. 25, 1865.

?=*Doridopsis denisoni* (Angas) see Bergh "Mal. Unters.," *Semper's Reisen*, Heft xv., p. 694.

Ten specimens seen alive at Misaki. The largest was about fifty millimetres in length but varying in shape and capable of considerable elongation. The ground colour is essentially the same in all specimens, though it varies in tint and intensity from a pale yellowish-brown to a rich chocolate-brown. The margin of the mantle is thin, undulated and mobile; marked by a white line which sometimes sends inwards a few short stripes. The medio-dorsal area is bounded on either side by three large compound tubercles. They are mobile and contractile especially those nearest to the branchiæ, which seem to pulsate in harmony with the heart. On the back are distributed darker brown areas, bearing one to three bright, metallic, blue spots. In one specimen there are as many as six blue spots on the areas. There are generally three median areas between the branchiæ and rhinophores, and six on either side, besides one behind the branchiæ and one in front of the rhinophores. Between the rhinophores are two tubercles. The dark brown areas are comparatively free from tubercles but the rest of the back is more or less covered with them. Most of them are small and simple but the outermost, which are arranged in a circle round the mantle edge, are larger with faint indications of a composite structure. The rhinophore pockets are slightly raised but quite smooth. The rhinophores consist of very tall, smooth, semitransparent stalks which bear at the tip about twenty-five fine brownish perfoliations. The edge of the branchial pocket is smooth, though its sides bear tubercles like the rest of the back. The branchiæ are five in number, very ample and delicate, so large that they cannot be com-

pletely retracted and tri- or quadri-pinnate. They are of a pellucid brown, the outermost axes (but not the main axis) are black. The anal papilla is rather tall, and its edge is not crenulate. The foot is white or brownish-white, without markings. The tentacles are distinct though not large, forming a sort of veil over the mouth.

The animal is very soft but active in its movements. Its excrements are a bright reddish-yellow, and, as a soft orange coloured compound ascidian was found on the rocks over which it was crawling, this is probably the food of the *Doridopsis*. The spawn is of a dirty white, disposed in a single straggling coil.

As preserved the specimens are soft and slimy. The intestines are purplish-grey but there is black pigment in the buccal part and here and there in the viscera, especially the mesenteries. The nervous system and the anterior portion of the digestive tract are according to the type of *Doridopsis* not of *Doriopsilla* and agree with Hancock's account of *Doridopsis gemmacea*. The portion of the alimentary tube which lies in front of the buccal ganglia has comparatively thin walls and a large lumen, whereas that which lies between the buccal ganglia and the liver has thick spongy walls and a very small lumen. There is a large double gland under the mouth parts. The pericardial lamellæ are well developed. The liver is very distinctly bifid behind. The vas deferens consists of two portions, one thick and elaborately coiled, the other thinner and simpler. In spite of repeated investigation no spines or other armature were found anywhere in the genitalia. The spermatheca is stalked, large, globular and full of white contents; the spermatocyst moderately large and pear shaped.

I think this form is the *Doridopsis gemmacea* of Alder & Hancock. The external features as well as the anatomy agree with their description and the coloration is very similar. Neither in these specimens nor in A. & H.'s type specimens could I find any hooks or other armature on the male genitalia and I think that as far as these Japanese specimens are concerned its absence must be regarded as certain, as the examination was thorough. Bergh could not find such an armature in a large specimen of *Doridopsis gibbulosa* and I have been unable to find it in specimens of *Doridopsis mammosa* from New Zealand. Both of these are similar to *Doridopsis gemmacea* in general external and internal features, though differing in coloration. So, perhaps, there may be a subgeneric group of tuberculate forms without the usual armature.

The specimen described by Bergh (l.c.) as *Doridopsis denisoni* and identified by him with *Doridopsis gemmacea* had a distinct armature. But the identity seems to me doubtful. It is not clear from the descriptions of Bergh and Angas or from Angas's figure that *Doridopsis denisoni* has large compound tubercles.

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

361st Meeting, April 10th, 1907.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

Miss Lucinda Milner, Clevelands, Ellesmere Park, Eccles, Manchester.

E. Arnold Wallis, Springfield, West Parade, Scarborough.

Names Struck Off.

It was reported that the name "J. Linter" which appears under this heading in the Proceedings of the last Meeting was a misprint for "J. Linton."

Exhibits.

By Mr. W. H. Heathcote : Living *Arion ater* var. *alba* (sub-var. *marginata* Moquin-Tandon) ; and *Helix aspersa* var. *exalbida* from Woodhead, near Grange, Lancs.—a new county record ; and *Vitrina thomsoni* Brug. from South Australia.

By Mr. J. T. Wadsworth : A number of fine examples of *Tectacella haliotidea* from an open garden border at Withington, near Manchester.

By Mr. R. Cairns : Specimens of *Trivia europeæ* from glacial drift in the cliffs, Blackpool.

By Mr. C. H. Moore : *Petricola pholadiformis* from Shellness ; *Helicella caperata* and a number of marine shells from Southport.

By Mr. R. Standen : Sections of a number of exotic non-marine shells, shewing their various peculiarities of internal structure.

By Mr. J. Wilfrid Jackson : *Acanthinula lamellata* from Grange-over-Sands, Lancs. ; *Succinea oblonga* from Grange, Lancs., and Meathop, Westmorland ; *Limnæa pereger*, *L. truncatula*, *Pisidium pusillum*, *P. obtusale*, etc., from ditches near Meathop ; also *Vitrea cellaria* (very thick form), distorted *Limnæa pereger* and *L. truncatula* (slender elongate forms)—all fossil—from deposit at Hale Moss, Westmorland ; also white form of *Pyramidula rotundata* and "excentric" *Vallonia costata* from Silverdale, Lancs.

A fine series of Helicinæ and allied groups was exhibited by Messrs. Edward Collier, B. R. Lucas, R. Cairns, and R. Standen.

362nd Meeting, May 8th, 1907.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Candidates Proposed for Membership.

Arthur Reginald Horwood, Ivanhoe, Gwendolen Road, Leicester.

Henry Gerard Thornton, Kingsthorpe Hall, Northampton.

Papers Read.

"Holocene Deposits near Reigate," by Lionel E. Adams.

"*Assemania grayana* Leach, in Suffolk," by A. Mayfield.

Exhibits.

By Mr. A. Mayfield : *Assemania grayana* Leach, from Aldeborough, Suffolk, to illustrate his note.

By Mr. Lionel E. Adams : Shells from the Holocene Deposits, near Reigate, to illustrate his paper.

By Mr. R. Standen: A number of land shells from Madeira, Teneriffe, and Grand Canary, recently acquired by the Manchester Museum.

By Mr. Chas. Oldham: A number of Bucks. mollusca collected by Messrs. J. E. Cooper and H. Wallis Kew in the neighbourhood of Burnham, including the following new county records:—*Vitrea alliaria*, *V. radiatula*, *V. pura* var. *nitidosa*, *V. crystallina*, *Euconulus fulvus*, *Acanthinula aculeata*, *Sphyradium edentulum*, *Carychium minimum*, *Jaminiia cylindracea*, *Cochlicopa lubrica*, *Vertigo pygmaea*, and *V. pusilla*.

As a special exhibit about two-thirds of the known species of *Ariophanta* were shewn by Messrs. J. C. Melvill, Ed. Collier, R. Cairns, and R. Standen, and from the Manchester Museum collections.

363rd Meeting, June 12th, 1907.

Mr. Edward Collier (vice-president) in the chair.

Donations to the Library announced and thanks voted:

"Notes on the pairing of *Limax maximus*," by C. S. Carter; "Additions to Lincolnshire Non-Marine Mollusca," by C. S. Carter; "The Mollusca of the Persian Gulf, Gulf of Oman, and Arabian Sea, as evidenced mainly through the collections of Mr. F. W. Townsend, 1893-1906; with descriptions of new species," by J. Cosmo Melvill and R. Standen; "On a new species of *Chloritis*," by G. K. Gude; "On a new species of *Papuina*," by G. K. Gude; "On the subgenus *Calorus* Pilsbry," by G. K. Gude; "A new species of *Eulota* from Formosa," by G. K. Gude; "Occurrence of internal septa in *Glyptostoma newberryanum*," by G. K. Gude (from the respective authors); and the usual periodicals received in exchange.

New Members Elected.

A. R. Horwood, Ivanhoe, Gwendolen Road, Leicester.
H. G. Thornton, Kingsthorpe Hall, Northampton.

Candidates Proposed for Membership.

Vernon Howard, Carlton Lodge, Eastgate, Louth.
S. L. Petty, Dykeland, Ulverston, Lancs.

Resignation.

Miss G. M. Harrison.

Name Struck Off.

It was reported that the following name had been struck off the list of members in terms of Rule 4:—

J. R. Redding.

Paper Read.

"Nudibranchs from the Indo-Pacific, III.," by Sir Charles Eliot.

Exhibits.

By Mr. C. H. Moore: *Volutharpa perryi*, *Anatina japonica*, *Cypricardia villicata*, and other Japanese marine shells; also *Vitrea pura* from Castleton, Derbyshire.

By Mr. R. Standen: *Zonitoides excavatus* var. *vitrina*, collected by Mr. J. Kidson Taylor in the Winnatts, Derbyshire—a new record for the Castleton district; *Acicula lineata* and *Acanthinula lamellata* collected during last Whit-week at Grange-over-Sands, Lancs. Both species occurred abundantly in company with *A. aculeata*, *Vitrina pura*, *V. radiatula*, *Euconulus fulvus*, and *Carychium minimum* in thick beds of beech leaves in Eggerslack Wood; the lower layers of rotting leaves were thickly permeated with the mycelium of some species of fungus and amongst this the *Acicula lineata* swarmed—apparently feeding upon it.

A fine series of the various sections of Orthalicidæ was shewn by members and an interesting discussion followed.

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"Notes on a collection of Terrestrial and Fluvial Mollusca, made in North-Eastern Rhodesia, during 1905, by Mr. Sheffield A. Neave, M.A., B.Sc.," by JAMES COSMO MELVILL and ROBERT STANDEN [3 nn.spp. and 2 nn. varr. figured].
Nachrichtsblatt der Deutschen Malacozoologischen Gesellschaft, part 1, Jan.-Mar., 1907.

"Ein Beitrag zur Kenntnis der *Pomatias* und *Auritus*-formen Griechenlands," by A. WAGNER. "Mollusken aus dem Issykul." by S. CLESSIN. "Eine neue *Xerophila*-Art [*X. densestriata*] von Rumanien," by S. CLESSIN. "Zur Fauna von Frankfurt-a.-M.," by C. BOETTGER. "Die Land- und Süsswasserconchylienfauna der deutschen nordfriesischen Inseln," by C. BOETTGER. "Zur Conchylienfauna des Kiihkopfs," by C. BOETTGER. "Beiträge zur schlesischen Molluskenfauna," by V. FRANZ. "Die ersten Landschnecken von der Insel Thasos," by O. BOETTGER. "Ueber *Vivipara diluviana* (Kunth)," by S. BRUSINA.

The Irish Naturalist, vol. 16, nos. 1-6, Jan.-June, 1907.

"Marine Mollusca [of Lambay]," by N. COLGAN [117 spp.]. "Land and Fresh-Water Mollusca [of Lambay]," by A. W. STELFOX and R. WELCH [35 spp.]. "Some further additions to the Marine Mollusca of Co. Dublin," by N. COLGAN [4 spp.].

The Naturalist, nos. 600-605, Jan.-June, 1907.

"Life-Zones in British Carboniferous Rocks," by WHEELTON HIND. "*Succinea oblonga* Drap. in Westmorland," by H. BEESTON.

"*Spondylus latus* in the Chalk of North Lincolnshire," by H. C. DRAKE. "Note on a variety of *Limnaea stagnalis*," by J. W. TAYLOR. "Variety of *Limnaea stagnalis* found near Leeds," by W. H. HUTTON [figured].

"Life-Zones in British Carboniferous Rocks," by WHEELTON HIND [plate]. "*Limnaea* [*Limax*] *maximus* vars. *aldrovandi* and *bicolor* in Lincolnshire," by C. S. CARTER [with additional note by J. W. TAYLOR].

"Notes on *Succinea oblonga* Drap. and other species at Grange-over-Sands, Lancs.," by J. WILFRID JACKSON.

Records of the Australian Museum, vol. 6, no. 4, Jan., 1907.

"Mollusca from eighty fathoms off Narrabeen," by C. HEDLEY [3 plates].

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"Notes on a collection of Mollusks from the vicinity of Alpena, Michigan," by F. C. BAKER [plate].

"Kinderhook Faunal Studies, IV. The Fauna of the Glen Park Limestone," by S. WELLER [2 plates].

La Feuille des Jeunes Naturalistes (4), vol. 37, nos. 435-440, Jan.-June, 1907.

"*Petricola pholadiformis* L.," by A. GIARD.

"Revision des espèces françaises appartenant aux genres *Vivipara* et *Bythinia*," by LOUIS GERMAIN [plate].

"Question sur les *Zonites algirus* et *cellarius*," by C. CHATELET.

"Note sur la variation de forme de l'*Helix candidissima* Drap., dans les environs d'Avignon," by C. CHATELET. "Sur la faune marine de l'étage Ludien," by J. BOUSSAC.

"An Illustrated Catalogue of the Mollusca of Michigan: Part I—Terrestrial Pulmonata (Land Snails)," by BRYANT WALKER.

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"Descriptions of Two New Naiads," by P. BARTSCH (*Proc. U.S. Nat. Mus.*, vol. 30, no. 1454, 1906) [3 plates].

"The Philippine Pond Snails of the Genus *Vivipara*," by P. BARTSCH (*Proc. U.S. Nat. Mus.*, vol. 32, no. 1518, 1907) [2 plates].

"The Philippine Mollusks of the Genus *Planorbis*," by P. BARTSCH (*Proc. U.S. Nat. Mus.*, vol. 32, no. 1512, 1907) [figured].

"Two New Land Shells from Mexico," by P. BARTSCH (*Proc. U.S. Nat. Mus.*, vol. 32, no. 1515, 1907) [figured].

"New Mollusks of the Family Vitrinellidæ from the West Coast of America," by P. BARTSCH (*Proc. U.S. Nat. Mus.*, vol. 32, no. 1520, 1907) [figured].

"Über clado- und holohepatische nudibranchiate Gastropoden," by R. BERGH (*Zoologische Jahrbücher*, part 6, 1906) [plate].

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"Mollusca," by E. R. SYKES and E. A. SMITH. "Brachiopoda," by E. R. SYKES and E. A. SMITH (*Zoological Record*, vol. 42, parts 7-8).

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"On the occurrence of internal septa in *Glyptostoma newberryanum*," by G. K. GUDE (*Proc. Malac. Soc.*, vol. 6, part 5, June, 1905).

"Description of a new species of *Eulota* [*E. warburgi*] from Formosa," by G. K. GUDE [figs.] (*Ann. Mag. N.H.*, ser. 7, vol. 19, Feb., 1907).

"On the Land Molluscan Subgenus *Cœlorus*, Pilsbry," by G. K. GUDE [figures] (*Ann. Mag. N.H.*, ser. 7, vol. 18, Dec., 1906).

"The Genus *Chloritis*," by G. K. GUDE. "On Papuina, etc.," by G. K. GUDE [plate] (*Proc. Malac. Soc.*, vol. 7, part 4, March, 1907).

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Vol. 12].

OCTOBER 1st, 1907.

[No. 4.

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*BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
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EXCHANGE COLUMN.

ALFRED HARTLEY, of 19, Thorp Garth, Idle, Bradford, Yorkshire, has a large number of British and Foreign Land, Freshwater, and Marine Shells to exchange, and desires to obtain specimens of *Testacella mangei*, *Testacella scutulum*, *Helix obvolvata*, *Limnæa involvata*, *Vertigo liljeborgi*, *Vertigo angustior*.

TENBY LAND-SHELLS.—I have duplicates of the following: *Helix pisana*, *itala*, *virgata*, *caperata*, and *acuta*, in exchange for British Land and Freshwater Mollusca, not in my collection.—**J. Kidson-Taylor**, 45, South Avenue, Buxton, Derby.

HELIx NEMORALIS, Monst. sinistrorsum (Bundoran specimens), offered for rare British shells.—**Walter Gyngell**, 13, Gladstone Road, Scarborough.

Catalogue of the Library

OF THE

Conchological Society of Great Britain and Ireland.

P R E F A C E .

THE last Catalogue of the Society's Library was issued as part of the April number of the *Journal* for 1891 (vol. 6, p. 321-330), and contained the titles of some two hundred books and pamphlets and five-and-twenty periodicals. During the seventeen years which have since elapsed the library has grown considerably, partly by donations from friends and members, partly by exchange with other societies and academies, so that the old catalogue very inadequately represents its present resources. The Council has therefore ordered the preparation of a new catalogue arranged according to authors' names. This has been carried out under the superintendence of the Hon. Secretary, who has had the assistance from time to time of Mrs. Jas. Easton (then Miss Copinger), Mrs. J. W. Jackson (then Miss Standen), Mrs. Hahn (then Miss Nördlinger), and Miss K. Wilkinson. Mr. Charles Leigh, Librarian of the Manchester University, has kindly read over the proofs. To these ladies and gentlemen the thanks of the Council are gratefully tendered.

The Library has been divided into two sections, "books" and "serials," indicated by the letters "M" and "S" in the press marks. In each of these divisions the works have been arranged according to the Dewey decimal system, and it is hoped that little difficulty will be experienced by subsequent librarians in finding any book or pamphlet required.

In conclusion the Council desires to point out that the whole of the subscriptions are absorbed in printing the *Journal* and defraying the administrative expenses of the Society, and that therefore reliance must be placed on the generosity of members for additions to the library. Many acceptable gifts have thus been received in the past, which have been recorded in the proceedings of the monthly meetings and the annual reports. Any volumes not in this catalogue, which members can spare from their shelves, will be gratefully received by the Society's Librarian.

W. E. HOYLE.

LIST OF ABBREVIATIONS.

| | | |
|-------------------------|---------|--|
| <i>A.f.N.</i> | - - - - | Archiv für Naturgeschichte. |
| <i>A.N.H.</i> | - - - - | Annals and Magazine of Natural History. |
| <i>A.S.N.</i> | - - - - | Annales des Sciences Naturelles. |
| <i>B.M.C.Z.</i> | - - - - | Bulletin of the Museum of Comparative Zoology. |
| <i>C.R.</i> | - - - - | Comptes rendus. |
| <i>Ed.</i> | - - - - | Editor, edited by, edition. |
| <i>J.L.S.</i> | - - - - | Journal of the Linnean Society (Zoology). |
| <i>J. Mal.</i> | - - - - | Journal of Malacology. |
| <i>JB.</i> | - - - - | Jahrbuch. |
| <i>n.d.</i> | - - - - | No date. |
| <i>n.p.</i> | - - - - | No place of publication. |
| <i>L</i> | - - - - | London. |
| <i>Nat.</i> | - - - - | Naturalist. |
| <i>p.</i> | - - - - | Page, pages. |
| <i>pl.</i> | - - - - | Plate, plates. |
| <i>P.L.S. N.S.W.</i> | - - | Proceedings of the Linnean Society of New South Wales. |
| <i>P. Mal. Soc.</i> | - - | Proceedings of the Malacological Society. |
| <i>P.U.S. Nat. Mus.</i> | - | Proceedings of the United States National Museum. |
| <i>P.Z.S.</i> | - - - - | Proceedings of the Zoological Society. |
| <i>transl.</i> | - - - - | Translation, translator, translated by. |
| <i>v.</i> | - - - - | Volume, volumes. |
| <i>v.p.</i> | - - - - | Various paginations. |
| <i>v.y.</i> | - - - - | Various years. |
| → | - - - - | Continued. |
| [] | - - - - | Information supplied by cataloguer. |

SIZE NOTATION.

| | Height in Centimetres. | | | Height in Centimetres. |
|------------|---------------------------|--|------------|---------------------------|
| T. - - - - | 12·5—15 | | O. - - - - | 20—25 |
| S. - - - - | 15 —17·5 | | Q. - - - - | 25—30 |
| D. - - - - | 17·5—20 | | F. - - - - | above 30. |

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BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
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 1879. Laver, Henry, M.R.C.S., F.L.S., Head Street, Colchester, Essex.
 1894. Lawson, Peter, Jesmond Dene, 87, Finlay St., Fulham, London, S.W.
 1905. Laycock, John, 30, Herries Street, Ashton-under-Lyne.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1878. Leicester, Alfred, 148, Liscard Road, Liscard, Cheshire.
 1906. Letson, Miss E. J., Sc.D., Buffalo Society of Natural Sciences, New York, U.S.A.

1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1903. Linter, Miss J. E., Saville House, Twickenham.
 1897. *L* Lodder, Miss Mary, Bank of Australasia, Launceston, Tasmania.
 1895. Loydell, A., 36, Milton Road, Acton, London, W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire, S. Wales.
1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire
 1903. McClelland, Hugh, Bryn, Somerville Road, Sutton Coldfield.
 1885. McKean, Kenneth, The Homestead, Monkton Combe, near Bath.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1905. Macindoe, Dr. A., D.P.H., Sidmouth, Devon.
 1884. Madison, James, Turves Green, West Heath Rd., Northfield, Worcestershire.
 1885. Marquand, Ernest D., A.L.S., Knyghtwood, St. Martin's, Guernsey.
 1887. Marshall, J. T., Herbert Villa, Prince of Wales Road, Bournemouth.
 1906. Marshall, Arthur G., 66, Victoria Street, Westminster, London, S.W.
 1887. *P* Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
 1904. Massy, Miss A. L., 9, St. James's Terrace, Malahide, Dublin.
 1905. Maxwell, Mrs. Miller, Bangholm Bower, Goldenacre, Edinburgh.
 1897. May, William Lewis, F.R.S. Tasm., Forest Hill, Sandford, Tasmania.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880. *P* Melvill, James Cosmo, M.A., F.L.S., Meole Brace Hall, Shrewsbury.
 1891. Middleton, Robert, Sheepscar Foundry, Leeds.
 1888. Milne, J. Grafton, Duncroft, Leatherhead.
 1904. Milne, James N., Foylemore, St. Jude's Avenue, Belfast.
 1907. Milner, Miss Lucinda, Cleveland, Ellesmere Park, Eccles, Manchester.
 1879. Milnes, Rev. Herbert, M.A., Darley House, Berkeley St., Cheltenham.
 1906. Monterosato, Il Marchese di, 2, Via Gregorio, Ugdalena, Palermo, Sicily.
 1902. Moore, Chas. H., 5, Mill Street, Stocks Lane, Stalybridge.
 1907. Morey, Frank, Elm Grove, Newport, Isle of Wight.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
 1926. Murdoch, R., Wanganui, New Zealand.
 1907. Musham, J. F., Blenheim House, South Park, Lincoln.
1905. Napier, H. C., Headington Hill, Oxford.
 1903. Nash, P. B., Bruce Mines, Algona, Ont., Canada.
 1899. Neild, J. E., Merlewood, Queen's Road, Urmston, near Manchester.
 1887. Newstead, A. H. L., B.A., 38, Green Street, Bethnal Green, London, E.
 1891. Newton, Richard Bullen, F.G.S., 11, Twyford Crescent, Acton Hill, London, W.
1891. *P* Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., etc., The Red House, Berkhamstead.
 1903. Northey, Rev. A. E., M.A., Lisworney, Torquay.
 1901. Norton, Miss E. M., 20, Eastfield Road, Westbury-on-Trym, near Bristol.
1901. Oelrichs, W., 22, Hackins Hey, Liverpool.
 1887. Oldham, Charles, Essex House, Wellington Road, Watford.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, Innisfallen, Highbridge Road, Wylde Green.
 1905. *L* Owston, Alan, Yokohama, Japan.
1903. Pace, S., Marine Station, Millport, N.B.
 1900. Pannell, Chas., 13, East Street, Haslemere, Surrey.
 1904. Parritt, H. W., 8, Whitehall Park, Upper Holloway, London, N.
 1902. Pattison, Ernest, 52, Saxe Coburg Street, Leicester.

1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
1901. Penrose, G., Royal Institution of Cornwall, Truro.
1907. Petty, S. L., Dykelands, Ulverston, Lancs.
1906. Plant, James R., M.R.C.S., L.R.C.P., 107, Hinckley Road, Leicester.
1904. Platt, Thos. H., 73, Clarendon Road, Manley Park, Manchester.
1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
1905. Poole, W. G., South Lawn, Godalming, Surrey.
1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
1903. Preston, Henry, F.G.S., Hawthornden Villa, Spittlegate, Grantham.
1897. Preston, Hugh Berthon, F.Z.S., 53, West Cromwell Road, London, S.W.
1907. Priske, R. A. R., 9, Melbourne Avenue, West Ealing, Middlesex.
1906. Pritchard, G. B., F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.
1906. Radley, Percy E., F.R.M.S., 30, Foxgrove Road, Beckenham, Kent.
1896. Ragdale, John Rowland, The Beeches, Whitefield, near Manchester.
1899. Ramanan, Vedaraniam Venkata, M.A., F.Z.S., 12, Sami Pillai Street, Triplicane, Madras, S. India.
1906. Reynell, Alexander, 152, Selhurst Road, South Norwood, London, S.E.
1905. Reynolds, Laurence R., 233, Aspinwall Avenue, Brookline, Mass., U.S.A.
1905. Reynolds, W. G., 15, Alfoxton Avenue, West Green, London, N.
1896. Rhodes, John, F.E.S., 360, Blackburn Road, Accrington, Lancs.
1900. Richards, C. P., Mission House, Stenalees, St. Austell, Cornwall.
1906. Ritchie, John, jr., Box 2795, Boston, Mass., U.S.A.
1898. Roberts, A. William Rymer, The Common, Windermere.
- O P Roebuck, Wm. Denison, F.L.S., 259, Hyde Park Road, Leeds.
1907. Rolle, Hermann, Königgrätzer Str. 89, Berlin, S.W.
1901. Rooth, J. A., M.R.C.S., 14, St. George's Place, Brighton.
1905. Rope, Geo. T., Blaxhall, Tunstall, Suffolk.
1893. Roseburgh, John, Market Square, Galashiels, Roxburgh.
1892. Rosevear, John Burman, 109, New King's Rd., Fulham, London, S.W.
1906. Salisbury, Albert E., 64, Pemberton Gardens, Highgate, London, N.
1877. P Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
1906. Schepmann, M. M., Rhoon, near Rotterdam, Holland.
1895. L Schill, C. H., The Elms, Byrom Lane, Macclesfield.
1904. Scott, Miss Gwynedd, 4, The Terrace, Riding Mill-on-Tyne.
1886. Scott, Thomas, LL.D., F.L.S., 280, Victoria Road, Torry, Aberdeen.
1893. Shackelford, Rev. Lewis John, 66, Granville Road, Blackpool.
1907. Shaer, Isidore, B.A., 25, Darlington Street, Cheetham Hill, Manchester.
1906. Sharp, C. J., M.R.C.S., 2, Wellington Avenue, Liverpool.
1904. Shaw, Rev. W. A., Haselbeech Rectory, Northampton.
1906. Sheppard, T., F.G.S., Municipal Museum, Hull.
1906. Shopland, Commander E. R., St. Benedict's, Carlton Road, Lowestoft.
1895. Sich, Alfred, F.E.S., Corney House, Chiswick, London, W.
1896. Sidebotham, Dr. E. J., Erlesdene, Bowdon, Cheshire.
1906. Sikes, F. H., M.A., The Craigs, Windermere.
1905. Simpson, James, c/o G. Sim, Esq., A.L.S., 52, Castle Street, Aberdeen.
1884. Skilton, Mrs. Mary, 21, London Road, Brentford, Middlesex.
1902. Smallman, Raleigh S., Wressel Lodge, Wimbledon Common, near London.
1886. P Smith, Edgar A., I.S.O., F.Z.S., Natural History Museum, Cromwell Road, London, S.W.

1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth St., Topsham, Exeter.
 1899. *L* Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
 1907. Smith, Maxwell, 417, West 120th Street, New York, U.S.A.
 1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, London, S.W.
 1906. Soames, Rev. H. Aldwin, M.A., F.L.S., F.R.M.S., Bromley, Kent.
 1900. Solly, E. H., 3, South Street, Deal, Kent.
 1902. Sorby, Henry Clifton, LL.D., F.R.S., Broomfield, Sheffield.
 1886. Sowerby, Geo. Brettingham, F.L.S., Riverside, Kew, near London.
 1892. Span, Bartlet, Woodlands, Tenby, South Wales.
 1907. Spence, G. C., 6, Neston Avenue, Withington, Manchester.
 1906. Stalley, Henry J., Thornton House, Christ's Hospital, West Horsham, Sussex.
 1886. Standen, Robert, 113, Sewerby Street, Alexandra Park, Manchester.
 1903. Stelfox, A. W., Delamere, Chlorine Gardens, Belfast.
 1906. Step, Edward, F.L.S., Oakwood House, Ashstead, Surrey.
 1896. Stonestreet, Rev. W. T., B.D., F.R.S.L., Arnside, Prestwich Park, Manchester.
 1885. *L* Storey, J. A., B.A., Mafeking Villa, Locking Road, Weston-super-Mare.
 1897. Stracey, Bernard, M.B., Sutton Bonnington, Loughborough.
 1890. Stubbs, Arthur Goodwin, The Meads Cottage, Hailey Lane, Hertford.
 1893. Stump, Edward Consterdine, Polefield, Blackley, Manchester.
 1906. Suter, Henry, Haslett Street, Eden Terrace, Auckland, New Zealand.
 1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
 1888. *P* Sykes, Ernest Ruthven, B.A., F.L.S.; etc., 3, Gray's Inn Place, Gray's Inn, London, W.C.
 1895. Taylor, Frederick, 32, Landseer Street, Park Road, Oldham, Lancs.
 1907. Taylor, G. H., School House, Higher Blackley, Manchester.
 1897. Taylor, Rev. George W., F.R.S. Canada, etc., St. Matthew's Rectory, Wellington, British Columbia.
 1904. *L* Taylor, Gerald Medland, Rossall School, Fleetwood.
 1907. Taylor, J. Kidson, 45, South Avenue, Buxton.
O P
 Taylor, John W., North Grange, Horsforth, Leeds.
 1901. Taylor, Thos., Tainui Street, Greymouth, New Zealand.
 1903. Thaanum, D., 5, Church Street, Hilo, Hawaiian Islands.
 1907. Thornton, H. G., Kingsthorpe Hall, Northampton.
 1886. Tomlin, J. R. le Brockton, M.A.; Stoneley, 42, Alexandra Road, Reading.
 1906. Turton, Lt.-Col. W. H., D.S.O., R.E., Harley House, Clifton Down, Bristol.
 1907. Upton, Charles, Tower House, Stroud, Glos.
 1899. Vaughan, J. Williams, J.P., The Skreen, Erwood, R.S.O., Radnorshire, S. Wales; winter address: St David's, London Road, Guildford.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
 1902. Wadsworth, J. T., Highfield, Palatine Road, Northenden, Manchester.
 1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea, S. Wales.
 1891. Walker, Bryant, 205, Moffat Building, Detroit, Michigan, U.S.A.
 1907. Wallis, E. A., Springfield, West Parade, Scarborough.
 1905. Walton, H. Maurice, Goodburne House, Richmond, Yorks.
 1900. *L* Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1886. *P* Watson, Rev. R. Boog, LL.D., F.L.S., etc., 11, Strathearn Pl., Edinburgh.

1900. Webb, Walter F., 202, Westminster Road, Rochester, N.Y., U.S.A.
 1902. Weeks, Wm. H., jr., 508, Willoughby Avenue, Brooklyn, N.Y., U.S.A.
 1895. Welch, Robert John, M.R.I.A., 49, Lonsdale Street, Belfast.
 1907. Wheat, Silas C., 987, Sterling Place, Brooklyn, N.Y., U.S.A.
 1905. Whitehead, William, 26, High Street, Stalybridge.
 1886. Whitwell, Wm., F.L.S., 2, Arden Grove, Dorridge, Birmingham.
 1889. Williams, John M., 31, Grove Park, Liverpool.
 1906. Williams, Mrs. A. L., 593, Jackson Boulevard, Chicago, Ill., U.S.A.
 1906. Winkworth, John F., 290, Burdett Road, London, E.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1901. *Z* Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1898. Woods, Henry, M.A., F.G.S., Sedgwick Museum, Cambridge.
 1886. *Z* Woodward, Bernard B., F.L.S., etc., 4, Longfield Rd., Ealing, London, W.
 1903. Worsdale, R., 163, Dudley Road, Grantham.
 1906. Wragge, Clement L., F.R.G.S., etc., 26, Jasper Road, Upper Norwood,
 London, S.E.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.



***Helicella barbara* (L.), in Lancashire.**—With reference to my recent note in this Journal (vol. xi, p. 367) on above species, it will be of interest to know that Mr. E. C. Stump, whilst staying at St. Annes, made a special journey to the locality mentioned. Finding no trace of the so-called "Roman Road"—the place having been built up so considerably—he made enquiries from the residents, and learnt that all that now remains of the above road is a narrow passage between two rows of houses. Thinking that the species might still linger in the neighbourhood he made a careful search but failed to find it. With a view, therefore, of preventing further disappointments, I have written this note.—J. WILFRID JACKSON (*Read before the Society*, November 14th, 1906).

***Ena montana* in Northamptonshire.**—My friend, Mr. Adams, who has seen the specimen of *Ena montana* found at Stanwick (*vide J. Conch.*, vol. xi, p. 200) considers it to be a drift specimen, and I certainly agree with him, as further research has revealed no recent specimen.—[Rev.] W. A. SHAW (*Read before the Society*, November 14th, 1906).

***Vertigo moulinsiana* in Berkshire.**—While hunting for snails along the banks of the stream at Cothill, in Berkshire, on March 30th, 1906, I was fortunate enough to discover a few specimens of *Vertigo moulinsiana* Dupuy. From subsequent visits to the place I find that it occurs fairly abundantly in company with *Vertigo antivertigo* over an area of some twenty square yards, among the thick tussocks of *Carex paniculata*, at a point where the stream frequently overflows its banks and forms a marsh. Cothill is about seven miles from Oxford, and nineteen miles from Bradfield, at which latter place Mr. Tomlin found this species in 1905.—H. C. NAPIER (*Read before the Society*, February 13th, 1907).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

364th Meeting, September 11th, 1907.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

“ A new Parasitic Mollusk of the genus *Eulima*,” by Paul Bartsch (*presented by the author*) ; “ A List of Cyclophoridæ found in Australia, New Guinea, etc.,” by J. C. Cox (*presented by Chas. Hedley*) ; “ Land and Freshwater Mollusca of India,” vol. ii., parts vii. to x., by H. H. Godwin-Austen (*presented by the author*) ; and the usual periodicals received in exchange.

Donation to Cabinet announced and thanks voted :

Petricola pholadiformis from Felixstowe, by Mr. A. Mayfield.

New Members Elected.

Vernon Howard, Carlton Lodge, Eastgate, Louth.

S. L. Petty, Dykelands, Ulverston, Lancs.

Candidates Proposed for Membership.

Mrs. A. L. Baker, 167, Hoddle Street, Richmond, Melbourne, Australia.

Chas. J. Gabriel, 293, Victoria Street, Abbotsford, Victoria, Australia.

F. Hugh Gripper, Springfield, Camden Park, Tunbridge Wells.

Chas. P. Harrington, Langlands, King's Avenue, Clapham Park, London, S.W.

Isidore Shaer, B.A., 25, Darlington Street, Cheetham Hill, Manchester.

George C. Spence, 6, Neston Avenue, Withington, Manchester.

G. H. Taylor, The School House, Higher Blackley, Manchester.

J. Kidson Taylor, 45, South Avenue, Buxton.

Resignation.

James Mitchell, 14, Knowe Terrace, Pollokshields, Glasgow.

Members Deceased.

Solomon I. DaCosta, 9, Gloucester Square, London, W.

Alexander Somerville, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow.

Papers Read.

“ Description of New Slug from Java,” by Walter E. Collinge.

“ On the Corrosion of Shells,” by Mrs. Agnes Kenyon.

“ On the Colonisation of Mollusca,” by the Rev. Canon Horsley.

“ *Acanthinula lamellata* (Jeff.) in Upper Airedale,” by Fred Booth.

“ *Petricola pholadiformis* Lam. in Suffolk,” by A. Mayfield.

“ Report of Rambles : London Branch,” by J. E. Cooper, Hon. Sec.

Exhibits.

By Mrs. Agnes Kenyon : A series of *Cypræa* to illustrate her paper.

By Mr. A. W. Stelfox : A set of *Limnaea*, allied to *L. involuta*, and also approximating to *L. burnetti*—from Lough Nagarriva, Co. Kerry, Ireland (see *Irish Naturalist*, vol. xvi., Sept. 1907, p. 286) ; also photographs of this locality and Lough Crimcaun, the *L. involuta* habitat.

By Mr. F. Booth : *Acanthinula lamellata* from Holden Clough, Silsden, Yorks., to illustrate his note.

By Mr. G. H. Taylor : A small delicate form of *Helix hortensis*, type and vars. *lutea* and *arenicola*, *H. nemoralis*, *H. arbustorum*, *Hyalinia cellaria*, and very large *Hy. lucida*, all from Grange-over-Sands, Lancs. ; also *Acicula lineata* from Far Arnside, Westmorland.

By Mr. C. H. Moore: Land shells (sp. ?) found in a bag of Indian corn.

By Mr. R. Cairns: *Helix virgata* from Aberystwyth, including good examples of var. *hypozona*.

By Mr. Edward Collier: A beautiful specimen of *Helix nemoialis* with interrupted bands, and of unusual size, from Black Head, Co. Clare, Ireland; and var. *citrinononata* of same from Croyde Bay, North Devon; also *Succinea oblonga* from Braunton Burrows.

By Mr. H. Beeston: A living sinistral *Limnea glabra* from Scarborough. This appears to be the first recorded reversion of this species.

By Mr. J. D. Dean: *Hyalinia cellaria*, forms approaching var. *obscura* Locard, from North Lancashire localities; *Helicodonta obvoluta* from Pleistocene deposits, Cambridgeshire; a curious *Clausilia bidentata* with two apertures, from Melling, Lanes. W.; a series of *Succinea*, including five white examples, from Old Colwyn, North Wales, collected by Mr. A. C. Lloyd, a form which resembles the shells from Hale Moss, Westmorland, formerly looked upon as *S. oblonga*, but now proved not to belong to that species. Also *Planorbis umbilicatus* var. *rhombica* from Morecambe, and *Pl. carinatus* from Milnthorpe, Westmorland, a new record for vice-county 69. Also *Bithynia tentaculata* and var. *excavata* from Southport.

By Mr. A. S. Kennard: A series of shells from Blythburgh, Suffolk, including *Helix hortensis*, *Bithynia tentaculata* (decollate specimens), *Limnea pereger*, *Planorbis vortex*, *Paludestrina stagnalis* (= *ulva*), *P. jenkinsi*, and *P. confusa*.

365th (Annual) Meeting, October 12th, 1907.

Mr. W. E. Collinge, M.Sc., President, in the chair.

Donations to the Library announced and thanks voted:

"Collecting Trip in S.S. 'Garland.'" "On the Phenomenon of Sinistrorsity in the Mollusca." "Notes on the Marine Mollusca of Portstewart, North Ireland." "Marine Mollusca and Brachiopoda." "A Day with the Dredge at Machrie Bay, Arran." "Contributions towards a List of the Marine Mollusca of the Upper Portion of Loch Linnhe, Argyllshire." "The Etymology of the Names *Ascea* and *Assiminea* of Leach." "Remarks on some of the Land and Freshwater Mollusca of Palestine." "A Visit to the Outer Hebrides in search of Mollusca." "A Molluscan Visit to some of the Inner Hebrides." All by the Rev. G. A. Frank Knight, and presented by the author.

"On the Geographical Distribution of the Mollusca of the Malagasy Region." "Notes on the References for Authorship of Species, as given in Jeffreys' 'British Conchology,' vols. ii.—v." "On the Genus *Cuma*." "On *Fulsella*, a Genus of Acephalous Mollusca." "On Parasitic Mollusca." "Notes on the Nomenclature of the British Nudibranchiata, etc." "On the Geographical Distribution of the Land Mollusca of the Philippine Islands, etc." "On the Molluscan Fauna of the Gulf of Suez, etc." "On the Generic Position of the so-called Physæ of Australia." "On the Relationships and Geographical Distribution of the Land and Freshwater Mollusca of the Palearctic and Nearectic Regions." "On the MacAndrew Collection of British Shells." All by the Rev. A. H. Cooke, and presented by the author. "The Marine Shells of Scilly." "Idem, Additions and Corrections," by the Rev. R. W. J. Smart and the Rev. A. H. Cooke (presented by the Rev. A. H. Cooke).

"Report on the Non-Operculate Land Mollusca [Malay Peninsula]." "On a Collection of Slugs from South Africa, with Descriptions of some New Species." "On a further Collection of South African Slugs, with a Check List of Known

Species." "On some Species of Slugs collected by Mr. H. Fruhstorfer." "Description of some New Species of Slugs collected by Mr. H. Fruhstorfer." "On the Anatomy and Systematic Position of some Recent Additions to the British Museum Collection of Slugs." "On the Occurrence in Ireland of *Arion empircorum* Fér. var. *boagei* Simr." "Note on the Anatomy of *Zonites rollei* Kobelt." "Description of a New Species of *Anadenus* from China." "On the Anatomy of the *Vitrina irradians* of Pfeiffer." "Note on the Anatomy of *Apera burnupi* E. A. Smith." "Some Notes on the Genus *Prisma* Simroth: Further Notes on *Amalia carinata* Risso." "Description of a New Species of *Onchidium* from South Africa." "On the Anatomy of the Genus *Myotesta* Cllge." "On some Land Mollusks from Java, etc." "On two New Species of Slugs of the Genus *Microparmarion* from Borneo." "On the Anatomy of *Apera burnupi* E. A. Smith." "Contributions to a Knowledge of the Mollusca of Borneo, part i." "The Genera *Damayantia*, *Collingea*, and *Issellentia*," all by Walter E. Collinge (presented by the author).

And the usual periodicals received in exchange.

Appointment of Auditors.

Messrs. C. H. Moore and Fred Taylor were appointed Auditors.

Appointment of Scrutineers.

Messrs. J. Madison and H. Overton were appointed Scrutineers.

New Members Elected.

Mrs. A. L. Baker, 167, Hoddle Street, Richmond, Melbourne, Australia.
 Chas. J. Gabriel, 293, Victoria Street, Abbotsford, Victoria, Australia.
 F. Hugh Gripper, Springfield, Camden Park, Tunbridge Wells.
 Chas. P. Harrington, Langlands, King's Avenue, Clapham Park, London, S. W.
 Isidore Shaer, B.A., 25, Darlington Street, Cheetham Hill, Manchester.
 George C. Spence, 6, Neston Avenue, Withington, Manchester.
 G. H. Taylor, The School House, Higher Blackley, Manchester.
 J. Kidson Taylor, 45, South Avenue, Buxton.

Candidates Proposed for Membership.

Dr. Paul Bartsch, Smithsonian Institution, Washington, D.C., U.S.A.
 H. H. Bloomer, 35, Paradise Street, Birmingham.
 John Brookes Henderson, junr., 16th Street and Florida Avenue, Washington, D.C., U.S.A.
 Reginald Thomas Hindley, 59, Collingwood Avenue, Muswell Hill, London, N.
 John F. Musham, Blenheim House, South Park, Lincoln.

Resignations.

Rev. Charles Chichester, Shirwell Rectory, Barnstaple.
 A. D. Darbishire, M.A., B.Sc., Royal College of Science, South Kensington, London, S.W.
 Rev. Robert Godfrey, M.A., 111, Finlay Drive, Dennistoun, Glasgow.
 J. S. Corker, Cambridge Street, Manchester.

Annual Report and Balance Sheet.

The Annual Report of the Council (see p. 111), and the Treasurer's Report including the Balance Sheet for 1906 (see p. 58), and the Interim Balance Sheet up to October 4th, 1907 (see p. 112) were presented and adopted.

Reports of the Leeds and London Branches.

The Reports of the Leeds and London Branches for the past year (see p. 112) were presented and read.

Election of Officers and Council.

The Scrutineers reported that thirty-six valid papers had been received, of which thirty-three had voted for the entire list as nominated by the Council. It was then reported that since the balloting list had been circulated, a letter had been received from Mr. Charles Oldham, stating that owing to his removal to London it would be impossible for him to accept the office of Recorder, and it was thereupon resolved that Mr. Fred Taylor be elected to the office thus vacated, and the Officers and Council given in the List on p. 98 were declared to be duly elected.

A resolution expressing the thanks of the meeting to the retiring Secretary and Recorder for their services to the Society was proposed and carried.

Paper Read.

"Obituary Notice of Alexander Somerville, B.Sc., F.L.S., late President of the Conchological Society," by the Rev. G. A. Frank Knight.

President's Address.

Mr. W. E. Collinge then delivered an Address, entitled :

"SOME OBSERVATIONS ON SLUGS AND SLUG-LIKE MOLLUSCA."

A vote of thanks to the President for his Address and for his reception of the Society in Birmingham was unanimously passed.

Exhibits.

By Mr. R. Standen : Series of young forms of *Anodonta cygnea* from the Marple Canal ; *Helix aspersa* m. *scalariforme* from the Cove, Silverdale, Lancs. ; *Limnaea* sp. ? from Lough Nagarriva, Co. Kerry, Ireland (collected by Mr. A. W. Stelfox).

By Mr. J. Wilfrid Jackson : *Vertigo alpestris* from Hazelslack, Westmorland ; *V. pusilla* from Beetham Fell, Westmorland, and Warton, Lancs. ; *V. pygmaea*, *V. antivertigo* (new record for vice-county 60) ; and *Functum pygmaeum* from banks of the Keer, Carnforth ; *Vertigo antivertigo* and *Punctum pygmaeum* from Hawes Water, Silverdale ; *Jamiania secale*, *Vertigo pygmaea* and *V. antivertigo* (new record for vice-county 69) from near Meathop Fell, Westmorland ; exceedingly fine examples of *Succinea oblonga* taken on the face of the cliffs at Meathop Fell, twenty-five feet above the level of the road ; a curious small form of *Hygromia hispida* (5 mm. diameter) from Grange, Lancs. ; *Clausilia bidentata* and v. *cravenensis* (alt. 14 mm.) from Hazelslack, Westmorland, and Warton, Lancs., for comparison with a small form (alt. 7.5 mm.) of this species found abundantly at roots of grass and rushes on the banks of the Keer, Carnforth. Also specimens and photo-micrographs of newly-hatched fry of *Paludestrina taylori*, and of Glochidia (larval state of *Anodonta cygnea*). Also photo-micrographs of *Vertigo moulinsiana*, *V. liljeborgi*, *V. antivertigo*, *V. pygmaea*, *V. alpestris*, *V. pusilla* and *V. angustior*.

By Mr. H. Beeston : Sinistral *Limnaea glabra* from Scarborough.

By Mr. H. Overton : Pleistocene and Holocene Land and Freshwater Mollusca from Ightham, Crayford, Ilford, Walthamstow, Newbay, and London.

By Mr. W. Wells Bladen : *Helix nemoralis* v. *suffusa* from Balbriggan.

By Mr. H. H. Bloomer : Malformed *Anodons* from Sutton Park, taken between 1899 and 1906.

By Mr. C. H. Moore : *Vallonia excentrica* from Aberystwyth ; *Limnaea truncatula* and *Jamiania cylindracea* from Barmouth ; *J. cylindracea* and *Vitrea rogersi* approaching v. *umbilicata* from Dolgelly ; *V. rogersi* from Arthog ; *V. cellaria*, *V. alliaris* and v. *viridula*, and *Vertigo pygmaea* from Meathop ; *Vitrea cellaria*,

Jamnia cylindracea v. *albina*, *Succinea elegans*, *Vertigo alpestris*, *V. pusilla* and *Limnaea peregere* from Grange.

By Mr. C. E. Wright: Scalariform examples of *Limnaea auricularia*, *L. palustris*, *L. stagnalis*, *Planorbis spirorbis*, *Helix nemoralis*, *H. hortensis*, *H. arbustorum*, *H. virgata*, *H. itali*, and *H. caperata*. Also *Helix arbustorum*, *H. hortensis*, *H. rotundata*, and *Clausilia bidentata* from Howe Harry, Orkney Isles; *Physa acuta*, Ashton, Northants. Series of *H. nemoralis* and *H. hortensis* from Northamptonshire, collected this year. *H. virgata* vars., from Folkestone.

By Mr. E. Collier: Small species of land and freshwater shells, including *Vertigo alpestris*, *V. angustior*, *Acicula lineata*, and *Limnaea involuta*.

By Mr. J. Davy Dean: Enlarged water-colour paintings of British *Hyalina*.

By Mr. J. Madison: Series of local shells from the Birmingham district, including large *Physa heterostropha*, *Clausilia bidentata* v. *albina*, large *Limnaea stagnalis*, etc.

By the Manchester Museum: Series of specimens illustrating the manufacture of Pearl-buttons from the *Unionidae* of the United States, including drilled examples of *Quadrula ebena*; blanks as cut from shell; blanks rough-faced; blanks holed, and finished buttons (see "Mussel Fishing and Pearl-Button Industry," by L. E. Adams, *J. Conch.*, vol. xi., p. 215).

By Mr. W. E. Collinge: Series of Slugs to illustrate his address.

ANNUAL REPORT.

The Council is pleased to be able to announce that in spite of a heavy death roll the number of members of the Society has been maintained.

On the date of the last annual meeting there were 309 members on the Society's list. Between that date and the end of the year, nine new members were elected, one died, two resigned, and two were struck off the list in accordance with Rule 4, so that the list published on January 1st of this year contained 313 names. Since then sixteen new members have been elected, four have died, eleven resigned, and five struck off the list, leaving at the present time 309 names—exactly the same number as at this time last year.

Dr H. A. Pilsbry, of the Academy of Natural Sciences, Philadelphia, has been elected an Honorary Member in the place of the late Mr. Wm. Nelson.

The Council has regretfully to record the loss by death of Miss Caroline Birley, Mr. Solomon I. DaCosta, Mr. Wm. Baillie, and Mr. Alexander Somerville, an ex-president of the Society, of whom an obituary notice will appear in the next number of the *Journal*.

Ten meetings of the Society have been held during the past year, from October 20th, 1906, to September 11th, 1907. The proceedings at these meetings will be found recorded in three numbers of the *Journal*, containing 96 pages.

The fourth number, just issued, is occupied by the Catalogue of the Society's Library, filling 35 pages, which have been separately numbered, so that this can either be bound at the end of the complete volume or independently as members may desire. The Council has great satisfaction in recording the completion of this work, and trusts that its utility to the Society will justify the expense incurred in its production.

Donations to the Cabinet have been received from Messrs. J. W. Baldwin, Edward Collier, T. Edwards, A. Mayfield, H. C. Napier, and R. Standen.

Valuable publications for the Library have been received from different societies in exchange for the *Journal*, and most welcome additions have also been received from Rev. G. A. Frank Knight, Rev. A. H. Cooke, Messrs. Paul Bartsch,

R. Bergh, C. S. Carter, W. E. Collinge, H. H. Godwin-Austen, G. K. Gude, Charles Hedley, A. Leicester, J. Cosmo Melvill, R. Standen, E. R. Sykes, and J. W. Taylor.

Mr. A. da Costa Gomez has kindly contributed to the Illustration Fund.

The Council have to announce with regret that the Secretary and Editor (Dr. Hoyle), and the Recorder (Mr. Oldham), have found it impossible to continue to discharge the duties of these offices. After careful consideration they have decided that it will be advisable to divide the duties of Secretary and Editor, and they have made nominations on this basis in the voting list. The Council believe that they have been fortunate enough to secure the services of gentlemen who will carry on the duties of all these offices with zeal and efficiency, and they look forward with confidence to a career of increased usefulness and prosperity for the Society in the future.

TREASURER'S REPORT.

The statement of Income and Expenditure for the year 1906 was presented and adopted at the meeting held on March 13th, 1907, and is to be found printed on page 58, volume 12, in the April number, so no good purpose will be served by repeating the same here, beyond the fact that there was a credit balance carried forward of £14 : 0 : 10 to the next year's account. In bringing before you the usual interim statement of accounts from January 1st, 1907, to October 4th inclusive, the Council is again pleased to point out that the finances of the Society continue to be found in a most satisfactory condition, there being in hand at the present moment a cash balance of some £42 with outstanding liabilities of about £15.

STATEMENT OF INCOME AND EXPENDITURE

From January 1st to October 4th, 1907.

| RECEIPTS. | £ | s. | d. | | EXPENDITURE. | £ | s. | d. |
|------------------------------|----------|-----------|-----------|--|------------------------------|----------|-----------|-----------|
| Cash in hand Jan. 1st, 1907 | 14 | 0 | 10 | | Library Cards - - - | 1 | 2 | 0 |
| Subscriptions - - - | 59 | 8 | 10 | | Printing Journal— | | | |
| 3 Life Membership Fees | 9 | 9 | 0 | | January, 1907 | 12 | 5 | 3 |
| Sale of Publications - - | 1 | 2 | 5 | | April, 1907 - - | 11 | 12 | 3 |
| Advertisement - - - | 0 | 7 | 0 | | July, 1907 - - | 11 | 6 | 6 |
| Donation (A. da Costa Gomez) | 0 | 5 | 0 | | Illustrations - - - | 0 | 3 | 6 |
| | | | | | Reprints - - - - - | 2 | 6 | 0 |
| | | | | | Stationery - - - - | 1 | 13 | 6 |
| | | | | | Pt. xiii. Taylor's Monograph | 0 | 10 | 6 |
| | | | | | Treasurer's expenses - - | 1 | 10 | 0 |
| | | | | | Cash in hand - - - - - | 42 | 3 | 7 |
| £84 13 1 | | | | | £84 13 1 | | | |

ANNUAL REPORT OF THE LONDON BRANCH.

The usual monthly meetings have been held during the past year, and the attendance of members at most of them has been larger than in some previous seasons. Four of the winter meetings took place at the Rev. Canon Horsley's Rectory; we have also to thank Miss A. C. S. Foster and Mr. J. C. Dacie for kindly extending hospitality to us on January 10th and March 1st respectively. At all these evening meetings a considerable number of interesting shells was exhibited.

The first field meeting of the season was held on May 4th, in the grounds of Fulham Palace, by kind permission of the Bishop of London. Ten members were

present, and they found between them thirty species of mollusca—not a bad total for one afternoon's collecting in Fulham. The most interesting capture was *Vitrea lucida*, of which there was a large colony.

On June 1st five members met at Catford in very wet weather to explore the Ravensbourne stream. Including land mollusca, thirty-three species were collected. In more favourable weather, the total would no doubt have been larger. Canon Horsley took a large water-beetle with two *Ancylus lacustris* attached to its elytra. Mr. B. T. Lowne very kindly provided tea for the members present, and afterwards exhibited his collection of British non-marine shells, and also a fine series of rare British plants, growing in his wild flower garden.

Subsequent meetings were held on July 6th, at Cheshunt, where twenty-four species of mollusca—mostly aquatic—were taken; at West Drayton on Aug. 10th; and at Bushey Park on Sept. 7th, when a nice gathering of *Pisidia* (including *P. pulchellum*) was made.

The membership of the branch shows a slight increase.

2nd Oct., 1907.

J. E. COOPER, Hon. Sec.

ANNUAL REPORT OF THE LEEDS BRANCH.

At the last Annual Meeting, held at the Leeds Institute, on Dec. 9th, 1905, Mr. T. Castle, of Heckmondwike, was elected President, with Messrs. F. Booth (Shipley), and J. E. Crowther (Elland), as Joint Hon. Secretaries.

Twelve meetings have been held during the year, including the last Annual Meeting, with an average attendance of $5\frac{1}{2}$ from a roll of eleven members on the books, exclusive of visitors, against last year's average of six members from a roll of twelve.

The death of our late lamented member, Mr. W. Nelson, to which sympathetic reference was made at the time both at our meetings and through the *Naturalist* and *Journal of Conchology*, and the absence of Mr. A. H. Pawson, F.L.S., F.G.S., who now resides too far away to attend, reduces the actually attending members to ten, and moreover two of the meetings were arranged in connection with the Yorkshire Naturalists' Union excursions. These were not a success from the point of view of attendance, only three members being present on each occasion—the lowest attendance except at the Otley meeting, when only two members put in an appearance.

The club has had the pleasure of Mr. W. Denison Roebuck's company at the meetings again this year since his arrival home in April after his long trip abroad.

There have been five indoor meetings during the year, three at Leeds and two at Bradford.

Of the seven meetings held in the field, the first was at Mablethorpe in April, on the invitation of Mr. C. S. Carter, of Louth, who kindly volunteered to guide the members to several localities for choice species. Although they were doomed to disappointment in regard to one species (*Amphipeplea glutinosa*) as they were two years ago at Cleethorpes, the outing was an enjoyable and interesting one.

The May meeting was held at Ingleton in connection with the Yorkshire Naturalists' Union's visit to that district. Mr. W. D. Roebuck reported the outing, which yielded very little of note for that very productive district.

The June meeting was held at Flamborough, again in connection with the Yorkshire Naturalists' Union.

The July meeting was held at Leeds, for a visit to the pond at Moortown, where it is said the late Mr. Nelson secured his examples of reversed *Linnæa*

pereger. The members were unsuccessful. Examples of *L. stagnalis*, *L. palustris*, *Planorbis corneus*, and *P. carinatus* were amongst the species recorded. The members were kindly entertained to tea on this occasion at the Parade Restaurant by Mr. W. Denison Roebuck, after which a visit was made to his residence to inspect his many curios.

The August meeting took the form of an Excursion to Ilkley, for a visit to the habitat of *Azeca tridens* var. *crystallina*, *Hygromia fusca*, etc., near Addingham. This outing was a very successful one from a conchological point of view, a number of species being observed and collected, mostly of uncommon occurrence.

The September meeting was held at Grassington, for a further investigation of Grass Woods for the newly re-established British slug, *Limax tenellus*. A thorough search in several parts of the wood failed to secure this species, the probability being that this wood is not of sufficient age to have been in existence at the time of the supposed retirement of this slug from more congenial habitats to its present fastnesses in the primitive pine-clad forests. A good number of other species of slugs was observed in addition to the land shells recorded.

The October meeting was held at Otley, and was a total failure, both in regard to attendance and the discovery of mollusca. The only two finds of the ramble were slugs, viz., *Arion minimus* in abundance in all stages of growth, and one *Limax levis*, both occurring in a wood on Leeds Road.

No papers were given during the year, but the exhibits at the winter meetings were many and varied and of an interesting character. In regard to the species of British shells exhibited, Mr. J. W. Taylor has always had some instructive knowledge to impart, in regard to either the exhibit, the character of the shell, or the morphology of the animal, which has really been of more value than the mere exhibition of the shells themselves.

No new species has been added to the Yorkshire area during the year, which has a fairly complete list so far as the mollusca indigenous to the north of Britain go.

The club has been officially represented at the meetings of the Y.N.U., and reports of their investigations have appeared in the *Naturalist*, for which the thanks of the members are due to Mr. W. Denison Roebuck and Mr. J. E. Crowther.

The membership at the beginning of the year was twelve. The death of Mr. W. Nelson in January deprived the club of one of its founders and time-honoured members. The funeral took place at Burmantofts Cemetery, and the club was represented by Mr. W. Hutton and its two secretaries. A vote of condolence with the widow and children was passed at a subsequent meeting, the sympathy of the members being conveyed to Mrs. Nelson by letter and gratefully acknowledged.

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| T. CASTLE, President. | } Hon. Secs. |
| F. BOOTH, | |
| J. E. CROWTHER, | |

366th Meeting, November 13th, 1907.

Mr. B. R. Lucas in the chair.

Donation to the Library announced and thanks voted:

"Observations on the Genus *Unio*," by Isaac Lea (*from Dr. J. H. Ashworth*); and the usual periodicals received in exchange.

New Members Elected.

Dr. Paul Bartsch, Smithsonian Institution, Washington, D.C.

H. H. Bloomer, 35, Paradise Street, Birmingham.

John Brooks Henderson, jr., 16th Street and Florida Avenue, Washington, D.C.

Reginald Thomas Hindley, 59, Collingwood Avenue, Muswell Hill, London, N.

John F. Musham, Blenheim House, South Park, Lincoln.

Candidates Proposed for Membership.

Herbert L. Hawkins, Dalton Hall, Victoria Park, Manchester.
 Frank Morey, Elm Grove, Newport, Isle of Wight.
 Charles Upton, Tower House, Stroud, Glos.

Resignation.

W. R. Sherrin.

Papers Read.

"*Vitrea lucida* Drap. at Grange, Lancs.," by G. H. Taylor.

"*Vertigo antiovertigo* Drap. in Silverdale District, West Lancs.," by J. Wilfrid Jackson.

"*Linnæa glabra* var. *decollata-sinistrorsum*," by H. Beeston.

"*Vitrea rogersi* with pale animal," by J. E. Cooper.

"*Paludestrina jenkinsi* in Middlesex," by J. E. Cooper.

"Conchological Notes from Russia," by Lionel E. Adams.

Exhibits.

By Mr. L. E. Adams: A fine series of specimens to illustrate his paper.

By Mr. W. Evans: A number of "alien" shells picked up in the vicinity of Edinburgh, including *Helix vermiculata*, *H. appennina*, *H. pisana*, *H. vestalis*, *H. tuberculosa*; also *Lucinopsis undata* and *Lucina borealis* from Aberlady Bay, Firth of Forth.

By Mr. B. R. Lucas: (1), a series of Irish *Vitrea*; these were submitted to Mr. A. S. Kennard, who found his newly-described *Vitrea hibernica* amongst them; also a form of *Vitrea* not yet described. (2), sample of alluvial deposit containing land shells from the estuary of the Ribble and Hodder (Yorks.). (3), *Turritella?* collected at Winnington in the sand quarry above the boulder clay, 130 feet above ordnance datum.

By Mr. C. P. Richards: *Helcion pellucidum* L. on frond of *Laminaria*, from Newquay, Cornwall.

By Mr. H. Beeston: Reversed *Linnæa glabra* to illustrate his note.

By Mr. G. H. Taylor: *Vitrea lucida* Drap. from Grange, Lancs., to illustrate his note.

By Mr. J. Wilfrid Jackson: Series of specimens to illustrate his paper. Also *Helicigona arbustorum*, *Hygromia rufescens* vars., *Hyg. granulata* var. *cornea*, *Vitrea cellaria* var. *compacta?*, all from Grange; *Jamnia muscorum* var. *brevis*, *Pomatias elegans* var. *violacea*, from the Cove, Silverdale; *Neritina fluviatilis*, *Bithynia tentaculata*, *Hygromia granulata*, *Hyg. rufescens* and var. *alba*, all from Borwick; *Helicella caperata* vars. *ornata* and *fulva*, from Sandside, Westmorland.

Petricola pholadiformis Lam. in Suffolk.—On the Wednesday of last Whit-week while picking up valves of *Barnea candida* and *Zirfea crispata* on Felixstowe beach, I noticed among them some broken shells and single valves of *Petricola pholadiformis*. The next day a specimen turned up north of Lowestoft harbour exhibiting the malformation pointed out by Mr. J. E. Cooper as characterising some of the shells at Shellness (*Journal of Conchology*, vol. ix., p. 243), but otherwise perfect. Mr. A. S. Kennard, to whom I made known the discovery, tells me that he has obtained two pairs of valves from a mass of peat washed up by the sea at Dunwich. It is evident that now it extends all along the Suffolk coast.—ARTHUR MAYFIELD (*Read before the Society, September 11th, 1907*).

OBITUARY NOTICE.

**ALEXANDER SOMERVILLE, B.Sc., F.L.S., late President
of the Conchological Society.**

BY THE REV. G. A. FRANK KNIGHT, M.A., F.R.S.E.

(Read before the Society, October 12th, 1907).

ON 5th June, 1907, there passed away one whose memory will long be cherished by many a naturalist in Great Britain and Ireland. Alexander Somerville was the eldest son of a distinguished father, the late Rev. A. N. Somerville, D.D., who, after being minister of Anderston Free Church, Glasgow for forty years, at the age of sixty-four resigned his pastorate to become a world-wide evangelist for the remaining twelve years of his life. He died in 1889, crowned with the highest honours his Church could bestow on him, being Moderator of the Free Church of Scotland in 1886-1887.

The son inherited the pronounced scientific proclivities of his father. Born in Glasgow, in 1843, he was educated at Glasgow Academy, and attended three sessions at the Old College in the High Street. Embracing a business career, after a few years in this country, he proceeded to India, where he spent fifteen years in the service of the well-known firm of Mackinnon, Mackenzie & Co. His health suffering through the Indian climate, he returned to Scotland, and plunged once more into student habits and scientific pursuits long abandoned. He went back to the University, now in its splendid new buildings at Gilmorehill, attended science classes, and in due course graduated B.Sc. Every branch of natural history had its charm for him. As a boy he had been an ardent entomologist, but now his inclinations turned towards the mollusca. He threw himself into practical research work, and systematically dredged the bays and lochs and firths of our western shores. Not content with investigating within such already well-worked localities as the Firth of Clyde and Oban Bay, he explored spots hitherto practically untouched by the dredge. The Sound of Jura, with the neighbouring Knapdale Lochs, the deep waters of Loch Linnhe, the islands round Iona, the Sound of Sleat and its neighbouring lochs, the western seaboard of the mainland from Loch Carron northwards to Gairloch, Loch Broom, and Loch Inver, the islands of Rum, Eigg, Skye, and the Outer Hebrides, were diligently studied, and thus he was instrumental in widening the area of our knowledge of the mollusca of these regions in a very marked degree. Most punctilious in regard to exact nomenclature, his lists of species obtained were models of

scientific precision, the locality, depth in fathoms, and nature of the bottom, being always added to the name of the shell. It is to be regretted that very few of these carefully drawn-up lists have ever been made accessible in any scientific journal, but the present writer into whose hands they (and most of the shells obtained by him) have come, has the intention, at no distant date, of doing justice to his uncle's widespread research by publishing these records.

Already a Fellow of the Linnean Society (1881), Mr. Somerville in 1886 compiled a "List of British Marine Shells, comprising those of the Brachiopoda and Mollusca (Proper) after the arrangement in Jeffreys' *British Conchology*, with Alterations and Additions to 1885," which was most favourably received, and for years was a standard authority. On March 4th, 1886, he was elected a member of this Society; on December 9th of the same year he was appointed one of the three referees for British Marine Mollusca under the Council's scheme for the nomenclature and identification of shells; on December 20th, 1890, he was elected a Vice-President; and on October 27th, 1900, he was chosen to be President. In the twenty-one years during which he was a member of this Society, Mr. Somerville contributed much to its help, his delight being to secure new members, to send specimens for exhibition, and in every way to foster its interests. The following papers were read by him to the Society:—"*Trophon truncatus* (Ström) var. *scalaris* Jeff. on the West of Scotland" (*J. of C.*, v. (1888), p. 319), and "The Conchology of the Clyde: Geographical and Biological," Presidential Address (*J. of C.*, x. (1902), p. 138).

In his native city Mr. Somerville was a recognised leader in scientific research. He was successively Secretary, Editor, Vice-President, and President of the Natural History Society of Glasgow, and contributed many communications to that institution. A life-member of the Royal Philosophical Society of Glasgow, he was also one of the founders, and an ardent supporter of the marine station at Keppel Pier, Millport, which now has enlarged its sphere of usefulness as the "Marine Biological Association of the West of Scotland." In the recent Scottish Antarctic Expedition, under Dr. W. S. Bruce, he took a keen interest, and helped considerably towards obtaining support for that national enterprise. He maintained correspondence with many of the leading scientists of Britain, and as his letters were charming and thoroughly illustrative of the writer's open and buoyant nature, his communications were much prized.

In later years his enthusiasm turned towards botanical research. Indefatigably exploring the less-worked parts of his native land, he made his herbarium one of the richest in Scotland. For several years

he conducted botanical classes for ladies. He declined the offer of a professorship of botany in St. Mungo's College, Glasgow. His energy and genuine love of nature infected all with whom he came in contact. To the study of topographical botany he applied himself with assiduity; published a very handy wall-sheet of the Watsonian Vice-Counties of Britain and Ireland; contributed numerous papers to the Glasgow Natural History Society, the Cryptogamic Society (of which he was a vice-president), the Edinburgh Botanical Society, *the Annals of Scottish Natural History*, the *Journal of Botany*, etc. His loss as an original investigator is deplored especially by those who know how widely he extended our knowledge of rare plants by his discoveries of them in places where they had hitherto been unknown to exist.

A singularly lovable man, he had a genius for friendships, and his circle of friends was ever increasing. It was his special joy to encourage young naturalists, and ungrudgingly he devoted many precious hours to the task of sending specimens with notes attached to those who were beginning the study of any branch of science. Many in all parts of Britain to-day mourn the loss of one who spared no pains to help them in every possible way. He is buried in the Western Necropolis at Glasgow.

DESCRIPTION OF A NEW SPECIES OF SLUG OF THE GENUS *ATOPOS* FROM JAVA.

BY WALTER E. COLLINGE, M.Sc., F.E.S.

(Read before the Society, September 11th, 1907).

SOME few months ago I received from Mr. John Ponsonby a small collection of slugs from Java, entrusted to him by Major Ouwens, of the Botanical Gardens, Buitenzorg.

Most of the specimens belong to the genus *Parmarion* Fisch., with the exception of an immature example of *Philomycus bilineatus* Bens., two damaged *Helicarion*-like specimens, and two specimens of a new species of *Atopos*.

This is the first record of the last-mentioned genus in this island, although it is known from the Malay Peninsula, Sumatra, Borneo, Celebes, and the Philippines.¹ In all probability future investigation will show that the genus is distributed throughout the East Indian Archipelago.

¹ See Collinge, *J. of Malac.*, 1902, vol. ix., p. 84.

Atopos ouwensi n.sp.

Colour of the notum a dirty light-brown, with a faint tinge of green, extending over the head in a hood-like manner, extreme anterior end yellow; there are a few black circular spots laterally, and the whole has a granulated appearance; head yellow; underside (perinotum?) greenish-brown; foot-sole yellowish-green; keel prominent, light greenish-yellow in colour. Length of notum (in alcohol) 38 mm.; breadth, 5 mm.; height, 6.5 mm. Female generative orifice, 8.5 mm. from the male generative orifice.

Habitat: Java (Botanical Gardens, Buitenzorg).

This is quite a distinct species, reminding one in the general attenuated form of the body more of *Atopos rugosus* Cllge. and *A. punctata* Cllge. than of the broad heavy *A. sarasini* type.

The following is a complete list of the species described up to the present:—

Atopos Simroth, 1891.

1. *A. semperi* Simr., 1891. Mindanao.
 2. *A. strubelli* Simr., 1891. Amboina.
 3. *A. leuckarti* Simr., 1891. Amboina.
 4. *A. trigonus* Semp. Central Luzon.
 5. *A. pulverulentus* Bens. Penang.
 6. *A. scutulatus* P. & F. Sars, 1899. Celebes.
 7. *A. simrothi* P. & F. Sars, 1899. Celebes.
 8. *A. cristagalli* P. & F. Sars, 1899. Celebes.
 9. *A. pristis* P. & F. Sars, 1899. Celebes.
 10. *A. schildii* Babor, 1900. Sumatra.
 11. *A. sarasini* Cllge., 1902. Malay Peninsula.
 12. *A. harmeri* Cllge., 1902. Malay Peninsula.
 13. *A. rugosus* Cllge., 1902. Malay Peninsula.
 14. *A. punctata* Cllge., 1902. Malay Peninsula.
 15. *A. laidlawi* Cllge., 1902. Malay Peninsula.
 16. *A. shelfordi* Cllge., 1903. Borneo.
 17. *A. maximus* Cllge., 1903. Malay Peninsula.
 18. *A. ouwensi* Cllge., 1907. Java.
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THE LAND-SHELLS OF LUNDY ISLAND.

By J. R. LE B. TOMLIN, M.A.

Read before the Society, February 13th, 1907).

As far as I can ascertain no mollusca have ever been recorded from Lundy. I must own that coleoptera and not mollusca were the primary object of my visit last Easter, but fortunately these two forms of collecting so often coincide, that I am able to present a list of thirty-five species—no doubt further collecting would considerably increase this total, especially in the way of aquatic species, as I paid very little attention to the numerous tanks and ponds on the island. Of trees there are very few and the vegetation chiefly consists of heather, grass, brambles and bracken, as well as great quantities of thick moss. It was in this moss that nearly all the terrestrial species occurred. Nothing could be called at all plentiful but this may have been due to the early time of year.

Lundy Island is situated off the north coast of Devon, about fourteen miles from Hartland Point and thirty from the Welsh coast. In spite of its isolation, there is a local post office, served by a fortnightly mail from Instow, and the proprietor of the island, the Rev. F. G. Heaven, usually supplements this by one in the alternate weeks, the mail boat in each case being a local trawler. The facetious Devonian is fond of pointing to Lundy as "the Kingdom of Heaven upon earth." The island is an isolated rock of granite, some three and a half miles long by half a mile broad, about 1,000 acres in extent, and rising more than 400 feet directly from the sea. Exposed as it is to the full force of the Atlantic Ocean, one must be prepared for a rough passage out and be considered lucky if one can leave on the day appointed. There is only one landing-place, a little bay well sheltered from the prevailing S.W. winds, but fully exposed to the east, so that a change of wind may mean a delay of many days in getting off. This bay lies towards the S.E., under the lee of Rat Island, and at the S.W. corner is the dreaded Shutter rock, made famous in "Westward Ho," and recently familiar in connection with the "Montagu" disaster. There are now two lighthouses, one on Rat Island, and one at the very bare north end, a third towards the centre of the island being now disused and occasionally let to visitors in the summer. On the west side the cliffs are magnificent and descend perpendicularly to the sea, but on the east they are less sheer and to a great extent covered with thick vegetation.

It was visited once or twice last century by entomologists; thus in June, 1844, and in July, 1845, Mr. T. V. Wollaston collected in the

island (*Zoologist*, vol. 3, p. 897, and vol. 5, p. 1753), as also Mr. F. Smith, the well-known hymenopterist, in August, 1864, and 1874 (*Ent. Month. Mag.*, vol 6, p. 134, and vol. 11, p. 111). Dr. Joy collected beetles there in August, 1905 and induced me to accompany him on a second visit in April, 1906. These I believe to be the only records of naturalists visiting Lundy, except, perhaps, in the case of ornithologists. It may be interesting to note that we not uncommonly saw the buzzard and the peregrine falcon sailing by on outstretched wings, and on one occasion watched a hoopoe, from only twenty or thirty yards away, hungrily hunting about, most likely after a long journey.

The following is the detailed list of species; none exhibited any noticeable deviation from the type, such as one might, perhaps, have expected. From entomological reasons one may probably infer that the island has been separated from the mainland for a very long period.

Limax flavus L.—Observed once or twice in damp ground.

Agriolimax agrestis L.—Common.

A. lævis Müll.—Common.

Milax sowerbyi Fér.—Occasional; on old walls.

Vitrina pellucida Müll.—Fairly common.

Vitrea crystallina Müll.—A few in moss.

V. cellaria Müll.—Only dead shells.

V. alliaria Miller.—Not uncommon in moss.

V. nitidula Drap.—Not uncommon in moss.

V. pura var. **nitidosa** Gray.—I did not find the type, though it doubtless occurs.

V. radiatula Alder.—Common in moss.

Zonitoides nitidus Müll.—Common in marshy ground towards the north end.

Euconulus fulvus Müll.—Not uncommon but small.

Arion ater L.—Not uncommon.

A. fasciatus Nilsson.—Not uncommon.

Punctum pygmæum Drap.—A few in moss.

Sphyradium edentulum Drap.—Common.

Pyramidula rotundata Müll.—Common and rather large.

Helicella caperata Mont.—Dead shells only.

Hygromia granulata Alder.—Rare; strange to say I did not observe *H. hispida* L.

H. revelata Fér.—Not at all uncommon on the cliffs in situations similar to those in which it occurs in the Channel Isles. Only a short time before it turned up, I remarked on the possibility of finding it and the likely appearance of the ground. Lundy with its granite cliffs is, I imagine, geologically similar to the Channel Isles.

Acanthinula aculeata Müll.—Rare in moss.

var. **albida** Jeff.—A single living specimen.

Vallonia excentrica Sterki.—Several examples.

Helix aspersa Müll.—In gardens.

H. nemoralis L.—Apparently very scarce, but this may be due to the time of year.

Cochlicopa lubrica Müll.—Very common.

var. **hyalina** Jeff.—Several specimens in moss.

Jamina anglica Fér.—Very local but common.

J. cylindracea DaC.—Common.

var. **curta** West.—With the type.

Vertigo substriata Jeff.—Rare.

V. pygmæa Drap.—Common.

Balea perversa L.—Obtained in great numbers by beating old and half-dead branches of gorse.

Clausilia bidentata Ström.—Fairly common.

Phytia myosotis Drap.—A single example at the landing-place.

Limnæa truncatula Müll.—A few very fine examples in a pond towards the Shutter rock.

Pisidium pusillum Gmel.—In ponds.

var. **grandis** Adams.—Common in a quarry pond on the east side.



The Colonization of Molluscs.—I wish we had more faunistic papers and notes in the *Journal*. I suggest the subject of artificial colonization. Last year having become possessed of a strip of chalky bank by the sea in Kent, I turned out there some hundreds of immature specimens of *Helix virgata* of the variety *radiata* obtained from Rye. It would seem an excellent spot for this chiefly maritime variety, but this year not a specimen can I find. I purposely turned out immature specimens since I believe that attempts to colonize often fail from the fact that adults are deposited, and that, after they have laid their eggs. In such a case only dead shells are likely to be found next year. I have also several times, and in several spots, as like as could be to their only British habitat, and usually not very far from it, endeavoured to form fresh colonies of *Turricola terrestris*, but in no case with a shadow of success. With the same soil, the same kind of vegetation, the same aspect, in the same county, care being taken that young and not moribund specimens are selected for the experiment, success should be anticipated. Yet it never seems to come to me or to others whom I have consulted. Attempts to transfer *H. pomatia* from one chalky lane or down in Kent or Surrey to another also fail. Why? I invite the record of experiences and of suggestions.—[REV. CANON] J. W. HORSLEY. (Read before the Society, September 11th, 1907).

Unio tumidus v. **ponderosa** Pascal in Leicestershire.—In Jeffreys' "British Conchology" (1862, p. 36) I find that *Unio tumidus* of "the great size of $4\frac{7}{16}$ inches in breadth and $2\frac{3}{4}$ inches in length, and weighing 2 oz. 6 dr.," is noted as having "been taken by Mr. Norman in ponds at Wistow in Leicestershire." The large

shells from this locality were first identified as var. *ponderosa* Pascal, by Mr. H. E. Quilter, in a local list published in the *Transactions of the Leicester Lit. and Phil. Society*, part vii., April, 1888. This record is, I understand, the first for this country of this fine variety. I have myself taken living specimens at different times since 1893 in this locality, but last August when I visited the pond I could with difficulty obtain living examples, although dead shells abounded. I handled perhaps two hundred shells, but only found ten living ones. Many were evidently quite recently defunct, since the remains of the animals were still in their shells. The place had become so choked with decaying branches and leaves from the surrounding trees that dredging was impracticable, and I had to feel for the shells amongst the mud and refuse, and thus was only able to work round the edge of the pond. I found that the causes so fatal to the *Unio tumidus* were having an equally baneful effect upon the *Anodonta cygnea*, of which scarcely a living example remained, and also upon *Limnaea stagnalis*, *Planorbis corneus*, and other species, of which I could only find dead shells. The Anodons in this pond are of the usual thin type, and not at all incrassate, which seems somewhat remarkable considering the heavy and ponderous growth attained by the Unios. Only one specimen of *Unio pictorum*, and that dead, was found on this visit. On October 25th I again visited the pond, but failed to obtain a living Unio, although I did find two living Anodons, so that both species, so far as one can judge from the shells obtainable at the edge of the pond, appear to be fast dying out. Whether there are some still living in the middle of the pond I cannot say, but judging from the condition of the water it is highly improbable, for it is so highly charged with sulphuretted hydrogen that a silver ring I wore was soon turned to a brassy black colour. The last two summers have been very dry here, and the pond having only one small inlet has received but little fresh water for two seasons. The formation upon which the pond is situated is Lower Lias Clay with a surface of Boulder Clay. When Mr. Quilter worked it in 1887-8 he found that the water contained 15·2 grains of carbonate of lime per gallon. It is rather curious that whilst Wistow Pond has only produced two specimens of *U. pictorum*, Saddington Reservoir three or four miles away has this species in plenty, but has only produced one valve of *U. tumidus*, although I examined nearly the whole area of the bed when it was practically empty last year. The Wistow specimens of *U. tumidus* are unusually large and massive, and very dark, practically black, in colour. My largest measures 120 mm. by 66 mm., and weighs 5·5 oz. It would thus seem that they have increased in dimensions and weight since Norman's time, assuming that he recorded the largest, for his weights and measurements would answer to the smallest I have taken. The shells are mostly a little eroded at the umbonal region. On the occasion of the Annual Meeting of the Society, in October last, I was pleased to have an opportunity of comparing my Wistow specimens with a remarkably fine series of *Unio tumidus* and *U. pictorum* obtained under very similar conditions from a pond at Ward End near Birmingham by Mr. R. D. Darbishire, and now in the Manchester Museum. So much do the *U. tumidus* in this series resemble mine in form, colour and general characteristics, that were they mixed it would be almost impossible to separate them. But the largest of the Birmingham specimens far surpass the Leicester ones both in dimensions and weight, the biggest measuring 130 mm. by 67 mm., and weighing 7·5 oz. The series—a large drawerful—is further remarkable also in that an apparent transition in form from *U. tumidus* to *U. pictorum* is most strikingly demonstrated, which certainly gives one food for reflection and raises doubts as to the stability of the two forms—as species!—THOS. EDWARDS (Read before the Society, November 14th, 1906).

BIBLIOGRAPHY OF THE NON-MARINE MOLLUSCA
OF LANCASHIRE.

By J. WILFRID JACKSON.

(Continued from page 79).

1891. **Standen, R.**—Manchester Conchological Society. *The Conchologist*, i., p. 45.

Testacella scutulum from Forton, Lancashire, exhibited, taken by W. H. Heathcote; reference also made to former records of *Testacella* at Crumpsall many years ago (coll. Ed. Kirk, of Pendleton), and at Red Scar, near Preston, 1878.

1891. **Taylor, John W.**—The Variation of *Limnæa peregra* Müll. *J. Conch.*, vi., pp. 299 and 302.

Reference made to var. *boissii* Dupuy, from Southport (coll. W. H. Heathcote); also to var. *diaphana* Parreyss, from Burnley (coll. R. Wigglesworth).

1891. **Standen, R.**—Report of the Manchester Branch of Conch. Soc. *J. Conch.*, vi., p. 314.

Cyclostoma elegans at Silverdale (coll. Mr. J. Ray Hardy); *Vertigo pygmæa* at Clitheroe (coll. Messrs. Moss and Cairns); *Pisidium roseum* and *P. nitidum* at Liverpool; *Sphærium lacustre* var. *ryckholtii* near Liverpool (coll. Mr. W. J. Farrer); *Limnæa auricularia* and var. *albida* at Levenshulme, near Manchester.

1891. **Taylor, J. W.**—*Helix arbustorum* var. *canigonensis* Boubée. *J. Conch.*, vi., p. 360.

At Clitheroe (coll. R. Wigglesworth).

1891. **Taylor, J. W.**—Exhibits. *J. Conch.*, vi., p. 388.

Limnæa auricularia var. *acutalis* from Newsham, near Preston.

1891. **Heathcote, W. H.**—Exhibits. *J. Conch.*, vi., p. 395.

Helix virgata from Rossall Point; *Limnæa peregra* var. *picta* and *Pisidium heuslowianum* from Grimsargh Reservoir near Preston; and *Planorbis dilatatus* from canal at Blackburn.

1891. **Wigglesworth, R.**—Exhibits. *J. Conch.*, vi., p. 397.

Helix arbustorum from Clitheroe and Simonstone; *H. hortensis* from Altham.

1891. **Higgins, Rev. H. H.**—Local Freshwater and Land Mollusca (Liverpool and District). *Proceedings of the Liverpool Naturalists' Field Club for the year 1890*. Liverpool, 1891, pp. 11-33.

List prefaced by introductory remarks on the study of conchology, the author's chief aim being to revive the interest which for twenty-five to thirty years appears to have been dormant; mentions *Cyclas*

rivicola (canal, Litherland); *C. ovalis* (canal, Litherland, by W. Weld; canal, Burscough, by A. Leicester); *C. calyculata* (Thatto Heath); *Pisidium amnicum* (canal, Litherland); *Anodonta cygnea* (Sephton); *Dreissena polymorpha* (Leeds and Liverpool Canal); *Paludina listeri* = *contecta* (Southport, Fauna of Liverpool, 1856; A. Leicester, 1891); *Planorbis glaber* (Southport, T. Gibson, 1867); *P. nautilus* = *imbri-catus* (near Rainhill); *P. spirorbis* (Thatto Heath); *P. contortus* (near Warrington, F.L.; Rainhill); *P. lacustris* (near Windsor); *Limnæa auricularia* (near Broad Green); *L. glabra* (near Huyton Quarry); *Ancylus oblongus* (Speke); *Limax arborum* (Rainhill); *Zonites radiatulus* (Lea Green); *Z. excavatus* (Rainhill); *Z. crystallinus* (Rainhill); *Z. fulvus* (Huyton Quarry); *Helix hortensis* (near Altcar; Huyton, Mr. Whitehead); *H. rufescens* (quarry, Wavertree; Rainhill); *H. virgata* (near Southport, A. Leicester); *H. pulchella* var. *crenella* (Huyton Quarry); *H. pygmaea* (Halsnead); *Carychium minimum* (Rainhill); and several others.

1892. **Standen, R.**—*Vertigo pusilla* Müll. in Lancashire. *J. Conch.*, vii., p. 7.

Taken by F. C. Long at Silverdale in 1891; larger and paler than at Ingleton; first record for Lancashire.

1892. **Long, F. C.**—Exhibits. *J. Conch.*, vii., p. 12.

Vertigo pusilla from Silverdale, Lancashire.

1892. **Long, F. C.**—The Land Shells of Burnley. *The Garner*, vi., p. 56.

List of 39 spp.

1892. **Long, F. C.**—The Freshwater Shells of Burnley. *The Garner*, vi., p. 89.

List of 34 spp.

1892. **Smith, J. E.**—[Mollusca observed by] Penketh Boys' Field Club. *Nat. Hist. Journ.*, June, 1892, p. 74.

Anodonta cygnea in fresh localities.

1892. **Hardy, J. Ray.**—Exhibits. *J. Conch.*, vii., p. 12.

Sinistral *Helix nemoralis* and *H. aspersa* from Lancashire.

1892. **Standen, R.**—Observations on the Reproduction of the Dart during an Attempt to Breed from a Sinistral *Helix aspersa* Müll. *J. Conch.*, vii., pp. 33-38.

Taken at Whalley, in June, 1889, and paired with a dextral example taken at Meols; elaborate details given.

1892. **Taylor, F.**—Exhibits. *J. Conch.*, vii., p. 88.

Zonites excavatus, *Z. fulvus*, *Z. alliarius*, *Z. crystallinus*, *Z. cellarius*, *Zua lubrica*, *Vertigo substriata*, from Holden Clough; *Planorbis nautilus* m. *scalariforme*, from Fitton Hill, Oldham; new localities.

1892. **Standen, R.**—Extraordinary Finds of *Vertigo pygmæa* Drap. at Clitheroe, Lancashire. *J. Conch.*, vii., p. 89.

In great abundance, associated with *Zonites fulvus*, *Helix pygmæa*, *H. pulchella*, *Zua*, *Vitrina*, and *Bulimus obscurus*.

1892. **Reade, A. L.**—A Few Words on the Study of Conchology. With special reference to the neighbourhood of Crosby [near Liverpool]. *Merchant Tailors' [School] Review, Crosby*, no. 5, April, 1892, pp. 134-140.

Includes notes upon the occurrence of *Limnæa stagnalis*, *L. peregra*; *Physa hypnorum*; *Planorbis marginatus*; *Paludina contecta*; *Cyclas rivularia*; *Unio pictorum*; *Zua lubrica*; and *Bulimus obscurus*, with their comparative frequency.

1892. **Chaster, G. W.**—A list of the Mollusca of Southport and District. *First Report of the Southport Society of Natural Science* (1890-91), appendix, 1892, pp. 32-38.

Twenty-nine land and twenty-nine freshwater species mentioned, with localities and notes on same.

1892. **Long, F. C.**—*Planorbis dilatatus*. *Nat. Jour.*, July, 1892, p. 5.

Its occurrence at Gorton, Pendleton, Burnley, and Gannow mentioned, and details given.

1892. **Long, F. C.**—Collecting *Paludina contecta*. *Nat. Jour.*, Nov., 1892, pp. 52-53.

At Huncoat, near Accrington, in a pond choked with *Anacharis alsinastrum*; *Limnæa peregra*, *Planorbis albus*, *Sphærium corneum*, and *Pisidium pusillum* also noted.

1892. **Long, F. C.**—*Vertigo pusilla* in Lancashire. *Sci. Goss.*, 1892, p. 143.

At Silverdale, July, 1891, with *Vitrina*, *Helix rupestris*, and *H. pulchella*.

1892. **Wigglesworth, R.**—New variety of *Helix arbustorum*. *Sci. Goss.*, 1892, p. 187.

Described but not named; from Clitheroe, Lancashire.

1892. **Cockerell, T. D. A.**—The Endemic Features of the British Slug-Fauna. *Sci. Goss.*, 1892, pp. 255-9.

Discussed with illustrative reference to *Agriolimax agrestis* monst. *griseus*, Lancashire.

1893. **Kew, Harry Wallis.**—The Dispersal of Shells. London. Contains numerous references to Lancashire species and localities.

1893. **Cockerell, T. D. A.**—Notes on the Conchological Society's New List of British Mollusca. *Sci. Goss.*, 1893, pp. 25-27.

Mentions *Stenogyra octona*, near Manchester; ventricose form of

Bythinia leachii found by Hargreaves in the Bolton Canal near Manchester; and *Pisidium nitidum* var. *globosum*, Swinton (T. Rogers).

1893. **Heathcote, W. H.**—*Acicula lineata* var. *alba* Jeffreys. *Sci. Goss.*, 1893, p. 47.

At Fleetwood, July and Sept., 1890.

1893. **Dixon, J. B.**—Exhibits. *J. Conch.*, vii., p. 136.

Vertigo pusilla, *Cyclostoma elegans*, *Balea*, and *Clausilia dubia*, from Silverdale, Lancashire.

1893. **Heathcote, W. H.**—Exhibits. *J. Conch.*, vii., p. 136.

Anodonta cygnea, 8-9 inches, from Cloughton, Lancashire.

1893. **Wigglesworth, R.**—Exhibits. *J. Conch.*, vii., p. 207.

Sphaerium corneum and *Limnæa peregra* from Clayton-le-Moors, near Accrington.

1893. **Collinge, Walter E.**—The Slug-Fauna of Lancashire. *The Conchologist*, ii., p. 148.

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Numerous Lancashire references.

1894. **Stephenson, Isaac** [Report Secretary]—Accrington Naturalists' and Antiquarian Society. *Sci. Goss.*, 1894, p. 166.

Notes on *Helix arbustorum* and varieties at Barlow Moor Wood near Manchester, Clitheroe, etc.

1894. **Long, F. C.**—A Conchological Ramble. *Sci. Goss.*, 1894, pp. 227-228.

Notes on numerous land and freshwater shells collected in the neighbourhood of Whalley.

1894. **Jones, K. Hurlstone.**—Albinism in Mollusca, and the Tendency to the Phenomenon in 1893. *Brit. Nat.*, 1894, p. 121.

Discussed at Manchester Conchological Society; details given as to *Planorbis corneus* at Birch.

1894. **M[osley] S. L.**—Monstrosities of Shells. *Nat. Journ.*, 1894, p. 137, and woodcut.

Gives figures of *Limnæa stagnalis* from Ashton, Lancashire, scalari-form and with expanded lip.

1894. **[Chaster, G. W.]**—Exhibits. *J. Conch.*, vii., p. 367.

Paludina contecta from Southport.

1895. **Briscoe, J. Potter.**—*Helix nemoralis* as Ornament. *Sci. Goss.*, 1895, p. 138.

Note that towards the close of the '50's, or beginning of the '60's, necklaces of them were sold in large numbers at Southport.

1895. **Mosley, S. L.** [not signed].—Large *Dreissena* polymorpha. *Nat. Journ.*, 1895, p. 206.
Taken in the old canal at Park Bridge, near Oldham.
1895. **Long, F. C.**—Caddis Cases built of Shells. *Nat. Journ.*, 1895, p. 264.
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1895. **Cooke, Rev. A. H.** — “Cases of Singular Habitat.” *Molluscs: Cambridge Natural History*. London, 1895, iii., p. 48.
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1895. **Standen, R.**—*Helix aspersa* Müll. m. sinistrorsum Taylor. *J. Conch.*, viii., p. 23.
Specimen labelled “Morecambe, 1841,” in collection of Mr. J. R. Hardy, mentioned as being second record for Lancashire, the first being Whalley, 1889.
1895. **Standen, R.**—Exhibits. *J. Conch.*, viii., p. 49.
Monstrosities of *Planorbis albus* from canal at Burnley, 1888; and *Pl. spirorbis* from Birch, near Manchester, 1889.

(To be continued).

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THE
JOURNAL
 OF
CONCHOLOGY.

BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
 OF GREAT BRITAIN AND IRELAND.

PUBLISHED QUARTERLY.

HON. EDITOR:
 J. R. LEB-TOMLIN, M.A., F.E.S.,
 STONELEY,
 ALEXANDRA RD., READING.

HON. SECRETARY:
 REV. L. J. SHACKLEFORD,
 66, GRANVILLE ROAD,
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HON. TREASURER:
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THE
JOURNAL OF CONCHOLOGY.

VOL. 12.

APRIL, 1908.

No. 6.

THE MOLLUSCA OF WILTSHIRE.

BY E. W. SWANTON.

(Read before the Society, February 13th, 1907).

IN 1884 the Conchological Society had not received any shells from this county. The census of 1902 tabulated only forty-six species—twenty-eight for the north, and thirty-two for the south division. Of these, fourteen were recorded for North Wilts. only, and eighteen for South Wilts.; whilst *Vitrea cellaria*, *P. rotundata*, *H. rufescens*, *H. hispida*, *H. itala*, *H. virgata*, *Clausilia bidentata*, *Cochlicopa lubrica*, *Succinea elegans*, *Planorbis albus*, *P. umbilicatus*, *Limnea pereger*, *Bithynia tentaculata*, and *Sphærium corneum* were common to both. Only three slugs—*Arion ater*, *Limax maximus*, and *Agriolimax agrestis*—found a place in the list, and no *Vertigo*.

This remarkable paucity of information tempted me to spend part of the summer vacation of 1905 touring in Wilts. collecting shells. It being unfortunately (from the conchologist's standpoint!) a dry season, very few slugs were seen, and only one species of *Vertigo*, but I succeeded in adding nineteen species to the census records for the northern half of the county, and thirty-two to those of the southern half. During the past year much additional information was obtained from a valuable little collection of land and freshwater shells presented to Dr. Jonathan Hutchinson's Museum at Haslemere by Mrs. F. N. Townsend, the widow of the well-known critical botanist. It contained thirty-two species, collected in the fifties by Mr. Townsend at Great Bedwyn, in the north-east of the county.

The earliest reference to the shells of Wilts. is probably that given by John Aubrey, the antiquary, in his Natural History of Wilts. It deserves quotation if only for its exceeding quaintness. He writes:—“Snailles are everywhere; but upon our downes, and so in Dorset, and I believe in Hampshire, at such degree east and west, in the summer time, are abundance of very small snailles in the grasse and

corne, not much bigger than small pinnes' heads. Though this is no strange thing among us, yet they are not to be found in the north part of Wilts., nor on any northern wolds. When I had the honour to waite on King Charles [II.] and the Duke of York, on the top of Silbury hill, his Royal Highnesse happened to cast his eye on some of these small snailes on the turfe of the hill. He was surprised with the novelty, and commanded me to pick some up, which I did, about a dozen or more, immediately, for they are in great abundance. The next morning, as he was abed with his Dutches, at Bath, he told her of it, and sent Dr. Charleton to me for them, to shew her as a rarity."

Colonel Montagu's "Testacea Britannica" (1803) contains many references to Wilts. mollusca, as may be gathered from the fact that at Lackham alone he found thirty-five species. Lackham is four miles east of Corsham, on cornbrash soil, which is always so abundant in molluscan life (as we know from experience in East Somerset). Here Montagu discovered *Clausilia laminata* and *Ena montana*—the latter he christened *Helix lackhamensis*. All his records are noted in the following list.

In 1867 Dr. H. P. Blackmore contributed to the tenth volume of the Wiltshire Magazine a very valuable paper "On the Recent Discovery of Flint Implements in the Drift of the Valley of the Avon." Describing the drift at Milford Hill, he remarks:—"Some few years since a good section of this drift was exposed on the south-eastern side of the hill in a cutting made for the London and South-Western Railway; and here, near the base of the gravel, a narrow seam of loose light-coloured sand containing shells was discovered. The shells in this spot existed in the greatest abundance, and although extremely friable, were generally unbroken. They consisted principally of *Helix hispida* in all stages of its growth, a few specimens of *Helix arbustorum*, and a single individual of *Zua subcylindrica*. All these shells are terrestrial, and in every way agree with examples of the same species still living in the adjacent fields." Thirty species were found, one being *Succinea oblonga*, which no longer exists in the district. A series of shells from this interesting section may be seen in the Blackmore Museum at Salisbury.

In the Museum of the Wilts. Archæological and Natural History Society at Devizes is deposited a collection of land and freshwater shells, made by Miss Anne Cunnington. They were, for the most part, collected in the neighbourhood of Devizes, between 1843 and 1850, and comprise sixty-six species. Localities are given in a manuscript book; these are incorporated in my list, with some necessary alterations in nomenclature, and with notification of varieties.

In addition to the three collections above alluded to, I have also examined one formed by Mr. C. D. Heginbotham, who has been an assiduous collector for many years in the neighbourhood of Devizes. I am specially indebted to him for much kind help in the preparation of these notes; also to my friend, Mr. Thomas Baker, of Salisbury, the well-known Wiltshire antiquary.

Sources from which information has been obtained, additional to those already indicated, are given in the Bibliography at the end of this paper.

The greatest length and breadth of Wiltshire are respectively fifty-four and thirty-seven miles. Its area is 1,354 square miles or 866,677 acres. The population, as might be expected in a county containing so much open pasture land, is remarkably small, being (in 1901) only 273,845. The soil is chiefly chalk. A Greensand valley divides the Marlborough Downs from the great Salisbury Plain, and both are bounded by Greensand on the west. Roughly speaking, a belt of Greensand stretches across the county from the neighbourhood of Swindon in the north-east to Warminster in the west, and separates the north-western third, containing the Oolites, from the Chalk, which chiefly constitutes the remainder. The Oolites are also exposed in a triangular area in the south-west around Mere and Tisbury. Tertiary strata occur in patches near Bedwyn and Savernake in the north-east, south-east of Salisbury (around West Grinstead), and in the extreme south near Cranborne. There are Quaternary Gravels in the Avon Valley near Salisbury. The county is well watered; the Kennet flows through the Marlborough Plain to join the Thames at Reading; the Somerset Avon drains the Oolites of the north-west, whilst the Hampshire Avon passes from north to south through Salisbury Plain, from near Devizes to Salisbury, where it is joined by its tributaries, the Wyly and Nadder (uniting at Wilton), from the south-west.

The Avon and Kennet Canal forms the separating line between the two vice-counties. It enters the county at Hungerford, bending to the south-west to Pewsey Vale (Greensand) through which it winds a westerly course to Devizes. West of this town it is cut through the Oolites, passing successively over Portland Beds, Oxford Clay, and Cornbrash, joining the Avon a few miles south of Bradford on the western border of the county.

One-hundred-and-eleven species have been observed. Four of these are new records:—*Agriolimax levis*, *Milax sowerbyi*, and *Valtonia excentrica* have been added by the writer; *Planorbis glaber* was found by Mr. F. Townsend at or near Great Bedwyn more than half-a-century ago, but its occurrence there has not been previously published.

That much work still remains to be done by Wiltshire conchologists is evident from the fact that for no less than fifteen species only one locality is known at present. They include the above-mentioned new records, also *Arion intermedius*, *Hygromia fusca*, *Azeca tridens*, *Vertigo substriata*, *V. pygmaea*, *V. angustior*, *Clausilia rolphii*, *Amphipeplea glutinosa*, *Limnaea glabra*, *Pisidium nitidum*, and *P. gassiesianum*.

A thorough exploration of Savernake Forest seems very desirable. There is every reason to expect that conchologists would reap as rich a harvest as did the mycologists during the visit of the British Mycological Society in October, 1903. Here *Limax tenellus* should be specially sought for.

Testacella maugei Férussac.—Very local, apparently only around Devizes and in the gardens at Longleat. South Broom, Devizes (Miss Cunnington); Longleat Gardens, Warminster, J. Trollope (Webb, *J. of Malac.*, Dec., 1897, p. 49). "They are sometimes found in Devizes, but not in large numbers, and only when the gardeners are preparing their ground for crops, or digging up their crops; the demand here for them, for the sake only of their palates, is great, and the price high, comparatively. I have bought them at a penny each, but since the demand has increased, so has the price; I have paid lately sixpence each for them."—(J. J. Fox, in *Science Gossip*, vol. iii., p. 89).

var. **griseo-rubescens** Gassies and Fischer.—Longleat Gardens, Warminster (J. A. Singer).

Testacella haliotidea Draparnaud.—Distribution very local as in the preceding species. "The *Testacella* itself is of rare occurrence, probably because it burrows in the ground in winter, and is only above ground at the close of the year. It is found at Trowbridge and Devizes, indeed, the winter before last some gardener here made a little pocket-money by selling all he found at sixpence apiece; there need be little doubt that those who hunt for them would very easily secure numbers, although they are considered scarce."—(Vize, in *Wiltshire Mag.*, vol. ix., p. 278). Longleat Gardens, near Warminster (J. A. Singer).

Limax maximus Linné.—Generally distributed. Stourton, Salisbury, Edington (E.W.S.); Salisbury, common (Vize); Devizes (Miss Cunnington); Vicarage garden, Steeple Ashton, 1887 (E. P. Knubley); Marlborough (Bromehead).

var. **cinereo-niger** Wolf.—Sub-var. *vera* Dumont and Mortillet. Teffent (H. Wyndham).

var. **fasciata** Moquin-Tandon.—Clyffe Pypard, Swindon (Goddard); Stourton (E.W.S.); Longleat gardens, Warminster (J. A. Singer).

var. *sylvatica* Morelet.—Vicarage garden, Steeple Ashton (E. P. Knubley); Clyffe Pypard, Swindon (Goddard).

Limax flavus Linné.—Apparently rare. Edington and Stourton (E.W.S.); Marlborough (Bromehead). Recorded through error in the Marlborough list as *Arion flavus*.

Limax arborum Bouchard-Chantereaux.—Probably more widely distributed than records indicate. Stourton and Edington (E.W.S.); Longleat gardens, Warminster (J. A. Singer).

Agriolimax agrestis (Linné).—Widely distributed. Mere, Stourton, Salisbury and Edington (E.W.S.); brickearth at Fisherton (Blackmore); Swindon (Cockerell); Marlborough (Bromehead); very numerous in gardens in damp weather about Trowbridge and Salisbury (Vize).

Agriolimax lævis (Müller).—Rare. Only one station at present known, viz. the borders of the ponds at Stourton, where I found it in October, 1893.

Milax sowerbyi (Férussac).—Rare. Gardens at Stourton below the church (E.W.S.).

Vitrina pellucida (Müller).—Widely distributed. Stourton, Edington, and Avebury (E.W.S.); Marlborough (Bromehead); Devizes (Miss Cunningham); Warminster, Old Sarum, Ashcombe Wood, Salisbury, banks and woods at Devizes (Vize).

Vitrea crystallina (Müller).—Amongst moss in damp situations. Common. Stourton, Maiden Bradley, and Edington (E.W.S.); Hilperton, Salisbury, Devizes (Vize); Devizes (Miss Cunningham).

Vitrea cellaria (Müller).—Widely distributed. Stourton Woods and Devizes (E.W.S.); Great Bedwyn (Townsend); Swindon (Cockerell); Devizes (Miss Cunningham); Corsham, Trowbridge, woods at Salisbury and Ashcombe, Devizes (Vize).

Vitrea rogersi B. B. Woodward.—Rare. Devizes (Miss Cunningham); gardens at Stourton (E.W.S.).

Vitrea alliaria (Miller).—Evidently widely distributed. Mere, Edington, and Avebury (E.W.S.); Trowbridge, under chalk stones at Warminster, Salisbury, Devizes (Vize).

Vitrea nitidula (Draparnaud).—Common. Stourton, Edington, Devizes, Melksham, and Avebury (E.W.S.); Great Bedwyn (Townsend); Corsham, North Bradley, Trowbridge, Warminster, Salisbury (Vize).

Vitrea pura (Alder).—Apparently rare. Swindon (Cockerell); I have taken it at Steeple Ashton, and also near Stourton.

(To be continued).

HOLOCENE DEPOSITS NEAR REIGATE.

By LIONEL E. ADAMS, B.A.

(Read before the Society, May 8th, 1907).

THE Rev. R. Ashington Bullen in an interesting paper, entitled "Holocene Land Shells from Reigate,"¹ has given a list of species which he obtained from the face of a Holocene Deposit at the Colley Chalk Pit (also known as the Horseshoe Pit) on the south side of the downs near Reigate. In January, 1900, Mr. Bullen and I visited the spot, and since then I have made frequent excursions there to collect the shells that are found embedded in the continually weathering face. When Mr. Bullen first discovered the spot, the deposit was much richer in species than it is to-day, probably because it then extended to a lower level of the slope, where the prehistoric shells were washed down the hill into a sort of "pocket." I have recently come upon three more of these Holocene faces in chalk pits along the same slope of the downs, all within a distance of three miles. In none of these are the species very numerous, though frequently the individuals of a few species are exceedingly plentiful. These faces, which are clearly distinct from the underlying chalk, vary from two to eight feet in depth, and are formed of chalk rubble (mixed with upper greensand in the Horseshoe Pit) and flint flakes, with a top layer of about nine inches of earth on which grass grows. A comparison of the species contained herein with those now to be found living on the surface is very interesting, as it shows how much richer the local molluscan fauna was in bygone times, while the occurrence of *Helix arbustorum*, *Limax maximus*, *Hyalinia pura*, *Azeca tridens*, *Helix hortensis* and *Bulimus montanus*, all of which seem to have died out, points to a damper habitat than now exists, with a certain amount of wooded vegetation and a considerable mossy undergrowth. The presence of *Helix caperata*, *H. itala*, and *Pomatias reflexus*, however, reminds us that large stretches of open grass-land existed much as is the case at the present day. *H. pomatia* and *P. reflexus*, which still thrive along the whole range of these downs, are found at all depths of the deposit. *H. itala*, though very abundant throughout, is rarely if ever found now in a living state, and the cause of its disappearance is very puzzling.

A fourth section, which occurs within one hundred yards of the Horseshoe, is similar in character, and gives similar results, therefore I have not devoted a separate column to it. It will be noticed that I have not been able to add to Mr. Bullen's list.

I have never come across the granules by which Mr. Bullen identified *Arion ater*.

Those species which I have marked with an asterisk, have, as far as I know, entirely died out in the immediate neighbourhood.

| Species. | Old Chalk Pit. | Horseshoe Pit. | Betchworth. |
|----------------------------------|----------------|--------------------------------|---------------|
| * <i>Limax maximus</i> Linn. | — | R.A.B. and L.E.A. | — |
| <i>Agrio. agrestis</i> (Linn.). | — | Abundant, R.A.B. | — |
| <i>Hy. cellaria</i> (Müll.). | — | R.A.B. | — |
| <i>H. nitidula</i> (Drap.). | — | R.A.B. and L.E.A. | — |
| * <i>H. pura</i> (Ald.). | — | R.A.B. | — |
| <i>H. crystallina</i> Müll. | 2 specimens | R.A.B. | — |
| <i>Arion ater</i> (Linn.). | — | Abundant, R.A.B. | — |
| <i>Pyr. rotundata</i> (Müll.). | — | R.A.B. and L.E.A. | — |
| * <i>Helix cantiana</i> (Mont.). | — | R.A.B. | — |
| <i>H. itala</i> (Linn.). | Abundant. | Abundant, L.E.A. | Abundant. |
| <i>H. caperata</i> (Mont.). | Abundant. | R.A.B. | — |
| <i>Hyg. rufescens</i> (Penn.). | — | Abundant, L.E.A. | — |
| <i>H. hispidula</i> (Linn.). | Common. | R.A.B. and L.E.A. | — |
| * <i>Ac. aculeata</i> (Müll.). | — | R.A.B. | — |
| * <i>V. pulchella</i> (Müll.). | 2 specimens. | Abundant, R.A.B. | — |
| * <i>H. arbustorum</i> (Linn.). | — | R.A.B. and L.E.A. | — |
| * <i>H. lapicida</i> (Linn.). | — | R.A.B. | — |
| <i>H. aspersa</i> Müll. | — | R.A.B. | — |
| <i>H. pomatia</i> Linn. | Occasional. | Common, L.E.A. | Abundant. |
| <i>H. nemoralis</i> Linn. | Mod. comm. | Mod. comm., L.E.A. | Mod. comm. |
| * <i>H. hortensis</i> Müll. | 1 specimen. | R.A.B. and L.E.A. | — |
| * <i>B. montanus</i> (Drap.). | — | R.A.B. | — |
| <i>B. obscurus</i> (Müll.). | — | R.A.B. | — |
| <i>Coch. lubrica</i> (Müll.). | Common. | R.A.B. and L.E.A. | — |
| * <i>A. tridens</i> (Pult.). | — | R.A.B. | — |
| * <i>C. acicula</i> (Müll.). | — | R.A.B. | — |
| * <i>P. muscorum</i> (Linn.). | 3 specimens. | R.A.B. | — |
| * <i>V. pygmæa</i> (Drap.). | — | R.A.B. | — |
| * <i>Cl. laminata</i> (Mont.). | — | R.A.B. and L.E.A. | — |
| * <i>Cl. biplicata</i> (Mont.). | — | R.A.B. | — |
| <i>Cl. bidentata</i> (Ström.). | — | R.A.B. | — |
| * <i>Cl. rolphii</i> Gray | — | R.A.B. | — |
| <i>C. minimum</i> (Müll.). | — | R.A.B. | — |
| <i>P. reflexus</i> (Linn.). | Abundant. | Abundant, R.A.B. and L.E.A. | Abundant. |

Since writing the above, I have obtained *V. costata* and *V. excentrica* with *V. pulchella* in the Horseshoe Pit cutting.

NEW VARIETY OF *AGRIOLIMAX LÆVIS* FROM ORKNEY

By W. DENISON ROEBUCK, F.L.S.

(Read before the Leeds Branch of the Conchological Society, 16th Nov., 1907).

THIS autumn I received from Mr. A. W. Stelfox an exceedingly interesting consignment of living slugs, collected by him on the mainland of Orkney. Amongst them were one or two typical specimens of the Marsh Slug, and also one perfectly black example—the first melanic form of this 'species I have seen or known to occur, and which it is necessary should be discriminated and named.

I therefore describe it as follows:—

Agriolimax lævis var. nov. **nigra** Rbk.

Animal entirely deep black, with the foot-sole paler.

The example displayed when alive all the characteristics of the species: its active and lively temperament, large shield, and long neck when fully extended.



***Acanthinula lamellata* (Jeff.) in Upper Airedale.**—In the evening of May 22nd of this year, along with two friends and accompanied by the keeper, I visited Holden Gill, a deep and narrow glen in the hillside near Silsden. On our way up the bottom of the Gill I picked up several handfuls of decaying leaves on the off chance of finding something of interest on new and practically private ground. There is a footpath along the top of the Gill, past a waterfall and then on to the open moor, which the owner of the estate kindly allows the public to use. The first species to be observed was *Vertigo antivertigo*, followed by examples of *Pupa anglica*, *Punctum pygmaeum*, *Vitrea radiatula* and var. *viridescens-alba*, *Vitrea pura*, and var. *nitidosa*, etc. Higher up the valley, on examining a handful of leaves, I picked from one sycamore leaf two full-grown examples of *Acanthinula lamellata*, and on another leaf of the same kind one other specimen, also full grown. The leaves were picked up under a half-grown sycamore tree. Owing to the shortening daylight, and the density of foliage on the overhanging trees, I did not spend any time ascertaining its range, etc. I was glad to have the three examples which constitute, so far as I know, the only locality for this species in Upper Airedale. Several specimens were collected in Shipley Glen in 1887-8, but since then the habitat has been destroyed by a flood, and all our endeavours have not enabled us to find it again. Owing to the kindness of the keeper, I was allowed to again visit the place on Monday, August 5th, with a friend, and we secured a fair number of specimens. But the wild nature of the glen was against our making a thorough search in one day, to determine its distribution, though we anticipate having further opportunities of doing so. During our day's search we increased my May list by adding *Vertigo substriata*, *Sphyradium edentulum*, *Enconulus fulvus*, *Acanthinula aculeata*, *Vitrea rogersi*, and other commoner things.—FRED BOOTH (Read before the Society, September 11, 1907).

NOTE ON THE BRITISH SPECIES OF AZECA.

BY HENRY A. PILSBRY.

(Read before the Society, February 12th, 1908).

AN investigation of the nomenclature of the several forms of *Azeca* shows that the name *A. tridens* (Pulteney) commonly used for the British species is untenable.

The species seems to have been noticed first by Pulteney, who, in his "Catalogues of the Birds, Shells and some of the Rare Plants of Dorsetshire," published in 1799, identified the British *Azeca* as *Turbo tridens* of Gmelin (*Helix tridens* Müller, the well-known *Chondrula tridens* of Central Europe). He refers also to figures in Gualtieri and Chemnitz which represent other species. Pulteney did not describe his shell as a new species, his name being merely a wrong identification of Gmelin's *Turbo tridens*; and this fact should, in my opinion, bar the use of *Turbo tridens* Pult. (*non* Gmelin) for the *Azeca*. There are a good many similar cases in zoological literature, where a really new species has been first described under an old name, by an author who identified the novelty as a species already known; and so far as I can learn, such errors are not allowed to stand, even when the two species in question are eventually placed in different genera. From the standpoint of abstract justice it is clear that Pulteney has no claim to the species, since he did not know that he had found a new shell, and had no intention of giving a new name.

Pulteney's description is so poor that the *Azeca* would hardly have been recognized from his account. He states that it is "scarcely two lines long" and has three teeth. I have never seen a specimen so small as this, nor one with less than four teeth. Montagu criticises Pulteney's description, but as his specimens were received from Pulteney himself, we have no reason to doubt that the Dorsetshire author really had *Azeca*.

Various continental authors noticed the discrepancy between the *Turbo tridens* of Pulteney as redescribed and figured by Montagu, and *T. tridens* of Gmelin. The first to discover this was Férussac, who in his well-known "Tableau Systématique" renamed *Turbo tridens* Pult. and Montagu, calling it *Helix goodalli*,¹ and basing the new name upon the descriptions of the English authors mentioned. He gave neither description nor figure. Subsequently the English snail was named *Carychium politum* Jeffreys (1829), *Pupa brittanica* Kenyon (1829) and *Azeca matoni* Turton (1831).

¹ Tabl. Syst. de la Famille des Limaçons, 1821, p. 71.

C. Pfeiffer, in his work on the German Mollusca, published in 1821, called another form of the same species *Carychium menkeanum*, giving an excellent description and a figure.¹ Since his account is much more complete than Férussac's, and of the same date, so far as I can learn, it seems best to use the name *menkeana* for the species. The English form is varietally separable from typical *A. menkeana* by the absence of teeth deep within the last whorl, and the usual absence of a lower palatal plica below the marginal lip-tooth. In *A. menkeana* two small internal teeth are visible from the outside as whitish spots on the back of the last whorl, and a lower palatal tooth is ordinarily present. Typical *A. menkeana* is the prevalent form in Germany and France.

The nomenclature, if I am right in the positions taken, will stand thus:

Azeca menkeana (C. Pfr.). Type loc. Pymont.

var. *goodalli* (Fér.). Type loc. "by the River Stour."

As synonyms of *A. menkeana goodalli* the following names will fall: *Turbo tridens* Pult. non Gmel., *Carychium politum* Jeffreys, *Pupa brittanica* Kenyon, *Azeca matoni* Turton, *A. nouletiana* Dupuy.

In the eastern Pyrenees and adjacent regions a form described as *A. nouletiana* Dupuy (1849) occurs. So far as I have been able to learn from the literature and from a series received from Terver, this form is not distinguishable from the English race *goodalli*. This adds another case of discontinuous distribution of a British and South European stock. It may be significant that *goodalli* and *nouletiana* are more primitive than typical *A. menkeana*.

The variety "*crystallina*" Dupuy was based on albino examples of "*nouletiana*" and if, as I believe, *nouletiana* and *goodalli* are identical, the albino British *goodalli*, such as the beautifully clear glassy examples found at Ilkley, may correctly be referred to Dupuy's *crystallina*. It seems, however, to be merely a sporadic variation, not of racial significance.



Vitrea rogersi with Pale Animal.—Among a small lot of *Vitrea rogersi* at Hendon there was one individual with the animal light cream colour, almost white. As the animal of this species is usually a dark slate colour, an abnormal specimen like this seems worthy of record. The shell was normal.—J. E. COOPER (*Read before the Society*, Nov. 13th, 1907).

¹ Systematisches Anordnung und Beschreib. Deutscher Land- und Süßwasser-Schnecken p. 70, pl. 3, fig. 42.

OBITUARY NOTICE.

SOLOMON I. DACOSTA.

BY JAMES COSMO MELVILL, M.A.

(Read before the Society, Jan. 8th, 1908).

THE year 1907 deprived the science in which we are all interested of several well-known and honoured workers, notably M. Césaire Felix Ancey, Captain F. Wollaston Hutton, F.R.S., and Sir James Hector, F.R.S., both of New Zealand, Dr. W. T. Blanford, F.R.S., and lastly, we, with many regrets, must now include Mr. Solomon Israel (Frederick) DaCosta, who passed away at his residence, 9, Gloucester Square, Hyde Park, W., in June last, at the age of eighty-two years.

Mr. DaCosta was long and honourably connected with Lloyds', being for several years latterly deputy-chairman, and had not, we believe, turned his attention to the Mollusca till comparatively late in life. When, however, he did begin, he showed a zeal almost unparalleled, and at first collected in all orders. Latterly, determining to specialize, he parted with all his marine shells excepting the genera *Pecten* and *Mitra*, mainly concentrating his attention on the land molluscs of the South American continent. Collectors were despatched to little-known parts of Peru, Ecuador, and Colombia, whence the late Mr. Buckley in 1871-72 had brought so many new and startling forms; Chili, Brazil, and other territories were ransacked, the result being that for beauty of variety, perfection of condition, and elegance of arrangement, his cabinets were almost unrivalled in the genera *Bulinulus*, *Strophochilus*, *Porphyrobaphe*, etc.

I have had the privilege, under his guidance, of inspecting these beautiful series, and found it difficult to give preference to any particular group, where all were in such fine condition.

The Philippine Islands species, and those from the Solomon Islands were also particularly richly represented.

As an author, Mr. DaCosta was mainly known by his various descriptive papers in the pages of the Proceedings of the Malacological Society of London, commencing in 1898. Altogether, about one hundred species were named and described by him, mainly of the genera *Bulinulus*, *Drymæus*, *Neocyclotus*, *Amphicyclotus*, etc. Many of these are almost, if not quite, unique, and the types, happily, have all been placed in the British Museum (Natural History).

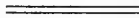
On Tuesday, 21st October, 1907, Mr. DaCosta's collection was sold at Stevens' Auction Rooms, and attracted more interest amongst

conchologists and the general public than any other similar sale for several years; indeed, the rooms presented a very animated and crowded appearance, and to some extent recalled the old days of Cuming, Reeve, and Barclay, in the sixties and seventies.

The whole were catalogued (we believe by Mr. Preston) in 438 lots, including books and pamphlets, and the prices realized were generally high, there being considerable competition. Lots 242 and 243, containing each a single specimen (one, uniformly dark-brown, the other paler, with one spiral dark band) of the wonderful *Bulinus labeo* Broderip, were particularly sought after; as also lot 97, a fine assemblage of mollusca from Lake Tanganyika; and the fine series we have already alluded to, of *Cochlostyla* from the Philippines, *Papuina* from the Solomon and allied islands, and the exceptional groups of *Bulini*. His collections of *Chloritis* were also very fine, and included *C. concisa* Fér. and many other rarely seen species.



The Colonization of Mollusca.—It is evident from his note in the last number of the *Journal* that the Rev. Canon J. W. Horsley has no sympathy with the conchologist who studies the distribution of our land and freshwater mollusca. It may be that those interested in colonization deem the discontinuous distribution of certain species to be due to an oversight of nature. But I think that many will agree that their time and zeal might be more profitably employed in other way than upsetting and rendering—to a large extent—useless the work of those engaged in disclosing the geographical distribution of our shells. And might I ask what good can possibly arise from introducing a particular species into a particular part of the country which it does not naturally inhabit? I cannot but feel glad that—up to the present—most of the attempts to colonize shells have failed.—A. W. STELFOX (*Read before the Society*, January 8th, 1908).



Additions to the Mollusca of Lundy Island.—During a short visit to Lundy at the end of August, 1907, I collected among other land mollusca the following species, which are not mentioned in Mr. Tomlin's paper (*antea*, pp. 120-122):—*Limax maximus*, *L. arborum*, *Milax gagates* var. *plumbea*, *Arion subfuscus*, *A. intermedius* and *Carychium minimum*. *Arion ater* was inconveniently abundant, in that it persistently devoured the bait—bread and powdered aniseed—in my mouse-traps. In addition to the typical form of this species, I found the vars. *aterrima* and *castanea* not uncommonly, whilst the beautiful vars. *aibolateralis* and *bicolor* were particularly plentiful.—CHAS. OLDHAM (*Read before the Society*, January 8th, 1908).



PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

367th Meeting, December 11th, 1907.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

“Beiträge zur Kenntniss der Mollusken-Fauna der Magalhaen-Provinz,” no. 5, by Hermann Strebel. “Descriptions of new species of Mollusca of the Genera *Helix* and *Glessula* from the Khasi Hills and Manipur.” “Notes on, and Drawings of, the Animals of various Indian Land Mollusca,” nos. 1, 2 and 3. “Descriptions of nine species of *Alycaeus* from Assam and the Naga Hills.” “Descriptions of two new species of *Plectopylis*, a sub-genus of the *Helicidae*.” “On supposed new species of Land Mollusca from Borneo belonging to the genera *Opisthostoma* and *Diplommatina*.” “Anatomy of *Ariophanta ampulla* Benson.” “On the Anatomy of *Helix politissima* Pfr. of Ceylon, etc.” “On the molluscan genus *Paryphanta* and on the Anatomy of *P. hochstetteri* Pfr.” “On some new species of the Land-Molluscan Genus *Alycaeus* from the Khasi and Naga Hill country, Assam, Manipur, and the Ruby Mine district, Upper Burmah; and on one species from the Nicobars.” “On *Philanka*, etc.” “Descriptions of new Land Shells from the Andaman and Nicobar Group of Islands in the Bay of Bengal.” “On some Land Mollusks from Burmah, etc.,” part 1. “On a supposed new species of *Rhystoma* from Borneo, etc.” “Notes on the genus *Euplecta* of Semper, with descriptions of supposed new species from Ceylon.” “Description of the Animal of *Durgella christiane*, a species of land shell from the Andaman Islands.” “On the *Helicidae* collected during the Expedition into the Daffa Hills, Assam.” “On new species of the genus *Plectopylis*.” “On the *Cyclostomacea* of the Daffa Hills, Assam.” “Anatomy of two new *Helicarion* (?) from New Britain and Lifu.” “The President’s Address” [Mal. Soc., 1899]. “Further description of the Animal of *Damayantia carinata* Cllge., etc., etc.” “Note on *Damayantia smithi*.” “*Helix basileus* Benson from Southern India.” “Description of a supposed new species of *Parmarion* from Pulo Lant, Borneo.” “List and Distribution of the Land Mollusca of the Andaman and Nicobar Islands, etc.” “On *Trochonanina*, etc.” “Anatomy of *Hemiplecta floweri* Sm.” “Description of new species of *Helix* from Tenasserim.” “*Macrochlamys* from Mauritius.” “*Dyakia striata* var. from Siam.” “On the generic position of Benson’s *Helix hyba*, etc.” “Anatomy of *Eurystoma* of Albers.” “On a collection of Land Shells from Borneo,” part 2— all by H. H. Godwin-Austen. “New species of *Cyclophorus* and a *Spiraculum* from the Khasi and Naga Hills, Assam,” by H. H. Godwin-Austen and R. Beddome. “On the Anatomy of *Ferussacia gronoviana* Risso from Mentone,” by H. H. Godwin-Austen; “Concluding with a Note on the Classification of the Genus, etc.,” by Geoffrey Nevill. “Descriptions of Shells from Perak and the Nicobar Islands,” by H. H. Godwin-Austen and G. Nevill. “On new molluscs from Borneo,” by W. E. Collinge and H. H. Godwin-Austen. “Additions to Japanese Land Snail Fauna.” “New Land Mollusca of Japanese Empire.” “Catalogue of *Clausiliidae* of the Japanese Empire.” “New *Clausiliidae* of the Japanese Empire,” x. “Mexican Land and Freshwater Molluscs.” “A new Hawaiian *Limnaea*.” “New Japanese Marine Mollusca : Pelecypoda.” “On the Localities of A. Adams’ Japanese *Helicidae*.” “A new American Genus of *Arionidae*.” “New Japanese Marine Mollusca : Gastropoda.” “New Japanese Marine Mollusca.” “Additions to the Japanese Land Snail Fauna,” nos. iii., iv., v., and viii. “New Land Mollusks of the Japanese Empire” [2 papers]. “New

Mollusca from Japan, Loo Choo, Formosa, and Philippines." "Notices of New Japanese Land Snails." "New South American Land Snails." "Notices of New Land Snails from the Japanese Empire." "New Land Mollusca from Japan and Loo-Choo Islands." "New and Little-Known Whelks from Northern Japan and the Kuril Islands,"—all by H. A. Pilsbry. "Mollusca of the Ozarkian Fauna," by H. A. Pilsbry and James H. Ferriss. "New Land Mollusks of the Japanese Empire." "Descriptions of new Land Snails of the Japanese Empire." "Catalogue of the Land and Freshwater Mollusca of Taiwan (Formosa), etc.," by H. A. Pilsbry and T. Hirase. "Papers from the Hopkins-Stanford Galapagos Expedition, 1898-1899, xiii., Marine Mollusca." "Mollusca of Flint and Caroline Islands." "Notes on some Hawaiian *Achatinellidae* and *Endodontidae*." "On two Hawaiian *Cerithiidae*." "New Hawaiian species of *Endodonta* and *Opeas*." "On some Pacific *Cerithiidae*," by H. A. Pilsbry and Ed. G. Vanatta. "Annotated List of Types of Invertebrate Cretaceous Fossils in the Collection of the Academy of Natural Sciences, Philadelphia," by Charles W. Johnson. "New Marine Molluscs from the West Coast of America," by Paul Bartsch. "Supplementary Notes on Martyn's Universal Conchologist," by William Healey Dall—(from the respective authors); and the usual periodicals received in exchange.

New Members Elected.

Herbert L. Hawkins, Dalton Hall, Victoria Park, Manchester.

Frank Morey, Elm Grove, Newport, Isle of Wight.

Charles Upton, Tower House, Stroud, Glos.

Candidate Proposed for Membership.

Mrs. G. B. Longstaff, Highlands, Putney Heath, S.W.

Resignation.

H. Wallis Kew, F.Z.S.

Papers Read.

"The Non-Marine Mollusca of Suffolk," by A. Mayfield.

"Impressions of Barmouth and District Shell-Collecting," by C. H. Moore.

"Six Hours' Collecting in Sligo," by B. R. Lucas.

"New Variety of *Agriolimax laevis* from Orkney," by W. Denison Roebuck, F.L.S.

"Note on *Vitrina elongata* Drap.," by P. H. Grierson.

"Note on *Ianthina*," by Canon J. W. Horsley.

Exhibits.

By Mr. A. Mayfield: A series of Suffolk mollusca to illustrate his paper.

By Mr. Chas. Oldham: Specimens of *Vitrina elongata* Drap., from Collon, county Louth, Ireland; these were exhibited on behalf of Mr. P. H. Grierson at a former meeting of the Society (see *J. of Conch.*, vol. 11, p. 125), and then identified erroneously as *Vitrina pellucida* var. *depressuscula* Jeff.

By Mr. R. Standen: Vestigial shells (granules) of *Arion ater* L.; young *Anodonta cygnea*, 5 × 3 mm., from Drinkwater Park Lake, Prestwich; photograph of *Clausilia bidentata* feeding on wall, at Grange, Lancs.; eggs of *Helix hortensis*, *Helicigona arbustorum*, *Testacella haliotidea*, *Opeas goodalli* and *Rumina decollata*; eggs and newly-hatched young of *Pyramidula rotundata* and *Achatina zebra*; embryonal young of *Taminia cylindracea*, *Clausilia biplicata*, and *Pyramidula rupestris*.

By Mr. H. G. Thornton: *Jamiania muscorum* from a stone wall at Kennington, Berks.; and *Physa acuta* from the water-lily tank in the botanical gardens, Oxford.

By Mr. J. Kidson Taylor: A number of the smaller and rarer species of British Marine Mollusca, from Channel Islands and south coast.

By Mr. C. H. Moore: A series of specimens to illustrate his paper.

368th Meeting, January 8th, 1908.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted:

“‘Feeding-tracks’ of Gastropods.” “What Evolutionary Processes do the Mollusca show,” by B. B. Woodward. “The Non-Marine Mollusca of the River Lea Alluvium at Walthamstow, Essex.” “A Revision of the Pliocene Non-Marine Mollusca of England.” “The Pleistocene Non-Marine Mollusca of Ilford.” “The Post-Pliocene Non-Marine Mollusca of the South of England.” “Note on the occurrence of *Planorbis stroemsi* Westerlund, in the Holocene Deposits of the Thames Valley.” “On the Non-Marine Mollusca from the Holocene Deposits at London Wall and Westminster.” “On the occurrence of *Neritina grateloupiana* Fér. (hitherto misidentified as *N. fluviatilis*) in the Pleistocene Gravels of the Thames at Swanscombe.” “On Sections in the Holocene Alluvium of the Thames at Staines and Wargrave.” “Notes on the Post-Pliocene Mollusca of the Mylne Collection.” “Notes on some Holocene Shells from Ightham,” by A. S. Kennard and B. B. Woodward. “Notes on the Dates of Publication of the Parts of Kiener’s ‘Species Général et Iconographie des Coquilles Vivantes,’ etc. (1834-80).” “On the Dates of Publication of the ‘Histoire naturelle générale et particulière des Mollusques terrestres et fluviatiles’ and the ‘Tableaux systématiques des Animaux Mollusques,’ by the Barons Férussac and G. P. Deshayes,” by C. Davies Sherborn and B. B. Woodward. “Holocene Deposits at Clifton Hampden, near Oxford,” by A. S. Kennard and B. B. Woodward and others. “On *Vitrea (Hyalinia) hibernica* n.sp.,” by A. S. Kennard. “With Notes on the Anatomy,” by Rev. E. W. Wake Bowell. “Preliminary Notice of new and remarkable Cephalopods from the South-west Coast of Ireland,” by (Miss) A. L. Massy. “Some Land and Freshwater Mollusca that have been found in Morteheo Parish,” by Mrs. G. B. Longstaff. “Manual of Conchology,” part 75, by H. A. Pilsbry. “The Marine Mollusca of the Scottish National Antarctic Expedition,” by James Cosmo Melville and Robert Standen. “Descriptions of new species of Australian *Planispira* and *Chloritis*.” “The Presence of a Double Wall in some species of the *Diaphora* group of *Ennea*.” “A List of the species of *Amphidromus* Albers, with Critical Notes, etc.” “Descriptions of new species of *Trochomorpha*, *Cochlostyla*, *Amphidromus*, etc., etc.” “Notes on *Papuina* and *Pupina*.” “Note on *Bulimulus (Drymaeus) citrinellus*, Pfr., and *scitulus* Reeve.” “Descriptions of new Australian *Pupina* and *Pupinella*, with a Note on *Pupina pineticola* Cox.” “Description of a new species of *Unio (Cuneopsis)* from Yunnan.” “Descriptions of new species of *Pleurodonte (Caraculus)*, *Planispira* and *Kaliella*.” “On *Chloritis (Austrochloritis) pelodes* Pfr., and *pseudoprunum* Pils.” “On *Drymaeus euryostomus* Phil., and *hamadryas* Phil.” “Descriptions of new species of *Papuina*, *Planispira*, etc.” “On new species of *Helicaron*, *Ariophanta*, etc.” “Descriptions of some new species and varieties of *Cataulus* from the Collection of the late Hugh Nevill, Esq.” “Figures and descriptions of supposed new species and varieties of *Ennea*, *Macrochlamys*, etc., etc.” “Descriptions of new species of Helicoids from German New Guinea and New Mecklenburg (New Ireland).” “On some new species of *Melania* and *Jullienia* from Yunnan and Java.” “On a Collection of Land Shells from Gebi Island, Moluccas, with descriptions of new species.” “Note on *Leptopoma crenilabre* Strubell.” “Description of *Amphidromus inconstans*, n.sp., from the

Malay Archipelago." "Notes on *Thersites (Hadra) bellendkerensis* Braz., and *beddomæ* Braz." "A Critical List of the *Sphaerospira* section of *Thersites*." "Description of *Thersites (Rhagada) woodwardi*, n.sp., from N.W. Australia." "Descriptions of supposed new species of *Streptaxis* and *Amphidromus*." "Descriptions of new species of *Ampelita* and *Tropidophora* from Madagascar." "Description of *Ennea affectata*, n.sp., from Zanzibar." "Descriptions of new species of Land Mollusca from New Guinea." "Descriptions of a new *Alycaeus* from Perak and a *Bulimulus* from Bolivia." "Descriptions of new species of *Nanina*, *Helix*, *Amphidromus*, and *Porphyrobaphe*." "Descriptions of some supposed new species of *Diplommatina*, *Opisthostoma*, and a new variety of *Alycaeus* from N. Borneo, Banguay Island and Darjeeling." "Descriptions of two new species of *Amphidromus*." "On supposed new species of *Oleacina*, *Trochomorpha*, and *Bulimulus*." "Descriptions of new species of *Xesta*, *Amphidromus*, and *Cyclostoma* from Madagascar and Perak," by Hugh Fulton. "Descriptions of five new species of Shells," by G. B. Sowerby (all from respective authors); and the usual periodicals received in exchange.

New Member Elected.

Mrs. G. B. Longstaff, Highlands, Putney Heath, S.W.

Candidate Proposed for Membership.

Mr. H. J. S. Stobart, Belbroughton, Stourbridge.

Resignations.

Miss Gwynedd Scott.

Mr. J. E. Neild.

Papers Read.

"Additions to the Mollusca of Lundy Island," by C. Oldham.

"Shells at high altitudes in Scotland," by Frank F. Laidlaw.

"The colonization of Mollusca," by A. W. Stelfox.

"*Helicella itala* in West Norfolk," by C. E. Y. Kendall.

"Obituary Notice of S. I. DaCosta," by J. C. Melvill.

Exhibits.

Mr. J. C. Melvill exhibited selections from a series of South American *Bulimuli* and *Drymæi*, obtained at the sale of the collection of the late Mr. S. I. DaCosta, containing many varieties of *D. felix* Pfr., *cognatus* Pils., *murrinus* Rve., *flexuosus* Pfr., *trigonostomus* Jones, etc., mostly from Cauca or Bogota, and *D. chanchamayensis* Pfr., from Eastern Peru. Likewise *D. expansus* Pfr., in variety. Also, from another source, a very perfect *B. (Metorthalicus) labeo* Broderip, intermediate in coloration between the two DaCosta examples. Mr. Melvill also showed two specimens of the wonderfully constructed *Trachycystis scolopendra* M. & P., from Port Shepstone, Natal, in which the epidermis, fluted, thickened, and bearing the semblance of regular longitudinal ribs, superimposes the periphery, rendering it one of the most remarkable of South African terrestrial shells.

By Mr. R. Standen: Type specimens of twenty-one new species of mollusca obtained during the Scottish National Antarctic Expedition of 1903-4. These have recently been described and figured by Mr. J. Cosmo Melvill and Mr. R. Standen in the "Transactions of the Royal Society of Edinburgh," and are *Tugalia antarctica*, *Littorina coriacea*, *Lacuna notorcadensis*, *Rissoa edgariana*, *R. scotiana*, *Nassa valleritini*, *Cerithiopsis malvinarum*, *Trophon minutus*, *Bathyarca strebeli*, *Lissarca notorcadensis*, *Modiolaria mesembrina*, *Pecten pteriola*, *Amussium 18-liratum*, *Lima goughensis*, *Scacchia plenilunium*, *Pecten multicolor*, *Chrysodomus crassicoatus*, *Columbarium benthocallis*, *Cuspidaria brucei*, *Chrysodomus archi-*

benthalis, and *Dentalium eupatrides* (from Lat. $71^{\circ} 22' S.$, I.ong., $16^{\circ} 34' S.$), the four last species being from the immense depths of 1775, 2645, 1775, and 1410 fathoms respectively.

By Mr. H. Beeston: Living specimens of *Helicodonta obvoluta* from Ditcham, with periostracum in fine condition, and showing winter epiphragm in situ.

By Mr. Lionel E. Adams: Specimens of *Cyprea moneta* engraved with girls' names and sold as charms in the streets of Theodosia, on the Black Sea.

By Mr. C. E. Wright: *Paludestrina jenkinsi* and *Bithynia tentaculata* found on the cover of the door of a condenser when overhauling the engines at the pumping station of the L.C.C. at Shoreditch.

By Rev. C. E. Y. Kendall: A series of *Helicella* to illustrate his note.

By Mr. J. Kidson Taylor: Series of British Marine Shells.

By Mr. J. W. Baldwin: *Helix nemoralis* var. *rubella-undulata* from Bridle, near Chorley, and a very thin var. of *H. nemoralis* from Isle of Man.

By Mr. J. Wilfrid Jackson: *Bythinia tentaculata* and var. *producta*?—an exceedingly long form—from the canal at Lancaster; *B. tentaculata*—short fat forms; *Sphyradium edentulum* var. *columella*; *Succinea oblonga* and var. *elongata* from the Barnwell Gravels, Cambs. Also *S. oblonga* var. *elongata* from the Loess of Achenheim, near Strassburg (e coll. Dr. Wüst) for comparison with above.

By Rev. Lewis J. Shackelford: *Voluta mamilla* Gray from Western Port, Victoria. The specimens of this fine Volute are mostly obtained from lobster-pots into which they have been carried by a large species of hermit-crab. From the same locality and same source specimens of the still rarer *V. roadknights* McCoy are occasionally obtained. Mr. Shackelford also exhibited two very distinctly marked and fine specimens of *Voluta turneri* var. *daymanii* from Port Darwin, N. Australia.

369th Meeting, February 12th, 1908.

Mr. E. C. Stump in the chair.

Donations to the Library announced and thanks voted:

"Illustrated Index of British Freshwater Shells," by Arthur G. Stubbs. "A Survey of the Species and Varieties of *Pupa* Draparnaud (*Jamini* Risso) occurring in South Africa," by J. C. Melvill and J. H. Ponsonby. "*Bythinia leachii*, an addition to the Irish Fauna, with some Notes on its Distribution, and also that of *Planorbis corneus*," by R. Welch. "David Dyson: A Biographical Sketch," by J. Wilfrid Jackson. "The Pyramidellid Mollusks of the Oregonian Faunal Area," by W. H. Dall and P. Bartsch. "The West American Mollusks of the Genus *Triphoris*," by Paul Bartsch. "List of Lincolnshire Non-Marine Mollusca, in collection of Mr. J. F. Musham," by J. F. Musham (*from the respective authors*), and the usual periodicals received in exchange.

New Member Elected.

Mr. H. J. S. Stobart, Belbroughton, Stourbridge.

Candidate Proposed for Membership.

Mr. H. F. Edgar, 14, Woodside Park Gardens, North Finchley, London, N.

Papers Read.

"Note on the British Species of *Azeca*," by H. A. Pilsbry.

"List of Mollusca from one chalk pit in Surrey," by G. D. H. Carpenter.

"*Limnaea glabra* (Müll.) in East Sussex," by C. E. Y. Kendall.

Exhibits.

By Miss L. Milner: A beautiful example of *Anomia ephippium* attached to upper valve of *Pecten maximus*, from Dawlish. The *Anomia* has taken the shape of the *Pecten* ribbing in a perfectly symmetrical manner, giving the specimen the appearance of a pure white *Pecten* superimposed upon a red one.

By Rev. C. E. Y. Kendall: *Pomatias elegans*, type and var. *ochroleuca* from Lewes; and *Limnaea glabra* from Framfield, East Sussex.

By Mr. J. Kidson Taylor: *Helix hortensis* var. *incarnata* and var. *arenicola* from Colchester; *H. arbustorum* var. *luteofasciata* from Cuning Dale, Derbyshire; a beautiful pale yellow variety of *Cypræa arabica* with colourless base and teeth, and no terminal dark spots; another variety with pale yellow anterior and posterior, dark band across middle, with livid purple blotches on sides; and a fine example of *C. erosa* var. *phagedaina* Melv.

By Mr. J. Wilfrid Jackson: *Otina otis*, *Onoba striata*, *Skenea planorbis*, *Eulimella nitidissima* and *Cæcum glabrum* from foraminiferous sand collected by Mr. R. Welch at Nairn, Co. Donegal. Also types of *Vertigo moulinsiana* from Morden, Dorset; Braunton Burrows, Devon; Wicken Fen, Cambs.; and Bessungen, Darmstadt, S.W. Germany, for comparison with Irish specimens collected by Mr. R. A. Phillips at Tinnahinch, Co. Carlow. Also photo-micrographs of same series to shew local variation.

It was decided to have the following special exhibits at future meetings:—

| | | |
|---------------------|-----|------------------|
| British Nassidæ | - - | April 8th, 1908. |
| British Stenogyridæ | - - | May 13th, „ |
| British Rissoidæ | - - | June 17th, „ |

BIBLIOGRAPHY.

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“**Monograph of the Land and Freshwater Mollusca of the British Isles,**”
by JOHN W. TAYLOR (parts 13 and 14, pp. 281-312 and pp. 17-64).

This double part completes the Appendix, and brings the second volume, which comprises *Testacellidæ*, *Limacidæ*, and *Arionidæ*, to a conclusion. Two excellent coloured plates illustrate the variation of *Geomalacus* and the various species of *Arion*, the figures of the former being particularly good.

This part also contains *Hyalinia lucida*, *H. cellaria*, *H. helvetica*, and *H. alliaria*. Mr. Taylor gives adequate reasons for employing Blum's name *helvetica* for the shell which Jeffreys erroneously called *glaber* Stud., and very fully discusses its affinities as shown by the radula.

**BIBLIOGRAPHY OF THE NON-MARINE MOLLUSCA
OF LANCASHIRE.**

By J. WILFRID JACKSON.

(Concluded from page 128).

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 Scalariform *Limnæa peregra*, Grimsargh, Lancashire W., 1887;
 ditto of *Planorbis spirorbis*, Tarleton, Lancashire S.; *Pl. nautilus*
 from Whittingham, Lancashire W., Charnock Moss and Walton-le-
 Dale, Lancashire S.; *Limnæa stagnalis*, Drinkwater Park, Prestwich,
 Lancashire S.; Ringley Canal, Lancashire S., shewing variation and
 distortion caused by chemical refuse, &c.; *L. peregra* var. *boissii* from
 Southport, Lancashire S., collected in 1886 and 1887; *Planorbis*
albus m. *scalariforme* from Farington, Lancashire S.; *Pl. nautilus*
 var. *crista* and m. *scalariforme*, Whittingham, Lancashire W.
1895. **Hardy, J. Ray.**—Exhibits. *J. Conch.*, viii., p. 52.
Helix aspersa m. *sinistrorsum* from Morecambe.
1895. **Cairns, R.**—Exhibits. *J. Conch.*, viii., p. 53.
Helix nemoralis from Blackpool.
1895. **Taylor, F.**—Exhibits. *J. Conch.*, viii., pp. 53-54.
Helix pulchella; *Pisidium amnicum*, *P. henslowianum*, *P. obtusale*,
P. pulchellum, and *P. milium*, collected about Ashton-under-Lyne;
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 169-171.
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Hyalinia alliardia and var. *viridula*, *H. nitida*, *H. excavata*, and var. *vitrina*, from Bardsley, near Oldham.
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 Subscalariform *Limnæa palustris*, Accrington, and *Valvata piscinalis*, Clayton-le-Moors.
1897. **Standen, R.**—Exhibits. *J. Conch.*, viii., p. 330.
Limnæa peregra var. *tenera* from Upholland, near Wigan.
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Vertigo alpestris from Holker.
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Arion minimus from Park Bridge.
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Review of Messrs. J. W. Jackson and F. Taylor's paper in *J. Conch.*, xi., pp. 9-11. Droylsden habitat cited.

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Pupa anglica from near the Ferry Hotel, on the Furness side of Lake Windermere.

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Forty-seven species enumerated with localities, seven being additions to the census for District 69.

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Preliminary list of some twenty-six species with localities, nine species being additions to the census for 1902.

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Neritina fluviatilis from canal, Lancaster; *Helix aspersa*, heavy form, from Caton near Lancaster.
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 Whalley examples of *Vitrea rogersi* (Oldham coll.).
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Sphærium pallidum, *Physa heterostropha*, *Planorbis dilatatus*, amongst others, found.
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 Lancashire localities enumerated.
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Limnæa auricularia, *Neritina fluviatilis*, *Ena obscura* and *Hygromia rufescens* from near Lancaster.
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Pomatias elegans and var. *ochroleuca*, *Clausilia bidentata* and var. *cravenensis*, *C. laminata*, *Jaminia cylindracea*, *Vertigo pygmæa*, *V. pusilla*, *V. substriata*, *Sphyradium edentulum* and var. *columella*, *Ena obscura*, *Vitrea cellaria*, *Euconulus fulvus*, *Punctum pygmæum*, and *Acanthinula aculeata*, all from Silverdale, Lancashire.
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Vitrea alliaria and var. *viridula*, *V. nitidula*, *V. crystallina*, *Zonitoides excavatus* and *Vivipara vivipara*, from Bardsley.
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1905. **Dean, J. Davy**.—New Records for West Lancashire. *J. Conch.*, xi., p. 146.
Cæcilioides acicula, by J. Davy Dean; and *Vertigo alpestris*, by J. Wilfrid Jackson—both from Silverdale, Lancashire; other species also enumerated.

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List of species living in the district given for comparison.
1905. **Dean, J. D.**—Exhibits. *J. Conch.*, xi., p. 153.
Limnæa peregra and *Pisidium pusillum* from Knott Hollow, Ulverston; and three freshwater species from Bank Well, Silverdale.
1905. **Jackson, J. Wilfrid.**—Exhibits. *J. Conch.*, xi., p. 158.
Pisidium nitidum var. *splendens*, *P. obtusale*, and *P. gassiesianum*, from Haweswater, Silverdale.
1905. **Baldwin, J. W.**—Exhibits. *J. Conch.*, xi., p. 159.
Limnæa stagnalis, labiate form, from Pit Lane, near Radcliffe.
1905. **Jackson, J. Wilfrid.**—*Pisidium nitidum* var. *splendens* in West Lancashire. *J. Conch.*, xi., p. 170.
Taken at Haweswater, Silverdale, with other *Pisidia*; species also constitutes record for District 60 of Census.
1905. **Standen, R.**—*Vivipara contecta* (Millet) m. *sinistrorsum*.
J. Conch., xi., p. 224.
Dr. Alcock's specimen collected at Southport in 1864, placed on record.
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Numerous Lancashire references.
1906. **Moore, C. H.**—Exhibits. *J. Conch.*, xi., p. 266.
Vitrea cellaria, *Jaminea cylindræa*, and three species of *Vertigo* from Grange-over-Sands; *Vertigo pusilla* and *V. alpestris* from Cark.
1906. **Jackson, J. Wilfrid.**—Exhibits. *J. Conch.*, xi., p. 268.
Planorbis dilatatus (Pendleton); *Paludestrina taylori* (Fairfield); *Physa heterostropha*, (near Ashton); and series of *Paludestrina jenkinsi* and var. *carinata* from many Lancashire localities.
1906. **Hardy, J. Ray.**—Exhibits. *J. Conch.*, xi., p. 273.
Ancylus fluviatilis from stone water-pipes taken up in Manchester in 1876.
1906. **Moore, C. H.**—Exhibits. *J. Conch.*, xi., p. 317.
Sphaerium pallidum, *Valvata piscinalis*, *Paludestrina jenkinsi* and var. *carinata* from pond at Droylsden, Lancashire.
1906. **Baldwin, J. W.**—Exhibits. *J. Conch.*, xi., p. 318.
Bythinia tentaculata var. *albida* from the Bolton Canal.

1906. **Standen, R.**—Observations on the Terrestrial Mollusca of the District around Silverdale, Lancashire. *J. Conch.*, xi., pp. 325-330.

A fairly complete list of the land shells of this district, with interesting remarks on their climbing habits, etc.

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A list of eighteen land and fifteen aquatic species, with notes on habitats and relative abundance, prefaced by an excellent resumé of the geological features of the district.

1906. **Jackson, J. Wilfrid.**—Exhibits. *J. Conch.*, xi., p. 352.

Pisidium henslowianum and *P. subtruncatum* from canal at Lancaster.

1906. **Hardy, J. Ray.**—Exhibits. *J. Conch.*, xi., p. 353.

Helicella barbara from near Bispham, Lancashire.

1906. **Jackson, J. Wilfrid.**—*Acanthinula lamellata* (Jeff.) at Grange-over-Sands, Lancashire, and Notes on various other species. *J. Conch.*, xi., p. 361.

Taken in Eggerslack Woods, with other species; new record for District 69.

1906. **Jackson, J. Wilfrid.**—*Bulimus fasciatus* Turton [= *Helicella barbara* (L.)] in Lancashire. *J. Conch.*, xi., p. 367.

Mr. Thos. Glover's record "near Fleetwood" noted, along with Mr. J. Ray Hardy's Bispham record of 1892.

1906. **Glover, Maria.**—Notes on the British Land and Fresh-water Shells, collected by the late Mr. Thomas Glover. *J. Conch.*, xi., pp. 368-372.

Contains numerous Lancashire records, dating from about 1824.

1906. **Swanton, E. W.**—A Pocket Guide to the British Non-Marine Mollusca. Lockwood.

Lancashire notes at p. 93 (*Planorbis dilatatus*); p. 101 (*Paludetrina taylori*); and p. 121 (*Sphaerium pallidum*).

1906. **Woodward, B. B.**—List of the Non-Marine Mollusca. *The Victoria History of the County of Lancaster*. London, vol. i., pp. 98, 99.

A list of 106 species, with localities of some of the rarer kinds; prefaced by remarks on the geology, etc., of the county.

Vitrea lucida Drap. at Grange, Lancs.—It will be of interest to know that the writer found an empty shell of this species in August last at the cliffs on Lindale Road, where Mr. J. Wilfrid Jackson found his specimens in 1903. The shell is a trifle larger than those of Mr. Jackson. No doubt diligent search after a good spell of rain would result in the acquisition of more examples.—G. H. TAYLOR (Read before the Society, Nov. 13th, 1907).

**OBSERVATIONS ON THE RADULÆ OF
HYALINIA DRAPARNALDI, CELLARIA, ALLIARIA
AND GLABRA.**

BY W. MOSS AND A. E. BOYCOTT.¹

(Read before the Society, January 10th, 1906).

PLATE I.

THE observations of which a summary is here given were made more than five years ago. At the time it was hoped that it would be possible to extend them to the other members of the group, and to examine in more detail the growth and other variations. For various reasons this has not been possible. That part of the enquiry which reached the greater degree of completion may, however, be of sufficient interest to other workers to be worth publication. It is certainly desirable that it should be amplified and extended.

In all more than 150 radulæ were examined. In some of these a fairly obvious mistake in specific diagnosis had been made, while others showed peculiarities which rendered it undesirable to include them in a series which was designed to be representative of specific differences between closely allied species. For these and other reasons the total number dealt with here is reduced to 131.

The measurements of (3) length and (4) breadth are not to be taken too minutely since the radula is often curved or folded (especially anteriorly) and the degree of pressure used in mounting no doubt makes a difference. This applies especially to the width which (apparently) varies a good deal in different parts of the same radula; in this series it has been measured at about the tenth row from the posterior end. In reckoning the (6) number of rows, the very youngest is not counted if it can only be seen (in glycerine-jelly) with a very small diaphragm. In (7) number of marginals, the maximum number found is given. As in the measurements of individual teeth, the rows chiefly examined have been those immediately in front of the young, pigmented part of the radula, *i.e.*, rows five to ten, and more especially rows six, seven and eight. The exact number is not important; it varies in different parts and on the two sides of the same radula and is dependent on the presence or absence of the minute terminal denticles. To avoid confusion in description, it has been reckoned throughout that there are three lateral teeth, and the fourth from the central tooth is counted as the first marginal. Owing to the difficulty of accurately defining the anterior margin of the basal plate, it has been sought to give some idea of the comparative size of individual teeth by measuring the distance from the tip of

¹ With a few negligible exceptions the whole of the material was prepared and mounted by W.M., who is responsible for the determination of species; the detailed examination and measurements were undertaken by A.E.B.

The following table summarises the characters of these specimens.

| | | <i>draparnaldi.</i> | <i>cellaria.</i> | <i>allivaria.</i> | <i>glabra.</i> |
|----|--|---------------------|------------------|-------------------|------------------------------------|
| 1 | Number of radula examined | 44 | 32 | 30 | 25 |
| 2 | Number of localities | 5 | 10 | 3 | 6 |
| 3 | Length of radula in mm. ... maximum minimum average | 6.1 | 3.1 | 2.2 | 3.2 |
| | | 3.3 | 2.0 | 1.7 | 1.45 |
| | | 4.55 | 2.71 | 1.99 | 2.10 |
| 4 | Width of radula in mm. ... maximum minimum average | 1.5 | 0.8 | 0.6 | 0.8 |
| | | 0.7 | 0.5 | 0.4 | 0.35 |
| | | 1.20 | 0.66 | 0.48 | 0.49 |
| 5 | Average length occupied by 10 rows in mm. | 1.59 | 0.81 | 0.57 | 0.54 |
| 6 | Number of rows maximum minimum average | 34 | 37 | 39 | 45 |
| | | 25 | 29 | 32 | 31 |
| | | 28.6 | 33.6 | 34.7 | 38.6 |
| 7 | Number of marginals maximum minimum average | 12 | 13 | 12 | 13 |
| | | 9 | 9 | 9 | 9 |
| | | 10.2 | 11.0 | 10.8 | 11.0 |
| 8 | Mesocone to ectocone of central in $\frac{1}{100}$ ths mm. maximum minimum average | 4 | $2\frac{1}{2}$ | 2 | $1\frac{3}{4}$ ($1\frac{3}{4}$)* |
| | | 2 | $1\frac{3}{4}$ | $1\frac{1}{4}$ | $\frac{3}{4}$ ($1\frac{1}{4}$) |
| | | 2.8 | 2.1 | 1.6 | 1.3 (1.5) |
| 9 | Mesocone to ectocone of first lateral in $\frac{1}{100}$ ths mm. maximum minimum average | 9 | $5\frac{3}{4}$ | $4\frac{1}{2}$ | 4 |
| | | $5\frac{3}{4}$ | $4\frac{1}{2}$ | 3 | $2\frac{3}{4}$ |
| | | 7.5 | 5.0 | 3.8 | 3.4 |
| 10 | Endocone of third lateral small absent | 0 | 0 | 3 | 17 |
| | | 0 | 0 | 0 | 2 |
| 11 | Ectocone of third lateral present doubtful absent | 24 | 15 | 0 | 1 |
| | | 8 | 6 | 0 | 1 |
| | | 12 | 11 | 30 | 23 |
| 12 | Endocone of first marginal present doubtful absent | 20 | 5 | 0 | 0 |
| | | 2 | 2 | 0 | 0 |
| | | 22 | 25 | 30 | 25 |
| 13 | Mesocone of central truncated | 1 | 0 | 0 | 9 or 11 |
| 14 | Endocone of laterals bifid | 18 | 0 | 0 | 0 |
| 15 | Endocone of first marginal bifid | 6 | 0 | 0 | 0 |

* The figures in brackets represent the results after deducting those cases in which the mesocone of the central tooth is truncated.

the mesocone to the tip of the ectocone. This has been done systematically for the (8) centrals and (9) first laterals only; it is, however, clear that useful information would have been obtained by the extension of this method of examination to the second and third laterals and to the first two marginals. The rest of the table requires no further explanation.

The four radulæ concerned are constructed on the same plan. Apart from differences in size, the main distinctions lie in the characters of the third and fourth teeth in each row. Thus in *draparnaldi*, the third lateral has a definite ectocone in fifty-four per cent. of the specimens, and a well-developed endocone in one hundred per cent., while in forty-five per cent. the first marginal also has an endocone: the radula, in short, is tending to have four laterals. In *glabra*, on the other hand, it is tending to have but two laterals: for in no case has the first marginal any endocone, and the endocone of the third lateral is noted as definitely small in sixty-eight per cent., and absent in eight per cent., while the same tooth shewed an ectocone in only one instance. Between these two lie *cellaria*, in a fairly intermediate position, and *alliaria* close to *glabra*. The chief difference between the two latter seems to be that *alliaria* has a well-developed endocone to the third lateral in ninety per cent. as against twenty-four per cent. of the specimens, and *glabra* shews the curious truncation of the mesocone of the central tooth in forty per cent. of radulæ.

There is thus a tendency for the first marginal tooth to move outwards along the series *glabra*, *alliaria*, *cellaria*, *draparnaldi*. This is associated with a similar progression of the largest tooth, which is generally the first tooth with truly marginal characters, and in *draparnaldi* is frequently as far out as the fifth, while in *glabra* it may be the third. The differences are obviously not absolutely diagnostic; the following formulæ give, perhaps, fair representations:

$$\begin{array}{l} \textit{draparnaldi} \quad \frac{1}{3} + \frac{3}{3} + \frac{10}{1} \times 29 \\ \textit{cellaria} \quad \frac{1}{3} + \frac{2}{3} + \frac{1}{2 \text{ or } 3} + \frac{11}{1} \times 34 \\ \textit{alliaria} \quad \frac{1}{3} + \frac{2}{3} + \frac{1}{2} + \frac{11}{1} \times 35 \\ \textit{glabra} \quad \frac{1}{3} + \frac{2}{3} + \frac{1}{1 \text{ or } 2} + \frac{11}{1} \times 39 \end{array}$$

We do not propose to enter into much detail as to the individual specimens examined; with regard, however, to the "*glabra*" specimens something more should be added. These fall into two distinct groups:

(α) Specimens from Finchley and Bettws with 37 to 45 (average 41) rows; average size of radula 2.3×0.53 ; length occupied by 10 rows = 0.56; average number of marginals 11.1.

(β) Specimens from Anglesea and Northampton with 31 to 38 (average 34) rows; average size of radula 1.7×0.45 ; length occupied by 10 rows = 0.50; average number of marginals 10.6.

The shape and size of the individual teeth are not materially different in the two groups, and truncated central mesocones are present in both series, though more frequent in group (a).

Group (a) corresponds more closely with the radula of *Vitrea rogersi* B. B. Woodward, which is described as being one-third larger than that of *alliaria* and as having "about 40 rows."¹ Attention has already been drawn by one of us² to the fact that consideration of the genitalia and radulæ of so-called *glabra* tends to shew that the species is not homogeneous. Some of our series from Anglesea bear, *qua* radula, a somewhat suspicious resemblance to *alliaria*, but the presence of a truncated mesocone in the central tooth of one example calls for special notice.

It is perhaps worth noting here that two continental specimens of "*glabra*" were also examined. These were received from Dr. Simroth and Dr. Babor; the former was apparently incomplete and had but thirty-nine rows while the latter had fifty-five. The formula of both was the same:

$$\frac{1}{3} + \frac{5}{2} + \frac{1}{2 \text{ or } 1} + \frac{24 \text{ or } 22}{1}$$

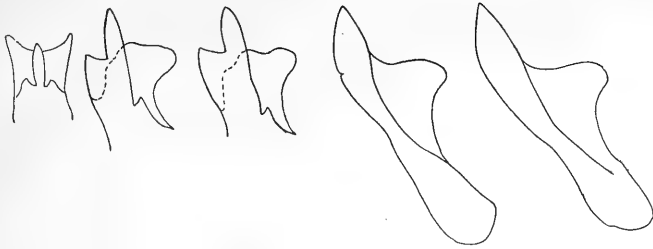
The individual laterals are after the *cellaria* type with a *nitidula* arrangement. The radula is not very close to that of any British species; except in size it is nearer the *excavata-nitida* type in general appearance than any other, but both specimens possess truncated mesocones on the central teeth.



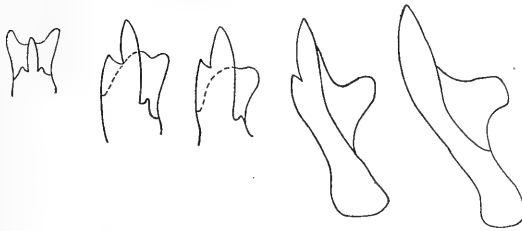
Snails in Captivity.—The longevity of snails is an interesting subject, and a certain number of instances are on record of cases in which snails have lived for more or less prolonged periods, when cut off from food. I do not remember having noticed any such record in the case of *Clausilia*, and it may therefore be worth mentioning that individuals of two species of this genus, taken by me in the island of Rhodes, in April 1905 (I think they are *cærulea* Fér. and *turrita* Pfr.), placed at once in a pill-box without food, and not opened since, have to-day (22nd September, 1906) crawled about vigorously when placed on the table. The extreme slenderness of the body of *Clausilia* appears to render this tenacity of life in a dry atmosphere somewhat remarkable, for the pill-box was itself enclosed in another box, which rested undisturbed on my mantelpiece. In this connexion it may be mentioned that when I was in Egypt in December, 1903, I procured a number of living *Helix desertorum*, with the view of testing their tenacity of life. They have been kept in a glass-topped box without food ever since, and have remained motionless. To-day they are still alive, and their bodies, when irritated, exude moisture freely.—[Rev.] A. H. COOKE (*Read before the Society, November 14th, 1906*).

¹ B. B. Woodward, *J. of Conch.*, vol. x., 1903, p. 311.

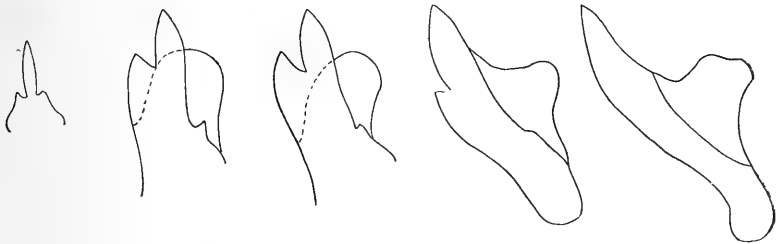
² W. Moss: "The Genitalia and Radulæ of British Hyalinia," *Trans. Manchester Microscopical Society*, 1898, p. 27.



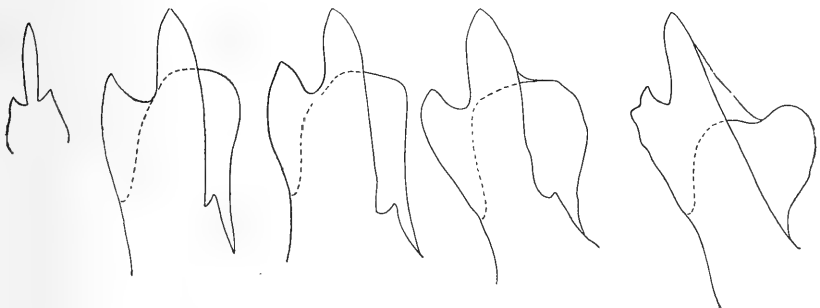
Hyalinia glabra auctt. olim.



Hyalinia alliaria Miller.



Hyalinia cellaria Müller.



Hyalinia draparnaldi Beck.

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THE
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VOL. 12.

JULY, 1908.

No. 7.

COLONEL GEORGE MONTAGU.

BY E. W. SWANTON.

(Read before the Society, February 13th, 1907).

It seems fitting that a biographical notice of Colonel George Montagu—"one of the most eminent practical naturalists of his age," and one who did so much to advance the study of conchology in this country—should be given in the *Journal of Conchology*. The only important notice of him that I can find appeared in the third volume of the *Wiltshire Magazine*. It was written by Mr. William Cunnington, F.G.S., who personally took much interest in the natural history of Wilts, and whose daughter placed a collection of Wilts Mollusca in the museum at Devizes. The short biography of Montagu in the *Dictionary of National Biography* differs in some important particulars from that by Mr. Cunnington, *e.g.*, it states that he was born in the year 1751, but Mr. Cunnington gives 1755. We may, with confidence, consider Mr. Cunnington's memoir the more trustworthy of the two, for that gentleman expressly remarks that he was indebted to the kindness of Mrs. L. M. Crawford, the daughter of Colonel Montagu, for many of the particulars therein given. It is from this memoir that I have obtained many of the following particulars.

The Montagu family is of ancient lineage, and it is of interest to note, in the pedigree which prefixes Mr. Cunnington's memoir, that for many generations long families have been the rule.

The Hon. James Montagu (third son of Henry, first Earl of Manchester, ob. 1665) had thirteen children. His grandson James had nine, and his great-grandson James—who married Elinor, the only surviving daughter of William Hedges, of Alderton Hall—also had thirteen in family, the ninth child and fourth son being George Montagu, the famous conchologist.

George was born at Lackham House, in North Wilts, in 1755.¹ At sixteen he entered the army, married at eighteen, and within a few months of his marriage embarked with his regiment for America. During their separation his wife lived with his family in Wiltshire. He did not remain long in America, probably not more than twelve months. He then quitted the army, and received a commission in the Wilts Militia, ultimately becoming Lieutenant-Colonel. Being a younger son he did not receive much patrimony from the large family estates, but money was left him by his maternal uncle, Thomas Hedges (£200 per annum), and by his brother James who died a bachelor.

He lived at Easton Grey for some time, but ultimately went to reside at Knowle House, near Kingsbridge, Devon.

James bequeathed him a rent charge of £800 per annum, devising the remainder of the estates to his (the Colonel's) eldest son George for life, with remainder to the children of the latter.

George, unfortunately, was extravagant, and at length caused the estate to be thrown into Chancery. The proceedings in the Courts, in which, regrettable to relate, the son appeared against the father, were very costly. Ultimately, the poor Colonel "had the mortification to see the fine old timber upon the estates, which had been valued at £70,000, cut down; and the valuable library of books, and collections of relics and curiosities, the gradual accumulations of two ancient families, sold and dispersed under a decree of the court. Even the pictures were included in the general devastation, though the chief of these were subsequently bought in." The death of his younger son Frederick, who was serving as Brigade-Major under Lord Beresford in Portugal, was a great blow to him. Frederick was his favourite son, and dutiful withal. A tablet to his memory, erected by his father, may be seen in Laycock Church. This was in 1811. Four years later, at Knowle, in June, 1815, the Colonel accidentally trod on a rusty nail which pierced his foot. Lockjaw resulted, and he died, after severe suffering, on the 20th of the same month.

During his illness, his valued friend, the Rev. R. Vaughan, of Modbury, asked him where he would like to be buried. He characteristically replied, "Where the tree falls there let it lie." His remains were interred in the churchyard at Kingsbridge. Of his character it is recorded that he was entirely free from all family pride, was just and upright, very punctual in his engagements, and having once made a promise did not rest until it was fulfilled. He was not prone to converse upon his favourite pursuits unless the subject was introduced. He had a wide knowledge, and his discourse was

¹ The old mansion has been destroyed, and replaced by a modern building.

peculiarly instructive and entertaining. His wife did not long survive him. I find in the obituary notices in the *Gentleman's Magazine*, March, 1816, the following paragraph: "February 10th, at the Hotwells, near Bristol, Anne, widow of the late Colonel Montagu, of Lackham, Wilts, and mother of the gallant Captain Frederick Montagu, who fell at Albuera." In the following August the collections of Greek coins and English medals were disposed of, also at least 300 letters of John, Duke of Marlborough, a few of Queen Anne, and various other papers of historical interest, which had descended to Mrs. Montagu through her grandfather, Sir Charles Hedges, Queen Anne's secretary.

I append a schedule of his life:—

GEORGE MONTAGU, F.L.S.,

SOLDIER, CONCHOLOGIST, AND ORNITHOLOGIST.

(Born at Lackham, in North Wilts, 1755).

| YEAR | AGE | |
|------|-----|---|
| 1771 | 16 | Entered the Army as Lieutenant in 15th Regiment of Foot. |
| 1773 | 18 | Married Anne, daughter of William Courtenay, and niece of the Marquis of Bute. |
| 1774 | 19 | His regiment ordered to America. |
| 1775 | 20 | Returned from America. |
| 1776 | 21 | Birth of eldest son, George Conway Montagu. |
| 1777 | 22 | Resided at Easton Grey, near Malmesbury. |
| 1779 | 24 | Acted as Lieutenant-Colonel of Militia. |
| 1781 | 26 | Devoted to scientific study and natural history pursuits. |
| 1783 | 28 | Working at the Shells of Wilts. |
| 1785 | 30 | Birth of his son Frederick. |
| 1788 | 33 | Residing at Alderton House. |
| 1789 | 34 | Corresponded with Gilbert White: he delights in the fact that he was an ornithologist from infancy. |
| 1792 | 37 | "The Sportsman's Directory" published in London. |
| 1796 | 41 | Wrote on Rare British Birds in the Trans. Linn. Society. |
| 1797 | 42 | Resigned his commission in the Wilts Militia, and went to reside at Kingsbridge, Devon. |
| 1798 | 43 | Library sold by Sotheby, also part of his collection of coins. |
| 1802 | 47 | The "Ornithological Dictionary or Alphabetical Synopsis of British Birds." |
| 1803 | 48 | Publication of the "Testacea Britannica;" The "Sportsman's Directory" reprinted. Papers to Trans. Linn. Soc. on Devonshire animals. |
| 1805 | 50 | Notes on Marine Animals, also Notes in Trans. Linn. Society. |
| 1807 | 52 | Papers on Marine Animals, also Birds in Trans. Linn. Society. |
| 1809 | 54 | Issued a supplement to the "Testacea Britannica." Contributed papers to the Wernerian Society, 1809 to 1815. |
| 1811 | 56 | Death of his son Frederick at Albuera. |
| 1813 | 58 | Published a supplement to the "Ornithological Dictionary." |
| 1815 | 60 | Died of lockjaw on June 20th, at Knowle House, Kingsbridge, Devon. |

The writer of the biographical notice in the *Dictionary of National Biography* states that the Colonel had two sons and two daughters. According to Cunnington he had four sons and two daughters. Three

of his sons died abroad; James, a prisoner of war in France; John, of the Royal Navy, killed in action; also Frederick, above alluded to. His eldest son died in 1847.

Though particulars of his early life are wanting, it would appear that he displayed at an early age a natural aptitude for natural history studies. Mrs. Crawford, alluding to the time when he was in America, remarks:—

“It was at this early period that my father first began to turn his attention, whenever opportunity offered, to those pursuits of natural science for which he had so strong a predilection, and for which he was afterwards so much distinguished. He first commenced by shooting any of the more curious American birds, a few of which he preserved with his own hands, though with no further intention at the time than that of presenting them to my mother, should he live to return to her, as proofs of his regard and memorials of his past adventures.

The interest which my father had felt from his boyhood in the works of nature, animate and inanimate, was much increased by the wild grandeur of the scenes which he traversed, and by the novelty of many of the feathered and four-footed tribes that inhabit them. He ultimately determined, however, to limit his researches and his specimens to British Birds and British Zoology generally, thinking that every collection ought to be as complete as possible of its kind, and being desirous that his own should be the result of his practical studies in the wide field of nature. It was thus that he formed that very extensive and beautiful collection of birds for which he was celebrated, and which after his death was disposed of to the Trustees of the British Museum for, I believe, £3,000.”

Two of his letters to Gilbert White are extant. In that dated June 29th, 1789, he writes: “I have delighted in being an ornithologist from infancy, and, was I not bound by conjugal attachments, should like to ride my hobby to distant parts.”

Memoranda respecting the Writings of Montagu.

His first work, “The Sportsman’s Directory,” dedicated to Lord Porchester, was published in London in 1792. Many chapters are devoted to a discussion of the penetrating power of gunpowder, and notes upon shooting and flying. Amongst other things he condemns rifled barrels, and gives detailed and curious directions to a duellist as to the best positions in which to receive the fire of his opponent. It was reprinted in 1803.

His descriptions of three rare species of British Birds were read before the Linnean Society on March 1st, 1796, and published in the fourth vol. of the Transactions (p. 35). They are designated *Sylvia sylvicola* (Wood Wren); *Tringa nigricans* (Phayrelarn Sandpiper); and *Alauda petrosa* (Rock Lark).

Six years later was published his well-known "Ornithological Dictionary, or Alphabetical Synopsis of British Birds." Eleven years elapsed before a supplement was published at Exeter. This work has been reprinted at least three times, by Rennie in 1831, by Edward Newman in 1866, and by Messrs. Sonnenschein & Allen. In the former editions many additions were made by the editors. Throughout this work that caution in accepting evidence, characteristic of all his writing, is everywhere seen, *e.g.*, though he mentions the Great Black Woodpecker, he does so "with considerable doubt," as he cannot speak of it from direct knowledge.

In the same year (1802) his "Description of several Marine Animals found on the South Coast of Devonshire" was read before the Linnean Society on December 7th, and subsequently published in the seventh vol. of the Transactions (p. 61), with two plates. In the introduction of this paper he remarks with pardonable pride, "In pursuit of my first object, that of making myself acquainted with all the *British Testacea* and their animal inhabitants, as far as possible, I soon discovered that much remained to be done in that branch of natural history, having with diligent search and indefatigable attention¹ added nearly double the number of species to those already given by any author, as indigenous to our coasts." The next year the "Testacea Britannica" saw the light. It was in two parts, printed by J. S. Hollis, Romsey, and sold by J. White, Fleet Street. The sixteen excellent coloured plates were drawn and engraved by Eliza Donville. This celebrated work has been justly described as being "next to Müller, one of the best works on land and freshwater shells."

The following paragraph from the preface is characteristic of the man: "Aware that some shells have been given as English which never originated there, we have been cautious of admitting anything but upon the best authority; and where we have expressed doubt, we beg it may not be considered as arrogance, or contempt for the opinion of others, but a wish to develop truth; we are all liable to err, but those least who search for nature where nature flows."

The year 1803 must have been an exceptionally busy one even for such an indefatigable worker as Montagu; not only did he publish the "Testacea Britannica," but also reprinted in this year the "Sportsman's Directory," and wrote a paper for the Linnean Society, giving his "Observations on some Species of British Quadrupeds, Birds, and Fishes." The latter was read on December 20th, and published in the seventh vol. of the Transactions (p. 274). It contains interest-

¹ Some idea of the magnitude of Montagu's work may be gleaned by noting that in the recent Lists of British Marine and Non-marine Mollusca published by the Conch. Soc., we find his name appended to no less than 72 species and 16 varieties (7 species and 4 varieties being non-marine). He was also responsible for the genus *Lamellaria*. Turton named the genus *Montacuta* after him.

ing notes on the Harvest Mouse, Water Shrew, Cirl Bunting, Dartford Warbler, etc., etc.

In 1805 two more papers from his pen appeared in the ninth vol. of the Transactions of the Linnean Society. These were entitled, "Descriptions of several Marine Animals found on the South Coast of Devonshire" (read June 18th, a long paper with seven plates), and "An account of the larger and lesser Species of Horse-shoe Bats, proving them to be distinct; together with a Description of *Vespertilio barbastellus*, taken in the South of Devonshire" (read Nov. 19th).

Montagu's paper on "Some interesting additions to the Natural History of *Falco cyaneus* and *pygargus*, together with Remarks on some other British Birds," was read before the Linnean Society on May 5th, 1807, and published in the Transactions, vol. ix. (p. 182), 1808. His papers entitled "Descriptions of several new or rare animals, principally marine, discovered on the South Coast of Devonshire," read on April 7th, 1807, and an "Account of some new and rare Marine British Shells and Animals," read on March 5th, 1811, did not appear in the Transactions of the Linnean Society until a short time before his death; they may be found in the eleventh vol., published in 1815.

Two posthumous papers in the Transactions of the Linnean Society are "On the Black Stork" (xiii., 19), and "On five British Species of *Terebella*" (xii., 2, 340). Between March, 1809, and March, 1815, Montagu contributed six papers to the Wernerian Society:—"On some rare British Fishes" (i., 79), "On the Gannet" (i., 176), "On Fasciola in Poultry" (i., 194), "On British Sponges" (ii., 67), "On Fishes taken in South Devon" (ii., 413), and on "A supposed new species of Dolphin" (iii., 75).

Colonel Montagu, of Lackham, was a splendid example of that happy combination, the country squire and genial naturalist, a type unfortunately becoming rare. This brief sketch of his life may fittingly be brought to a conclusion by quoting Edward Forbes's high appreciation of him :

"Montagu's eminence as a naturalist depended upon his acute powers of observation, and the perspicuous manner in which he recorded the facts that came under his notice. He excels as a describer, and all his accounts of the animals which he noted are clearly and truthfully drawn up. He avoided wordiness, yet his descriptions are never so brief as to be obscure. I have had occasion chiefly to test the observations of Montagu in cases where marine animals are concerned, and have been astonished at the extent, variety, and minuteness of his researches."

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

370th Meeting, March 11th, 1908.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

“Drift and Underlying Deposits at Newquay, Cornwall,” by B. B. Woodward (*presented by the author*); “Catalogue des Mollusques Marins du Boulonnais,” by Bouchard-Chantereaux (*presented by Dr. W. E. Hoyle*); and the usual periodicals received in exchange.

New Member Elected.

Mr. H. F. Edgar.

Candidates Proposed for Membership.

Mr. T. Rumney, c/o E. A. Surtees, Esq., Repton, near Derby.

Mr. R. A. Phillips, Ashburton, Cork.

Statement of Accounts.

The following Statement of Income and Expenditure for the year 1907, having been signed by the Auditors, was presented :—

| RECEIPTS. | £ | s. | d. | EXPENDITURE. | £ | s. | d. |
|------------------------------|-------------|-----------|----------|--|-------------|-----------|----------|
| Cash in hand | 14 | 0 | 10 | Library Cards | 1 | 2 | 0 |
| Subscriptions | 75 | 13 | 10 | Illustrations | 0 | 3 | 6 |
| Three Life Membership Fees | 9 | 9 | 0 | Taylor's Monograph, pt. xiii. | 0 | 10 | 6 |
| Advertisements | 0 | 7 | 0 | Printing <i>Journal</i> for Jan., 1907 | 12 | 5 | 3 |
| Sale of Publications | 9 | 0 | 11 | " " Apr., " | 11 | 12 | 3 |
| Donation : A. da Costa Gomez | 0 | 5 | 0 | " " July " | 11 | 6 | 6 |
| | | | | Reprints | 2 | 6 | 0 |
| | | | | Stationery | 1 | 13 | 6 |
| | | | | Editor & Secretary's Expenses | 9 | 8 | 4 |
| | | | | Recorder's Expenses | 0 | 5 | 10 |
| | | | | Treasurer's " " " | 2 | 5 | 0 |
| | | | | Balance forward | 55 | 17 | 11 |
| | <u>£108</u> | <u>16</u> | <u>7</u> | | <u>£108</u> | <u>16</u> | <u>7</u> |

Paper Read.

“The Land and Freshwater Mollusca of Grange-over-Sands,” by Harry Beeston.

Exhibits.

By Mr. Edward Collier : *Leucochroa candidissima* and *Helix conspurcata* from Bassano Vecchia ; *Helix pisana*, *H. aspersa*, *H. cespitum*, *H. virgata*, *H. apicina*, *H. elegans*, *H. acuta*, *H. trochoides* var. *sulculata*, *H. vermiculata*, *H. aperta*, *Pupa cinerea*, *Stenogyra decollata*, *Cyclostoma elegans*, and *Cionella folliculus*, from Bordighera, Italy, collected last January.

By Mr. G. C. Spence : *Succinea oblonga* and various small *Helices*, obtained from a consignment of carraway seeds received by a Manchester tradesman from Holland.

By Mr. J. W. Baldwin : White variety of *Bithynia tentaculata* from Bolton Canal.

By Mr. R. Welch : Fry of *Sphærium lacustre* from Antrim River.

By Mr. J. Kidson Taylor : Dark banded forms of *Helix hortensis* from Colchester, Chatburn near Clitheroe, and Miller's Dale ; *H. nemoralis* dark

(*libellula*) forms from Colchester and variously-tinted (*rubella*) forms from Tenby, and a series of *rubella* showing transitional forms from var. *castanea* to var. *olivacea*, from the Winnats. Mr. Taylor also exhibited two very fine specimens of *Cypræa aurantium* Mart., one $4\frac{1}{2}$ inches long, *C. decipiens* Smith, *C. thesites* Gask., *C. scotti* Brod., *C. mappa* var. *panerythra* Melv., and very large *C. tigris* L.

371st Meeting, April 8th, 1908.

Mr. B. R. Lucas in the chair.

Donations to the Library announced and thanks voted:

"List of Marine Mollusca of Coldspring Harbor, Long Island, with descriptions of one new genus and two new species of Nudibranchs," by F. N. Balch. "Descriptions of nine Terrestrial Mollusca from South Africa," by J. Cosmo Melvill and John Henry Ponsonby, including anatomical descriptions of two proposed new genera (*Afrodonta* M. & P. and *Peltatus* G.-A.) by Lt.-Col. H. H. Godwin-Austen. "A new freshwater bivalve (*Corneocyclas*) from the mountains of Ecuador," and "Notes on the freshwater mollusk, *Planorbis magnificus*, and descriptions of two new forms of the same genus from the Southern States," by Paul Bartsch. "Die Gastropoden: Der Schwedischen Sudpolar Expedition," by H. Strebel (*presented by the authors*); and the usual periodicals received in exchange.

New Members Elected.

Mr. R. A. Phillips, Ashburton, Cork.

Mr. Thos. Rumney, c/o E. A. Surtees, Esq., Repton, near Derby.

Candidates Proposed for Membership.

Mrs. H. D. Brainerd, Captiva, Lee Co., Florida, U.S.A.

Mr. A. D. R. Bacchus, Hazlemere College Terrace, London Road, Southampton.

Paper Read.

"Notes on the occurrence of *Helix aspersa* Müll.," by Capt. J. Farrer.

Exhibits.

By Mr. J. R. Hardy: A series of very large specimens of *Limnæa glabra*, measuring from 18 to 21 mm. in length, collected in 1846 from "Moss Lane Pits," Greenheys—a locality now built upon.

By Rev. C. E. Y. Kendall: *Valvata piscinalis* from Lancaster Canal, April, 1908—a series of very clean and unusually coloured specimens, some have a blueish and others a greenish tint.

By Mr. J. W. Baldwin: *Limnæa stagnalis* from pond at Bradshaw, Turton district, introduced from Little Lever, and now abundant; all are beautifully roseolabiate.

By Mr. J. Kidson Taylor: A fine series of the smaller species of *Cypræa*—including *C. lentiginosa*, *C. oweni*, *C. fabula*, etc.; and *Scala trevelyana* from Dogger Bank.

By Mr. C. P. Richards (on behalf of Miss Amy C. S. Foster): A remarkable form of *Cypræa eros*a with deep reddish chestnut suffusion on sides and base, and pale yellow dorsal surface; also *Cyp. errone*s, blotched variety, and *Trivia staphylea* var. *polita* from Sandwich Islands.

An interesting series of British Nassidæ, illustrating local variation in sculpture, was exhibited by Messrs. J. Cosmo Melvill, R. Standen, J. Wilfrid Jackson, J. Kidson Taylor, C. H. Moore and R. Cairns.

By Mr. J. Wilfrid Jackson (on behalf of the Manchester Museum): Series of *Nassa* from Pliocene strata including *Nassa granulata*, *N. propinqua*, *N. elegans*,

N. granifera, *N. labiosa*, *N. reticosa* vars., *N. prismatica*, *N. consociata* from the Red and Coralline Crags; *Nassa serrata*, *N. recticostata*, *N. mutabilis*, *N. sordida* from St. Erth beds. Also *Nassa reticulata* from Mid-Glacial beds at Gloppa, Shropshire, and Blackpool, Lancs., and from Post-Glacial beds at Kelsey Hill, Portrush, and Larne; also *Nassa incrassata*, St. Andrews, Scotland, and *N. pygmaea* Portrush, Ireland.

By Rev. Lewis J. Shackelford: *Voluta (Alcithoe) ponsonbyi*, Smith, and *Voluta (Alcithoe) africana* Reeve from the Natal coast in 40 fathoms.

372nd Meeting, May 13th, 1908.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted:

"On *Planorbis vorticulus* and *levis*; and proposed subdivisions of the genus."
 "*Vitrea scharffi*, n.sp.," by A. S. Kennard. "Observations on a number of *Plectopylis* collected in Tonkin by M. Mansuy, with descriptions of Four New Species," by G. K. Gude. "On the Revision of the Mollusk Genus *Pterinea*, Goldfuss," by H. S. Williams (*presented by the respective authors*). "A List of the Land and Freshwater Shells found in the Environs of London, 1836," by Daniel Cooper (*presented by Kenneth McKean*); and the usual periodicals received in exchange.

New Members Elected.

Mrs. H. D. Brainerd, Captiva, Lee Co., Fla., U.S.A.

Mr. A. D. R. Bacchus, Hazlemere College Terrace, London Road, Southampton.

Candidates Proposed for Membership.

Rev. R. E. Thomas, M.A., St. Martin's Clergy House, Salisbury.

Mr. Francis N. Balch, 60, State Street (Rooms 504-507), Boston, Mass., U.S.A.

Paper Read.

"Molluscan Records from Gloucestershire," by Chas. Upton.

Exhibits.

By Mr. R. Standen: A series of the various species of Marine Mollusca and recent Brachiopoda obtained by Mr. W. S. Bruce during the Scottish National Antarctic Expedition, 1903-4; *Trivia australis*, *Cypraea pulicaria*, and a fine series of juvenile forms of *C. angustata* Gmel. and its varieties, dredged alive in West Port Bay, Victoria, by Mr. C. J. Gabriel; also *C. xanthodon* Gray, Queensland, *Scala granosa* Quoy & Gaim., Victoria; and a remarkable set of *Cypraea caurica* with richly marked dorsal surfaces, and dark chocolate-coloured base of very unusual character, from New Caledonia.

By Mr. J. Kidson Taylor: *Helix nemoralis* var. *roseolabiata* and var. *olivacea + albolabiata* from Winnats, Castleton, Derbyshire; *Helicigona arbustorum* vars. *luteofasciata* and *cincta* from Topley Pike, Derbyshire; *Anomia patelliformis* from Dublin Bay; *Aporrhais pes-pelicanii*, Scilly Isles, and *Ap. serresianus* from Corsica and Shetland.

Special exhibit: A large series of the British representatives of the family Stenogyridæ, from many localities was shewn by Messrs. R. Standen, J. W. Jackson, J. Ray Hardy, R. Cairns, J. Kidson Taylor, C. H. Moore and from the collections of the Society, and the Manchester Museum.

CONCHOLOGICAL NOTES FROM RUSSIA.

By LIONEL E. ADAMS, B.A.

(Read before the Society, November 13th, 1907).

THE TONKA OF ARABAT is a long tongue of sand which forms the entire western seaboard of the Azov, dividing that sea from an inland salt lake called in Russian the Sivash. At its southern extremity the Tonka joins the mainland of the Crimea near the ancient Genoese fort of Arabat, and at the northern end there is a narrow strait connecting the Azov with the Sivash, across which is a bridge at the town of Ghenitshesk. The length of the Tonka is sixty miles and the breadth varies from a quarter to three-quarters of a mile, except in two places towards the northern end where it widens irregularly to three and a half miles. The Sivash or "Putrid Sea" is a lake of the strongest brine in which animal and vegetable life are alike impossible, for which reason it is locally known as the "Dead Lake." The name "Putrid Sea," given on account of the foetid salt mud on parts of its banks, is thoroughly well deserved. At intervals along the Sivash shore of the Tonka are salt pans whence the salt is obtained by means of evaporation. It was while we were engaged for a month in shipping this salt from various places along the Tonka that I was enabled to gather the material for the present note. A glance at a chart of the Azov will suggest the formation of the Tonka, which, like the three long sand spits on the north coast, was built up by the sweep of the current of the Don issuing from the Gulf of Taganrog, aided by the strong east winds which prevail in autumn. Our Chesil Beach presents a somewhat similar case. The geological formation of the Tonka is interesting conchologically as it is entirely composed of a small cockle (*Cardium edule* Linn.) which is found in every stage of detrition, and, though never found alive in this part of the Azov, is used as food at Mariupol and Burdiansk. On the surface of the Tonka the shells are ground into fine sand, but below this they form a conglomerate rock, which is quickly disintegrated on exposure to air and damp. Along the coast of the Crimea adjoining the Tonka the same formation occurs, but here the conglomerate, which is much firmer, being presumably considerably more ancient, is mined and quarried for building purposes. In Kertch and Theodosia it is much used for public buildings and seems to resist the extremes of climate as well as most freestones do in England. The height of the Tonka averages about six feet above sea level, though here and there an elevation of ten feet may be reached. There is, of course, no tide in the Azov, but when the strong east winds blow, the water frequently

makes breaches over the spit, and in winter the ice from the sea is often piled up in masses and driven over into the Sivash. Just above the normal water line vegetation begins—coarse grass, spurge, mallows, wild thyme, sea-holly, &c. Only in one spot along the whole length of the Tonka is fresh water to be obtained, which issues perpetually from an artesian well; elsewhere along this coast humans, cattle, poultry—all living things drink from the Azov, or from wells just as salt, if not more so, from infiltration from the Sivash. This Azov water is, of course, unpleasant, but one becomes accustomed to anything at need.

From the foregoing remarks it will be readily understood that land and freshwater shells are not abundant. In fact I believe that neither freshwater species nor slugs inhabit the Tonka, and the dead examples of *Planorbis corneus* Linn., *Pl. umbilicatus* Müll., *Pl. spirorbis* Müll. and *Neritina fluviatilis* Linn. were, I fancy, drifted across the Sivash from the mainland of the Crimea. However, the hardy *Helix virgata* DaCosta and *H. caperata* Mont. were all over the place, the latter being far the less numerous, and almost seeming to blend with the former species, being both in form and sculpture almost intermediate.¹ With these two species was associated *Chondrus tridens* Müll. With regard to marine species the curious fact was that in no case was there a living specimen. Like the *Cardium edule* they were not only dead, but dead long before they were cast up on the beach. They comprise the following species:—

Paludestrina ventrosa Mont.—Swarming among the débris.

Phytia myosotis Drap.—Common.

Bittium reticulatum DaCosta.—Common.

Cylichna truncatula Brug.—One specimen.

Rissoa venusta Phil.—Common.

[?=*R. membranacea* var.]

Cardium vulgatum (Brug.).

Nassa reticulata Linn.—Common.

Venus gallina Linn.—Common.

Loripes lacteus Linn.—Common.

Ervilia castanea (Mont.).

Cardium fasciatum Mont.

Solen vagina L.—Common.

LIBAU.—A stay at Libau from August 20 to September 3, 1907, enabled me to make several excursions into the country in search of shells. The land in this region is flat and low, edged with willow covered sandhills, behind which is a narrow lake about twenty miles

¹ In 1901 I found both species abundantly on the N.W. of the Crimea in Karkinit Bay, and in 1902 I sought them in vain around Ghenitshesk, but that was after a prolonged drought when vegetation was withered up and strong winds had swept the country bare.—*Q.J.C.*, vol. x., p. 334.

in length, communicating with the sea by a river a mile and a half long. Quays and warehouses line the sides of the river around which the town is built. There are also many swamps and a canal. Contrary to my expectations the sandhills yielded absolutely nothing. The following species were found along the canal banks and around the lake in the usual situations. I found nothing in the ancient forests surrounding the lake, but as the trees were birches, oaks or firs, this did not surprise me.

Arion circumscriptus Johnston.—One pale blue specimen with darker bands.

Agriolimax agrestis Linn.—Type common. Under a pile of bricks I found a small colony of individuals with jet-black marbling thickly covering a normal body colour.

Hyalinia nitida Müll.—One specimen on the lake shore.

Hy. radiatula Ald.—Three, under logs.

Helix hispida var. **hispidosa** Mouss.—One pale specimen.

Cochlicopa lubrica and var. **lubricoides** Fér.—Common.

Vallonia pulchella Müll.—Moderately common.

Pupa muscorum Linn.—Common.

Succinea putris Linn.—Common.

S. elegans var. **pfeifferi** Rossm.—One specimen.

Planorbis corneus Linn.—Two specimens.

Pl. umbilicatus Müll.—Common.

Pl. spirorbis Müll.—Moderately common.

Limnæa palustris Müll.—Very abundant; in fact the commonest shell in the district.

L. peregra var. **boissyi** Dup. (**major**).—Mr. J. W. Taylor, to whom I have submitted these shells, which are all of one form, says, "The *Limnæa* is a form of *L. lagotis*; however, I shall prefer to place it under the form of *peregra*, around which centre *balthica*, *boissyi*, &c."

L. stagnalis Linn.—Common and typical.

L. truncatula Müll.—One specimen.

Bithynia tentaculata var. **curta**.—Only found in the lake, all of the same stunted form.

Neritina fluviatilis Linn.—Only a single juvenile specimen found, which would be impossible to pronounce upon positively, but, as Mr. E. A. Smith informs me that *fluviatilis* is the only *Neritina* known around the Baltic, I think we may assume that the specimen in question belongs to that species.

I am indebted to Messrs. J. W. Taylor, E. A. Smith and R. Standen for kindly identifying and confirming many species.



THE MOLLUSCA OF WILTSHIRE.

By E. W. SWANTON.

(Concluded from page 133).

Vitrea radiatula (Alder).—Frequent. Maiden Bradley and Melksham (E.W.S.); Devizes (Heginbothom); brickearth at Fisherton (Blackmore); Great Bedwyn (Townsend); between Box and Corsham, Salisbury, Devizes (Vize).

Zonitoides nitidus (Müller).—Rare, but abundant where it occurs. Always in damp situations. Corsham and Salisbury (Vize); Amesbury and Salisbury, amongst sedges on the banks of the Avon (E.W.S.).

Euconulus fulvus (Müller).—Common throughout the county in damp places. Montagu, describing it as *Helix trochiformis* in Test. Brit., p. 427, remarks that "it is a rare shell; we first observed dead specimens amongst the drifted sand in the river Avon in Wiltshire; and afterwards found it sparingly alive in Lackham Wood in the same county." Stourton, Edington and Amesbury (E.W.S.); brickearth at Fisherton (Blackmore); Swindon (Cockerell); Devizes (Miss Cunnington and Heginbothom); Great Bedwyn (Townsend); Stratford-sub-Castle, Salisbury, Devizes and neighbourhood (Vize.)

Arion ater (Linné).—Widely distributed. Stourton, Mere, and Edington (E.W.S.); Marlborough (Bromehead); ditches between Hilperton and Steeple Ashton, and elsewhere about Trowbridge, Salisbury (Vize).

var. **aterrima** Taylor.—Edington.

var. **alba** Linné.—Stourton Woods.

var. **albolateralis** Roebuck.—Salisbury (A. D. R. Bacchus).

var. **marginella** Schrank and sub-var. **nigrescens** Moquin-Tandon.—Swindon (Cockerell).

Arion subfuscus (Draparnaud).—Fairly common. I always find it most frequently on Greensand soil. It is common in the pine-woods at Stourton. Amongst specimens from this locality sent to Mr. W. E. Collinge in October, 1893, was one which he styled "var. *alteritius*." Banks of the Avon at Salisbury and Edington (E.W.S.); Marlborough (Bromehead); Manton near Marlborough (F. Meyrick).

Arion intermedius Normand.—Apparently rare. The only record that I can find is Dinton near Salisbury (H. Wyndham).

Arion hortensis Férussac.—In gardens and hedgerows in villages; widely distributed. Mere, Stourton, Edington, Salisbury, and Amesbury (E.W.S.); Dunollie, Bourne Avenue, Salisbury (A. D. R. Bacchus); Longleat Gardens, Warminster (J. A. Singer);

Clyffe Pypard, Swindon (Goddard); Salisbury (Vize); Marlborough (Meyrick and Bromehead).

var. **grisea** Moquin-Tandon.—Abundant about Marlborough (F. Meyrick).

var. **subfusca** C. Pfeiffer.—Garden, Steeple Ashton Vicarage, with type (E. P. Knubley); around Mere and Stourton (E.W.S.).

var. **nigra** Moquin-Tandon.—Stourton Gardens.

Arion fasciatus Nilsson.—Locally abundant. Pine woods at Stourton, Oct., 1893, Melksham and Mere (E.W.S.); Clyffe Pypard, Swindon (Goddard); Bourne Avenue, Salisbury (Bacchus).

var. **circumscriptus** Johnston.—Edington.

Punctum pygmæum (Draparnaud).—Only two records, but is probably fairly common, being frequently overlooked through its minuteness. Rare, Salisbury (Vize); brickearth at Fisherton (Blackmore).

Sphyradium edentulum (Draparnaud).—Rare; only two stations at present recorded. Corsham (Vize); near Mere (E.W.S.).

Pyramidula rupestris (Draparnaud).—Widely distributed on old walls. Melksham and Salisbury (E.W.S.); Great Bedwyn (Townsend); brickearth at Fisherton (Blackmore); Bath Road, near Atworth, Devizes (Miss Cunningham); walls near Corsham, very abundant between Freshford and Westwood, Salisbury, Clarendon (Vize).

Pyramidula rotundata (Müller).—Common. "Under the tiles, Lackham House" (Montagu); Stourton, Mere, Edington and Amesbury (E.W.S.); Devizes (Miss Cunningham); Swindon (Cockerell); Corsham, North Bradley, Hilperton, under chalk stones at Warminster and Salisbury (Vize).

var. **alba** Moquin-Tandon.—Devizes (Miss Cunningham).

Helicella virgata (DaCosta).—Widely distributed and very abundant, especially on the Downs. Montagu remarked that it "is not uncommon in Wiltshire, but nowhere in such abundance as within the influence of saline air" (Test. Brit., p. 417). Great Bedwyn (Townsend); Swindon (Cockerell); Marlborough Downs, very common (Bromehead); Devizes and Salisbury Plain (Miss Cunningham); Corsham, Salisbury, North Bradley, on banks between Trowbridge and Bradley, Upton Scudamore, Westwood and Freshford, Devizes (Vize).

var. **albicans** Grateloup.—Devizes (Miss Cunningham and Heginbothom).

var. **subalbida** Poiret.—Devizes (Miss Cunningham).

var. **lineata** Olivi.—Downs between Malmesbury and Salisbury, Devizes (Heginbothom); Great Bedwyn (Townsend).

Helicella itala (Linné).—Common, especially abundant on the Downs. Maiden Bradley, Amesbury, Avebury (E.W.S.); Great Bedwyn (Townsend); very common on Downs near Marlborough (Bromehead); Devizes (Miss Cunnington and others); Upton Scudamore, Salisbury, and generally on the Downs throughout the county (Vize).

var. **leucozona** Moquin-Tandon.—Devizes (Heginbothom).

var. **alba** Charpentier.—Devizes, fine specimens (Heginbothom).

Helicella caperata (Montagu).—Widely distributed. Montagu observed, "We have found it sparingly in Wiltshire" (Test. Brit., p. 432). Stourton, Mere, Edington and Devizes (E.W.S.); Great Bedwyn (Townsend); Devizes (Miss Cunnington, etc.); Corsham, Bradford-on-Avon, Upton Scudamore, Warminster, Salisbury (Vize).

var. **ornata** Picard.—Devizes (Heginbothom); Downs near Mere.

Helicella cantiana (Montagu).—Evidently very rare. The only notices that I can find are—Rare, near Weyhill, near Hungerford, and borders of Wilts. (Vize).

m. **sinistrorsum**. Mr. J. W. Taylor recorded, in *J. of Conch.*, vol. vi., p. 33, that he possessed a specimen, "one of several found in Wiltshire by Mr. Ripon, of Norwood."

Hygromia fusca (Montagu).—Very rare. Trowbridge (Vize).

Hygromia granulata (Alder).—Rare. Amongst nettles on the banks of the Avon at Salisbury; Great Bedwyn (Townsend); Salisbury, and near Hungerford (Vize).

Hygromia hispida (Linné).—Widely distributed and abundant. DaCosta recorded it from Wiltshire in 1778 under the name of *Cochlea hispida*. Montagu thought it occurred but sparingly in Wiltshire (Test. Brit., p. 423). On the banks of the Avon at Salisbury, Laycock, Avebury and Amesbury (E.W.S.); in the drift at Milford Hill and in brickearth at Fisherton (Blackmore); Swindon (Cockerell); Devizes (Heginbothom and others); Trowbridge, Hilperton, Freshford, Salisbury (Vize); Great Bedwyn (Townsend).

var. **hispidosa** Mousson.—Salisbury and Edington (E.W.S.); Swindon (Cockerell); Devizes (Miss Cunnington); brickearth at Fisherton (Blackmore); Great Bedwyn (Townsend).

var. **nana** Jeffreys.—Great Bedwyn (Townsend).

Hygromia rufescens (Pennant).—Widely distributed. Brick earth at Fisherton (Blackmore).

var. **rubens** Moquin-Tandon.—Swindon (Cockerell); Salisbury and Laycock (E.W.S.).

var. **albicincta** Cockerell.—Downs between Malmesbury and Salisbury (E.W.S.).

var. **alba** Moquin-Tandon. — Neighbourhood of Salisbury (Jeffreys); Blunsdon (Cockerell); Great Bedwyn (Townsend); Devizes (Miss Cunnington); Mere and Edington (E.W.S.).

Acanthinula aculeata (Müller).—Rare. “In the woods at Lackham” (Test. Brit., p. 430, as *Helix spinulosa*). Devizes (Miss Cunnington); rare at Durnford, moist meadows amongst mossy stones at Devizes (Vize); moist woods in Wiltshire (Jeffreys).

Vallonia pulchella (Müller).—Widely distributed. Montagu wrote of it, “It is most commonly found in rivers and streams of water, after floods, amongst the sand and other refuse brought down by the current, having been swept from the neighbouring wet and swampy situations. It is very plentifully found after a flood on the banks of the River Avon, in North Wiltshire, about Lackham” (Test. Brit., p. 441, as *H. paludosa*). Stourton, Mere and Edington (E.W.S.); brickearth at Fisherton (Blackmore); Devizes (Heginbothom); between Trowbridge and Studley, Salisbury, Devizes (Vize).

Vallonia costata (Müller).—In all probability as widely distributed as the preceding species. Edington and Avebury, also near Mere (E.W.S.); Hilperton Marsh (Vize); Swindon (Cockerell); Devizes (Miss Cunnington and Heginbothom).

Vallonia excentrica Sterki.—Probably hitherto confused with *V. pulchella*. I found three specimens at Edington, in the Vale of the White Horse.

Helicogona lapicida (Linné).—Local. DaCosta recorded it in 1778 as *Cochlea acuta* “from Wiltshire, in the moss on the bodies of large trees, and in woods.” Devizes, south of Kennet and Avon Canal (Heginbothom); Marlborough, moderately common (Bromehead); Corsham, Salisbury (Vize); Roundway Hill, Devizes (Miss Cunnington); Edington (E.W.S.).

Helicogona arbustorum (Linné).—Widely distributed: DaCosta recorded it from Wiltshire under the name of *Cochlea unifasciata*. Montagu wrote: “It delights in wet and shady places, particularly amongst willows and alders where the soil is black and boggy. In such places in the neighbourhood of Lackham in Wiltshire, contiguous to the River Avon, it is the most common shell, but we have rarely found it elsewhere” (Test. Brit., pp. 414, 415). A lightish form of the type occurs in nettle beds on the banks of the Avon at Salisbury. I have noticed in other places its fondness for nettles. A few specimens in the drift at Milford Hill and in the brickearth at Fisherton (Blackmore); Devizes (Miss Cunnington and others); Idmiston (W. L. W. Eyre); Marlborough, moderately common (Bromehead); Hilperton, Bradford-on-Avon, Alderbury, Salisbury (Vize).

var. **cincta** Taylor.—Banks of the Avon at Salisbury (E.W.S.); Devizes (Miss Cunnington and Heginbothom).

var. **fuscescens** Duchassaing.—Idmiston (W. L. W. Eyre); Devizes (Miss Cunnington and Heginbothom).

var. **canigonensis** Boubée.—Devizes (Heginbothom).

var. **conoidea** Westerlund.—Devizes (Heginbothom).

var. **flavescens** Moquin-Tandon.—Devizes (Heginbothom).

Helix aspersa Müller.—Abundant everywhere. Cockerell wrote: "They are largely eaten by the people round Swindon under the name of wall snails. I was assured by one who had eaten them that they are very excellent. The same practice obtains in East Somerset, where they are spoken of as 'wall fish.'" It was at one time thought that this species may have been introduced into England by the Romans, as it occurred in many Roman stations; but of late years several undoubted pre-Roman localities have been recorded, notably kitchen middens one mile from the present sea-shore on the shores of the Mersey, and at Harlyn Bay in Cornwall. Mr. J. W. Flower, F.G.S., has commented upon the fact that it frequently occurs in British barrows in Wilts. Three specimens were found about two feet below the surface during the excavation of a Romano-British dyke, Shiftway Coppice, near Rushmore, by General Pitt-Rivers, in November, 1882. They were associated with *H. pomatia* and *H. nemoralis*, also flint flakes, a spindle-whorl, pottery, and bones of domesticated mammals. Six specimens were found during excavations at Rotherly in 1887. Excavating at Bokerly Dyke, in 1888, General Pitt-Rivers found 183 oysters, three fragments of mussels, 109 *H. aspersa*, and 24 *H. nemoralis*. "Bokerly Dyke, the present boundary-line between Dorset and Wilts., is an entrenchment of high relief, nearly four miles in length, running in a north-west and south-east direction, across the old Roman road, which runs from Sarum to Badbury."—(Pitt-Rivers). It is not far from Cranborne. Period Romano-British. Occurring in such numbers, we may conclude *H. aspersa* was then an article of food; and it would seem that the practice of eating it has lingered to the present day in Wilts. and East Somerset.

var. **exalbida** Menke.—Around Devizes on both sides of the Avon and Kennet Canal (Heginbothom).

var. **flammea** Picard.—Devizes (Heginbothom); Collingbourne (Haslemere Museum Coll.).

var. **albo-fasciata** Jeffreys.—Devizes (Heginbothom); Marlborough and Edington (E.W.S.).

Helix pomatia Linné.—Very local and not abundant. Montagu thought it was not indigenous, and believed with the older conchologists that it was first introduced about the middle of the

sixteenth century, either as an article of food or for medicinal purposes. He records the finding of "a single specimen near Devizes," and adds, "which, with those mentioned in Gloucestershire, seems to be their furthest northern limits at present" (Test. Brit., p. 407). Later, it was held that it was introduced into this country by the Romans. Mr. C. N. Bromehead records it on the edge of the forest near Puthall Gate, Marlborough, and adds, "these molluscs are almost invariably found to occupy the site of a Roman settlement of some kind. It seems likely that, could anyone be found willing to excavate, the remains of a villa would be found here. The exact position in which the specimens were found is the south-east corner of East Croft." It is almost needless to remark that the supposition of the introduction of this mollusc by the Romans has been completely negated by its discovery in pre-Roman interments. Three "rather small" specimens were found by General Pitt-Rivers at a depth of about two feet below the surface whilst excavating a Romano-British dyke in Shiftway Coppice near Rushmore, November, 1882. They were associated with three specimens of *H. aspersa* and a single *H. nemoralis*. The Rev. J. E. Vize, in his paper on the land and freshwater shells of Wilts.,¹ remarks "*Helix pomatia* is to be found here." Dr. Gray, rather singularly, at p. 114, speaking of these shells, asserts that "they have been said to be found as far north as Devizes in Wiltshire, and in Gloucestershire." His stations are Salisbury (rare), and woods near Chilton and Ramsbury. Mr. C. D. Heginbotham has obtained specimens near Devizes, north of the Kennet Canal, and there are examples in the Museum at Devizes, obtained by Mr. Henry Cunnington, on Roundway Hill, Devizes, in June, 1883.

Helix nemoralis Linné.—Generally distributed. Several specimens were found by General Pitt-Rivers during his Romano-British excavations, viz., in the dyke in Shiftway Coppice, Rushmore, one; at Rotherby, one; at Winklebury Camp, seven; in Bokerly Dyke, twenty-four; and four during the excavations at Wansdyke, four miles north of Devizes. Stourton, Mere, Edington, Marlborough (E.W.S.); brickearth at Fisherton (Blackmore); Marlborough (Bromehead); Devizes (Miss Cunnington and others); Corsham, North Bradley, Westwood and Freshford, Salisbury (Vize).

var. ***rubella*** Moquin-Tandon.—Marlborough (Bromehead); Devizes (Miss Cunnington and others); Stourton, Mere, Edington, etc. (E.W.S.).

var. ***libellula*** Risso.—Devizes (Heginbotham); Great Bedwyn (Townsend); Stourton and Mere (E.W.S.).

¹ *Wiltshire Magazine*, vol. x., p. 94.

var. **albina** Moquin-Tandon.—Marlborough (Bromehead).

var. **castanea** Moquin-Tandon.—Marlborough (Bromehead); Devizes (Heginbothom); Edington (E.W.S.).

var. **olivacea** Risso.—Devizes (Heginbothom); Great Bedwyn (Townsend).

Helix hortensis Müller.—Widely distributed, especially abundant in hedgerows on the outskirts of towns and villages.

var. **lutea** Moquin-Tandon.—Stourton, Edington, Avebury, etc. (E.W.S.); Great Bedwyn (Townsend); Swindon (Cockerell); Devizes (Miss Cunnington and others).

var. **arenicola** Macgillivray.—Edington, Mere, Melksham, and Laycock (E.W.S.); Swindon (Cockerell); Devizes (Heginbothom).

var. **subalbida** Locard.—Swindon (Cockerell).

var. **olivacea** Taylor.—Great Bedwyn, with raised spire (Townsend).

var. **fuscolabiata** Von Martens.—Great Bedwyn (Townsend); Edington, with coalesced bands (E.W.S.).

var. **roseolabiata** Taylor.—Stourton and Mere (E.W.S.).

var. **incarnata** Moquin-Tandon.—Hedges at Stourton (E.W.S.).

Ena montana (Draparnaud).—The *Helix lackhamensis* of Montagu, and the "*Bulinus lackhamensis*, Wiltshire Twist-Shell" of Turton's Manual, p. 181. A rare species. "We first found it in a moist wood at Lackham in Wiltshire, in one small spot only, adhering to the trunks of ash and hornbeam trees; and afterwards tolerably plentiful in the woods belonging to the Marquis of Lansdowne, at Bow Wood, in the same county, not very distant from the former place, and in no other part" (Test. Brit., p. 395). Woods near Malmesbury (Bromehead); Ashcombe Wood, near Tollard Royal, Durnford, and Roundway Hill, Devizes (Miss Cunnington and Vize).

Ena obscura (Müller).—A common species, especially in beech woods. "We have found it in a moist wood at Lackham, on the trunks of smooth-barked trees, such as ash and hornbeam, not uncommon" (Test. Brit., p. 392). Near Mere and Avebury (E.W.S.); Great Bedwyn (Townsend); Devizes (Miss Cunnington and others); Corsham and neighbourhood, North Bradley, Salisbury, Old Sarum, Ashcombe, and Roundway Hill, Devizes (Vize).

Cochlicopa lubrica (Müller).—Widely distributed. A single individual in the drift at Milford Hill (Blackmore); brickearth at Fisherton (Blackmore); Marlborough (Bromehead); Corsham, Trowbridge, Salisbury, Devizes (Vize); Swindon (Cockerell); Salisbury, Edington and Maiden Bradley (E.W.S.).

Azeca tridens (Pulteney).—Apparently a very rare species. I can find but one record; the Rev. J. E. Vize found it at Clarendon Wood.

Cæcilioides acicula (Müller).—An uncommon species, but abundant where it occurs. "Have found great abundance, amongst a variety of shells brought down by the floods in the River Avon at Lackham" (= *Buccinum terrestre*, Test. Brit., p. 249). Avebury (E.W.S.); "in decaying bulbs of tulips at Salisbury. The dead shell is frequent" (Vize).

Jaminia secale Draparnaud.—Frequent on the Downs throughout the county, especially under stones beneath juniper bushes. "We first found it, very sparingly, on an old mossy wall at Easton Grey in Wiltshire, ten or twelve years ago, and never since till lately, when we discovered considerable abundance at the roots of juniper bushes on the sides of the hills, near Devizes" (= *Turbo juniperi*, Test. Brit., p. 341). Great Bedwyn (Townsend); Devizes (Miss Cunnington and others); Ascombe and Durnford (Vize); Edington, Maiden Bradley and Mere (E.W.S.); Marlborough (Bromehead).

Jaminia cylindræa (DaCosta).—A very local species. Salisbury (Vize); Devizes (Miss Cunnington and Vize); Stourton and Edington (E.W.S.).

Jaminia muscorum (Linné).—Locally abundant. "In great abundance among the rejectamenta of the River Avon, after floods, about Lackham, probably washed from the neighbouring meadows" (= *Turbo sexdentatus*, Montagu in Test. Brit., p. 337, which was referred to this species by Jeffreys). Brickearth at Fisherton (Blackmore); Salisbury (Vize); I have taken it at Edington and Devizes; in the latter locality it has been taken by Mr. C. D. Heginbotham and others.

Vertigo antivertigo (Draparnaud).—Rare. It is probable that many of the *Vertigines* are more generally distributed than the records would indicate; they often escape detection through their minute size. Stratford-sub-Castle, near Salisbury (Vize); Edington (E.W.S.).

Vertigo substriata (Jeffreys).—Very rare. Specimens from Roundway Hill, Devizes, may be seen in Miss Cunnington's Collection at the Devizes Museum. The Rev. J. E. Vize also records it from this locality.

Vertigo pygmæa (Draparnaud).—Apparently a very rare species. The only Wilts. station at present known is the banks of the Kennet and Avon canal at Trowbridge (Vize). It is frequent in East Somerset.

Vertigo angustior Jeffreys.—Very rare. The only locality I can find mentioned is that given (under *Turbo vertigo*) by Montagu "Rarely amongst the rejectamenta of the River Avon in Wiltshire" (Test. Brit., p. 364).

Balea perversa (Linné).—Local. Montagu vaguely remarks

"We have taken it in Wiltshire" (= *Turbo perversus*, Test. Brit., p. 355). Ashcombe, Salisbury (Vize); Marlborough (Bromehead); Devizes (Miss Cunnington); Swindon (Cockerell); Edington (E.W.S.).

Clausilia laminata (Montagu).—Widely distributed in all beech woods. "We have never found it but in Lackham Wood, in the north of Wiltshire, and at Bow Wood, the seat of the Marquis of Lansdowne in the same county" (= *Turbo laminatus*, Test. Brit., p. 360). Clarendon, Ashcombe, Devizes (Vize); Devizes (Miss Cunnington and others); Marlborough (Bromehead); Warminster (E.W.S.).

var. **albina** Moquin-Tandon.—Devizes (Heginbothom).

Clausilia buplicata (Montagu).—This rare British shell, occurring only in three counties, has been recorded from three Wiltshire stations. "We first discovered this species sparingly at Easton Grey in Wiltshire" (= *Turbo buplicatus*, Test. Brit., p. 361). Alderbury, near Salisbury (Maton); Roundway and Durnford (Vize); Devizes (Miss Cunnington); Clarendon, near Salisbury (Bridgman, in Jeffreys' B.C., vol. i., p. 283).

Clausilia bidentata (Ström).—Widely distributed. Great Bedwyn (Townsend); Corsham, Maiden Bradley, Warminster (Vize); Devizes (Miss Cunnington and others); Swindon (Cockerell); Marlborough (Bromehead); Stourton, Mere, Avebury, etc. (E.W.S.).

var. **tumidula** Jeffreys.—Swindon (Cockerell).

Clausilia rolfii Leach.—A very rare species which has hitherto been observed only on the Downs near Devizes, where it has been taken by Mr. C. D. Heginbothom. Specimens labelled "near Devizes" were probably collected in the same locality by the late Mr. F. Townsend.

Succinea putris (Linné).—Apparently widely distributed. Corsham, canal banks on weeds, stones, etc.; between Trowbridge and Steeple Ashton, near the reservoir of the canal at Devizes, and Salisbury (Vize); Devizes (Miss Cunnington and Heginbothom); in wet meadows near first milestone on Swindon Road, Marlborough (Bromehead); Great Bedwyn (Townsend); the Avon at Salisbury (E.W.S.).

Succinea elegans Risso.—Not so common as the preceding species. Devizes and Salisbury (Vize); brickearth at Fisherton (Blackmore); Great Bedwyn (Townsend); Stourton, garden pond, etc. (E.W.S.).

var. **pfeifferi** Rossmässler.—By the canal, Swindon (Cockerell); Fisherton, brickearth (Blackmore); Devizes (Miss Cunnington).

Succinea oblonga Draparnaud.—Specimens from the Fisherton brickearth, collected by Dr. H. P. Blackmore, may be seen in the famous Blackmore Museum at Salisbury. They are of great interest

as being the only species found in this deposit which does not exist at the present time in that district. It should be carefully sought for by Wiltshire conchologists as it occurs in Somerset and Devon.

Carychium minimum Müller.—Widely distributed. "We have found it in several parts of Wiltshire, particularly in Lackham Wood, and in drifted sand of the River Avon" (= *Turbo carychium*, Test. Brit., p. 339). Brickearth at Fisherton (Blackmore); roots of grass at Roundway, Salisbury (Vize); Swindon (Cockerell); Edington and Marlborough (E.W.S.).

Ancylus fluviatilis Müller.—A very local species. Brickearth at Fisherton (Blackmore); canal reservoirs at Devizes, Salisbury (Vize); Devizes (Miss Cunnington).

Acroloxus lacustris (Linné).—Locally abundant. "We have found them tolerably plentiful in a fishpond at Lackham, in Wiltshire, and in the River Avon, on the stalks of the yellow water lily; but is rarely, if ever, found in rapid water, in which the *fluviatilis* seems most to delight" (= *Patella lacustris*, Test. Brit., p. 484). Ponds near Lavington, Salisbury (Vize); stream at Amesbury (E.W.S.); Lavington and Devizes (Miss Cunnington); Swindon (Cockerell).

var. **moquiniana** Bourguignat.—Swindon (Cockerell).

Limnæa auricularia (Linné). Widely distributed in the two Avons and in the canals. "We have found it of a superior size in the River Avon, in the north of Wiltshire" (= *Helix auricularia*, Test. Brit., p. 376). Swindon, "in the canal and elsewhere, apparently as common as *L. peregra* in the district. One specimen approached variety *ampla*" (Cockerell); Devizes (Miss Cunnington and Heginbotham); Trowbridge, Salisbury (Vize); half-mile N.W. of Manton House, Marlborough (Bromehead).

Limnæa pereger (Müller).—A common species. "Very frequent in any likely places and varying in size according to circumstances" (Vize). The *Helix limosa* which Montagu found "sparingly in the River Avon" was probably a form of this species. Brickearth at Fisherton (Blackmore); Great Bedwyn (Townsend); Avon at Salisbury, Stourton, Devizes, Amesbury, etc. (E.W.S.).

var. **vulgaris** C. Pfeiffer.—Stourton and Amesbury (E.W.S.).

var. **lutea** Montagu.—Edington (E.W.S.).

m. **scalariforme**.—Warminster (Jeffreys).

Limnæa palustris (Müller).—Widely distributed. North Bradley, Trowbridge, Salisbury, Devizes (Vize); brickearth at Fisherton (Blackmore); Elcot Mill, Marlborough (Bromehead); Swindon (Cockerell); stream at Amesbury, Avon at Salisbury (E.W.S.).

Limnæa truncatula (Müller).—A common species. Brick earth at Fisherton (Blackmore); numerous in a ditch at Corsham, at

the end of Lord Methuen's Park, Salisbury, Devizes, Hungerford (Vize); Marlborough (Bromehead); Amesbury and Avebury (E.W.S.).
var. **elegans** Jeffreys.—Devizes (Miss Cunnington).

Limnæa stagnalis (Linné).—Locally abundant. Montagu's *Helix fragilis* is probably the var. *fragilis*; he remarks "The only place in which this has ever occurred to us is the canal intended to make a junction of the Kennet and Avon, between Chippenham and Laycock. Many that were collected from that water were all of the same slender shape, and in the younger shells there were, in all we examined, a few opaque white lines, crossing the smaller volutions. The largest measured an inch and a half in length and not quite three-quarters of an inch wide in the largest part" (Test. Brit., p. 369). Devizes (Miss Cunnington and others); Trowbridge (Vize); Swindon (Cockerell); Marlborough, in pond one mile north of Chase Woods, Elcot Mill, Flashy Pond (Bromehead); Avon at Salisbury (E.W.S.).

var. **fragilis** Linné.—Pond three hundred yards west of north-end Tunnel, Elcot Mill (Bromehead); Avon and Kennet Canal (Montagu).

Limnæa glabra (Müller).—The inclusion of this—the rarest British representative of the genus—in the Wiltshire list rests upon half-a-dozen specimens in the Townsend Collection labelled "Great Bedwyn," probably collected in the year 1850, and upon Jeffreys' record (B.C., i., 118). It is the *Helix octanfracta* of Montagu.

Amphipeplea glutinosa (Müller).—Very rare. Salisbury (Vize).

Planorbis corneus (Linné).—A rare and local species. Rare at Salisbury, where Dr. Blackmore thinks it was probably imported (Vize); canal near Wroughton, Marlborough (Bromehead).

var. **albida** Moquin-Tandon.—Canal at Cricklade (Bromehead).

Planorbis albus Müller.—A common species. "It is one of the most common of the compressed species of *Helix*; it is plentiful in the River Avon about Lackham, as well as in the fishponds; and in many other places in the same county, especially at Wedhampton, in ditches and ponds, of a superior size" (= *Helix alba*, Test. Brit., p. 459). Swindon, one specimen measuring diam. $7\frac{1}{3}$ mm., alt. 2 mm. (Cockerell); canal at Trowbridge and Devizes, on cases of caddis-worms, Salisbury (Vize); Great Bedwyn (Townsend); Stourton (E.W.S.).

Planorbis glaber Jeffreys.—This species, of which most British records are from northern counties, was obtained by Mr. F. Townsend at or near Great Bedwyn in 1851. Presumably he obtained it, as well as *L. glabra*, from the Avon and Kennet Canal.

Planorbis crista (Linné).—A rare species. "Of a larger size than usual in a pond at Wedhampton in Wiltshire, with the *Helix alba*.

Diameter one-eighth of an inch" (= *Helix nautilus*, Test. Brit., p. 466). Devizes (Heginbothom); ponds near Lavington and Devizes, Salisbury (Vize).

Planorbis carinatus Müller.—Frequent in the two Avons and the Kennet Canal. "We first discovered it in the River Avon about Lackham, but all dead and bleached white, which seems to be the character of this shell in natural state. We do not, however, believe they inhabit that river, but are brought into it in the time of floods, though we could never find it elsewhere, amongst the other species, which is common in the neighbourhood" (= *Helix carinata*, Test. Brit., p. 453). Brickearth at Fisherton (Blackmore); Devizes (Miss Cunnington); Kennet and Avon Canal, on weeds at Trowbridge, Salisbury (Vize); Swindon (Cockerell); Elcot Mill, Marlborough (Bromehead).

Planorbis umbilicatus Müller.—Apparently not so widely distributed as the preceding species. In a ditch between Trowbridge and Studley; Salisbury and canal at Devizes (Vize); Swindon (Cockerell); Amesbury, and streams near Avon at Salisbury (E.W.S.).

Planorbis vortex (Linné).—A frequent species. Swindon (Cockerell); very abundant near Corsham and Trowbridge, North Bradley, and canal at Devizes (Vize); Devizes (Miss Cunnington); on caddis cases in ditches adjoining Avon at Malmesbury (E.W.S.).

Planorbis spirorbis (Linné).—Common. Brick earth at Fisherton (Blackmore); stream in lower part of Butts Valley, Marlborough (Bromehead); Devizes (Miss Cunnington and others); Swindon (Cockerell); Kennet and Avon Canal, Stratford-sub-Castle, Salisbury, Steeple Ashton (Vize); Amesbury (E.W.S.).

Planorbis contortus (Linné).—Locally abundant. "It is rather a local species, but we have found it not uncommon in the River Avon about Lackham, after floods, having been swept from the ditches in the neighbouring meadows, where it is found alive in abundance" (= *Helix contorta*, Test. Brit., p. 458). Swindon (Cockerell); Devizes (Miss Cunnington); stream at Amesbury, Avon at Salisbury, and Edington (E.W.S.).

Planorbis fontanus (Lightfoot).—A frequent species. "We have found it sparingly in the ditches about Wareham in Dorsetshire, and near the village of Wedhampton in Wiltshire, but have observed it in greater abundance in a fish-pond at Lackham, in the same county, and in the river contiguous, adhering to aquatic plants, frequently deep in the water" (= *Helix fontana*, Test. Brit., p. 463).

Segmentina nitida (Müller).—A rare species. There are specimens in the Cunnington Devizes Collection, and in the Townsend Collection from Great Bedwyn in the Haslemere Museum. The Rev.

J. E. Vize found "one shell after many searches near the canal bridge on the Trowbridge and Bradford road," and also recorded it from the canal at Devizes.

Physa fontinalis (Linné).—Abundant in the canal at Trowbridge, splendidly fine on the Trowbridge and Bradford road, Drew's Pond, Devizes, and Salisbury (Vize); there are Devizes specimens in Miss Cunnington's collection; Elcot Mill, Marlborough (Bromehead); Edington and Amesbury (E.W.S.).

Aplecta hypnorum (Linné).—A local species. "In Wiltshire of an extraordinary size, measuring nearly three-quarters of an inch. In a pond, subject to be overflowed by the Avon in that county, we have seen great abundance, and in the same field were plenty of the *B. fontinalis*, and yet they had never communicated with each other, for in neither place were they to be found together" (= *Bulla hypnorum*, Test. Brit., p. 229). Large size at Corsham, sparingly and small on the Hilperton and Steeple Ashton road, Trowbridge, very abundant, and Salisbury (Vize); Edington and Avebury (E.W.S.).

Bithynia tentaculata (Linné).—A common species. Swindon (Cockerell); abundant in the Kennet and Avon Canal in winter and summer, Salisbury and Devizes (Vize); Idmiston, one with a spiral band of distorted epidermis (W. L. W. Eyre); Kennet and Avon Canal, near Elcot Mill (Bromehead); Devizes (Miss Cunnington); brickearth at Fisherton (Blackmore); Amesbury (E.W.S.).

Bithynia leachi (Sheppard).—Apparently a very rare species, occurring only in two localities. Salisbury and Devizes (Vize). Specimens from the latter place are in Miss Cunnington's collection.

Vivipara vivipara (Linné).—Locally abundant, but certainly not a common species. So very abundant at certain seasons that they can be collected in great numbers from the Kennet and Avon Canal at Trowbridge, canal at Heybrook, and Devizes (Vize); canal at Cricklade, canal near Wroughton, Marlborough (Bromehead).

Valvata piscinalis (Müller).—A common species. "We have found it in various parts of Wiltshire, especially in the Avon, and in the moat round the old castle at Marlborough" (= *Turbo fontinalis*, Test. Brit., p. 349). Canal reservoirs at Devizes (Vize); brickearth at Fisherton (Blackmore); stream at Amesbury, Calne, Salisbury (E.W.S.).

Valvata cristata Müller.—A very local species. "Not uncommon in drifted sand in the River Avon with the last (*Planorbis albus*), and sometimes on aquatic plants, but more plentiful in a ditch near Wedhampton in Wiltshire; it may, however, be considered as rather a scarce, or at least, a very local species" (= *Helix cristata*, Test. Brit.,

p. 461). Canal at Trowbridge, Salisbury (Vize); Edington and Amesbury (E.W.S.).

Pomatias elegans (Müller).—Widely distributed on the chalk. In the woods at Lackham (Montagu); Roundway Hill, Salisbury (Vize); Devizes (Miss Cunnington and Heginbothom); Edington and Marlborough (E.W.S.).

var. **albescens** Des Moulins.—Gully on south side of Oare Hill, near Marlborough (Bromehead).

var. **pallida** Moquin-Tandon.—Lane on the south side of Kennet, opposite Mildenhall, near Marlborough (Bromehead).

var. **ochroleuca** Moquin-Tandon.—Devizes (Miss Cunnington and Heginbothom).

Acicula lineata (Draparnaud).—A rare species. Dr. Blackmore found it in the brickearth at Fisherton, and the Rev. J. E. Vize on roots of grass at Upavon.

Neritina fluviatilis (Linné).—A very local species. On stones in the canal at Trowbridge, Salisbury (Vize); Dr. Maton also recorded it from Salisbury; Great Bedwyn (Townsend); canal at Devizes (Heginbothom).

Dreissensia polymorpha (Pallas).—Apparently confined to the Avon and Kennet Canal. Very abundant near Trowbridge in the canal, and reservoirs and canal at Devizes (Vize); Devizes (Miss Cunnington and Heginbothom).

Is anything known of the introduction of this species into the Kennet Canal? It is supposed to have been imported into this country in or about the year 1824. Within twenty years of that date it was reported from two counties in Scotland and thirteen in England. It was unknown to the Rev. J. E. Vize, who contributed a list of the Land and Freshwater Shells of Wilts., in 1863, to volume ix. of the Wiltshire Magazine, or, at least, he makes no reference to it. In the 1889 Census List of British Non-Marine Mollusca it is recorded from twenty-one counties and vice-counties in England and two in Scotland. In the 1902 Census it is given under twenty-five English—including S. Devon, N. Somerset, Surrey and Middlesex—and four Scotch. Wilts. must now be added to the list and specimens have been sent to the Society's Recorder. There are no records from Wales and Ireland. "The *Dreissena* is perhaps better fitted for dissemination by man and subsequent establishment than any other freshwater shell; tenacity of life, unusually rapid propagation, the faculty of becoming attached by a strong byssus to extraneous substances, and the power of adapting itself to strange and altogether artificial surroundings have combined to make it one of the most successful molluscan colonists in the world" (H. Wallis Kew in "Dispersal of Shells," p. 219).

Unio pictorum (Linné).—Apparently a local species. At the present time it has been recorded only from the Kennet Canal and its reservoirs at Devizes (Vize and Heginbothom).

Unio tumidus Retzius.—Recorded from the northern part of the county only; has not, as yet, been observed south of the Kennet Canal. Canal at Devizes (Miss Cunnington and Vize); canal at Swindon (Cockerell); canal at Wantage (Bromehead).

var. **ovalis** Montagu.—“This very strong variety is not uncommon in the Avon that runs through the north of Wiltshire and Somersetshire, inhabiting the deeper parts of the river” (= *Mya ovalis*, Test. Brit., pp. 34 and 563). From the Avon and Froome, Wiltshire (Turton, as *Mysca ovata*).

Anodonta cygnæa (Linné).—Widely distributed in the canal, and occurs in all the largest ponds. Numerous in the canal at Trowbridge, canal at Devizes, the moat at Britford, Longleat (Vize); canal at Wantage (Bromehead); canal at Devizes (Heginbothom); Stourton ponds and Longleat (E.W.S.).

var. **incrassata** Sheppard.—“This shell we found in great abundance in the River Avon about Lackham” (= *Mytilus avonensis*, Test. Brit., p. 172). “Miss Bennett, of Norton House, favoured me lately with specimens from Tisbury, Wiltshire. They were old shells, and the animal having lived in water highly impregnated with chalk and calcareous matter, its epidermis has been secreted so rapidly and increased the shell so much in thickness that the Linnean character ‘testa fragilissima’ is entirely lost” (Gray’s Turton, p. 292). Specimens from the Norton House garden pond, labelled “grown to this size by good living,” may be seen in the Cunnington collection at the Devizes Museum. Mr. J. W. Taylor remarks: “A characteristic specimen of this variety from a brook at Tisbury, Wiltshire, kindly given to me by the late Mr. J. Pickering, weighs 2,227 grains or 5·12 ounces, while an example of the typical form of equivalent size from Nagden, near Faversham, collected by the late Miss E. B. Fairbrass, weighed only 322 grains, or about one-seventh the weight of the variety *incrassata*” (Mon. L. & F. W. Moll., i., 79).

Sphærium rivicola (Leach).—Locally abundant. “Frequently to be found at certain seasons in the canal at Trowbridge, Milford, near Salisbury, canal at Devizes” (Vize); Devizes (Miss Cunnington and Heginbothom); Salisbury Avon (E.W.S.).

Sphærium corneum (Linné).—A common species. Canal at Trowbridge (Vize); Great Bedwyn (Townsend); Swindon (Cockerell); Devizes (Miss Cunnington and Vize); ponds at Stourton, and Avon at Salisbury (E.W.S.).

Sphærium lacustre (Müller).—Widely distributed. Swindon (Cockerell); Great Bedwyn (Townsend); Drew’s Pond, Devizes (Miss

Cunnington and Vize); Salisbury, Edington, Avebury and Amesbury (E.W.S.).

var. **ryckholti** Normand.—Swindon (Cockerell); “the type of *S. lacustre* was very common at one place, but only one of var. *ryckholti* was found (measuring 6×6 mm.)”.

Pisidium amnicum (Müller).—A common species. “Dr. Maton, who first defined it as a distinct member of our fauna, obtained his specimens from the Avon, near Salisbury, and Montagu from the North Avon” (Forbes & Hanley, Brit. Moll., vol. ii., p. 134). Canal at Trowbridge, Milford near Salisbury (Vize); canal at Devizes (Miss Cunnington and Vize); Elcot Mill, Marlborough (Bromehead); brickearth at Fisherton (Blackmore); Stourton, Salisbury, Edington and Amesbury (E.W.S.).

Pisidium henslowianum (Sheppard).—A local species. Milford near Salisbury, Drew’s Pond, Devizes (Vize); Great Bedwyn (Townsend); Edington (E.W.S.).

Pisidium subtruncatum Malm.—Very local. Swindon (Cockerell); Great Bedwyn (Townsend); Stourton (E.W.S.).

Pisidium pusillum (Gmelin).—Locally abundant. North Bradley, Harnham Meadows, Salisbury (Vize); Swindon (Cockerell); brickearth at Fisherton (Blackmore); Great Bedwyn (Townsend).

var. **cinerea** Alder.—Great Bedwyn (Townsend); North Bradley and one or two other localities near Trowbridge (Vize).

Pisidium nitidum Jenyns.—Very rare. Elcot Mill, near Marlborough (Bromehead).

Pisidium obtusale Pfeiffer.—Very rare. Recorded only from the neighbourhood of Salisbury. Milford, Salisbury (Vize); brick earth at Fisherton (Blackmore).

Pisidium gassiesianum Dupuy.—Very rare. There are specimens from Great Bedwyn in the Townsend collection at the Haslemere Museum.

Pisidium pulchellum Jenyns.—Locally abundant. Brick earth at Fisherton (Blackmore); Milford near Salisbury, and Drew’s Pond, Devizes (Vize); Stourton, Edington and Amesbury (E.W.S.).

In all probability the last four species have a much wider distribution than the above records indicate.

SPECIES ERRONEOUSLY RECORDED FOR WILTS.

The *H. cartusiana* in the Cunnington collection at Devizes are *H. cantiana*. *Bulimus ventrosus* (= *Helix acuta*) in Bromehead’s list of shells from the neighbourhood of Marlborough should have been *Cochlicopa lubrica*.

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-

Note on *Vitrina elongata* Drap.—On several occasions during 1904-05 I took specimens of the above, and was greatly struck by its peculiarly flat shell, and the size of the snail as compared with its shell. I took it to be a variety of *V. pellucida*, but had never seen any in the least like it before. I sent some specimens for exhibition at the meeting of the Conchological Society held Sept. 14, 1904, and they were recorded in the *Journal* as *V. pellucida* var. *depressiuscula*. In 1906 I sent my collection to Mr. J. W. Taylor, and suggested that he might use one of my specimens for an illustration in his Monograph if he had not a better one, as I considered them so very abnormal and striking; but when writing on the subject of *Vitrina* he had not come across the specimens in my collection. It was only in June or July last that he found the specimens, and recognised them as a new British species. On Nov. 6th I visited the demesne at Collon, co. Louth, the only locality where I have found them, and where they are very abundant among fallen beech leaves. The soil is a cold wet clay. The snail is easily observed when you are looking specially for it and have once seen it alive. I procured a number of specimens in about one-hour-and-a-half, all of which I have sent to various people for observation and dissection.—P. H. GRIERSON (*Read before the Leeds Branch*, Nov. 16th, 1907).

Assemania grayana Leach, in **Suffolk.**—In June last year, whilst examining siftings from the rejectamenta of the River Alde, at Aldeburgh, I obtained a few examples of *Assemania grayana*. This species is an extremely local shell, being only known from the banks of the Thames below Erith, Cuxton, River Medway, the Stour at Sandwich, the Blackwater and Colne in Essex, whilst there are only two records for the form outside England, viz., Ribe, Denmark, where the species was detected by Dr. A. C. Johansen, and an old record for Belgium, which may be incorrect. It has been recorded from Cleethorpes, Lincolnshire, F. M. Burton (*Naturalist*, 1893, p. 255), but the identification has been doubted by Mr. H. Wallis Kew (*Naturalist*, 1902, p. 269). I am indebted to Mr. A. S. Kennard, F.G.S., for verifying the identification of the shells as well as for the above facts concerning the distribution of the species. Since writing the above I have found a single specimen at the mouth of the River Orwell, and Mr. Kennard has met with it in rejectamenta from the River Blyth, at Blythburgh. This latter find is very interesting, as it extends the range of the species still further northwards.—A. MAYFIELD (*Read before the Society*, May 8th, 1907).

Paludestrina jenkinsi in **Middlesex.**—On October 5th we found a flourishing colony of *Paludestrina jenkinsi* in a small swamp close to one of the branches of the river Colne, near Uxbridge. It is not clear how they were introduced there, as the stream in question is not used as a canal. So far as we know this is a new record for the district.—G. D. H. CARPENTER and J. E. COOPER (*Read before the Society*, Nov. 13th, 1907).

Sinistral Limnæa glabra.—In August last while staying at Scarborough in company with another member of the Conchological Society I was fortunate enough to discover a reversed specimen of this rather uncommon species. So far as I am able to discover, no previous record of a sinistral *L. glabra* has ever been noted on the British list, so that this discovery is quite unique. The specimen also belongs to the monstrosity *decollatum*. In connection with the find there are one or two points worth noting which came under our observation at the time. The locality is a small triangular piece of ground by the roadside, and to all appearances is nearly dry throughout the summer, being supplied with water from the road drainage only after rainfall. No doubt in winter the slight hollow would become filled with water, but it was almost dry in August, except for a little dampness at the roots of the long luxuriant grass. This marshy bit of ground is, according to good authority, the only place where *L. glabra* is to be found in the vicinity of Scarborough and is thus a rather favourite locality with local conchologists. I am indebted to Messrs. Gynge and Hargreaves of Scarborough for introducing me to the spot, and on one or two previous occasions I have had the pleasure of collecting there with them. An interesting point which is worth recording was the difficulty we both at first experienced in finding a live specimen. We came across many shells with the top whorls eaten entirely away, nothing but the first one being left, and in almost every instance they were the largest and best shells. Investigation revealed the fact that either mice, or possibly field voles, were the depredators, as the ground was literally honeycombed in every direction with their burrows. We almost despaired of finding a living shell, but after casually striking the tall grass with a stick we discovered one or two specimens lying at the roots. After that, by beating the grass about a foot from the ground, we were rewarded by finding a few more. Evidently the snails had left the damp ground and climbed some distance up the grass stems, whence they were dislodged by beating. Very few of the shells were full grown, the voles having been before us and cleared out the adults. The shells were extremely clean and, when the animals were taken out, required very little preparation for the cabinet. They were very transparent and thin, quite unlike specimens I obtained during the month while collecting in two other districts, viz., Manchester and Longton (Staffs.). The Manchester specimens were rather dirty and covered with confervæ, which was removed easily with a stiff brush after boiling, but those from the Staffordshire locality were black as ink, having a thick coating of what I take to be soot or very hard black mud, and required scraping with a knife. They were taken from a roadside ditch on the outskirts of Longton, and were most difficult to discover as they were found adhering lengthwise to thin pieces of black decaying stick in the shallow water. I ought to mention that the reversed *L. glabra* was, unfortunately, only about two-thirds grown, but possibly under the care of the authorities of the Manchester Museum the animal may arrive at maturity in the course of time. A very large proportion of the shells of *L. glabra* from the Scarborough locality are the decollate form, and the usual explanation that the apices are worn away by attrition as the animals crawl about is not, in my opinion, a satisfactory one. It seems much more likely that the animals themselves are the cause of the decollation; not finding sufficient shell-building material in their food, they have discovered that their neighbours' shells supply suitable and convenient calcareous matter, and so at a very early stage of their existence they begin to rasp off small particles, thus producing the worn and incomplete appearance so noticeable. I once saw a number of dead *H. nemoralis* shells which had been, and were being eaten in holes by *H. aspersa* for the sake of the limy matter of the shells. Many water shells are often seen damaged in this way and no doubt the cause is the same.—H. BEESTON (*Read before the Society*, November 13th, 1907).

NOTE.—Since the above was written the specimen of *Limnæa glabra* has unfortunately died. It is, however, in excellent condition and has grown about two mm.—J. W. JACKSON.

Shells at High Altitudes in Scotland.—When I was in Perthshire last summer I made one or two observations on the snails of the mountains, which may be of sufficient interest to mention at a meeting of the Conchological Society. I should much like to know if any of the members have records of the molluscan fauna of our hills at an elevation of about 3,000 feet above the sea. I found on Ben Lawers, nearly at the top, that is about 3,800 feet above sea level, a few specimens of a *Vitrina*, presumably *Vitrina pellucida*, though the shells were so diaphanous that they would scarcely stand any handling, and being all dead shells were already more or less damaged. At about 3,000 feet I found several specimens of *Helix arbustorum* and of *Clausilia rugosa*, in both cases somewhat dwarfed. I found *Helix arbustorum* also on another hill in the neighbourhood at an elevation of about 2,500 feet, and I believe this species does not occur at lower levels in this part of the country.—FRANK F. LAIDLAW (*Read before the Society*, Jan. 8th, 1908).

***Helicella itala* (L.) in West Norfolk.**—While staying at Burnham Market in September last, after searching fairly diligently over some fifteen miles of hedgerows and banks, I came upon two isolated colonies of *Helicella itala*. *H. virgata* and *H. cantiana* I had found abundantly everywhere. One locality was about two miles from Burnham Market on the Holkham road, the other was just outside the village of Burnham Thorpe, perhaps a couple of miles south of the former locality. Four colour varieties seem to be represented in both colonies. The first is a small shell, banded above and below the periphery, a neat, compact and somewhat translucent form. The second form somewhat similar but with almost transparent banding. Two larger forms, and these were the more abundant, occurred with them. The one which is of a whitish ground-colour has a single strongly marked band above the periphery and is plain beneath. The other is plain, of a pale-yellowish colour, and perhaps one might best describe it, on the analogy of *H. virgata*, as a var. *lutescens*. The colonies were confined to a hedge-bank for a distance of some fifty to one hundred yards, and in both cases were on the north side of the road, receiving all the sunshine. Both were populous colonies and the creatures were for the most part crawling on the rank grass and on withered plants. The colonies seemed to end suddenly and not a single specimen was seen anywhere else.—C. E. Y. KENDALL (*Read before the Society*, January 8th, 1908).

NOTE.—The pale-yellowish form of *H. itala* above mentioned is the var. *lutescens* of Moquin-Tandon.—ED.

***Limnæa glabra* (Müller) in East Sussex.**—While collecting in August last at Framfield, near Uckfield, in East Sussex (a rather unproductive day, being in a sandstone district) I came across a number of *Limnæa glabra* in a small water-hole by the roadside. Quite small shells were very plentiful, but there were a few more mature which I collected. I find *L. glabra* is not recorded for East Sussex in the Census List.—C. E. Y. KENDALL (*Read before the Society*, Feb. 12th, 1908).

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Prepared by **B. B. WOODWARD, F.L.S.,**
and a **COMMITTEE of the CONCHOLOGICAL SOCIETY**

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THE
JOURNAL OF CONCHOLOGY.

VOL. 12.

OCTOBER, 1908.

No. 8.

THE LAND AND FRESHWATER MOLLUSCA OF GRANGE-
OVER-SANDS.

By HARRY BEESTON.

(Read before the Society, March 11th, 1908).

PLATE II.

DURING the month of August, 1906 (and part of the same month in 1905), I spent a very enjoyable holiday in this charming district, and employed much of my time exploring the vicinity in search of shells.

Living in the south of England where molluscan life is fairly abundant, my researches and collecting experiences at Grange were in many respects very different from the usual order of things in Hampshire, so much so, that I thought a few remarks on my observations might be of interest to conchologists.

This article I desire to be looked upon more in the light of a general review or synopsis, than as an entirely original record of work done in a new district. I have endeavoured to include in the list absolutely all the species and varieties which up to the present have been found in the district, whether discovered by myself or by others who have at various times collected at Grange. Perhaps the chief use which may be made of this list will be to enable conchologists who visit the locality to see at a glance what the district produces, and where the various species are to be found, and thus constitute a working list for future use.

So thoroughly had the district of Grange been explored in previous years, that I quite despaired of finding anything worth recording either in species or varieties. The few which I did find were perhaps, with the exception of *Succinea oblonga*, unimportant, but all such additions make for the completeness of a list of the fauna of any district. An asterisk serves to distinguish these.

The species not taken or observed by myself, have the initials of the recorders attached, and where possible the sources of information added for the purpose of reference.

Although one may consider the Grange district, as a whole, fairly rich in molluscan life, as far as the number of species is concerned (seventy in all up to the present), yet there are several very striking anomalies to which attention may be directed.

In the first place, the slugs are not at all well represented. Up to the present, nine species only have been recorded out of the seventeen on the Conchological Society's list—two of these, viz., *Limax maximus* (two varieties), and *Agriolimax agrestis* (two varieties), being found by myself. Around Cartmel the latter species was abundant, chiefly var. *pallida*. More systematic search in suitable weather, would, I am convinced, greatly extend the list.

From its mild and open climate in winter, Grange presents very favourable opportunities to ardent collectors of slugs of thoroughly working the locality and making a more comprehensive list.

Another very noticeable feature was the scarcity of the larger *Helices*—*aspersa*, *nemoralis*, *hortensis*, and *arbustorum*. Of these perhaps *aspersa* was the commonest shell, but it was not by any means abundant. Although widely distributed over the district, its representatives in any place were usually single specimens, eight being the largest number seen in one place at once, and no doubt this number constituted the entire colony.

H. hortensis is also a decidedly uncommon species. Usually only single shells rewarded one's search, but at the south end of Holme Island a small colony was discovered with the var. *arenicola* predominating. I say a "colony," although a whole afternoon's diligent search produced but nine poor specimens.

H. nemoralis is certainly somewhat more abundant than the last, but with the exception of the two colonies—one at the Hospice, and the other at Kirkhead—it seems poorly represented. This being what I may term a "skulking" snail, and more nocturnal in its habits than *H. hortensis*, it is quite possible that careful and systematic search at twilight (with a lamp) may result in its being discovered more plentifully and more extensively than at present, although I am of opinion that it is a very local species.

Of *H. arbustorum* it may quite safely be said that it is the rarest of the larger *Helices*. Nearly a whole day, spent in torrential rain, with a humid atmosphere, beloved of snails, resulted in less than half-a-dozen shells being taken. Eggerslack Wood with its immediate vicinity seems to comprise its chief habitat (with one exception—Lindale) in the Grange area.

On the other hand, four species, *Hygromia rufescens*, *Pyramidula rupestris*, *Jaminia cylindracea*, and *Clausilia bidentata*, seemed to be exceedingly abundant; scarcely any place examined failed to reveal one or other of the four, in some cases all being found together

under the same stone on the tops of the walls. In some favoured localities, *Pyramidula rupestris* and *Jaminia cylindracea* fairly swarmed, and could have been collected by hundreds, yet *Jaminia muscorum*, except in one small spot, seemed extremely rare. Here again closer search ought to reveal this species in other parts of the district.

Helicella caperata was a fairly abundant snail, and existed in isolated colonies, but why its nearest ally *H. virgata* should to all appearance be a total stranger to the district seems puzzling, as these two species are more often found together than not. Soil, climate, and other conditions apparently are all suitable, but *H. virgata* was not present anywhere.

Such anomalies as these are very interesting, but most difficult of explanation. The presence or absence of a particular species may depend upon some very slight favourable or adverse condition. Of the two species under discussion, *H. caperata* seems to be somewhat more hardy than *H. virgata*, as on several occasions, after severe frost, I have found the latter dead in some numbers, while the former appeared to have been quite unaffected by the cold, crawling about actively on the ground, and in no case could I discover one recently dead, though I have taken examples of *H. virgata* with dead animals immediately after a severe frost.

Temperature alone I do not consider the cause of the absence of *H. virgata* in this instance, as the species is recorded for other places in Westmorland, Cumberland, and West Lancashire. Predatory birds, mammals, or the prevalence of destructive parasites might account in some way for the non-existence of certain species. Investigations into the causes of anomalies of this character might reveal much that is at present enigmatical regarding the distribution of mollusca.

Again, one of the things which strikes a collector from the south when visiting the northern districts, is the amazing abundance of the smaller species—the genera *Jaminia*, *Vertigo*, *Pyramidula*, *Clausilia*, and *Vallonia*. It is quite a new and pleasing experience to be able to return from an excursion with, say, a couple of hundred *Vertigos*, instead of a paltry half-dozen or less, which may reward the conchologist in some parts of the south for a whole day's prospecting. But on the other hand, the scarcity of the genus *Helix* in some northern localities is disappointing. There are disadvantages in living at either extreme.

The freshwater species, too, are few in number and disappointing, at any rate in the immediate vicinity of Grange, owing to the scarcity of streams and ponds of fresh water. The pond in the ornamental grounds did not produce a single species, owing probably

to the number of tame water-fowl, and to the water being in constant motion, fed by a very powerful and persistent spring of pure water.

The greater number of freshwater species, as will be seen from the following list, is reported from Cark, Holker, and Cartmel, all obtained from the river Eea, and the ditches in this neighbourhood. This stream seems to be the only productive one for freshwater species, and would no doubt repay more careful and systematic search.

The area worked, with which this article is chiefly concerned, includes parts of Westmorland and Lancashire, but the whole district under review is in Vice-county 69, and extends from Meathop Fell (R. Winster) on the east to Cartmel on the west, Humfrey Head being the farthest point to the south, and Lindale the most northerly part visited, and comprised probably about eleven square miles.

I cannot refrain from specially alluding to Eggerslack Wood, and its immediate vicinity, before bringing these remarks to a close. It may be considered a conchologist's paradise; so many good things are found there that, when in the district, one feels almost instinctively drawn to it, with a yearning to explore its depths, and unearth its hidden treasures. It is unnecessary to enumerate the species found in the wood separately; they are specified in the list, but out of ninety-six land species on the Conchological Society's list, no fewer than forty-four, or nearly one-half, are to be obtained in this particular wood and its environs.

I am very much indebted to the various articles and notes by Messrs. R. Standen, J. W. Jackson, C. H. Moore, and J. D. Dean, which have appeared in this *Journal* at various times, for a very large amount of information respecting previous records.

I have very great pleasure in tendering my best thanks to Messrs. Standen and Jackson, for much valuable assistance, both before and since my visit to Grange.

To the latter gentleman in particular, my acknowledgments are due for so very many notes relating to several species not previously recorded, and for generously placing at my service much valuable MS. information, with full permission to copy extracts, a privilege of which I have taken full advantage.

The photographs from which the plate has been reproduced have been very kindly lent by Mr. Jackson and Mr. G. A. Booth of Grange for this article, for which I tender my sincerest appreciation.

The other recorders whose names I have not so far mentioned are Mr. W. D. Roebuck (W.D.R.); Mr. G. H. Taylor (G.H.T.); Mr. Fred Booth (F.B.).

LIST OF SPECIES.

Limax maximus Linné.—This slug appears to be rare in the district, both type and varieties; Eggerslack Wood (J.W.J.), *J. of C.*, vol. 11, p. 361.

*var. **fasciata** Moquin-Tandon.—One specimen only. Kent's Bank Road.

var. **concolor** Pini.—One specimen only. Garden at Lingholme. This variety has been previously recorded for Lancashire by Mr. W. D. Roebuck, October, 1886, at Coniston; Blawith, October, 1907 (J.W.J.).

Limax arborum Bouchard-Chantereaux.—One specimen only. Hags Lane, Cartmel; Eggerslack Wood (R.S.). *J. of C.*, vol. 9, p. 113.

Agriolimax agrestis (Linné).—Appears to be common and generally distributed throughout the district, var. *pallida* predominating. Cartmel; Kirkhead; Grange Fell Road; Low Meathop; Hampsfell; Eggerslack Wood (J.W.J.), *J. of C.*, vol. 11, p. 361; Meathop Marsh (J.W.J.), *Naturalist*, May, 1907, p. 173.

var. **pallida** Schrenk.—Very common everywhere.

var. **flavilatera** Dum. and Mort.—One specimen.

var. **sylvatica** Moquin-Tandon.—One, Cartmel.

Agriolimax lævis (Müller).—Very abundant in ditches and among grass in the habitat of *Succinea oblonga*, at Meathop Marsh and Blawith (J.W.J.), *Naturalist*, May, 1907, p. 173.

Vitrea pellucida (Müller).—Two or three dead shells only found on the top of a wall, in company with *Vallonia*, *Jaminia cylindracea*, and *Cochlicopa lubrica*. As this is more of a late autumn or winter species, it is quite probable that it may be much commoner than it appears to be, if searched for at the proper time of year. Hags Lane, Cartmel; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Holme Island (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Vitrea crystallina (Müller).—This species was only found in two places, and appears scarce, unless from its small size it has been overlooked, which is scarcely likely, although Mr. G. H. Taylor informs me that it was fairly plentiful in Eggerslack Wood, in August, 1907. Hags Lane, Cartmel; Eggerslack Wood; Grange Fell (W.D.R.), *J. of C.*, vol. 3, p. 338.

Vitrea lucida (Draparnaud).—In 1903 this shell was first discovered in the district of Grange by Mr. J. W. Jackson, at the foot of the limestone rocks, on the Lindale Road. Two specimens only were discovered, one being alive. (*J. of C.*, vol. 11, pp. 45, 46).

Another specimen (dead) was found by Mr. G. H. Taylor, at the same spot in August, 1907, a note of which will appear in the Society's *Journal*. Although the writer spent a considerable time on several occasions, on rainy days, at the above spot, in the hope of finding the snail, no success attended the efforts. It is quite likely, as Mr. Jackson suggests, that it is an alien, and has been introduced accidentally.

Vitrea cellaria (Müller).—A well distributed and plentiful species where found; seeming to exist in colonies on the ground, in very damp places, at the roots of nettles, and beneath thick matted moss at the foot of walls. One very thriving colony was discovered in Hampsfell Road, among a patch of Sweet-scented Coltsfoot (*Petasites fragrans*), some of the shells being of very fine size. Another extensive colony exists in a small field, which lies below the level of the road and is consequently very moist, on the south-east side of Eggerslack Wood, on the Windermere Road. The snails from these two colonies were regarded by the writer at first as *V. lucida*, but were submitted to Messrs. Jackson and Standen of the Manchester Museum, who pronounced them to be *V. cellaria* var. ?

On September 14th, 1907, a party of conchologists was conducted to the field near Eggerslack Wood, by Mr. G. H. Taylor, who with the writer had explored the field in August, 1906. Specimens were found, carefully examined, and after much discussion, were declared, "subject to dissection," to be *V. lucida*. The dissection has settled the point in favour of *V. cellaria*.

The shells are very fine specimens indeed, and the colour of the animal—a very dark blue, almost as dark as some of the animals of *V. lucida* from the north of Ireland—is exactly similar to specimens of *V. lucida*, found by the writer some years ago at Ilfracombe, in North Devon. As these Grange shells are so very different from the usual form of *V. cellaria*, may I suggest that it may be an intermediate variety, connecting the two species, *lucida* and *cellaria*? At any rate, it is such a distinctive form of *V. cellaria* that it is worthy of being ranked as a variety. To my mind, it is quite as worthy of a varietal name as *Vallonia excentrica* is of being called a separate species.

Hampsfell Road; Grange Fell Road; Kirkhead; The Hospice; Eggerslack Wood and vicinity; Low Meathop; Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale Road (J.W.J.), *J. of C.*, vol. 11, p. 361; Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.
var. **compacta** Jeffreys.—Since writing the above notes on *V. cellaria*, Mr. Jackson has favoured me with the following interesting points on this shell. "This is the form which is so

abundant all through North and West Lancashire, and by reason of its large size and blue animal, was mistaken for *V. lucida* by many collectors (the writer included). I dissected about a dozen examples from Grange (collected in September, 1907), to see if they were *cellaria* or *lucida*, and they turned out to belong to *cellaria*. The genitalia are quite different from those of *V. lucida*, and no one could make a mistake between the two. Mr. A. S. Kennard (Proc. Mal. Soc., 8, March, 1908), has just made this large form of *V. cellaria* (var. *compacta* ?), into a new species, *Vitrea scharffi*. He (Kennard) has seen all my specimens, and named them such. They certainly differ from true *V. cellaria* in colour of animal, and the bright glossy amber-coloured large shell." Vide Taylor's Monograph, vol. 3, p. 37. Meathop Fell (J.W.J.), *J. of C.*, vol. 12, p. 115.

Vitrea alliaris (Miller).—A fairly abundant and widely distributed species in the district; very common in Eggerslack Wood. When turning over and scraping among the dead leaves and refuse on the ground, the presence of this snail was revealed by the strong smell of garlic which the animal emitted, and it invariably turned up after a short search. Very slight irritation seems to cause the snail to give off the powerful, and to some people, disagreeable odour. I have more than once noticed that if the fingers touch the animal, the smell is retained for a very long time, sometimes even slightly so after washing. The animals too are cannibals; two of them in one night beautifully cleaned out the animals from the shells of half-a-dozen *Vitrina pellucida*. Hags Lane, Cartmel; Grange Fell Road; Charney Well Lane; Hampsfell Road; Eggerslack Wood; Windermere Road; Holme Island; Low Meathop; Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45. Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. ***viridula*** Jeffreys.—Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Meathop (C.H.M.), *J. of C.*, vol. 12, p. 110.

Vitrea nitidula (Draparnaud).—Apparently a common and generally distributed shell. It frequently turned up in the same situations as the previous species, and all were type specimens. Hags Lane, Carmel; Grange Fell Road; Kirkhead; Charney Well Lane; Eggerslack Wood; Holme Island; Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Vitrea pura (Alder).—Evidently a rare and very local shell in the district, as only one dead specimen was found in Eggerslack Wood. Mr. Jackson informs me that in 1903 he took two specimens in the same wood, one alive, the other dead.

var. ***nitidosa*** Gray.—This variety has been found occasionally. Both type and variety seem restricted to the one locality, Eggerslack

Wood, and have been recorded by (R.S.), *J. of C.*, vol. 9, p. 113, and (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

***Vitrea radiatula** (Alder).—This shell was taken in four widely separated areas in 1906; and although probably not an abundant species may be generally commoner than it seems, and being small is easily overlooked or mistaken for the young of other species. Several very good full-grown specimens were discovered on the underside of pieces of brick and coal clinkers, lying among long grass, at Low Meathop. In the other localities, only odd specimens were noted. Near Gasworks at Low Meathop; Hags Lane, Cartmel; Eggerslack Wood; wall of Grange Churchyard; common at Blawith, October, 1907 (J.W.J.).

***Zonitoides nitidus** (Müller).—Scarce, at the roots of weeds and rushes in a ditch at Meathop Marsh, Aug., 1908.

Euconulus fulvus (Müller).—Very common, and of fine size in Eggerslack Wood, the only locality where it was taken by the writer; also by (R.S.), *J. of C.*, vol. 9, p. 113 and (J.W.J.), *J. of C.*, vol. 11, p. 45; Blawith Point, September, 1907 (J.W.J.).

Arion ater (Linné).—The type (black), of this species is fairly common from Eggerslack Wood westwards to Cartmel, but it cannot be said to be abundant in any part of the district, although widely distributed. It seems to prefer the higher ground of the fells and their slopes to the lower and damper localities. Some of the varieties are most beautiful objects, and it is quite likely that a more thorough and extended search would reveal other varieties. Hags Lane, Cartmel; Grange Fell Road; Hampsfell; Eggerslack Wood.

*var. **succinea** Müller.

sub-var. **luteopallescens** Cockerell.—This handsome variety appears almost as common and widely distributed in the district as the type, adult animals only being found. Hags Lane, Cartmel; Hampsfell Road; Eggerslack Wood; Windermere Road.

var. **alba** Linné.—One specimen only. Eggerslack Wood; Fern Hill (Grange), (W.H.H.), *J. of C.*, vol. 12, p. 13.

sub-var. **marginata** Moquin Tandon.—(W.H.H.), *Naturalist*, May, 1907, p. 173.

*var. **albolateralis** Roebuck.—One adult only found under a piece of limestone rock, on Hampsfell, near the Hospice.

***Arion subfuscus** (Draparnaud).—A single individual. Eggerslack Wood; several in pasture adjoining above wood, June, 1908 (J.W.J.).

Arion intermedius Normand.—Not common. Eggerslack Wood (J.W.J.), *J. of C.*, vol. 11, p. 361.

Arion hortensis Férussac.—Fairly numerous. Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Windermere Road (J.W.J.), *J. of C.*, vol. 11, p. 45; Blawith, and Lindale Road, September, 1907 (J.W.J.).

Arion circumscriptus Johnston.—Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Low Meathop (J.W.J.), *Naturalist*, May, 1907, p. 173.

Punctum pygmæum (Draparnaud).—Four or five specimens were found on the top of a wall, among leaves, and on dead wood, in two localities only, viz.: south side of Yewbarrow in Charney Well Lane, and Hags Lane, Cartmel; Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Eggerslack Wood, in moss shakings, 1907 and 1908 (J.W.J.).

Sphyradium edentulum (Draparnaud).—Eggerslack Wood, found in abundance among bracken (R.S.), *J. of C.*, vol. 9, p. 114; 1903 (J.W.J.). Meathop Fell, very common on the face of the cliff, and among grass roots, October, 1907 (J.W.J.).

Pyramidula rupestris (Draparnaud).—A very abundant species all over the district, sometimes occurring in great numbers under loose stones on the top of the limestone walls; but the snail is not restricted to limestone, both slate and gritstone being almost as much favoured. Although the animals seemed to prefer the stones, yet in many places they swarmed over the moss and lichens on the lower parts of the walls after rain. In dry hot weather, numbers of the snails were observed basking in the sun, and this no doubt accounts for a large majority of the shells being bleached almost white, making it sometimes difficult to distinguish them from the rough excrescences of the stone or mortar. Hags Lane, Cartmel; Grange Fell Road; Cartmel Road; Spring Bank Road; Hampsfell (Hospice); Windermere Road; wall of Parish Church; Low Meathop; Allithwaite Road; Eggerslack Wood (J. W. J.), *J. of C.*, vol. 11, p. 361.

Pyramidula rotundata (Müller).—Not by any means a common species, although fairly generally distributed; not more than two or three specimens being found together in one place, as a rule only one. Kirkhead; Charney Well Lane; Hampsfell Road; Windermere Road; Eggerslack Wood; Low Meathop; Cartmel; Holme Island and Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale Road (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **turtoni** Fleming.—Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113.

*var. **pyramidalis** Jeffreys.—One specimen only. Cartmel.

Helicella caperata (Montagu).—This animal occurred in colonies at the places mentioned below, and was generally fairly abundant, the colony on the Lindale Road being exceedingly plentiful and undoubtedly the most thriving one in the whole district, although many of the shells were much weathered, exposed as the site is to all conditions of weather, and especially to motor dust. Grange Fell Road; Kirkhead; Hampsfell Road; The Hospice; Meathop Marsh; churchyard wall, Lower Lindale Road; Holme Island (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **ornata** Picard.—Not at all common, and in two places only: Grange Fell Road, Lower Lindale Road.

*var. **obliterata** Picard.—One dead specimen, although somewhat weathered, had every appearance of being this form. Hampsfell Road.

Hygromia granulata (Alder).—This species was noted in two localities only, several miles apart, and constituted two thriving colonies, the one at Cartmel having the larger and finer specimens. The Meathop colony simply swarmed at the foot of a stone wall among the grass, and also crawled in numbers over bramble-bushes growing near the wall. The Cartmel colony inhabited a bed of nettles in a copse. Although three other localities are recorded, yet it cannot be said to be "common" in the sense of being widely and generally distributed in the district. Hags Lane, Cartmel; Low Meathop; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Windermere Road (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale Road (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **cornea** Jeffreys.—A large colony of this variety was discovered by Mr. J. W. Jackson in September, 1907. He says: "Very abundant, and very large amongst grass in the pasture near Eggerslack Wood." Of another thriving colony at Meathop, he says: "Long grass and meadow-sweet yielded an abundance of exceedingly fine shells of var. *cornea*." The following bit of information is decidedly interesting: "Quite a handful of specimens was taken on a piece of waste paper, and sundry pieces of rusty iron proved equally good ground for this species and *H. rufescens*." Paper we know many snails like and devour greedily, but iron is usually destitute of molluscs. The only species the writer has ever found on iron have been *H. rufescens*, on one or two occasions, and *H. aspersa*, discovered hibernating in old tins, etc., in rubbish heaps. (J.W.J.), *J. of C.*, vol. 12, p. 115.

Hygromia hispida (Linné).—Only found by the writer in one locality, and certainly not common. Adams ("British Land and

Freshwater Shells," second edition) says: "Wherever *Hyg. rufescens* is found, there will *Hyg. hispida* be found." In the Grange district I cannot say that this holds true, for in several places where *H. rufescens* occurred there was no sign of *H. hispida*; examples of the latter, as far as my observations went, were decidedly few and far between. Grange Fell Road; Low Meathop; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Holme Island (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale Road (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **depilata** (Alder).—This variety was taken in two localities. In the second no type shells were found, only the variety existed, mingled with a colony of *H. caperata*, from which it was at first very difficult to distinguish while crawling on the grass. Hawkshead; Grange Fell Road, near the Cemetery.

Hygromia rufescens (Pennant).—As will be seen from list of localities, this species is well distributed, and a very common shell; next to *Jaminia cylindracea* it is perhaps the commonest and most abundant in the district, but grows to no large size, and varies little, var. *rubens* being the most abundant. Many of the shells are dwarfed in size and very thin. Hags Lane, Cartmel; Cartmel Road; Grange Fell Road; Charney Well Lane; Holme Island; Hawkshead; Cart Lane; Allithwaite Road; Low Meathop Road; Windermere Road; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Meathop (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale Road (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **rubens** Moquin-Tandon.—In some places predominating over the type, and abundant where it occurs. Grange Fell Road; Windermere Road; Kirkhead; Charney Well Lane; Lindale Road; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113.

var. **albocincta** Cockerell.—Almost as common and widely dispersed as var. *rubens*, and the two are usually found in association. Same localities as var. *rubens*.

var. **alba** Moquin-Tandon.—Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113. Eggerslack Wood (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45. Hampsfell Road, September, 1907 (G. H. Taylor).

m. **subscalariforme**.—A single specimen discovered in Eggerslack Wood, in 1903, by Mr. J. W. Jackson.

Acanthinula aculeata (Beck).—Presumably not a very common species, although easily overlooked. Taken in Eggerslack Wood only. Mr. Jackson informs me that he found it common on holly leaves in this wood, in 1905. Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.

Acanthinula lamellata (Jeffreys).—Another species whose area of distribution in the district seems to be confined to Eggerslack Wood ; at any rate, it has not been recorded from any other part of the locality. The writer was very unfortunate with this species ; although search was diligently made for it on the exact spot where it had been taken in abundance on two previous occasions, not a single individual was to be found. Mr. J. W. Jackson was the first to record this shell for the district, in October, 1905 (*J. of C.*, vol. 11, p. 361), when one specimen was taken on dead branch of elm. In August 1906 (*J. of C.*, vol. 12, p. 19), Messrs. Booth and Rhodes collected more than thirty specimens in a short time. Again on March 29th, 1907, a party of conchologists visited Eggerslack Wood, when the shells were found in plenty. Mr. Jackson says: "On the occasion of our joint visit, the shell was very much in evidence, almost every dead beech leaf having one or more examples adhering to it. The shells were mostly of a somewhat depressed form." (See *Naturalist*, May, 1907, p. 173).

Collectors are not infrequently quite nonplussed when visiting a locality where they expect to obtain a certain species, said to be plentiful, to find that the most diligent search is often fruitless, and the question arises—when is the right time to prosecute the search, or rather, what are the climatic conditions (as regards humidity, temperature, etc.), which exactly suit various species (the one under discussion as an example), and bring them out sometimes in thousands, while at other times, under apparently similar conditions, not a single individual is to be seen above ground. And further, although one may be on the exact spot, with a knowledge that the animals are present in quantity all around, yet however carefully and systematically the search may be carried on, failure is the result. What becomes of the creatures, and where do they manage to conceal themselves ?

There is evidently a very large field here for experiment and observation on the points mentioned, and one no doubt which would throw very much light on the habits and conditions of life of many species of snails, which at present remain a complete enigma. There seems to be little or no information obtainable at present dealing with these phases in the life-history of terrestrial mollusca.

Vallonia pulchella (Müller).—Not by any means abundant except in the second locality named, where, under stones and among dead leaves on the top of a wall, this and the next species were plentiful. Church-yard wall, Grange ; Hags Lane, Cartmel ; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113.

Vallonia costata (Müller).—This species was certainly the commonest of the genus, and associated with the previous species. The proportion of *costata* to *pulchella* was about three to one. Hampsfell Road; Windermere Road; Hags Lane, Cartmel; Eggerslack Wood and Lindale Road (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Vallonia excentrica Sterki.—Two or three specimens of this species (so called), have been identified by the late recorder (Mr. C. Oldham), from among a quantity of *Vallonia* submitted to him from the following localities: Hampsfell Road; Windermere Road; Eggerslack Wood; Hags Lane, Cartmel. Holker (sparingly), 1903 (J.W.J.).

Helicogona arbustorum (Linné).—A very uncommon species in the district, and practically confined to a restricted area—Eggerslack Wood and vicinity. Further search might perhaps extend its range, which is doubtful as suitable localities are few, the district lying between the Lower Lindale Road, and the western boundaries of Eggerslack Wood, in all probability constituting its limits. Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.

*var. **fuscescens** Duchassaing.—Two specimens of this uncommon variety only were found, the shells being rather thin. In a small field on the south side of Eggerslack Wood, skirting the Windermere Road.

*var. **flavescens** Moquin-Tandon.—A single example of this variety was found by the road-side, in Windermere Road, at the foot of a stone wall, among nettles and thick herbage.

Helix aspersa Müller.—Not by any means an abundant species in any part of the district, but widely distributed, seldom more than one or two specimens being found at a time. The largest number of shells met with at once was eight, crawling over stones bordering the path leading to the front entrance of the B. H. A. Guest House, at Lingholme. A very fine dead shell was found in the area at the back of the same house. Occasional shells turned up under the flat stones at the tops of the limestone walls, in several parts of the district. The majority of the specimens were the type, and exhibited scarcely any noteworthy variation, and were usually so badly weathered as to be useless as cabinet specimens. Hags Lane, Cartmel; Kirkhead; Grange Fell Road; Holme Island; Meathop Road; Charney Well Lane; Hampsfell Road; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Low Meathop and Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314.

*var. **albofasciata** Jeffreys.—One good specimen on the Grange Fell Road.

*var. **tenuior** Shuttleworth.— A single example, Lower Lindale Road.

var. **exalbida** Menke.—A fine specimen of this rare variety was discovered by Mr. W. H. Heathcote, at Woodhead, near Grange, at Easter, 1907 (see note by J. W. Jackson, in *Naturalist*, May, 1907, p. 173). This shell was exhibited at a meeting of the Conchological Society, April 10th, 1907.

Helix nemoralis Linné.—A very local, and apparently not an abundant species anywhere. It was noted in the first five localities by the writer, but only in the first two of them could it be said that the animals existed as a thriving and well-established colony—the larger one being among the loose weathered limestone rocks, near the Hospice, at Hampsfell, where they were fairly common. One specimen only rewarded the search in each of the first three places. In every case, and especially at the Hospice, the shells were badly denuded of their epidermis, scarcely one being worth preserving for the cabinet. A small and restricted colony exists among the grass tufts growing on the limestone rocks at Hawkshead, quite close to the sea, but from the numbers of broken shells—which by the way revealed the presence of the species in this place—scattered on the rocks, it is evident that the thrushes levy toll on the molluscs; and no doubt the animals find a difficulty in perpetuating their species—only about half-a-dozen specimens were to be found alive in the course of two hours' search. These, like the Hampsfell ones, were too eroded to be used for the cabinet. Hospice at Hampsfell; Kirkhead; Cartmel (north); Grange Fell Road; Hampsfell Road; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Holme Island (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lower Allithwaite and Humfrey Head, 1907 (G.H.T.). The following varieties were observed:—

var. **rubella** Moquin-Tandon.—Hampsfell; Kirkhead.

var. **libellula** Risso.—Hampsfell.

var. **bimarginata** Moquin-Tandon.—Hampsfell.

*var. **roseolabiata** Taylor.—Hampsfell.

*var. **undulata** Gentiluomo.—Hampsfell; Kirkhead.

*var. **minor** —Hampsfell.

Out of a total of fifty shells examined on Hampsfell, and a few others sent by Mr. G. H. Taylor for examination, the following bandings were made out:—

(a) *rubella*—12345, (123)(45), (12)345, (12)3(45), 123(45), (12)3(45), 123(45), 123(45), 123(45), 1:345, :2345, :23(45), ::3(45), 00::0, 00300 (the rarest form noted).

(b) *libellula*—12345, (12)3(45), (123)(45), (12345), 123(45), 123(45), 12345, 12345, 123(45), 12345, 12345, 10345, 02(345), :0345, :23(45), :2345, :2345, 023(45), 023(45).

The following were noted at Hawkshead, all the shells being var. *rubella*—12345, 12345, (12)3(45).

The var. *libellula* predominated by nearly two to one, and also included those forms with missing bands, *i.e.* 023(45), 023(45), 10345, 02(345), :0345. This is rather peculiar, and suggests an interesting query: Do shells of var. *libellula* from other parts of the country shew this same peculiarity of missing bands, and if so why? Perhaps conchologists will make a note of this, and send to the *Journal* the results of their observations. They may assist in explaining the somewhat puzzling question of band variation in the shells of the larger *Helices*.

Altogether twenty-seven distinct bandings were made out, so that practically one half of the shells were of different band forms. The commonest banding was (12)3(45), the exact number I omitted to note, but the forms common to both varieties are five in number, *viz.*: (12)3(45), 123(45), 123(45), (123)(45), :23(45). Of the form 00300, only one example was taken.

As previously mentioned, almost every shell was weathered, even the young half-grown ones having the apices denuded of epidermis, no doubt owing to crawling out on the bare limestone, and being exposed to rain, wind and sun.

Helix hortensis Müller.—This species is without doubt not common in the district, certainly much scarcer than *H. nemoralis*, and was only taken in three localities; at each of the first two, one specimen only was found, and not more than a dozen at Holme Island. The species was never found associated with *H. nemoralis* neither were the colonies of each near one another.

Mr. G. H. Taylor informs me that he found a small colony on Cartmel Road, feeding on Black Bryony. Some of the specimens are dwarfed in size and rather thin, approaching the var. *tenuis* Baudon, but they were mostly immature shells. Haggs Lane, Cartmel; Grange Fell Road (near Cemetery); Holme Island; Low Meathop and Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Cartmel Road and Allithwaite Road, August, 1907 (G.H.T.).

var. **lutea** Moquin-Tandon.—In most places this variety predominated over the type. Haggs Lane, Cartmel; Grange Fell Road; Cartmel Road (G.H.T.).

*var. **arenicola** Macgillivray.—The predominating form on Holme Island—the only place in the district where it was taken.

One typical banding only was noted out of a dozen specimens. This small colony was situated on the south end of the Island, where the rocks above high water mark are covered with masses of thick tangled ivy.

var. **coalita** Moquin-Tandon.—(12345). One specimen only, Holme Island. Cartmel (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

var. **albina** Moquin-Tandon.—Mr. G. H. Taylor reports that this var. was much more in evidence than either var. *lutea* or the type in Cartmel and Allithwaite Roads. The following band forms were observed:—12345, 12345, (12)(34)5, (123)(45), (12345).

Ena obscura (Müller).—Possibly a common shell, but seemingly confined to the wooded parts of the district. On the walls and trees in the Merlewood tract, after heavy rain, the snails were abundant, especially on the moss-covered walls on the west side of Windermere Road. No doubt the animals hibernate deep in the crevices of the walls, and climb to the top in wet weather. They are very difficult to find on the walls, but may be detected by stooping down and silhouetting the stones against the sky, when the shells stand out as conical bits of stone or excrescences of dirt here and there. Eggerslack and Merlewood; Hampsfell Road; Low Meathop (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Humfrey Head, August, 1907 (G.H.T.).

Cochlicopa lubrica (Müller).—In some places this shell was common, and in Hags Lane seemed to prefer the tops of the limestone walls, two or three specimens being often taken under a single flat stone, especially if moss-covered, and usually accompanied by a number of *Valonia costata*. Hags Lane, Cartmel; Grange Fell Road; Charney Well Lane; Low Meathop; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113; Holme Island (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314; Grange Fell (W.D.R.), *J. of C.*, vol. 3, p. 338.

var. **lubricoides** Férussac.—Several specimens, Eggerslack Wood, 1903 (J.W.J.).

Cæcilioides acicula (Müller).—Found in Hampsfell Road, June, 1908 (G. H. Gripper).

Jaminia secale (Draparnaud).—The only locality up to the present where this species has been found is on the limestone rocks of Meathop Fell. It was discovered by one of the party of conchologists who made an excursion to the Grange district, on September 14th, 1907, viz. Mr. Jackson, who says—"Not common; but weather dry, no doubt it would prove abundant on the cliff-face, &c., in suitable season, judging from the Ingleton habitat. The majority of mine were living, and were in grass roots." Also see *J. of C.*, vol. 12, p. 110.

(To be continued).

VERTIGO ALPESTRIS (Alder):

Its Distribution in North Lancashire and Westmorland, and its Association with *Vertigo pusilla* Müll.

BY J. DAVY DEAN AND THE REV. C. E. Y. KENDALL.

(Read before the Society, June 17th, 1908).

VERTIGO ALPESTRIS has generally been considered a rare shell, most of the British specimens in collections coming from a few well-known localities. It has occurred to us that, as there are in our neighbourhood so many other localities similar in every way and having the same conditions as to soil, climate, etc., *Vertigo alpestris* must be much more common than has been generally supposed. We have, therefore, carefully worked the Carboniferous Limestone district of Furness, Westmorland, and North Lancashire, with the results given below. We have succeeded in establishing a chain of localities stretching in an irregular line from Holker in the west right across to Kirkby Lonsdale in the east, a distance roughly of over twenty miles, and *Vertigo alpestris* occurs in practically every parish.

Commencing with Furness, the Lancashire portion of Vice-County 69, the most westerly locality so far established is Holker, where this shell was first recorded for the district; it was taken there by Mr C. H. Moore in September, 1902, and recorded in the *Journal of Conchology*, February, 1903. The next locality is Cark, for which place it is again recorded by Mr. Moore (*J. of C.*, vol. xi., p. 266). Still working east, we come to Cartmel, famous for its Priory, at which place we found it in May, 1908. We now come to Grange-over-Sands, where, as well-known, it is found abundantly in that conchologist's paradise, Eggerslack Wood. In passing, we might say that we visited this locality a few days after the Conchological Society's visit of last summer, and found this shell very rare. In the next village to the north-east, Lindale, we found it on a slate wall in May, 1908.

We must now cross the county border into Westmorland, and so come to the pretty little village of Witherslack, well-known to entomologists, where, under the shadow of Whitbarrow, this shell occurs again in great abundance, and was taken by us in May, also of this year. Crossing the river Kent at Levens Bridge, we can again record it for Levens, May, 1908, and some two miles to the east of Heversham and south-east of Levens is Crooklands, where in April of this year Mr. Dean found it on a slate wall.

Passing down the eastern side of the Kent estuary, we come to another small group of localities, the most easterly of which is

Hazelslack Hall, for which place it is recorded by Mr. J. W. Jackson in the *Journal of Conchology* of January last. Thence we pass to Arnside, at which place the Rev. C. E. Y. Kendall found a colony in April, 1908. We now pass out of Westmorland into West Lancashire (V.C. 60) and have it recorded for Silverdale, where it was found by Messrs. Dean and Jackson in November, 1904, and recorded in December the same year.

Working south-east, we come to Borwick, the most southerly point of its distribution in this district so far recorded, where Mr. Dean found a flourishing colony in May, 1908. Again, some miles to the north-east, the Rev. C. E. Y. Kendall found it at Whittington, still in Lancashire, in May, 1908; and re-crossing the border we come to Kirkby Lonsdale in Westmorland, where it occurs near the Devil's Bridge, and was found by Mr. Dean in August, 1905, and recorded in September of the same year.

This completes our chain of localities, though doubtless further search might make it even longer.

The distribution of this shell in North Westmorland is still very undefined. It was recorded for Kendal, Ambleside, and Grasmere many years ago, and has more recently been shown to be at Windermere, for which place it was recorded by Mr. R. Roberts in 1906. It is very abundant again in the neighbourhood of Penrith, and again at Clifton, at which places it was found by Mr. Dean in September, 1907; both these localities are in Westmorland, but some miles apart, and on opposite sides of the river Lowther.

All these habitats are more or less similar. An old, moss-covered wall, usually limestone, sometimes slate, always on a limestone soil, covered in parts with the common small-leaved ivy, more or less under trees, but not under a hedge—such is the usual home of *V. alpestris*. One side of the wall seems always to be well sheltered, and a wall in a bleak and exposed position hardly ever yields any results. The altitude is generally a low one, and several of the best localities are close to a stream or river. The Clifton locality is noteworthy in this respect; the three species—*V. alpestris*, *V. pusilla*, and *V. substriata*—occurring in great abundance along the embankment wall of the river, almost at the water's edge.

We have also noticed that *Vertigo alpestris* very commonly, but not always, occurs along with *V. pusilla*, specimens of both species being often found on the same stone. We give below lists of localities showing where both occur together and where they occur separately, and we may remark that we have here eight new locality records for *Vertigo pusilla* and no fewer than ten new records for *V. alpestris*.

The new records for *V. alpestris* are:—

| | | | | |
|-------------|------------|-------------|------------|------------|
| Cartmel | } V.C. 69. | Borwick | } V.C. 60. | |
| Lindale | | Whittington | | |
| Witherslack | | | Clifton | } V.C. 69. |
| Levens | | | Penrith | |
| Crooklands | | | | |
| Arnside | | | | |

Vertigo alpestris occurs alone at

| | | |
|---------|------------|----------|
| Cartmel | Crooklands | Penrith. |
|---------|------------|----------|

Vertigo pusilla occurs alone at

| | |
|--------------------------------|------------|
| *Cartmel (distinct from above) | } V.C. 69. |
| Beetham - - - - | |
| Burton-in-Kendal - - | } V.C. 60. |
| Yealand Conyers - - | |
| *Priest Hutton - - - | |

Vertigo pusilla occurs with *V. alpestris* at

| | |
|---------------------|------------|
| Grange - - - - | } V.C. 69. |
| *Lindale - - - - | |
| *Witherslack - - - | |
| *Levens - - - - | |
| Arnside - - - - | |
| *Borwick - - - - | } V.C. 60. |
| *Whittington - - - | |
| Silverdale - - - - | } V.C. 69. |
| *Clifton - - - - | |
| Kirkby Lonsdale - - | |

* *V. pusilla* recorded for the first time from these localities.

NOTE.—*Vertigo pusilla* also occurs separately on other walls within the districts mentioned for both species occurring together.

The constant association of the two species is a matter of considerable interest, and we should like, before closing, to draw attention to a small group of localities where *V. pusilla*, the commoner species, occurs alone. A glance at the map will show that we have, encircling the village of Burton-in-Kendal, a chain of stations for this species unassociated with *V. alpestris*. These are Yealand Conyers, with Holmer Hall and Tewetfield, Priest Hutton, Burton at Dalton Hall and Clawthorpe, and Beetham.

The point we wish to draw attention to is this—that *V. pusilla* persists in drier and more exposed situations than *V. alpestris*. Burton itself lies on the eastern slopes of an exposed valley, running north and south. It is somewhat sheltered on the eastern side by Farlton Knott and Hutton Roof, and it is on these eastern slopes that we find *V. pusilla* at the comparatively high altitude of 300 feet.

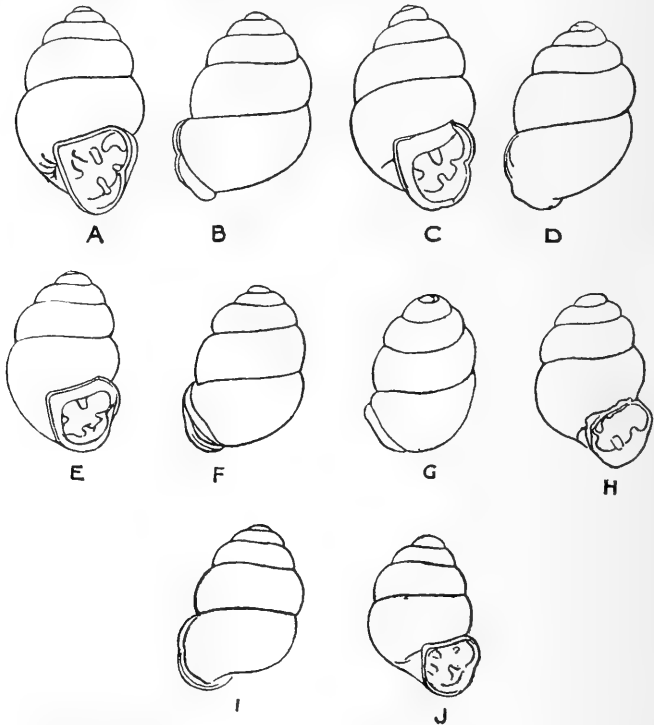
VERTIGO MOULINSIANA Dupuy.

BY J. R. LE B. TOMLIN AND THE REV. E. W. BOWELL.

PLATE III.

As well-known, *V. moulinsiana* Dup. was first placed on the British List by the late Dr. J. Gwyn Jeffreys (*Brit. Conch.*, 1, p. 255) on the strength of examples obtained in 1845 "under stones by the side of a small lake at Ballinahinch, near Roundstone, Co. Galway." There is now, however, no doubt that these specimens, as well as those found more recently by Dr. Scharff in the neighbouring Aran Isles (*Irish Naturalist*, 1, p. 136), really belong to the closely allied *V. lilljeborgi* West., and not to *V. moulinsiana* Dup. at all.

By the kindness of the Editors of the *Irish Naturalist*, we are permitted to reproduce in the present number a plate which appeared in



- | | | | |
|-------|------------------------------|---------------------------|-------|
| A, B. | <i>Vertigo moulinsiana</i> , | Tinnahinch, Co. Carlow, | × 9. |
| C, D. | <i>Do.</i> | Bessungen, Darmstadt, | × 9. |
| E, F. | <i>Do.</i> | Morden, Dorset, | × 8. |
| G, H. | <i>V. lilljeborgi</i> , | Ballinahinch, Co. Galway, | × 10. |
| I, J. | <i>V. antivertigo</i> , | Roundstone, Co. Galway, | × 10. |

their last May issue, illustrating the differences between *Vertigo antivertigo*, *V. moulinsiana*, and *V. lilljeborgi*, as well as a series of

outline figures of the same three species. The plate was originally a reproduction of sixteen beautiful photo-micrographs by our member, Mr. J. W. Jackson, and brings out admirably the variation of *V. moulinsiana* in point of size, form, outline of lip, and armature.

In the *Irish Naturalist* this plate accompanies a most interesting article by Mr. R. A. Phillips of Cork, in which the discovery of *Vertigo moulinsiana* in Ireland is announced near the River Barrow, at Tinnahinch, Co. Carlow. He found the species plentiful on *Glyceria aquatica* L. and other marsh plants in October, 1907, and again, in January of this year, on the branches of a small alder-tree, and in dead leaves caught up in the forks, hibernating with *Succinea putris*. On visiting the spot last June, Mr. Phillips found that these molluscs had not yet begun to ascend the stems, but were feeding low down amongst the grass, etc. He has also called our attention to another point of distinction between this species and *V. lilljeborgi* which does not so far seem to have been noted, viz. : the colour of the denticles. In the latter species these are of the same colour as the shell, whereas in *V. moulinsiana* they are usually white.

Three varieties have received names, viz. :—

var. *personata* Moq.-Tand.¹ "Coquille un peu plus allongée : ouverture avec deux plis columellaires : péristome interrompu." Toulouse (Partiot).

var. *ventrosa* Heynemann.² Very short oval and very tumid, whorls 4 (the type having $4\frac{1}{2}$ to 5), teeth—one or two on body (the inner one small), two on columella (the lower one small), two inside lip; size $2\frac{1}{4} \times 1\frac{1}{2}$ mm. (the type being $2\frac{1}{2}-2\frac{3}{4} \times 1\frac{1}{2}-1\frac{3}{4}$ mm.). This is the Carinthian form and was described as a species.

var. *octodentata* West.³ Teeth 2-2-2, and in addition two tiny denticles in the basal angle below the columella. An Italian form, rather smaller and more conical.

The following list of localities where it is known in a fossil state has been very kindly furnished me by Mr. A. S. Kennard:—The Pleistocene of Copford and Clacton (Essex), Barnwell and Grantchester (Cambs.), and West Withering (Sussex); the Holocene of Chignal St. James and Walthamstow (Essex), Westbury-on-Severn (Gloster), and Knettishall (Suffolk); on the Continent, from the Middle Pleistocene of Darmstadt, the Upper Pleistocene of Windsheim in Mittelfranken, and the Pleistocene of Oberalling, Bavaria (Clessin).⁴

1 Hist. Nat. des Moll. de France, vol. 2, p. 403.

2 Malak. Blätter, 1862, p. 11, pl. 1, fig. 6-8.

3 Faun. Eur. Moll. Extram., p. 195.

4 Berichte des Nat. Vereins zu Regensburg, Heft xi.

In a recent state, Jordan¹ (under its synonym of *V. levigata* Kok.) gives the following distribution:—S. Scandinavia; Jutland; England and S. Ireland; S.W., E., and N. France and Belgium; Middle Rhineland; Switzerland; S.E. Germany and Alpine region; S. Tyrol; Upper Italy. To these add Hungary (Clessin); Spain, Sicily, Denmark and Transcaucasia (Westerlund).

The full list of known English localities is as follows:—

Berks.—Bradfield (*J. of C.*, vol. 11, p. 170); Cothill (id. vol. 12, p. 106).

Cambs.—Wicken Fen (*J. of C.*, vol. 9, p. 217).

Derby.—Markland Grips, in rejectamenta, 1881 (Pickard).

Devon.—Braunton (*J. of C.*, vol. 11, p. 79).

Dorset.—Bloxworth and Morden (*J. of C.*, vol. 6, p. 348).

Hants.—Near Bishopstoke, 1876 (Groves); Otterbourne (Miss Hele).

Herts.—Watford, Nov. 1882 (Cash); Broxbourne (Groves); Hitchin (*Ann. & Mag.*, 1878, p. 380).

Middlesex.—Near Colnbrook (*J. of C.*, vol. 12, p. 19).

Norfolk.—Roydon Fen, in rejectamenta, July, 1908 (Mayfield).

Notts.—Carlton-on-Trent (*J. of C.*, vol. 5, p. 45); Darleton, July, 1885 (Gain).

Suffolk.—Knettishall, Sept., 1906, and Redgrave Fen, Aug., 1908, in rejectamenta (Mayfield).

There is also a record from Keswick (*J. of C.*, vol. 8, p. 158), subsequently cancelled by Captain Farrer in *The Victoria County History of Cumberland*.

The identification of the North American *V. ventricosa* Morse with this species was first suggested by Dr. Jeffreys in a paper in the *Ann. & Mag.*, Oct., 1872 (reprinted in an abbreviated form in the *J. of C.*, vol. 1, pp. 8-16). In this paper he tabulates the mollusca of Massachusetts, and identifies as European 134 out of 250 marine species, and 39 out of 110 land and freshwater. A few of these identifications have been accepted, e.g., *Helix minutissima* Lea = *Punctum pygmaeum* Drap., but the majority have never been adopted, and we would suggest to our energetic collectors of land and freshwater shells a fresh field for study in the comparisons of these forms from the old and the new world. In the genus *Vertigo* Jeffreys united the following species: *V. ovata* Say with *V. antiovertigo* Drap., *V. bollesiana* Morse with *V. pygmaea* Drap., *V. gouldii* Binn. with *V. alpestris* Ald., *V. simplex* Gould with *Sphyradium edentulum* Drap., and *V. ventricosa* Morse with *V. moulinsiana* Dup. Of these identifications, the first

two are definitely rejected by W. G. Binney on the ground of differences in dentition (*Terr. Air-Breathing Moll. U.S.A.*, vol. 5, pp. 215, 218), but *Sphyradium edentulum* has replaced *V. simplex* on the U.S.A. list (cf. *Nautilus*, vol. 11, p. 142). The other two have not been accepted, and, judging by the material at our disposal, seem improbable. *V. ventricosa* Morse is a small highly-polished species, $1\frac{3}{4}$ mm. \times $1\frac{1}{8}$ mm., with five denticles coloured as the shell, and an aperture shaped differently to that of *V. moulinsiana* Dup. Dr. Böttger, in "*Die Entwicklung der Pupa-Arten des Mittelrheingebietes*,"¹ considers the two forms identical. Binney² states that he had not seen either *V. ventricosa* or its radula, and he quotes from Morse and gives Morse's figures. As to the number of teeth, he states that there are thirteen on each side of the central, and of these he regards the first six as laterals. In examples of *V. moulinsiana* from Cambridgeshire and from Co. Carlow, there are from twenty-two to twenty-six teeth on each side of the central; there is no difficulty in counting them under an objective of medium power. The first nine or ten of these might be regarded as laterals, but all the teeth are really of the same type, and it would be better to speak of laterals only in those cases where (*e.g.*) aculeate and quadrate teeth occur on the same radula. The teeth before us are all tricuspid, the cusps being shaped like little spearheads, so that each tooth presents the appearance of a capital E (without serifs) lying on its back. The middle cusp is always the shortest. Besides these three cusps there is a varying number—from two to five—of accessory cusps at the base of the larger ones. These were at first regarded as an optical illusion, but careful examination shows them to be actual cusps. As in *Punctum* and *Succinea*, the individual tooth has somewhat the shape of a ladle, and the form of the basal plate is very characteristic. Binney's figure of *V. ventricosa* shows short rounded denticles instead of spear-like cusps, and even those disappear altogether on the marginals. He speaks of them, however, on p. 214 as "each bearing (I presume) a distinct cutting point." There is no doubt that the best microscope available in 1878 (the date of his work above cited) would have failed to show the points of these cusps. From the figure there is every reason to suppose that Morse's species possesses teeth of the same character as our *moulinsiana*, but they appear to be decidedly less numerous, and to diminish in size towards the outer margin very much more markedly than in our species. On the whole we cannot think that the evidence for the identity of these two *Vertigos* is at present conclusive.

(To be continued).

1 *Jahrb.-Nassau. Verein Naturk.* Jahrg. 42, p. 307.

2 *Bull. U.S. Nat. Museum*, 28 (1885), p. 192.

Vertigo antivertigo Drap. in the Silverdale district, W. Lancs.—

During the latter part of September and the beginning of October, Mr. Standen and I spent some time in the above district searching for shells, etc. Amongst the many found, we had the good fortune to make an addition to the census, as well as to Mr. J. Davy Dean's comprehensive paper (antea p. 34) in the shape of *Vertigo antivertigo*. The species was fairly common at the head of Hawes Water, Silverdale, in company with *Cochlicopa lubrica*, *Carychium minimum*, *Vitrea radiatula*, *Euconulus fulvis* var. *alderi*, *Punctum pygmaeum*, and *Vertigo pygmaea*. At this point there is a great quantity of drifted vegetation, and it was whilst working this for Coleoptera that the species was discovered. Though pleased with our success here, we were still more elated to find the species again in evidence on the banks of the River Keer, near Carnforth. It simply swarmed on the stems of the grasses and rushes and down at their roots. Amongst the shells found with it were *Vertigo pygmaea*, *Punctum pygmaeum*, *Jaminiia muscorum* and var. *brevis*, *Vitrea radiatula*, and numerous others, all more or less common. Slugs were represented by *Agriolimax agrestis*, *A. levis*, *Arion hortensis*, and *A. intermedius*. The most abundant shell of all here, and in fact along the coast past Ings Point, was a small form of *Clausilia bidentata*. The smallest we found was 7 mm., and none exceeded 9 mm. in altitude. There was also a corresponding diminution in breadth. At the former locality the species occurred amongst the grass roots—a rather unusual habitat in this district. At Ings Point it occurred with other species under stones. Amongst the shells found here were *Vertigo pygmaea*, *Jaminiia muscorum* (both abundant), *J. cylindracea* (rare), *Vallonia bulchella*, *V. costata*, *Vitrea cellaria* (large form—probably var. *compacta*), *V. nitidula*, and *Helicella caperata*, amongst which was a specimen nearly twice the size of its fellows and with three distinct bands above the periphery. The large form of *Vitrea cellaria* appears to be common throughout the district, as I have taken it at the Cove, Silverdale; Ings Point; Sandside, etc., as well as across the Kent Estuary at Meathop and Grange. As mentioned in my note in the *Naturalist*, the anatomy of the Grange specimens is practically that of *cellaria*, though superficially the shells are apt to be mistaken for *lucida*. Some of the localities of the above-mentioned species will be found to be additions to Mr. Dean's list already referred to.—J. WILFRID JACKSON (*Read before the Society*, November 13th, 1907).

List of Mollusca from one Chalk Pit in Surrey.—The number of species which may be found in a small area is often very considerable and of no small interest. Having paid several visits to a disused chalk pit and found the snails therein to be plentiful, I have worked up the fauna more thoroughly, and have obtained twenty-nine species from this limited area. The chalk pit is at Leatherhead, in Surrey; it is of moderate size and has evidently not been used for many years, as the bottom is completely covered with herbage and there are numbers of shrubs, bramble bushes, etc. There is a larch plantation round the margin, and the sides are perpendicular except at one part which abuts on the high road; here the side is shelving to allow the descent of carts, and there is a lot of ivy growing round the roots of small trees. Here also is a nettlebed overhung by shrubs and young beeches which shed their dead leaves into it; this spot proved to be very prolific. The centre of the pit is covered with short grass and there is a large clump of wild parsnip, about which I have more to say later. The list of twenty-nine species includes those which inhabit the pit at the present time. I have found several empty and weathered

shells of *H. lapicida*, but have not yet come across a living specimen. As yet only three species of slugs have been found, and no species of *Pupa* or *Vertigo*.

- (1) *Vitrina pellucida*.—Plentiful in the nettlebed.
 - (2) *Agriolimax agrestis*.—Plentiful everywhere.
 - (3) *Vitrea cellaria*.—Plentiful among herbage and in the nettlebed.
 - (4) *V. rogersi*.—Plentiful among herbage and in the nettlebed.
 - (5) *V. alliaria*.—Not at all plentiful.
 - (6) *V. nitidula*.—Plentiful among herbage and in the nettlebed. Both type and var. *nitens*; also a few much paler specimens.
 - (7) *V. pura*.—Both type and var. *nitidosa* extremely plentiful in the nettlebed. Grows to a large size.
 - (8) *V. radiatula*.—Several specimens from the nettlebed, and at roots of grass.
 - (9) *Arion hortensis*.—In the nettlebed.
 - (10) *A. intermedius*.—Among dead leaves.
 - (11) *Punctum pygmæum*.—Under fallen blocks of chalk.
 - (12) *Pyramidula rotundata*.—Very plentiful. I have taken two subscleriform specimens and several var. *alba*.
 - (13) *Helicella virgata*.—Curiously enough I have only found two small empty shells of the type, and two very small abnormal specimens approaching var. *lutescens*.
 - (14) *H. caperata*.—Very plentiful on the short grass. They are of a greyish-brown colour with an interrupted peripheral band. Var. *fulva* is quite plentiful and I have found one empty shell only of var. *ornata*. In the autumn this species ascends the withered brown flower stalks of the wild parsnip and rests there; the fulvous variety is then especially well protected by its colour which closely approximates to the brown of the dried flower stalks, so that the shell is practically invisible from a little distance.
 - (15) *H. cantiana*.—A few specimens only, darkly coloured with a white peripheral band.
 - (16) *Hygromia hispida*.—Plentiful, both type and var. *hispidosa*.
 - (17) *H. rufescens*.—Very plentiful, and grows to a good size, showing considerable variation in altitude. In colour the specimens vary from a deep red brown to a pale horn colour with a white peripheral band. Var. *alba* also is found.
 - (18) *Acanthinula aculeata*.—Several among dead leaves in the nettlebed.
 - (19) *Vallonia pulchella*.—Plentiful among the grass roots, but of small size.
 - (20) *V. costata*.—Among the grass roots.
 - (21) *Helix aspersa*.—Among the ivy.
 - (22) *H. pomatia*.—Several fine specimens in early summer.
 - (23) *H. hortensis*.—Type, var. *lutea*, and a specimen approaching var. *arenicola*. Also an anomalous variety approaching var. *roseo-zonata*.
 - (24) *Ena obscura*.—Plentiful and of good size.
 - (25) *Cochlicopa lubrica*.—Very plentiful and large; both type and var. *hyalina*.
 - (26) *Clausilia bidentata*.—Plentiful in the nettlebed and amongst ivy. They are rather shorter than typical specimens.
 - (27) *C. rolphii*.—This rare species is extremely abundant in the nettlebed, especially in early summer and in autumn.
 - (28) *Carychium minimum*.—Not as plentiful as one might expect.
 - (29) *Pomatias elegans*.—Plentiful, but only seen in quantity in early summer.
- Type and var. *ochroleuca*.—G. D. H. CARPENTER (*Read before the Society, February 12th, 1908*).

**BIBLIOGRAPHY OF THE NON-MARINE MOLLUSCA
OF LANCASHIRE.**

BY J. WILFRID JACKSON.

(Continued from page 79).

Owing to an unfortunate accident the following items were omitted from their proper places in the Bibliography.

1890. **Standen, R.**—Notes on the Occurrence of *Acme lineata* Drap., in Lancashire and Cheshire. *J. Conch.*, vi., pp. 161-164.
Details of its habitats at Barlow Wood, with *Carychium* and various *Zonites* (coll. Mr. J. Ray Hardy in 1866); at Clifton near Manchester with *Zonites excavatus* (coll. Mr. J. Ray Hardy and Mr. Thos. Morley in 1866); near Fleetwood, with *Helix aculeata*, *H. hispida*, *H. pygmæa*, *Vitrina*, *Zonites glaber*, *Z. alliarius*, *Z. nitidulus*, *Z. purus*, *Z. radiatulus*, *Z. fulvus*, *Z. crystallinus*, *Z. cellarius*, *Cochlicopa lubrica*, *Carychium*, *Succinea putris*, *S. elegans*, *Limnæa truncatula*, *Pisidium nitidum*, *Vertigo pygmæa* and *Helix pulchella*; at Preston (record unsatisfactory).
1890. **Standen, R.**—Sinistral *Helix nemoralis* in Lancashire. *J. Conch.*, vi., p. 175.
Found near Burnley by F. C. Long: var. *libellula*, 12345.
1890. **Standen, R.**—*Helix aspersa* m. *sinistrorsum* Taylor in Lancashire. *J. Conch.*, vi., p. 176.
At Whalley; details given.
1890. **Standen, R.**—Exhibits. *J. Conch.*, vi., p. 272.
Pisidium cinereum from Liverpool, *Sphærium corneum* v. *complanata* from Gass Canal, Hollinwood, very oblong and flattish *S. ovale* from canal at Hollinwood.
1890. **Kew, H. Wallis.**—The Faculty of Homing in Gastropods. *Naturalist*, 1890, pp. 307-318.
Discussed and exemplified by observations made at Swinton on *Limax maximus* and *Helix aspersa*; at Manchester on *Limax flavus*.
1890. **Norman, A. M.**—Revision of British Mollusca: Order iv., Pulmonata. *Ann. and Mag. Nat. Hist.*, 1890, pp. 327-341.
Mentions *Zonites glaber*, Preston; *Planorbis dilatatus*, Bolton Canal at Pendleton and Galton (? Gorton) (Thos. Rogers).
1890. **Laurence, W. M.**—*Natural History Journal*, 1890, p. 50.
Large *Anodonta cygnea* in Penketh district, near Warrington.

1891. **Horsley, J. W.**—Notes on *Helix nemoralis* and *H. hortensis*. *Brit. Nat.*, 1891, p. 17.

Mentions that the former abounds on sand hills near Liverpool.

1891. **Williams, J. W.**—New Shells from Southport. *The Conchologist*, i., pp. 10-11.

Gives localities for *Amalia marginata*; *Hyalinia alliaria*, *Hy. excavata*; *Helix aspersa*, *H. virgata*, *H. pygmæa*; *Vertigo pygmæa*; and *Pupa marginata*, sent by Dr. G. W. Chaster.

1891. **Heathcote, W. Hy.**—New Shells from Southport. *The Conchologist*, i., p. 32.

Amalia marginata taken in Hesketh Park in 1889; criticises J. W. Williams' note and points out that species mentioned by him have already been recorded for S. Lancashire,—the majority in R. Standen's "Lancashire Land and Freshwater Mollusca," 1887.

The result of six hours' collecting in Sligo, Easter, 1906.—Having only three days at my disposition, and wishing to see most of the ground covered by the Irish Naturalists at the Sligo Conference of September, 1904, that is to say Glencar, Lough Gill, Dromahair, Knocknarea, Strandhill, etc., I took note of the actual time given up to shell hunting with the following results. As the localities are given by Messrs. Welch and Stelfox and as I got nothing outside their list, and did not cover the whole of it, I just give the names of species collected: *Vitrina pellucida* Müll., *Hyalinia cellaria* Müll., *H. alliaria* Miller, *H. nitidula* Drap., *H. pura* Alder, *H. radiatula* Alder, *H. crystallina* Müll., *H. fulva* Müll., *H. nitida* Müll., *Arion ater* L., *A. subfuscus* Drap., *A. hortensis* Fér., *A. circumscriptus* Johnst., *Agriolimax agrestis* L., *A. levis* Müll., *Amalia sowerbyi* Fér., *Helix pygmæa* Drap., *H. rotundata* Müll., *H. rupestris* Drap., *H. pulchella* Müll., *H. excentrica* Sterki, *H. aculeata* Müll., *H. lamellata* Jeff., *H. hispida* L., *H. rufescens* Penn., *H. fusca* Mont., *H. arbustorum* L., *H. acuta* Müll., *H. nemoralis* L., *H. aspersa* Müll., *Cochlicopa lubrica* Müll., *Pupa anglica* Fér., *P. cylindracea* DaCosta, *P. nuscorum* Müll., *Vertigo edentula* Drap., *V. pygmæa* Drap., *V. substriata* Jeff., *V. angustior* Jeff., *Balea perversa* L., *Clausilia bidentata* Ström., *Succinea putris* L., *S. elegans* Risso, *Carychium minimum* Müll., *Limnaea stagnalis* L., *L. peregra* Müll., *L. palustris* Müll., *L. truncatula* Müll., *Physa fontinalis* L., *Planorbis contortus* L., *Ancylus fluviatilis* Müll., *A. lacustris* L., *Acme lineata* Drap., *Bythinia tentaculata* L., *Hydrobia ulve* Penn., *Valvata piscinalis* Müll., *V. cristata* Müll., *Neritina fluviatilis* L., *Pisidium subtruncatum* Malm, *P. gassiesianum* Dup., *P. pusillum* Gmel. I fall short by thirteen of the Sligo conference list, but nevertheless, considering the dryness of the weather, and early season, Sligo can well be called a conchologists' paradise. All these shells, except slugs, were shown at the Conchological Meeting of May 9th, and confirmed by Messrs. Standen & Oldham.—B. R. LUCAS (*Read before the Society*, Dec. 11th, 1907).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

373rd Meeting, June 17th, 1908.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

"*Vertigo moulinsiana* Dupuy, an addition to the Irish Fauna," by R. A. Phillips. "Reports on the Marine Biology of the Sudanese Red Sea, v., on the Polyplacophora, or Chitons," by E. R. Sykes. "A Note on *Loligo media* (L.)," by Anne L. Massy. "Mollusca, Zoological Record," by E. R. Sykes, completed by S. Pace and R. M. Pace; and the usual periodicals received in exchange.

Donation to Cabinet announced and thanks voted : By Mr Geoffrey D. H. Carpenter, a set of *Acanthinula lamellata*, from Burnham Beeches, Bucks.

New Members Elected.

Mr. Francis N. Balch, 60, State St. (Rooms 504-507), Boston, Mass., U.S.A.
Rev. R. E. Thomas, M.A., St. Martin's Clergy House, Salisbury.

Candidate Proposed for Membership.

Mrs. A. E. Gill, 2, Stanley Bank, Steven Street, Stretford.

Papers Read.

"*Vertigo alpestris*, its distribution in W. Lancashire and Westmorland," by Messrs. Dean and Kendall.

"Report of the Grange Ramble, June 10th, 1908," by J. Wilfrid Jackson.

"Note of a shell-collecting trip in Ireland," by F. H. Sikes.

"On the use of certain preoccupied names for European Mollusca," by Bryant Walker.

Exhibits.

By Mr. G. D. H. Carpenter : *Zonitoides excavatus* var. *vitrina*, from Burnham Beeches, Bucks.

By L. St. G. Byne : A curious monstrosity of *Cypræa moneta* with produced spire.

By Mr. Chas. Oldham : A number of very fine *Limax flavus*, from hollow in a decaying sycamore on the Plestor, Selborne, Hants.

By Mr. J. D. Dean and Rev. C. E. Y. Kendall : Thirty locality sets of *Vertigo alpestris* and *V. pusilla*, with enlarged coloured drawings of shells and animals (by Mr. Dean), to illustrate their paper.

By Mr. J. Kidson Taylor : Series of *Helicigona lapicida*, shewing variation from very dark to light forms, from Miller's Dale, Derbyshire.

By Mr. J. Wilfrid Jackson : (a) A large series of Pleistocene shells from the "shell-bed" at Swanscombe, Kent, including *Unio littoralis*, *Corbicula fluminalis*, *Pisidium amnicum*, *P. astartoides*, *Bithynia tentaculata*, *Valvata piscinalis*, var. *antiqua* and var. *naticina*, *Neritina grateloupiana*, and *Paludetrina ventrosa*, also *Neritina danubialis* from Vienna, the nearest living form to *N. grateloupiana*. (b) *Acicula lineata* and var. *alba* from Eggerslack Wood, Grange; *Succinea oblonga*, *Limnaea palustris*, *Jamiania muscorum* type, var. *edentula*, and a form with two denticles at the base of the last whorl,? var. *bigranata*, from Meathop Fell; *Cæcilioides acicula* from Grange, Lancs.

By Mr. C. H. Moore: *Ancylus fluviatilis* (large) and *Vitrea cellaria*, from Stalybridge; *Helix aspersa*, from Nuneaton; *Helicella caperata*, *Jamiania cylindracea* and *Vitrina pellucida*, from Lytham; *Vitrina pellucida*, *Vitrea crystallina*, *V. alliaria*, *V. nitidula*, *V. pura* and var. *nitidosa*, *Pyramidula rupestris*, *P. rotundata*, *Helicigona lapicida*, *H. arbustorum*, *Helix hortensis* and *Cæcilianella acicula*, from Miller's Dale. Also British *Rissoæ*.

Report of the Grange Ramble, June 10th, 1908.

A most enjoyable day was spent at Grange, on Whit-Wednesday last by a party of members of the Conchological Society. Some fifteen persons, including ladies, took part in the ramble, which proved on the whole fairly successful.

As on former occasions, the habitat of *Succinea oblonga* at Low Meathop Marsh was first visited to enable several of the members to personally collect this interesting species. It proved fairly abundant in the damp ditches, at roots of grass, &c., in the meadow, and under stones by the roadside, in all stages of growth. The absence, however, of adult examples was noticed. The usual percentage of perfect, but dead shells occurred as on previous occasions, and it would be most interesting to discover what the causes of this are.

As pointed out by the writer last year, some portion of the destruction of this and other species might be attributed to the ordinary red centipede (*Lithobius forficatus*), a suggestion based on the fact of finding, on at least two occasions, specimens of the latter in close proximity to cleaned out shells of *S. oblonga* and others. Beetle larvæ, slugs, and other species of mollusks, especially *Vitreæ*, might also be guilty of no little assistance in the work.

Though occurring in good numbers in the meadow below, only very few specimens of *S. oblonga* were noticed on the cliff face and ledges, where last September the writer obtained specimens at the height of twenty-five feet from the ground. On the marsh the shells were very numerous in the mice runs, and a haul of about twenty specimens was made on mice droppings.

The numerous already recorded species occurred here and in the intermediate neighbourhood, though perhaps not in such great abundance. An additional fresh-water species was added to the list in the shape of *Limnæa palustris*. *Jamiania secale*, an addition made by the writer last year, was much sought for but failed to put in an appearance, owing to the dry state of the herbage, etc.

With reference to the specimens of *Jamiania muscorum* occurring here, a fact which appears to have been overlooked on previous rambles is that the great proportion of them is of the typical form, possessing a well-defined denticle, deeply seated in the middle of the base of the last whorl. A few specimens occur of the var. *edentula*, and I obtained a specimen possessing two denticles in the position usually occupied by the single denticle, and in this respect differing from the var. *bigranata* Rossm., which has one denticle at base of columella and another well within the outer lip.

Though the type occurs at Meathop in such great abundance, the reverse is the case across the Kent estuary at Silverdale, Warton, etc., and the prevailing form is var. *edentula*, in fact one very rarely gets a typical specimen.

Some nice specimens of *Succinea elegans* were obtained at the road-side on the way back to Grange, and another specimen (dead) of *Vitrea lucida* fell to the lot of Mr. J. D. Dean, at the original habitat on Lindale Road. Eggerslack Wood and the adjoining pasture were then visited and the usual quota of species obtained. One of the party, Mr. F. H. Gripper, had the pleasure of

finding six white examples of *Acicula lineata*, along with several of the type, in less than a quarter of an hour, and later in the day was the successful finder of *Cæcilioides acicula*,—a notable addition to the Grange list—which occurred near the Fire Station, on Hampsfell Road.

Numerous specimens of what Mr. A. S. Kennard has named *Vitrea scharffi* were obtained amongst the damp grass in the pasture, where also were noted some interesting slugs including several specimens of *Arion subfuscus* and *Arion ater* var. *plumbea* and var. *alba*.—J. W. JACKSON.

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"*Arion ater* var. *castanea* at Newsome," by W. E. L. WATTAM.

"*Paludestrina confusa* at Saltfleetby," by C. S. CARTER.

"*Petricola pholadiformis* in Lincs. [about Mablethorpe and Sutton-on-Sea]," by C. S. CARTER.

Journal de Conchyliologie, vol. liv., nos. 3-4, April-May, 1907.

"Contribution à la Faune Malacologique de l'Indo-Chine," by PH. DAUTZENBERG and H. FISCHER [3 plates].

"Le Genre *Placostylus* dans la Nouvelle-Zélande," by HENRY SUTER [plate]. "Description d'une Nouvelle Espèce Terrestre Néo-Calédonienne" [*Trochomorpha (Videna) marteli*], by PH. DAUTZENBERG [plate]. "De la Présence d'un *Cypræa vinosa* Gmelin dans une Sépulture Franco-Merovingienne," by PH. DAUTZENBERG [text-figures]. "Sur quelques Déformations chez des *Cypræa* de la Nouvelle-Calédonie," by PH. DAUTZENBERG [plate]. "Descriptions of Two New Species of *Nassa* [*N. manillata* and *N. oberwimmerei*] from Fiji and New Caledonia," by H. B. PRESTON [text-figures].

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The Nautilus, vol. 21, nos. 1-8, May-Dec., 1907.

"The Differences between the Two New England Species of *Acmaea*," by H. JACKSON, jr. [plate and text-figures of radulæ]. "Pulmonates of the Matinicus Islands, Maine," by A. H. NORTON. "A List of Land and Freshwater Shells of Yemassee, South Carolina," by J. B. HENDERSON. "Some New Eocene Fossils from Alabama," by T. H. ALDRICH [plate]. "The Origin of the Lung in *Ampullaria*," by W. K. BROOKS.

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Records of the Australian Museum, vol. vi., nos. 5-6, July 1907-March, 1908.

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Nachrichtsblatt der Deutschen Malacozologischen Gesellschaft, parts 2-4, April-Dec., 1907.

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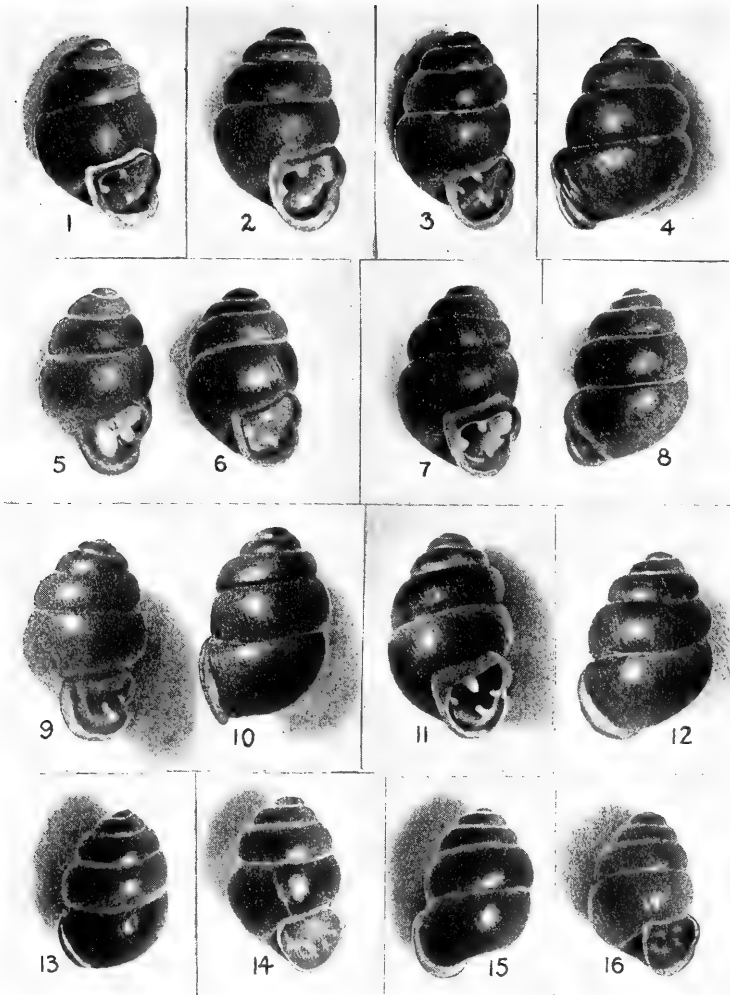
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“**Monograph of the Land and Freshwater Mollusca of the British Isles,**”
 by JOHN W. TAYLOR (part 15, pp. 65-144).

On the cover of this part Mr. Taylor describes and figures as new to science the Irish species of *Vitrina*, which was first identified by him with *V. elongata* Drap. (*Irish Naturalist*, 1907, p. 225) and subsequently with *V. pyrenaica* Fér. by Mr. Bowell (id., 1908, p. 94), and calls it *V. hibernica*.

By omitting detailed lists of localities in the case of ubiquitous species, Mr. Taylor is now appreciably quickening the progress of his work, and we do not think that anything is lost by such omission. The present part finishes *Hyalinia*, and also gives us *Zonitoides excavatus* and part of *Z. nitidus*. There is one coloured plate, figuring all the species of these two genera on the crawl; but the *Zonitidae* do not lend themselves to colour-printing, and though this is by no means an unsuccessful attempt to represent them *au naturel*, yet it would not be of material aid for purposes of identification. The letterpress is as thorough and exhaustive as usual. Under *Euconulus fulvus* the American forms are fully dealt with. The photographic portraits and other insets continue to enhance the interest of the work.

COLOUR VARIATION IN SOME BRITISH SLUGS.

(Presidential Address delivered at the Annual Meeting, Oct. 17, 1908).

By WALTER E. COLLINGE, M.Sc., F.L.S., F.E.S.

IN thinking over what subject I should choose for my Presidential Address, it occurred to me that probably the subject I had most recently been working at would be the one most likely to interest you.

It is not my intention to enter upon so complicated a physiological study as colour variation, even in so limited a group of animals as our British slugs, but rather to describe a series of experiments which have now extended over some years in connection with two or three of our commonest British slugs.

I have at different times pointed out that there is a tendency for certain, if not all, species to vary in well-marked directions so far as colour is concerned, and of these colour varieties various minor colour variations are constantly taking place, due in part to food, habitat, and other causes, but that such minor variations are not constant, *i.e.*, not perpetuated in the offspring.

This opinion was largely founded upon observations during the last twenty-five years, in examining large numbers of the colour varieties of the different British species. So far as I am aware, there is no actual experimental evidence proving or disproving this view, and it therefore seemed highly desirable that a series of carefully-planned experiments should be made with two or three common species, and for this purpose I chose *Arion empiricorum* Fér. and *A. subfuscus* Drap.

In work of this character, as might only naturally be supposed, many of the experiments were failures, owing to death, disease, and other causes; a number, however, were most successful, and it is these I wish to place on record.

1. *Arion empiricorum* Fér.—As is well known to all students of the slugs, this large black species has a white, a brown, and a red variety, and also a series of varieties in which the dorsum is different in colour from the lateral portions of the body. Such varieties are: *alba* Linn., *castanea* Dum. and Mort., *rufa* Linn., and *albolateralis* Roebuck.

In the first experiment, eggs deposited by the var. *castanea* paired with the typical form were taken. Of thirty-nine eggs, twenty-four specimens were hatched and reared to maturity; and of these, twelve were typical of the species excepting for slight variations on the foot-

fringe, ten were referable to var. *rufa*, and two to var. *castanea*. Of this second generation, the var. *rufa* was paired with the var. *castanea*, and fourteen eggs were hatched and reared to maturity. Of these fourteen, four were typical of the species, eight were referable to var. *rufa* and two to var. *castanea*.

A fourth generation was produced by again pairing two specimens of the var. *rufa*, and of fifteen specimens reared, two were typical of the species and five referable to sub-varieties of *castanea*.

A fifth generation, produced by again pairing two of the var. *rufa*, gave the following result:—Sixteen eggs were reared, of which twelve were typical of the species, two sub-varieties of *rufa* and two sub-varieties of *castanea*.

In a second experiment made with this species, two specimens of the var. *albolateralis* were paired, and twenty-two of the progeny were reared to maturity. All were typical forms excepting two which were referable to the var. *scharffi* of Cockerell.

The results of these and other experiments all tend to point to the following fact:—That the species *Arion empiricorum* Fér. shows a decided tendency to vary in four well-marked directions, viz., the four varieties mentioned above, but that these are only colour variations and by no means constant.

2. *Arion subfuscus* Drap.—As I have elsewhere¹ pointed out, the three principal varieties of this species are a red, a grey, and a yellow form, and these three vary in a minor degree, giving rise to colour variations which might well be classed under the variety. In quite a large number of cases, where the young have been reared to maturity, this tri-fold variation has been most marked, and where the varieties have been bred from, the minor colour variations have invariably been obtained. In confirmation of this, three somewhat lengthy experiments may be detailed.

Twenty-four eggs produced by the var. *griseus* Cllge. with var. *succineus* Bouill. gave the following results:—

10 typical *A. subfuscus*.

8 var. *griseus*.

4 var. *succineus*.

2 in which the dorsum was yellowish-brown and the lateral portion of the body grey. (Allied to var. *ferussaci* Kalen.).

The two varieties were paired, but only five eggs were reared, all of which were typical forms.

Two *subfuscus* were next paired, and forty eggs were hatched and

reared to maturity; of these

- 27 were typical *A. subfuscus*.
- 4 var. *griseus*.
- 5 var. *succineus*.
- 2 var. *krynickii*.
- 2 allied to the var. *lateritius*.

One of the var. *lateritius* was paired with a var. *succineus* from a former brood, and eighteen of the progeny were reared to maturity, of which seven were referable to the var. *succineus* and five to the var. *lateritius*.

Incidentally, some interesting colour variations were obtained in the foot-fringe of the different varieties. As no useful purpose would be served by describing these, I merely give the number of variations for each species and variety:—

| | | | | |
|---------------------------|---|---|---|----|
| <i>Arion empiricorum</i> | - | - | - | 22 |
| var. <i>castanea</i> | - | - | - | 14 |
| var. <i>hiberna</i> | - | - | - | 5 |
| var. <i>rufa</i> | - | - | - | 12 |
| var. <i>alba</i> | - | - | - | 3 |
| var. <i>albolateralis</i> | - | - | - | 14 |
| <i>Arion subfuscus</i> | - | - | - | 15 |
| var. <i>griseus</i> | - | - | - | 6 |
| var. <i>succineus</i> | - | - | - | 14 |
| var. <i>lateritius</i> | - | - | - | 12 |

Malacologists would seem now agreed to allow a species or variety to vary within a certain limit, and to discountenance sub-species and sub-varieties. It is, and always will be, a difficult matter to say where the limiting line should be drawn, particularly so with beginners or those with little experience. The longer one devotes attention to these interesting molluscs, the clearer does it become that the endless sub-varieties rather impede than facilitate progress.

So far as the two species of slugs here dealt with are concerned, it would appear that even the well-marked colour varieties are less stable or constant than we have hitherto supposed, and that the minor colour variations are almost endless in number and of little importance to the student of malacology or zoology.

Pyramidula rotundata m. **sinistrorsum** in Bucks.—On July 11th I found a small sinistral *Pyramidula rotundata* at Burnham Beeches, among dead leaves. This piece of ancient forest shelters a very interesting set of molluscs.—J. E. COOPER (Read before the Society, Sept. 9th, 1908).

**ON THE USE OF CERTAIN PREOCCUPIED NAMES
FOR EUROPEAN MOLLUSCA.**

By BRYANT WALKER.

(Read before the Society, June 17th, 1908).

THE modern system of nomenclature has by process of evolution become a science, so elaborate and intricate, that only the most expert are capable of applying it, and even they, not infrequently, are entirely at variance as to what name should be used in a given case. At this time, no one will deny the justice of the rule of priority in specific description, nor the absolute necessity for its strict enforcement. The equitable considerations, which would raise a statute of limitations in favour of names in general use and of long standing, would, in the absence of any court of final and unquestioned jurisdiction, be a constant source of controversy and only result in further confusing a subject altogether too involved and complicated.

Various attempts to compile a code of laws dealing with the entire subject and acceptable to the scientific world have been made. The latest and best, known as the International Code of Zoological Nomenclature is, unquestionably, the result of much careful consideration and painstaking labour on the part of the eminent scientists who have participated in its compilation. And in so far as it represents a codification of the common or unwritten law, which has grown up under the necessities of scientific work, and formulates the the practical rules adopted by the leading specialists in systematic zoology, no doubt it does justice, so far as under such circumstances exact justice can be done, to all past and present workers in that branch of science.

But when the Code goes beyond this and by direct legislation promulgates rules which, however wise for future use, have not been generally recognized in the past, and attempts to give them a retroactive effect, a serious question is raised both as to their justice and their wisdom. In such cases, it would seem that a desire for a technical perfection in the Code has been permitted to over-ride both justice and expediency, and result in confusing, rather than clarifying, the existing nomenclature. An example of this kind is to be found in Article XI of the Code which declares that specific and sub-specific names "from a nomenclature standpoint are co-ordinate—that is, they are of the same value," which being interpreted is—that a name which has once been used to designate a species, sub-species, variety or form cannot again be used for any of these purposes in the same genus.

That this rule is necessary so far as specific names are concerned is obvious. But its application to sub-specific and varietal names is of comparatively recent date and would seem to be neither necessary nor expedient. The only reason for its adoption that can be urged is that the line between species and varieties is a fluctuating one, and in many cases, a matter of individual opinion; and that in case a variety, which bears the name already in use for a species, is raised to specific rank, its varietal name would (if subsequent) become a homonym and have to be changed. While this is undoubtedly true, the real question is whether it is not better to deal with such comparatively rare cases in that way rather than to precipitate the tremendous confusion that will necessarily result if the rule of the International Code is to be enforced in the nomenclature of the Palæarctic Fauna.

That the rule has never been recognized by the European conchologists is evident upon a most cursory glance at the Conchological Society's "List of Brit. L. & F. W. Shells" or Westerlund's Palæarktischen Fauna, where, in species after species, varietal names such as *major*, *minor*, *alba*, *ornata*, etc., etc., are recognized as perfectly valid. Indeed, there is no good reason why there should not be a var. *major* and a var. *minor* (if the facts justify the description at all) of every species in the list. There would be no practical confusion as the varietal name is always used in connection with the specific one.

Moreover, cases where forms described as varieties are subsequently given specific rank have always been comparatively rare, and in these days of nice distinction are even less likely to occur.

On the other hand, the enforcement of the rule (and it should not have been promulgated, if it was not to be enforced) will result in the renaming of hundreds of well recognized varieties and the creation of an equal number of unnecessary synonyms. And all for no practical purpose, except perhaps the enhancement of the fame of the closet naturalists at the expense of those, who in good faith and in accordance with the recognized usage of their day have done original investigation.

Ex post facto laws are usually unjust, are abhorrent to the judicial mind and in many countries are void in their inception. It would certainly seem that in so far as Article XI makes specific and varietal names in force before its adoption of co-ordinate rank, it is an *ex post facto* law of the rankest kind and should never have been adopted.

As a practical example of the evils that will result from the application of this rule, take the case of the use of the var. *major*.

It appears from the Society's List that four British *Helices* have recognized varieties under this name. Moquin-Tandon describes

seven varieties under this name among the *Helices* of France. How many vars. or forms "*major*" are recognized among the eleven hundred species recorded by Westerlund, time is lacking to ascertain, but they must be very numerous.

Helix major, an American species, was formally described by Binney in 1837.

Under the International Code, all of these names will have to be changed, with the possible exception of the one, which may have priority not only over the *major* of Binney but over all the other vars. "*major*" that have ever been described in the genus *Helix*. If there is such an one, Binney's use of the name was improper and this well-known American form must be rechristened. This is the result in simply a single case. Multiply this by the cases of duplication of varietal names in the whole Palæarctic Fauna and a whole volume would be required to record this wholesale slaughter of the innocents.

It would be eminently appropriate if the conchologist, who undertakes this revision, would rechristen the largest and most conspicuous of these varieties as var. *expostfacta*.

It is possible, perhaps, that the eminent scientists, who co-operated in formulating and securing the adoption of Article XI, did not fully appreciate the unfortunate and wide-spread confusion that must inevitably result from the practical application of the rule to the existing nomenclature.

Again, if the rule is to be enforced (and if it is not to be strictly construed, it should be abrogated) the following European Lymnæas will have to be re-named, as their names are preoccupied for American species, assuming that the dates given by Westerlund are correct.

L. peregra v. *curta* Cless. (1876), not *L. curta* Lea (1841).

L. peregra v. *decollata* Anders (1881), not *L. decollata* Mighels (1841).

L. palustris v. *curta* Cless. (1873), not *L. curta* Lea (1841).

L. turricula v. *gracilis* Haz. (1881), not *L. gracilis* Zieten (1830) nor Jay (1839).

In view of the fact that Article XI is already embodied in the International Code and the probability that this Code will be generally recognized, it behoves the European conchologists, who have become so adept in recognizing varietal distinctions, to take cognizance of the present condition of affairs and, until the article shall be amended, conform to its requirements, if they desire to retain the credit of their scientific labours.

THE LAND AND FRESHWATER MOLLUSCA OF GRANGE-OVER-SANDS.

By HARRY BEESTON.

(Concluded from page 208).

Jaminia cylindracea (Da Costa).—A ubiquitous species. It is to be found in abundance under stones on tops of walls, and in some places seems to be very partial to stonecrop. Haggs Lane, Cartmel; Eggerslack Wood; Grange Fell Road; Charney Well Lane; Windermere Road; Churchyard wall; Allithwaite Road; Cartmel Road; Lindale; Holme Island and Low Meathop (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Grange Fell (W.D.R.), *J. of C.*, vol. 4, p. 314.

var. **curta** Westerlund.—Common; especially at Cartmel on the walls among stonecrop. Haggs Lane, Cartmel; Eggerslack Wood (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

var. **albina** Moquin-Tandon.—This pretty variety existed in two well-established and distinct colonies, almost to the exclusion of the type; in fact, not more than ten per cent. of the latter were taken in Hampsfell Road. Here the animals seemed to prefer in dry weather to conceal themselves among the dead dry leaves of laurel, a single leaf sometimes containing five or six specimens; and in addition, this colony appeared to be absolutely confined to the laurel hedge, as at either end of it not a single shell could be found, either variety or type. On the opposite side of the road, an ivy-covered wall, usually an excellent habitat for this species, seemed to be quite untenanted. The colony at Windermere Road was not so extensive, nor the species so abundant, being confined to a space of about half-a-dozen yards of wall. In this place the wall was quite bare of vegetation (except microscopic lichens), and all the snails were on the garden side of the wall (north), which appeared damper, and was less exposed to the sun and wind. On a dry day not a shell could be seen; almost without exception the colony consisted of the variety. Hampsfell Road; Windermere Road; one specimen only at Haggs Lane, Cartmel; Hospice; Eggerslack Wood, one shell (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

***Jaminia muscorum** (Linné).—Evidently this is one of the rarer species of the district, for it was found in one locality only by the writer, viz.: among stonecrop (*Sedum acre*), and at the roots of grass tufts growing between the stones, on the top of the churchyard wall. It had for companions *H. caperata*, *P. rupestris*, *V. pulchella*, *V. radiatula*, and *J. cylindracea*, and was the

commonest shell next to *J. cylindracea*. Meathop Fell, September 14th, 1907 (J.W.J.).

var. **brevis** Baudon.—Meathop Fell, September 14th, 1907 (J.W.J.).

Vertigo antivertigo (Draparnaud).—A single specimen of this shell was taken during the September, 1907 excursion, by Mr. Jackson, at Meathop Fell, among a quantity of *V. pygmæa*, under stones, *J. of C.*, vol. 12, p. 110.

Vertigo substriata (Jeffreys).—Sparingly. Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113, and (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Vertigo pygmæa (Draparnaud).—Odd specimens of this tiny species occurred in several places, but never in any numbers. Mr. G. H. Taylor reports: "Common under stones at Meathop Marsh," and Mr. Jackson says: "Occurred abundantly by the road-side under stones." Windermere Road; Hags Lane, Cartmel; on wall and under log of damp timber on Meathop Marsh; Eggerslack Wood (R.S.), *J. of C.*, vol. 9, p. 113.

Vertigo alpestris (Alder).—Where it occurred, this tiny snail was fairly plentiful, but searching for it was most tiresome work, especially in dull weather. It occurred chiefly under the flat stones on the tops of the walls in various parts of the district, but especially in the vicinity of Eggerslack. In showery weather a greater number of specimens could be obtained by carefully examining the dead leaves and decayed twigs and bits of bark lying in the crevices of the stones, than by examining the stones themselves; sometimes as many as half-a-dozen being obtained from a bit of twig a few inches long. In dry weather, the underside of the top stones of the walls would yield an odd shell or two. To be successful in finding these tiny shells, good eyesight, and an almost unlimited amount of time, patience, and perseverance are a *sine qua non*. If one is limited as to time, success almost to a certainty will be in vain. From a dozen to twenty specimens per hour, under favourable conditions, the writer considers a satisfactory result, that is when one is searching a locality where the animals are known to be fairly plentiful. This species was first recorded for the district by Mr. C. H. Moore, in 1902, from Holker. Hags Lane, Cartmel; Grange Fell Road; Windermere Road; Eggerslack Wood; Meathop Marsh (wall); Hampsfell Road; Lindale Road and Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Vertigo pusilla Müller.—What has been said of *V. alpestris* equally applies to this species. It frequently occurred with it, but was certainly not so abundant. It frequents the same places, and

was found under like conditions; also at Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Balea perversa (Linné).—An immense colony of this snail was found in possession of the top stones of part of a wall at Grange Fell. In mild rainy weather, the animals came out of their "hibernaculum" literally in thousands; in some places crawling over each other in dozens. Any stone overturned at hazard revealed "bunches" of the snails in all stages of growth, from the size of a half-grown *V. alpestris*, to full grown specimens, 7 mm. in altitude. The curious thing about this great colony was the fact that the wall appeared absolutely destitute of ordinary vegetation, except almost microscopic lichens. Not even a tiny clump of moss was to be seen; and the question suggested by this was—on what do the animals feed? They evidently subsisted on something which could be obtained easily and in quantity, or such a thriving crowd would not be there. It is quite likely that the lichens provided the necessary sustenance.

In the other two localities, where only single specimens were found, the walls were covered with many kinds of plants, from luxuriant grasses and other flowering plants, to great patches of moss, lichens, and two species of *Sedum*—the last three at Windermere Road more especially. Although conditions seemed suitable to the existence of snail life, yet it was practically absent except for the single example of *B. perversa*. Hagg's Lane, Cartmel; Spring Bank Road (Grange Fell); Windermere Road; Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Clausilia laminata (Montagu).—This snail is by no means abundant; one might venture to call it uncommon in the district. It seems confined chiefly to the wooded parts, the eastern side of Eggerslack Wood, which lies lower and is moister, supplying the majority of specimens taken. These were obtained from the thick moss of the walls, seeming to prefer these places to the denser parts of the wood. The largest number obtained at one time was nine, all crawling upwards from the base of the wall. No varieties were noticed. Eggerslack Wood; Hampsfell Road; Lindale (W.D.R.), *J. of C.*, vol. 4, p. 314; Low Meathop (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Humfrey Head, August, 1907 (G.H.T.).

Clausilia bidentata (Ström).—This species perhaps ranks next to *J. cylindracea* and *P. rupestris* in point of abundance and wide range of distribution. It seemed to be everywhere. During humid showery weather the snails came out of their hiding places in myriads, the walls, especially in damp situations, being some-

times thickly crowded with the animals, all travelling upwards, as though desirous of reaching the highest parts of the walls in quick time. Three or four square inches of surface often produced a dozen or more. A few gleams of warm sunshine seemed quickly to check their advance, and caused the animals to withdraw into their shells; and in this condition they would hang with apices all pointing downwards until another shower fell, when the advance began again. But it was very astonishing how quickly they disappeared in dry weather—in a place where perhaps only the day before the shells were so numerous, not an individual could be seen.

It is this extreme sensitiveness of many species of mollusca to the approach of rain, causing them to emerge from their hiding-places so quickly, that has given rise to the popular rustic belief in "showers of snails." This phenomenon is particularly noticeable with such species as *H. virgata*, *H. caperata*, and the larger *Helices*. Higgs Lane, Cartmel; Spring Bank Road; Cartmel Road; Grange Fell Road; Charney Well Lane; Windermere Road; Lindale; Cart Lane; Meathop Road; Eggerslack Wood; Lower Lindale Road; Holme Island and Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Holker, 1903 (J.W.J.).

var. **cravenensis** Taylor.—Fairly common. Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

*var. **gracilior** Jeffreys.—Two or three specimens only with the type. Locality uncertain.

var. **tumidula** Jeffreys.—Occasional examples only with type. (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Succinea putris (Linné).—Mr. G. H. Taylor (August, 1907) reports this species as "common" at Low Meathop, although the writer did not note it.

Succinea elegans Risso.—A few small dwarfed shells were found with *Limnæa pereger* and *Pisidia*, in a moist weedy ditch, by the roadside, at Up Holker, near Cartmel. Meathop Marsh (J.W.J.). See *Naturalist*, May, 1907, p. 173.

*var. **albida** Taylor.—Two examples with the type in a shallow ditch at Meathop.

***Succinea oblonga** Draparnaud.

?var. **arenaria** Bouchard.—This rare and local shell was discovered by the writer quite accidentally, while searching for *Vitrea radiatula*, near the rocks at the foot of Meathop Fell, and first recorded in the *Naturalist* (January, 1907, p. 31). The animals were found adhering to the under-side of stones and pieces

of confervæ-covered brick-bats in long matted grass at the bottom of a shallow roadside gutter. They were at first taken to be a small dwarfed form of *S. putris*, but when cleaned and examined, they had the distinguishing characteristics of *S. oblonga*; and upon being submitted to Mr. C. Oldham, they were pronounced to be that species, and subsequently this was verified by Mr. J. W. Taylor of Leeds. Five shells only were originally found—four alive and one dead.

Mr. Davy Dean, of Lancaster, had in 1903 found at Hale Moss, near Burton-in-Kendal, five or six miles away, what was at first pronounced to be *S. oblonga* by Dr. O. Böttger, of Frankfort, to whom they were submitted by Mr. A. S. Kennard, but after much controversy, these are now declared not to be *S. oblonga* (*J. of C.*, vol. 12, p. 103), so that the Meathop locality is up to the present the only one in this part of the country to produce the true species. A comparison of the Meathop specimens with those from Hale Moss, shows a very striking contrast; the shells from the latter are larger, thicker and more deeply coloured than those from the former place, and approach the var. *ochracea* Betta of *S. elegans*. They appear coarse and clumsy when compared with the true form, which is semi-transparent and delicate in shape and texture.

Since 1906, parties of conchologists have made excursions to the Meathop locality for the purpose of collecting *S. oblonga*, and studying its habits; and the place appears likely to become quite historical—a veritable Mecca of snail hunters (vide *Naturalist*, May, 1907, p. 173, for particulars of these pilgrimages).

An extract or two from these articles may not be out of place here, as some members of the Society may not have read them.

Mr. Jackson writes:—"Our main efforts were devoted to ascertaining the distribution of *S. oblonga*, taken for the first time in August last year (1906). Our first efforts were, however, disappointing, and we decided to try fresh ground some little distance away from the ditch where Mr. Beeston discovered it. In this we were more successful, and were soon rewarded by finding a dead adult specimen. This was shortly followed by others, among which were a few full-grown ones. We then became aware that the sides and bottom of the damp ditches in which we were working contained numbers of juvenile examples, all on the crawl, along with a number of other species. . . . We made our way back to Grange, examining other likely habitats for *S. oblonga* on the way. Near to a triangular piece of brackish water and marshy bit of ground, we were surprised to find the species again in evidence (all young specimens), at the roots of grass on the top of a low wall—a most unusual

habitat for *Succinea*; it is quite possible that they had been driven out of their usual marshy habitat by the inroads of the sea."

On September 14th, 1907, an excursion was planned for the purpose of again investigating the habitat of *S. oblonga*, and the leader, Mr. Jackson, has kindly supplied the following highly interesting report:—"I was surprised to find specimens of *S. oblonga* under the small stones resting on the ledges of rock at Meathop Fell, some six or seven feet from the ground, and I was determined to see how high up the Fell the species was to be found. With this object, I climbed up from ledge to ledge, to about twenty-five feet from the base, and found examples of the species the whole way. Some were in grass roots, others under stones, and a few found adhering to the rock face, covered in the usual manner with an incrustation of dirt, which made them difficult to see. How much further up the cliff they occur I cannot say, as my progress became very precarious, but it is most interesting and also extraordinary to find the species so high, and I think with such good evidence as this we might now class this species along with the many other climbing mollusks. Some of the specimens taken up the cliff, like their companions on the marsh, were dead, but in good condition, and I was keenly on the alert to find out if possible the cause of this. On two occasions I turned over stones and each time I found a specimen of the ordinary red centipede (*Lithobius forficatus*) in close proximity to cleaned-out shells of both *S. oblonga* and *H. rufescens*, and I am inclined to think that we must look to these creatures for the reason of finding so many dead examples of these and other species."

*var. **alba** Wright.—Five specimens in Aug., 1908, with the type at Meathop Marsh.

Carychium minimum Müller.—This tiny shell, inhabiting as it does only the dampest situations, is probably commoner and more widely distributed than the writer's researches revealed. Eggerslack Wood seems to be its favourite habitat, as with so many other moisture-loving species. Under rotting stumps of trees, decaying leaves and branches, and damp stones the snail was noted in some numbers. No doubt its minuteness, when one is in search of larger and more prominent species, causes it to be passed over unseen. Eggerslack Wood; Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Meathop Marsh (J.W.J.), *Naturalist*, May, 1907, p. 173.

Ancylus fluviatilis Müller.—A common shell on the stones in the river Eea at Cartmel. The shells were small, and thickly encrusted with confervæ.

var. **albida** Jeffreys.—Found sparingly in river Eea at Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Limnæa pereger (Müller *m*).—Owing to the lack of fresh-water streams and ponds, this and the other water mollusca are few in species and numbers. In a water trough (wooden) in a field at the foot of Beacon End (near cemetery), a single example was discovered, conveyed thither doubtless on the feet of birds, from the stream at Cartmel. A few small miserable eroded specimens were taken from a roadside rill, to the north of Cartmel. The streams to the east produced nothing. The marshy land between Grange and Low Meathop, being open to the inroads of the sea at high tides, is very brackish, and consequently almost destitute of freshwater shells. Low Meathop Road; Up Holker; Beacon End, Cartmel; Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

var. **maritima** Jeffreys.—Meathop Marsh (J.W.J.), *Naturalist*, May, 1907, p. 173.

Limnæa palustris (Müller).— Found “very sparingly and small” at Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; ditch, Meathop Marsh, June, 1908 (J.W.J.).

Limnæa truncatula (Müller).—This species was taken in two places in the marsh at Low Meathop, one of which was a roadside puddle a couple of yards square. It contained two or three adults only, but a great quantity of young, about the size of a pin's head. Several days of drought followed after they were first seen, and the pool became perfectly dried up, and to all appearance as hard as the road. Then a day or so later there fell some heavy rain, which filled the hollow again, and the snails appeared crawling about as lively as ever, as if the water had never dried up. Under such conditions, it is questionable whether any other water species could have survived. The water was never more than an inch deep, and there was scarcely any appearance of mud, not more the eighth-of-an-inch at most, merely the accumulation of a small quantity of road dust. To render the situation still more extraordinary as a habitat for mollusca, the ground immediately below the thin stratum of deposit consisted of cinders and refuse from gasworks, and railway ballast. The other habitat was also by the road-side, in a damp spot among grass, near the rocks at Meathop Fell (J.W.J.), *Naturalist*, May 1907, p. 173. All the shells were extremely small (even the adults) and stunted, as well they might be, considering the adverse conditions under which they contrived to exist. Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; Lower Allithwaite, August, 1907 (G.H.T.).

Planorbis albus Müller.—“A few only.” Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Planorbis spirorbis (Linné).—Lower Allithwaite, August, 1907 (G.H.T.).

Planorbis contortus (Linné).—“Common, but small.” Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Physa fontinalis (Linné).—“Two or three specimens only.” Cark and Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Aplecta hypnorum (Linné).—Fairly common, living, though not large; in ditch on the marsh (Meathop), with *Succinea oblonga*, etc. (J.W.J.), *Naturalist*, May, 1907, p. 173.

Mr. G. H. Taylor supplies the following information about this species:—“I found it in plenty at Lower Allithwaite (August, 1907) in a dry ditch, near to the railway crossing leading to Humfrey Head. The shells (dead) were accompanied by *Planorbis spirorbis* and *Pisidia*.”

Paludestrina stagnalis (Basterot).—One dead specimen on a ledge at Meathop Fell, carried there by flood early last year (1907) (J.W.J.).

Valvata piscinalis (Müller).—Common, and all of the turreted form. Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45; River Winster (C.H.M.).

var. **albina** Taylor.—Cark, 1903 (C.H.M.).

Pomatias elegans (Müller).—This shell seems comparatively rare and local in its range, and was taken in one locality only, viz.: in the hedgerow skirting the foot of Meathop Fell on the road to Lindale, beyond the gasworks to the north-east. The writer at first thought it quite likely that this locality would be its most westerly limit in the Grange district, the river Winster and the extensive marshland preventing its spread further to the west. This was only an opinion based on the fact that absolutely no evidence of it was apparent beyond this limit, although the species is very common across the river Kent, on Arnside Knott to the south, but it has since been found at Humfrey Head, four miles away to the south-west, and consequently it may yet be found between these two extremes. The discovery of the species at these two distant points seems fairly conclusive evidence that at some early geological period, the land was continuous here, and that the river Kent with the aid of the sea and other denuding agencies has long ago carried away this land, Arnside Knott, Humfrey Head, and the cliffs at Lindeth being the remnants of this destruction. Humfrey Head (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

var. **ochroleuca** Moquin-Tandon.—Occasionally found with type. Low Meathop (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

Acicula lineata (Draparnaud).—This species, like *A. lamellata*, completely eluded the search of the writer, although careful and patient attention was given to trying to discover it. It has been discovered in one locality only, viz.: Eggerslack Wood, and on occasions in some abundance, both type and variety. It was first recorded for the district by Mr. R. Standen, as far back as 1897.

The following extract with reference to this species is interesting (*J. of C.*, vol. 12, p. 94).—“(It) occurred abundantly in company with *A. aculeata*, *Vitrea pura*, *V. radiatula*, *Euconulus fulvus*, and *Carychium minimum*, in thick beds of beech leaves in Eggerslack Wood; the lower layers of rotting leaves were thickly permeated with the mycelium of some species of fungus, and amongst this the *A. lineata* swarmed, apparently feeding upon it.” It is also said to inhabit the various species of *Marchantia* (liverworts), which usually grow in moist situations. Eggerslack Wood, 1897 (R.S.), *J. of C.*, vol. 9, p. 113; (J.W.J. and C.H.M.), 1903, *J. of C.*, vol. 11, p. 45; (F.B.), *J. of C.*, vol. 12, p. 19.

var. **alba** Jeffreys.—Frequently obtained with the type, and in fair numbers, 1897 (R.S.).

Neritina fluviatilis (Linné).—Mr. Jackson says the specimens obtained are “a peculiar small black form,” possibly the var. *nigrescens* Colbeau. Cark and Low Holker (J.W.J. and C.H.M.), *J. of C.*, vol. 11, p. 45.

***Pisidium subtruncatum** Malm.—Two or three specimens only found with *L. pereger* and *S. elegans*, in a roadside ditch at Up Holker.

Pisidium pusillum (Gmelin).—“Only a few examples taken in ditch near the Fell.” Meathop Marsh (J.W.J.), *Naturalist*, May, 1907, p. 173.

Pisidium obtusale Pfeiffer.—A few specimens with *P. pusillum*.

Sinistral Helices near Scarborough.—I have the following sinistral monstrosities in my collection:—*Helicella caperata*, full grown and perfect, taken by myself at Ayton Road Quarry, in 1897; *Helicella virgata*, full grown and perfect, of the var. *lutescens*, taken by myself in Seamer village, 29th August, 1903.—W. GYNGELL (*Read before the Society*, Oct. 17th, 1908).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

374th Meeting, Sept. 9th, 1908.

Mr. J. W. Baldwin in the chair.

Donations to the Library announced and thanks voted :

“The Marine Fauna of Zanzibar and East Africa from Collections made by Cyril Crossland in 1901-1902: The Cephalopoda.” “Reports on the Marine Biology of the Sudanese Red Sea, VI., on the Cephalopoda,” by W. E. Hoyle. “Descriptions of New Species of Mollusks from the Pacific Coast of the United States, with Notes on other Mollusks from the same region,” by W. H. Dall. “*Physa acuta* Drap. im Botanischen Garten zu Kopenhagen (Dänemark);” “New Varieties of *Nanina belangeri* and *Corbicula fluminalis* Müller from India,” by Hans Schlesch. “Notes on the Cheshire Land and Freshwater Mollusca,” by Chas. Oldham. “Manual of Conchology,” part 76, by H. A. Pilsbry. “New Land Shells from Corea”; “New Land Shells of the Chinese Empire”; “New Land and Freshwater Mollusca of the Japanese Empire,” by H. A. Pilsbry and Y. Hirase. “On Japanese Species of *Corbicula*”; “Notes on *Succinea ovalis* Say, and *S. obliqua* Say,” by H. A. Pilsbry. “Malacology versus Palaeoconchology,” by B. B. Woodward. “Mollusca of Holocene Deposits of Thames River System,” by A. S. Kennard and B. B. Woodward (*from the respective authors*); and the usual periodicals received in exchange.

Donation to the Cabinet announced and thanks voted :

By Mr. Arthur Mayfield: Specimens of *Vertigo pygmea*, *V. antivertigo*, and *V. moulinsiana* from rejectamenta at Roydon Fen, East Norfolk—all new records for the district.

New Member Elected.

Mrs. A. E. Gill, 2, Stanley Bank, Steven Street, Stretford.

Candidate Proposed for Membership.

J. E. A. Jolliffe, 8, Dorchester Road, Weymouth.

Papers Read.

“Conchological Notes from the Argentine and Uruguay,” by Lionel E. Adams, B.A.

“Report of Field-Meetings of the London Branch,” by J. E. Cooper.

“*Pyramidula rotundata* m. *sinistrorsum* in Bucks.,” by J. E. Cooper.

“Note on the Occurrence of *Limax tenellus* in Halton Wood, Wendover, Bucks.,” by Chas. Oldham.

“*Vertigo antivertigo*, *V. angustior*, and *V. moulinsiana*, new records for East Norfolk,” by A. Mayfield.

“Two and Three-denticled Forms of *Jamnia muscorum* from Santon, Norfolk,” by A. Mayfield.

Exhibits.

By Mr. C. Oldham: *Limax tenellus*, found feeding on fungi under beech trees in Halton Wood, Wendover, Bucks.

By Mr. Lionel E. Adams: A set of freshwater shells from Montevideo, to illustrate his paper, and *Limax arborum* from Headley Lane, Box Hill, Surrey.

By Mr. G. H. Taylor: *Helix virgata* from Clitheroe and Barnetby; *Helix itala* from Wootton-under-Edge; *Zonitoides nitidus* from Low Meathop, Grange; *Vitrea alliaria* from Greenmoor, Penistone; *V. glabra* from Clitheroe.

By Mr. Arthur Mayfield: *Vertigo pygmea*, *V. antivertigo*, *V. moulinsiana* and *V. angustior* from rejectamenta gathered at Roydon Fen, East Norfolk; bidentate

and tridentate forms of *Jamnia muscorum* from Santon Warren, Thetford St. Peter, Norfolk (all presented to the Society's collection).

375th (Annual) Meeting, Oct. 17th, 1908.

Mr. Edward Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange for the *Journal*.

Appointment of Auditors.

Messrs. C. H. Moore and Fred. Taylor were appointed Auditors.

Appointment of Scrutineers.

Messrs. J. Ray Hardy and J. W. Baldwin were appointed Scrutineers.

New Member Elected.

J. E. A. Jolliffe, 8, Dorchester Road, Weymouth.

Resignations.

Loftus St. George Byne.

W. J. Hall.

W. L. May.

Reports and Balance Sheet.

The Annual Report of the Council (see p. 253), and the Treasurer's Report, including the Balance Sheet for 1907 (see p. 167), and the Interim Balance Sheet up to Oct. 1st, 1908 (see p. 254) were presented and adopted.

Reports of the Leeds and London Branches (see p. 255), and the Recorder's and Librarian's Reports (see p. 254) were presented and adopted.

Election of Officers and Council.

The Scrutineers reported that the Officers and Council for the ensuing year had been elected as given in the list on p. 228.

Papers Read.

"Land and Freshwater Mollusca from Tooting, London, S.W.," by A. W. Stelfox.

"Sinistral Helices near Scarborough," by W. Gyngell.

President's Address.

In Mr. Collinge's unavoidable absence his address on

"COLOUR VARIATION IN SOME BRITISH SLUGS" was read by Mr. Edward Collier.

A vote of thanks to the President for his Address and for his valuable services during two years of office was moved by Dr. W. E. Hoyle, seconded by Mr. W. Moss, supported by Mr. R. Welch, and passed unanimously by the meeting.

A vote of thanks was also accorded to the University authorities for the use of the Museum buildings for the Annual and Ordinary Meetings of the Society.

The Secretary was instructed to write conveying the same to the Vice-Chancellor.

Exhibits.

By Mr. Edward Collier: Shells collected in North-West Donegal during Sept., 1908, including a fine series of *Helix nemoralis* from several localities, many of them being var. *albolabiata* von Mart., various bandings, looking very much like *H. hortensis*. The var. *citrinazonata* Ckll., from Carrickfin, were very fine and associated there with var. *albolabiata* (123)(45). *Limnæa auricularia* var. *acuta* Jeff., and its var. *albida* from Carnboy Lough, Carrickfin, and Bunbeg, and *L. peregra* var. *albida* from the same places were very good; also a very fine var. from the Island of Inishmain, off Bunbeg. *Helix itala* L., very variable, from

several localities, and a very small form of *Clausilia bidentata* from near McSwine's Gun, Horn Head. *Helix nemoralis* var. *olivaceozonata* from Magilligan, County Derry. This answers in all respects to var. *roseozonata* and var. *citrinazonata*, but the bands are olive-coloured 12345 and (123)(45) with an olive-coloured mouth.

By Dr. G. W. Chaster: Fish-oil Cruise lamp made of two valves of *Modiola modiolus*, suspended with cords of sinew—Farøe Islands.

By Mr. T. Edwards: *Oliva*, *Mitra*, and a series of malformed carinate *Buccinum undatum* from Kentish coast.

By Mr. R. Welch: Whole-plate platinotype photographs of typical habitats of land and freshwater mollusca; *Helix nemoralis*, heavy large sub-fossil (Dog's Bay) form.

By Mr. R. Cairns: Specimens of *Cypræa arabica*, *C. reticulata*, *C. histrio*, and *C. intermedia*, with vars. *nigra*, *eglantina*, etc.

By Mr. J. W. Baldwin: Vars. of *Cypræa tigris* L.

By Mr. F. Booth: Vars. of *Helix caperata* from localities in the north of England; *Vertigo alpestris* from Bingley and Ingleton; *Azeca tridens* var. *crystallina*, Addingham, Yorks.; *Cochlicopa lubrica* var. *hyalina* from Silsden, Yorks.; and *Bulimulus revoili* Bourg. from Somaliland.

By Rev. L. J. Shackelford: *Voluta ancilla* Sol., *V. exoptanda* Sow., *V. papillosa* Sw., *V. verconis* Tate, *V. turneri* var. *daymanii*, *V. punctata* Sw., *V. virescens* Sol., *V. africana* Reeve, *V. roadknightæ* McCoy, *V. pretexta* Rve., *V. cymbiola* Chem., *V. junonia* Chem., *V. ponsonbyi* E. A. Smith, *V. rossiniana* Bern., *V. mamilla* Gray, *V. imperialis* Lam., and *V. gracilis* Sw.

By Mr. J. Kidson Taylor: Mollusca from Grange district; *Cypræa tessellata* Sw., *C. erosa* var. *phagedaina* Melv., *C. pulchella* var. *pericalles* Melv., *C. physis* Brocchi, *C. madagascariensis* Gm., *C. sulcidentata* var. *xanthochrysa* Melv., *C. esontropia* Ducl., *C. cruenta* var. *variolaria* Melv., *C. cruenta* var. *coloba* Melv., *C. rashleighana* Melv., *C. citrina* Gray, *C. gaskoinii* Reeve, *C. cribraria* var. *translucida* Melv., and *C. errones* var. *sophie* Braz.

By Mr. W. Moss: Specimens of *Hyalinia araparnaldi*, *H. cellaria*, *H. glabra* and *H. alliaria*, and vars.; radule and genitalia of same.

By Mr. R. D. Darbishire: Photograph of Dog's Bay, Connemara.

By Mr. C. E. Wright: *Testacella scutulum*, living specimens from near Kettering; and *Vertigo anti-vertigo*, Wadenhoe, Northants.—both new records for the county. Series of *Helix nemoralis*, showing various forms, including a large number of the *albolabiata* shells so plentiful in West Donegal.

By Mr. F. Taylor: A living sinistral *Helix aspersa* Müll., taken at Southport, Aug. 25th.

By Mr. C. H. Moore: A specimen of *Vertigo substriata* taken near Stack Rocks, S. Pembroke—a new record.

By Mr. J. Wilfrid Jackson: A fine series of *Vitrea lucida* Drap., obtained in September last at the original habitat at Grange, Lancs., where it was first discovered in 1903. The abundance of the shell (thirteen were found altogether) seems sufficient justification for now considering the species indigenous there. Series of shells from Kendal and Ambleside, Westmorland, and Cark, N. Lancs. Holocene mollusca from the Ribble valley, near Great Milton, Yorks. Photomicrographs of British species of *Vertigo*, *Acicula lineata*, and *Carychium minimum*.

On behalf of the Manchester Museum: Large series of post-glacial shells from Larne and Magheramorne, County Antrim (Caroline Birley collection). Holocene shells from the submerged forest, Leasowe, Cheshire (Chas. Roeder collection). Pleistocene shells from Swanscombe, Kent (J. Wilfrid Jackson collection).

By Mr. R. A. Phillips: A remarkably large and heavy form of *Helix nemoralis* with double lip, from Lisdoonvarna, County Clare; *Linnæa involuta* (? var.) from Barley Lake, County Cork; *Linnæa stagnalis* var. *fossarina* from Lough Rea, County Galway—this small form is abundant in the clear waters of the lough; and a curious monstrous form of *Linnæa palustris* from Newmarket Lake, County Clare.

By Mr. R. Standen: A fine series of the calcareous eggs of British and exotic mollusca.

By Mr. F. B. Fitzsimons: Unusually large *Cardium aculeatum* dredged between Exmouth and Dawlish.

By the Manchester Museum: British and foreign *Planorbis*, *Linnæa*, *Chilina*, and *Physa*; British *Vivipara*, *Patella*, *Capulus*; Irish and Continental *Helix nemoralis*; Falkland Islands mollusca; Madeiran land shells; Rhodesian land and freshwater mollusca.

ANNUAL REPORT.

It is gratifying to the Council to be able to report a substantial increase in the number of members of the Society. At the date of the last Annual Meeting there were 310 names on the list; since then 26 new members have been elected, 8 have resigned, and 1 has died, leaving a membership of 327, or together with the honorary members 337.

Ten meetings of the Society have been held during the year from Oct. 12th, 1907, to Sept. 9th, 1908, at which some 36 papers contributed by 24 members have been read and discussed; many of them were subsequently published in the *Journal of Conchology*. The exhibits at the meetings have been numerous and instructive, including special exhibits of the British *Nassidae*, British *Stenogyridæ*, and the British *Rissoideæ*, and the type specimens of 21 new species of mollusca obtained during the Scottish National Antarctic Expedition of 1903-4, described and figured by two of our members—Mr. J. Cosmo Melville and Mr. Robert Standen—in the Transactions of the Royal Society of Edinburgh. Some of these species had been obtained from the immense depths of 1,410, 1,775, and 2,645 fathoms.

In addition to the monthly meetings, members of the Society have taken part in two rambles—one in the Grange district, and the other in the Ingleton district. Valuable publications for the Library have been received from different societies in exchange for the *Journal*, and an unusually large number of monographs, including numerous important papers on the mollusca of the Japanese Empire, from their respective authors.

Donations to the Cabinet have been received from Messrs. G. D. H. Carpenter and A. Mayfield.

With the object of extending the usefulness of the Society, and in view of the stress now laid by educationalists on the importance and value of nature-study in the schools—as, for instance, in the papers read at the recent meetings of the British Association in Dublin—the Council would urge upon members the desirability of bringing the objects of our Society under the notice of the Director of Education and school-masters in charge of secondary schools in their various localities. For this purpose members can always obtain a supply of nomination forms and copies of the rules of the Society on application to the Secretary.

TREASURER'S REPORT.

The Statement of Income and Expenditure for the year 1907 was presented and adopted at the Meeting held on March 11th, 1908, and it is to be found printed on page 167, vol. 12, in the April number of the *Journal*. There is, therefore, no need to repeat the Statement here. It will be noticed that there was then a credit balance of £55 17s. 11d. to carry forward to the present year's account. The Council are again to be congratulated on the healthy position maintained by the finances of the Society, there being in hand at the present time a cash balance of £48 6s. 8d., with outstanding liabilities of £33 12s. 1d.

The Subscriptions still to be paid amount to about £35.

Interim Statement of Income and Expenditure,

From January 1st to October 1st, 1908.

| RECEIPTS. | £ | s. | d. | EXPENDITURE. | £ | s. | d. |
|--------------------------|----|----|----|------------------------------------|----|-----|-----|
| Cash in hand | 55 | 17 | 11 | Library Cards | 0 | 11 | 6 |
| Subscriptions | 30 | 4 | 11 | Printing <i>Journal</i> for Oct., | | | |
| Two Life Membership Fees | 6 | 1 | 0 | 1907 | 14 | 12 | 8½ |
| Advertisement | 0 | 7 | 0 | Printing <i>Journal</i> for Jan., | | | |
| Sale of Publications ... | 3 | 1 | 11 | 1908 | 11 | 17 | 5 |
| | | | | Printing <i>Journal</i> for April, | | | |
| | | | | 1908 | 11 | 10 | 10½ |
| | | | | Illustrations | 0 | 14 | 3 |
| | | | | Reprints | 3 | 2 | 6 |
| | | | | Stationery | 3 | 1 | 10 |
| | | | | Bookbinding | 1 | 15 | 0 |
| | | | | | | 47 | 6 |
| | | | | Cash in hand ... | 48 | 6 | 8 |
| | | | | | | £95 | 12 |
| | | | | | | 9 | 9 |

LIBRARIAN'S REPORT.

Since the publication of the Catalogue of the Society's Library in October last 209 contributions have been received, as well as the usual number of Periodicals received in exchange. This great influx has entailed a considerable amount of work in the way of cataloguing, etc., but this is now done, and the various additions placed on the Library shelves ready for the use of the members.

Lists of the various additions have appeared from time to time in the Proceedings of the Society's meetings, which members are requested to look upon as Addenda to the Catalogue.

The following is a list of the principal donors to whom the Society is indebted for these welcome additions: Rev. A. H. Cooke, Rev. G. A. F. Knight, Drs. H. Strebel, P. Bartsch, W. H. Dall, J. Cosmo Melvill, H. A. Pilsbry; Lieut.-Col. H. H. Godwin-Austen; Messrs. W. E. Collinge, Y. Hirase, B. B. Woodward, A. S. Kennard, H. C. Fulton, R. Welch, A. W. Stelfox, J. N. Milne, A. E. Boycott, and Charles Oldham.

Amongst the numerous papers received from Dr. H. A. Pilsbry are ten volumes (X. to XIX.) of Tryon's "Manual of Conchology." These, on the recommendation of the Council, have been bound in cloth, and thus rendered much handier for reference.

The Library is not so much used by members as it might be, containing as it does so many valuable books and papers relating to all branches of the science. This can hardly result from lack of knowledge of what the Library contains, as was the case before the publication of the Catalogue, and it would be gratifying to see more use made of it than at present.

RECORDER'S REPORT.

Since the publication of the last Report in the *Journal of Conchology* (vol. 12, p. 16) 535 new county records have been registered ; for a great many of these thanks are due to Mr. J. W. Taylor, who has acted as referee in critical cases, and from whose Monograph liberty has been taken to extract records, in cases where the Society had none, and which are vouched for by Mr. Taylor personally.

Thanks are also due to Messrs. A. Mayfield, J. W. Vaughan, A. H. Jowett Murray, J. E. Cooper, J. R. le B. Tomlin, C. Upton, H. E. Napier, and C. E. Wright, among others, for specimens from various English and Welsh localities.

No new records have been received during the past year from Ireland and Scotland. It is earnestly desired that collectors in the latter country will forward specimens, as the distribution of our most common species is but imperfectly known. There have been so many new records during the past few years that the publication of a new Census may be deemed advisable before long.

A new scheme of recording has been formulated by Mr. W. Denison Roebuck for the benefit of Mr. J. W. Taylor's Monograph. I have been kindly invited to co-operate with Mr. Roebuck and Mr. F. Booth in the working of this scheme ; and as it will greatly assist the Conchological Society's records, I have pleasure in accepting the invitation.

It is proposed to send out printed lists to collectors in all parts of the British Isles, with a request to help us by sending for inspection such species as are not erased from the list. Specimens may be sent to Mr. W. D. Roebuck, Mr. F. Booth, or myself, to be returned to sender if required. It is hoped that our efforts will meet with a ready response, and that no species, however common, will be deemed of too little importance, as we aim at the acquisition of a perfect knowledge of the distribution of all our indigenous species of land and freshwater mollusca.

ANNUAL REPORT OF THE LEEDS BRANCH,

For the Year ending 7th December, 1907.

The Annual Meeting was held at the Leeds Institute of Science and Art, when the Report for the year just ended was presented by the Hon. Secretary, Mr. J. E. Crowther ; the retiring President, Mr. F. Booth, in the chair.

Twelve meetings had been held, with an average attendance of six members, exclusive of visitors ; seven of them in the field, and five in the Leeds Institute and Cartwright Hall, Bradford.

The first field-meeting was held in April at Malham, where a very profitable day was spent, thirty-four species and thirteen varieties being noted during the day. The second was held at Ingleton, but here the dry weather was against successful collecting. The third was held at Leeds for a visit to the habitat for *Limnaea pereger* m. *sinistrorsum*, recorded by the late Mr. W. Nelson, but the members were unsuccessful in obtaining any. The fourth was held at Bolton Woods, Wharfedale, for an investigation of Posforth Gill ; heavy rain during the whole of the afternoon prevented any search being made. The fifth meeting was

held in Shipley Glen. The sixth was held at Grange-over-Sands, in conjunction with members from Lancashire, and was a most successful one. Unfortunately only two members from Yorkshire were able to be present. Thirty-nine species and ten varieties were noted during the day, and one new addition made to the Grange list, viz., *Vertigo antivertigo*. The seventh and last field-meeting was held at Addingham, Wharfedale, which was also a successful one from the large number of species observed. The winter meetings held indoors were devoted to exhibition of specimens. The members, as usual, had the benefit of Mr. J. W. Taylor's presence, who commented on the various exhibits, and pointed out the features of any particular species or variety. It is not expected that any addition can be made to the Yorkshire list of mollusca, and the work of the members is devoted to adding new localities for species and varieties to the Census List. Mr. F. Rhodes recorded a *Vallonia* from the banks of the Bradford Canal, which was referable to the so-called species *V. excentrica*. Mr. F. Booth by recording *Acanthinula lamellata* re-established this species for Upper Airedale; and Mr. J. W. Jackson, of Manchester, submitted specimens of *Hyalinia helvetica* which he had found at Malham to Mr. J. W. Taylor, who described them as *v. umbilicata*, a new form not before recorded.

The Branch has been officially represented at the meetings of the Yorkshire Naturalists' Union, and reports have appeared in the *Naturalist*, the organ of the Union. The membership at the close of 1907 was twelve.

J. E. CROWTHER, *Hon. Sec.*

ANNUAL REPORT OF THE LONDON BRANCH.

Since our last Annual Report twelve meetings have been held—six ordinary and six field-meetings. The average attendance has been somewhat below that of recent years. Five of the ordinary meetings were held at St. Peter's Rectory, Walworth, by kind permission of Canon Horsley, to whom our best thanks are due.

At the winter meetings there were many interesting exhibits, including series of British *Hygromia*, *Planorbis*, and *Vitrea*; also some Holocene mollusca.

The field-meetings were held at Uxbridge (twice), Leatherhead, Burnham Beeches, West Drayton, and Hayes (Kent).

The first of these was held at Leatherhead on May 30th, when a small party visited the chalk-pit, which has been described by Mr. G. D. H. Carpenter (see page 216). Twenty-seven species of mollusca were collected, including *Pyramidula rotundata* var. *alba*, *Cochlicopa lubrica* var. *hyalina*, and a good series of *Clausilia rolfii*.

On July 11th a meeting was held at Burnham Beeches, where the following twenty species were obtained: *Limax arborum*, *L. tenellus*, *Vitrea cellaria*, *V. alliaria*, *V. pura*, *V. radiatula*, *V. nitidula*, *Zonitoides excavatus*, *Euconulus fulvus*, *Arion intermedius*, *Punctum pygmaeum*, *Sphyradium edentulum*, *Pyramidula rotundata*, *Hygromia hispida*, *Acanthinula aculeata*, *A. lamellata*, *Ena obscura*, *Clausilia laminata*, *Acicula lineata*, and *Carychium minimum*. Several of the above are not credited to Bucks. in the last Census, but there have been considerable additions to the list of late, and the only actual new record appears to be *Acicula lineata*.

Uxbridge and West Drayton did not yield us any novelties this season, except *Pisidium henslowianum*. Hayes was a failure from the conchological point of view, though it afforded a very pleasant ramble through charming country.

J. E. COOPER, *Hon. Sec.*

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NOTICE TO MEMBERS.

It has been decided to hold the following SPECIAL EXHIBITS
at future Meetings :

- January 13th, 1909 - *Helicella caperata* and its Varieties.
February 10th, 1909 - British *Solenidæ*.
March 10th, 1909 - The Section *Cylinder* of the Genus *Conus*.
-

REPRINTS.

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THE
JOURNAL
 OF
CONCHOLOGY.

BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
 OF GREAT BRITAIN AND IRELAND.

PUBLISHED QUARTERLY.

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| HON. EDITOR: J. R. LE B. TOMLIN, M.A., F.E.S., STONELEY, ALEXANDRA RD., READING. | HON. SECRETARY: REV. L. J. SHACKLEFORD, 66, GRANVILLE ROAD, BLACKPOOL. | HON. TREASURER: E. D. BOSTOCK, HOLLY HOUSE, STONE, STAFFS. |
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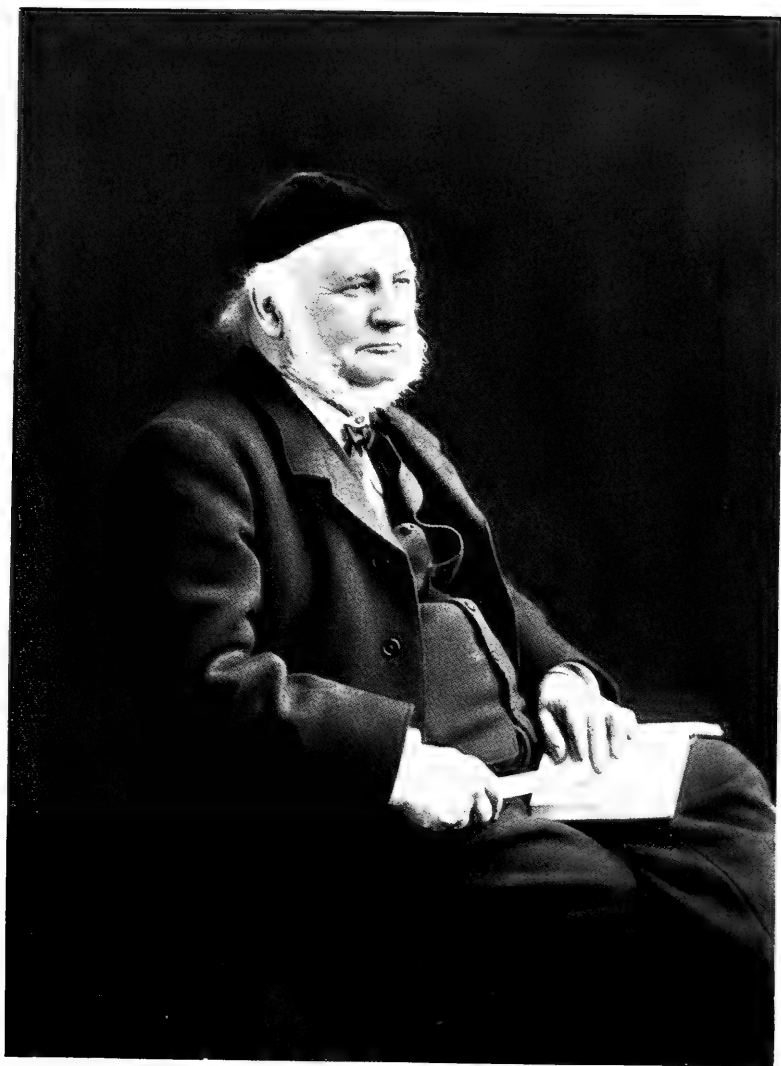


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Yours sincerely
R. D. Danteski
—

THE

JOURNAL OF CONCHOLOGY.

VOL. 12.

APRIL, 1909.

No. 10.

**PROPOSED RAPID COMPLETION OF THE VICE-COMITAL
CENSUS OF BRITISH LAND AND FRESHWATER MOLLUSCA.**

To render more complete the coloured maps of distribution in Mr. John W. Taylor's comprehensive and invaluable Monograph, a circular has been issued by the undersigned, with the hearty co-operation of Mr. Fred Taylor, the Recorder of the Conchological Society, and the active assistance of Mr. Fred Booth, for enabling malacologists to know what species are required for inspection from the various counties or vice-counties. The circular includes a full list of the British species. When sent to a worker for any particular area, all species are scored out which have already been authenticated by Mr. John W. Taylor. The idea is that workers should submit for inspection any species left unmarked.

The result has already been satisfactory—for 500 of the blanks have been filled up (for 47 counties), thanks to Miss A. L. Massy, Mrs. Carphin, Dr. Scharff, and Messrs. I. E. Adams, F. H. Sikes, A. H. Jowett-Murray, J. R. le B. Tomlin, B. R. Lucas, J. E. Cooper, J. F. Musham, G. D. H. Carpenter, E. D. Marquand, A. Mayfield, C. H. Moore, J. N. Milne, A. Loydell, C. Oldham, R. Welch and A. W. Stelfox, and assistance is promised by Mrs. G. B. Longstaff, and Messrs. Hugh Watson, J. Williams Vaughan, J. Roseburgh, and C. P. Richards.

Will conchologists send for marked lists, more particularly for areas in which they have collected but are not resident?

Collectors planning expeditions to outlying areas are desired to ask for marked lists—more particularly for districts in Scotland, Wales, Ireland, and the western promontory of England.

Of unworked areas County Longford is the most conspicuous instance, for so far only two species have been authenticated—both slugs. Various Scottish counties (Wigtownshire particularly) have been very scantily worked, and in England Hunts. and Monmouth are but little represented in the records—while for numerous well-worked areas there are common species not yet authenticated.

OBITUARY NOTICE.

R. D. DARBISHIRE.

 BY JAMES COSMO MELVILL, M.A., D.Sc.

 (Read before the Society, March 10th, 1909).

 (WITH FRONTISPIECE).

DURING the early morning hours of Sunday, November 8th, 1908, Robert Dukinfield Darbishire passed away, after a very short illness, at his residence, High Elms, Victoria Park, Manchester. Born in 1826, he had entered upon his eighty-third year; and thus there has been removed from our midst a strong and many-sided personality, endued with a singleness of heart ever directed towards the public good, ever unselfish, always esteeming the interests of others more than his own.

He has left us, but his memory will remain and flourish long, especially in that large and busy city with which he was identified from his birth, being the son of Mr. Samuel Dukinfield Darbishire, a solicitor in large practice, of Manchester and Penmaenmawr, North Wales, whose profession he ultimately followed.

When quite young, he was placed under the care of Mr. Merz, a man of enlightened and remarkably progressive views residing at Chorlton-on-Medlock, then to some extent a rural suburb. The influence of this teaching remained through life. Subsequently he was educated at Manchester New College, and finally graduated B.A. at the London University.

His parents belonging to the Unitarian body, he was at once brought into contact with many gifted and highly intellectual people, scions likewise of that persuasion, the names of Gaskell, Herford, Philips, and Martineau occurring to one at once.

We have mentioned Mr. Darbishire as many-sided, and it is, indeed, difficult to single out, during a long life of so much activity, any one particular leaning or characteristic bent as absolutely predominant; but, when the great opportunity of his life arrived, and he was appointed by Sir Joseph Whitworth (1803-1887) in company with Mr. Richard Copley Christie (formerly Chancellor of the See of Manchester) and Lady Whitworth, administrator of an estate valued at over one-million-and-a-quarter sterling, the principal of which was entirely devised to the three executors to be laid out and expended at their unfettered discretion for the best public advantage, he exhibited a strong leaning towards the betterment of those doomed to live in congested surroundings, by providing open-air spaces, parks,

baths, etc., for their benefit, as well as the erection of buildings for the furtherance of education, art, and science.

Most fortunate indeed was Sir Joseph Whitworth in those he had selected to carry out such splendid administrative schemes! They worked in unison with but one aim only—the general good of the community, small and great, poor and rich alike.

The great hall of the Victoria University of Manchester rightly named after its founder; the Whitworth Park also, with its Institute and Art Gallery; the Whitworth Hospital and Institute at Darley Dale in Derbyshire—all these, and other things besides, were the outcome of the princely generosity of Sir Joseph, and the loving and fostering care of the three administrators of his wealth, and especially of the survivor of them all by several years, Mr. Darbishire.

We may add, he was always particularly interested in the welfare of the Manchester Museum, affiliated to the University, the buildings of which form a not unimportant part in the chief quadrangle; a large proportion of the cost of the erection had, indeed, been borne by the Whitworth Trustees. He had also acted in his professional capacity as the legal medium of the transference to the Owens College of the old Natural History Society's Museum, formerly situate in Peter Street, and which had, curiously enough, been offered to and declined by the Corporation of Manchester.

A similar transference of the collections of the Manchester Geological Society was arranged also through the same medium; and these collections formed the nucleus of the now superb possessions of the Manchester Museum, which are justly considered by experts unsurpassed in the provinces.

But it must be our chief aim in this brief account, written for a malacological journal, to exhibit the subject of this sketch as especially devoted to that science, as indeed he was. Both recent and fossil shells claimed his attention, and he in time amassed a large and rare series of specimens. He was a friend and ally of the late Dr. J. Gwyn Jeffreys, F.R.S., and in his younger days was, we believe, more than once his companion on a dredging expedition. Among the mollusca, he was especially attracted by those genera the species of which exhibit a sculpture bizarre, and of unusual design; of such he would always endeavour to obtain large and varied suites—such shells as *Latiaxis mawæ* Gray, an extraordinary gastropod, with flattened apex and evolute whorls, beset with an incurved coronal of spines; as *Magilus antiquus* Montfort, that curious, somewhat uncouth species inhabiting corals and growing with their growth; the *Leptoconchi*, probably juvenile forms of the last-named; or the “Spiny Venuscomb,” or “Thorny Woodcock,” to quote the old English names

for these beautiful members of the *Muricide*—all such were very well represented in his cabinets. Arctic mollusca were likewise with him a speciality, and their corresponding exponents in the southern zone. It will be remembered by some members of this Society that perhaps the finest example ever seen of *Trophon gerversianus* Pallas was, at his expense, photographed specially for the *Journal*, and will be found in the volume for 1898, p. 100, pl. II.¹

His collection of *Scalaria* was also very fine, and was given by him several years ago in its entirety to Mr. Robert Standen; his land operculates also are now in Mr. E. Collier's possession.

The terrestrial shells of the Philippines also much attracted him, and his series of them was most complete. Also the marvellous quasi-marine genera of Lake Tanganyika, of which he possessed an almost unique series, for size and perfection of condition.

From time to time, during the latter years of his life, he bestowed upon the Manchester Museum all these collections, which, at his request, were gradually removed from his house, and re-arranged carefully at the Museum.

Nor was this all; his important suites of Fossil Mollusca, mostly Pliocene and Pleistocene, and other geological specimens, examples of drift and raised beaches, of flint-heads, and other eoliths, pre-historic relics and the like—all these were most generously bestowed upon the same Museum, and it was not long before his death that the last consignment was received.

His extensive scientific library was also transferred to the same destination.

We may add that when the British Association met at Manchester in the year 1861, he acted as one of the Local Secretaries.

He was for many years a very active member of the Manchester Literary and Philosophical Society, and contributed many papers to their Memoirs and Proceedings; and also served on the Council, being elected President in 1886, but very shortly after his election he resigned the office.

He was also a Fellow of the Geological Society of London.

With regard to the Conchological Society, he always took a very marked interest in its affairs, constantly travelling to Leeds for the purpose of attending the Council Meetings then held in the rooms of the Leeds Philosophical Society. Frequently do I remember journeying there and back with him, and how pleasant a companion he was, full of anecdote and information.

I am informed by Mr. John Ray Hardy, of the Manchester

¹ Mr. Darbshire afterwards presented this specimen to the writer of this notice.

Museum, that he was formerly an expert student of Coleoptera, both British and exotic, and studied them in company with the late Mr. J. Aspinall Turner, M.P., both their collections excelling particularly in the beautiful order of *Cetoniidae*, or Rose Beetles.

In politics he was a sincere and advanced Liberal, and at one time frequently appeared upon the platform at election-time, though he did not often speak. A few years ago, in 1899, he received the unusual honour of the Freedom of the City of Manchester, in recognition of his many eminent services in the cause of progress and betterment; and when, as a passive resister, certain of his goods were distrained upon, he handed over the casket containing the Freedom, which was, as he said, the thing he valued most in the world!

By his will he especially directed that no public notice of the time or place of his funeral should be issued; that, as he had found the world so delightful, he was anxious that, after cremation, his ashes should be scattered and dispersed over some wood or sylvan glade, so as to add to its fertility. On Wednesday, Nov. 11th, the last rites were performed, and on this occasion the Rev. C. T. Poynting delivered a striking address in which he said that "No man more fully and surely loved his neighbour as himself, but it was ever a sanctified self that he sought to share. It was never the ready alms, the easy gift, the present of that which he would never miss that he sought to bestow. The gift without the giver was bare, and so he ever gave himself."

The following is a list of some of the chief papers contributed by Mr. R. D. Darbishire upon Mollusca, to the Proceedings or Memoirs of the Manchester Literary and Philosophical Society and to this *Journal*:—

- "On Marine Shells in stratified drift at high levels on Moel Tryfaen, Caernarvonshire."—[Abstract] (1863) *Proc.*, III., 177.
- "Notes on Marine Shells found in stratified drift near Macclesfield."—(1864), *Mem.* (3) III., 56.
- "Notes on some Superficial Deposits at Great Orme's Head, and as to the period of its elevation."—(1867), *Mem.* (3) IV., 1.
- "On Deposits from the raised sea-bottom at Uddevalla, Sweden."—(1860), *Proc.*, II., 21.
- "On supposed *Pholus* Burrows in the limestone hills near Buxton."—(1867), *Proc.*, VII., 7.
- "On a collection of Land Shells and Slugs made at Gibraltar in 1863, with a list of the species."—(1868), *Proc.*, VIII., 78.
- "Notes made during a Visit to the Shell-Beds of Uddevalla, Sweden."—(1876), *Proc.*, XV., 135.

- "On Animals dredged at Oban in September, 1882."—(1882), *Proc.*, XXII., 45.
- "Land Shells at Dog's Bay, Connemara."—*J. of C.*, vol. IV., p. 317, 1885.
- "Marine Mollusca at Oban."—*J. of C.*, vol. IV., p. 350, 1885.
- "Collecting Mollusca in the Celtic Region (on the coast of France) near Brest."—*J. of C.*, vol. V., p. 177, 1887.
- "Note on Shells of *Argonauta argo*."—*J. of C.*, vol. V., p. 371, 1888.
- "A Visit to a Snail-Farm."—*J. of C.*, vol. VIII., p. 374, 1897.
- "Report on the Testaceous Mollusca of the L.M.B.C. District."—*L.M.B.C. Reports*, no. 1, p. 233, 1886.
- "*Helix aperta*: Revival of, after long drought."—*J. of C.*, vol. VI., p. 101, 1889.



***Helix cantiana* Montagu at Tooting Common, Surrey.**—A previous note in this *Journal* (vol. 11, p. 55) records the introduction of a number of *Helix cantiana* at the above locality in 1901. In the course of correspondence I learn that this species occurred there previous to this date. Mr. C. S. Coles, of Hambledon, who has very kindly given me this information, writes:—"My children used frequently to bring me specimens of this shell which they had gathered on Tooting Common. A record in my notebook also reads—Tooting Common, on nettles, April 17th, 1895; variety with white band on periphery." The special interest that is attached to this locality lies of course in the fact that it is actually in London, and, as further pointed out by Mr. Whitwell, within five miles of Charing Cross.—J. DAVY DEAN (*Read before the Society*, December 12th, 1906).

Some new Herefordshire Records.—In the course of a visit to Herefordshire during August and part of September, 1908, I collected the following species which are new to the county census published in vol. 10 of this *Journal*, though the majority of them are recorded in Boycott and Bowell's paper published under the auspices of the Woolhope Naturalists' Field Club. I also add some varieties of slugs collected at the same time, for the names of which I am indebted to Mr. W. Denison Roebuck. *Limax cinereoniger* Wolf, one in the Woolhope district among beech leaves; *L. maximus* var. *fasciata* Moq., Stoke Edith; *Agriolimax agrestis* var. *reticulata* Moq., West Malvern and Stoke Edith; *A. levis* (Müll.), Ledbury and Devereux Pools; *Milax gagates* var. *rava* Wms., common in gardens at West Malvern; *Arion ater* var. *rufa* L., West Malvern; *A. ater* var. *castanea* Dum. and Mort., Stoke Edith; *A. circumscriptus* var. *neustriaca* Mab., Stoke Edith; *Acanthinula aculeata* (Müll.), West Malvern; *Azeea tridens* (Pult.), common in moss in the bed of the disused canal near Wellington Heath; *Vertigo pygmaea* (Drap.), Ledbury, West Malvern and Wellington Heath; *Limnaea auricularia* (L.), common in a pond at West Malvern; *Planorbis spirorbis* (L.), Colwall; *Physa fontinalis* (L.), very common near Mathon, but always small; *Sphærium corneum* (L.), very common at Ledbury and West Malvern; *S. lacustre* (Müll.), a few at Wall Hills Camp near Ledbury; *Pisidium henslowianum* (Sheppard), rare in the Wye near Mordiford.—J. R. LE B. TOMLIN (*Read before the Society*, Nov. 11, 1908).

HOLOCENE MOLLUSCA NEAR GREAT MITTON, WEST YORKSHIRE

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, November 11th, 1908).

THE Holocene deposits of the Ribble valley, though in places fairly extensive, appear to have hitherto been neglected. In fact one might say the same regarding the recent mollusca of this corner of Yorks., as, with the exception of three excursions made by the Yorkshire Naturalists' Union, when on each occasion Mr. W. Denison Roebuck appears to have been the sole conchologist of the party, no systematic attempt has been made to study the mollusca, although the adjacent Whalley district has been pretty well worked.

Whilst traversing the district some weeks ago I devoted some time to an examination of the banks of the river and succeeded in obtaining a fairly respectable list of shells.

The Ribble, after flowing through the narrow Carboniferous Limestone gorge between Gisburn and Sawley Abbey, continues its S.W. course through the limestone districts of Chatburn and Clitheroe, where are extensive alluvial deposits and river terraces, especially north of Chatburn; thence through the sandstones and marls of Permian age below Waddow Hall and over the "shales-with-limestones," past Great Mitton, a little below which place it is joined by the River Hodder, draining the Grit Fells on the west. From Waddow Hall to the junction of the Hodder are further alluvial flats, especially on the Yorkshire side of the river.

Both above and below Mitton bridge, which spans the Ribble here, the alluvium contains land and freshwater shells more or less abundantly.

The right, or Yorkshire, bank of the river varies somewhat in height, being on the average about six feet high, the ground gradually increasing in height as it recedes from the river. The underlying rock is only seen in one or two places near the bridge where beds of sandstone occur, dipping at an angle of about 20° .

Though common all along the bank and scattered through the alluvium from bottom to top, the shells appear to be specially abundant at a point about a third of a mile down from the bridge, where the river takes a sharp turn to the right opposite a high cliff of Boulder Clay situated on the Lancashire side. Here the bank slopes more gradually down to the water's edge and is much burrowed into by rabbits. Numerous shells have thus been thrown up and lie

scattered about on the surface. Some species are very abundant especially *Limnæa pereger*, *Bithynia tentaculata* and *Ancylus fluviatilis* amongst freshwater shells, and *Hygromia hispida* and *H. rufescens* amongst land shells.

The following is a list of the species obtained:—

- Agriolimax agrestis* (L.). Two examples.
Vitrea crystallina (Müll.). One example.
V. cellaria (Müll.). Several.
V. nitidula (Drap.). Several.
Zonitoides nitidus (Müll.). One example.
Pyramidula rotundata (Müll.). Several.
Hygromia hispida (L.). Abundant.
H. rufescens (Penn.). Abundant.
H. granulata (Alder). Scarce.
Vallonia excentrica Sterki. Several.
Helix nemoralis L. Several.
H. hortensis Müll. One example.
Cochlicopa lubrica (Müll.). Common.
Vertigo pygmaea (Drap.). One example.
Succinea putris (L.). One example.
Carychium minimum Müll. Several.
Ancylus fluviatilis Müll. Abundant.
Limnæa pereger (Müll.). Abundant.
L. truncatula (Müll.). Three examples.
Planorbis albus Müll. Several.
Bithynia tentaculata (L.). Abundant.
Valvata piscinalis (Müll.). Several.
Sphærium corneum (L.). Several valves.
Pisidium amnicum (Müll.). Several valves.
P. pusillum (Gmelin). Several valves.

The shells do not present any striking differences from those at present living in the district, and if comparison is made with the lists of species collected about Gisburn and Sawley Abbey by Mr. W. Denison Roebuck in 1881 and 1893¹, it will be seen from what region the alluvium shells have no doubt been derived. Out of the twenty-five land species in his lists fourteen are recorded from the alluvium, and of the ten freshwater species nine are represented, along with three others, viz.:—*Planorbis albus*, *Pisidium amnicum* and *P. pusillum*, which are not given in his lists.

No remains other than mollusca were noted in the deposit. It is therefore difficult to arrive at any satisfactory conclusion as to the precise age of the shells. Those from the lowest part of the alluvium

¹ *Naturalist*, 1881, p. 159, and 1894, p. 9.

are undoubtedly old, but until further observations are made it would be unwise to attribute them to Roman or pre-Roman age.

My best thanks are due to Mr. B. R. Lucas and Mr. R. H. Wrigley for much valuable help and topographical information.

◆◆◆

ON A FOSSIL DART AND EPIPHRAGM OF HELIX POMATIA FOUND IN THE LOESS DEPOSIT OF THE RHINE VALLEY.

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, December 9th, 1908).

WHILST working out the mollusca from some specimens of Loess obtained from Eendingen, Kaiserstuhl, near Freiburg, I came across a rather fine example of *Helix pomatia*, which, on carefully clearing from the matrix and cleaning out the mouth of the shell, yielded, to my surprise, both the dart and epiphragm of this species. The dart is in a wonderful state of preservation, the annulus being practically the only part broken off. The epiphragm, also, is very well preserved, there being only a few bits chipped from the edge. So far as I am aware there appear to be no published records of any fossil darts, but Mr. A. S. Kennard tells me he has in his collection two darts of *H. nemoralis* from the Dog's Bay deposit, and also one example from Holocene deposits, London Wall. Mr. B. B. Woodward also possesses a dart each of *H. nemoralis* and *H. aspersa* from Holocene deposits at Newquay, Cornwall. These are the only examples of fossil darts that I know of. As to the epiphragm I have never seen or heard of one being found in a fossil state previous to this example. Should there be any records I should be extremely interested to know of such.

The other species of mollusca found with the *H. pomatia* are *H. arbustorum*, *H. fruticum*, *Pomatias elegans*—with operculum in situ; *Jamnia muscorum*, *Hygromia hispida* and its variety known as *H. plebeia* Drp., and *Succinea oblonga*.

◆◆◆

New Records of Vertigo for East Norfolk.—On July 11th last, when on a natural history excursion to Roydon Fen, East Norfolk, with the Ipswich and District Field Club, I brought away with me a sample of rejectamenta, which on examination yielded an extraordinary abundance of dead shells, particularly of the genus *Vertigo*. I took from about two quarts of this material *V. pygmaea* and *V. antivertigo* in plenty, more than a hundred specimens of *V. angustior* and ten of *V. moulinsiana*. As the three last are new records for East Norfolk, specimens of them were exhibited at the September meeting of the Conchological Society, and afterwards placed in the Society's collection. — ARTHUR MAYFIELD (*Read before the Society, September 9th, 1908*).

ON THE DETERIORATION OF SHELLS IN CABINETS.

By AGNES F. KENYON.

(Read before the Society, September 11th, 1907).

THIS subject will be best divided, and I will take first the effects of dampness or humidity in the atmosphere. The deplorable effects produced by this cause in a collection are happily of infrequent occurrence, and the only two instances of which I am aware are both Australian. The first case happened in my own collection, and until this experience befel me, I think I should have deemed it a matter of impossibility for a shell to lose its colour as mine did. I had in my possession for some years a young example of *Cypræa aurantium* Mart., of very thin, almost transparent, fabric and of a matchless deep red colour. I believe that the only other young example known of this species is in the British Museum. For five or six years the lovely tint of my *Cypræa* was quite unaltered, when unfortunately I went for a month's holiday to Tasmania. During my absence my next-door neighbour started trenching his garden to a depth of several feet, and in order to soften the hard earth kept the water-pipes running and saturated the ground. Of course in a warm climate the walls of a house are not particularly thick, nor are the foundations deep, and I have no doubt whatever that the aqueous vapour penetrated through the foundations of our house and imperceptibly but surely permeated the atmosphere. Anyhow the lovely red colour of my *C. aurantium* faded into a lemon-yellow in the space of four weeks, though the polish of the shell remains as brilliant as before. I cannot imagine any cause for this speedy change except damp.

I have also seen a more recent instance of the effect of damp on a collection of shells, though the results were somewhat different to those in my experience. The collector required a larger space for his cabinets, corals, etc., and built a separate museum-room, enclosing therein an ornamental rockery where plants had been growing in tanks of water. I noticed, when examining his collection, that some of the larger specimens of *Cypræa* had the dorsal surface partly or wholly clouded over with a whitish lime-like film, and on enquiry learnt that this had taken place since the cases had been lodged over the old water-tanks. As far as I recollect the species affected were *C. argus*, *C. cervus*, *C. mauritiana*, *C. testudinaria* and others: the different effect produced may have been due to their mature condition, and the consequent thickness of the enamel.

I have also seen a general collection, which was kept shut up in a locked cabinet, with numbers of shells clouded over or streaked with a sort of efflorescence—I do not think there was any corrosion, but simply a blotching of the surface. This I attribute to the fact that the owner resided for several years close to the sea. When a high wind drives the breakers on shore, the air is laden with saline moisture which is carried to a considerable distance inland. I am led to believe that this supposition is correct from the condition of numbers of specimens picked up on the beach. These are easily distinguishable from sea-worn and sun-bleached shells.

Of the second division of my subject, viz., corrosion of shells, whether due to bacteria or to some other cause, I have had no experience, nor have I ever noticed the vinegary aromatic odour referred to in previous papers in this *Journal*, and I therefore leave this question to those who have more knowledge of it.

Thirdly, with regard to fading of colour. This I have never noticed in any genus but *Cypræa*. I find that Australian cowries, even when gathered alive, lose their colour after a lapse of time, especially the darker varieties. Specimens which are almost black when collected gradually fade until they are of a grey shade, and this whether they have been picked up empty or with the animal still inside. Yellow or light-brown colours seem to be more permanent. I do not think that portions of the animal remaining in the shell make any difference. I have frequently had such shells in my collection for years, notably three specimens of *C. pyramidalis* (alas! only with ordinary spires). Accidentally finding that these still contained the animals, I soaked them in hot water for several hours and was able to extract the soft parts with the aid of a long pin without harm to the shells or their natural polish. The only detriment, in my experience, when the animal remains, is that it generally attracts some of the minute insect pests which not only consume the animal remains but also destroy the operculum of any shell that possesses a horny one.

Finally as to the keeping and general preservation of shells. My collection has always been admired for the beautiful polish of the specimens—those, of course, which naturally do not possess an epidermis—and I am usually credited, by non-collectors, with the use of chemicals to achieve this effect. I immerse my shells in very hot water, sometimes with a little soap in it, for a longer or shorter period according to the solidity or delicacy of the specimens, and then, after draining the shell thoroughly, I dry lightly with a soft rag and polish with another one. The use of oil is only permissible for faded or dead shells in order to bring out the colour and improve the worn

parts. Soap, if used, should be dissolved in the water and not rubbed on the shell, and if the shell is very thin and delicate it is better to use tepid water. Shells with an epidermis should never be put into fresh water or the epidermis will crack and peel off. They may, however, be washed in sea water. I should be inclined to suggest to the South Kensington Museum authorities to try very hot water as a cure for the corrosion from which their shells are said to suffer. I am unable to make the experiment, as I have never had an instance of such corrosion in my own cabinets.

Helix nemoralis eaten by Rabbits.—In the first edition of Adams' "Collector's Manual" (1884), the author mentions finding empty and broken shells of *H. nemoralis* at the entrance to rabbit burrows on sandhills in the north of Ireland, and again refers to this in his second edition, but he states that he could never discover whether rabbits or rats were the culprits. During a recent visit to co. Donegal I actually saw the rabbits devouring the snails, so the matter is satisfactorily settled. Quite a large number of shells was seen broken and with the snails eaten.—C. E. WRIGHT (*Read before the Society*, Nov. 11th, 1908).

NOTE.—During a residence of six months in the north of Ireland I constantly used to find heaps of gnawed empty shells, often amounting to a bushel, sometimes nearly blocking up the mouths of rabbit burrows on the sandhills at Portrush, but never actually saw the animals eat the snails, which they must have brought in one by one in their teeth to eat at leisure. As I never found traces of rats about, I suspected the rabbits, and am glad that Mr. Wright has definitely settled the matter. I suspect, however, that rats, which often frequent sandhills near seacoast villages, also prey on snails when they find them.—LIONEL E. ADAMS (*Read before the Society*, Nov. 11th, 1908).

Banding of Helix nemoralis.—In reference to Mr. Beeston's remarks on *Helix nemoralis* (*J. of C.*, vol. 12, p. 207), I would note that (1)—The *libellula* type no doubt exists in most places quite in the proportion of two to one—often more. (2)—If his suggestion is that the *rubella* type does not provide its proper proportion of missing band forms, I should think this doubtful. He almost writes as if the *rubella* type provided no missing band forms, but a glance at my collection shews 00300, 00340, 12045, 02300, 10345, 00(345), 003(45), 00345, 00045, 000(45), 00305, 02345, 103(45), 023(45), 10300, and 12305. It would be interesting to discuss at a meeting the question whether the archetypal *Helix* was 5 banded, or possessed of one peripheral band, or unicolorous. I incline to think that the peripheral band is the original and usually constant one (variations 12045 are always rare in the whole family of Helicidae) and that "splits" from the peripheral band have developed into four other bands.—[REV.]. W. HORSLEY (*Read before the Society*, Nov. 11th, 1908).

THE NON-MARINE MOLLUSCA OF SUFFOLK.

By A. MAYFIELD.

(Read before the Society, December 11th, 1907).

THE following list is intended to be supplementary to the two papers which appeared in the *Journal of Conchology*, vols. x., p. 295, and xi., p. 333, and contains, besides many additional localities for the shells therein enumerated, notice of some species that have since been found by the writer, and records quoted from other lists.

I am much indebted to several kind friends who have rendered great assistance by giving me lists of the species they have met with in parts of the county that I have not had a chance of exploring, and I take this opportunity of sincerely thanking them, viz.: Mr. A. S. Kennard, F.G.S., for a list of species from the Blyth valley; Mr. G. T. Rope, of Blaxhall, for numerous records from the valleys of the Alde and Stour; the Rev. S. Spencer Pearce and Mr. C. Morley, F.E.S., for notes from the Deben and Gipping valleys; and the Rev. E. N. Bloomfield for some notes made by the late Mr. E. Skepper, of Bury St. Edmunds. Localities given on the authority of the late Dr. Churchill Babington and Miss Powles of Ipswich, are quoted from the Rev. Carleton Greene's list published in the "Proceedings of the Suffolk Institute of Archæology and Natural History," vol. vii., p. 275. Other sources of information made use of in this paper are:—Mr. J. W. Taylor's "Monograph;" Rev. R. Sheppard's "Suffolk Notes" in the Linnæan Society's Transactions, vol. xiv.; a list of shells from Sudbury by Mr. W. D. King in "The Zoologist," 1853, vol. xi., p. 3916. My thanks are due also to Mr. B. B. Woodward, F.G.S., who kindly identified the smaller *Pisidia*.

Species that in the former papers were not recorded for one or other of the two vice-counties 25 and 26 are marked with an asterisk.

***Testacella haliotidea** Draparnaud.

EAST SUFFOLK.—Blaxhall (G. T. Rope), Martlesham (S. S. Pearce), Woolverstone Park (J. Sheppard in Taylor's "Monograph"), Dallinghoo Rectory (R. A. Bullen, W. M. Webb in *J. of Mal.*, 1893).

WEST SUFFOLK.—Bury St. Edmunds (F. Norgate in Carleton Greene's Suffolk list), Sudbury (E. Ransom in Taylor's "Monograph").
var. **flavescens** Moquin-Tandon. E.—Martlesham (S.S.P.).

***T. scutulium** Sowerby. E.—Campsey Ash (A. S. Kennard).

Limax maximus Linné.

E.—Blaxhall (G.T.R.), Woodbridge (S.S.P.), Needham Market (A.M.).

W.—Fornham St. Martin (W. R. Burrell), Sudbury (E. Ransom in Taylor's "Monograph"), Mildenhall (A.M.).

var. **fasciata** Moquin-Tandon. E.—Blaxhall (G.T.R.).

L. flavus Linné.

E.—Blaxhall (G.T.R.), Woodbridge (S.S.P.).

W.—Elmswell, Wetherden (A.M.).

L. arborum Bouchard-Chantereaux.

E.—Wenhaston (A.S.K.), Old Newton (A.M.).

W.—Fornham St. Martin (W. R. Burrell in Taylor's "Monograph"), Walsham-le-Willows (A.M.).

Agriolimax agrestis (Linné).

Common everywhere throughout both vice-counties, but not abundant on the clay soil in the centre of the county.

var. **brunnea** Taylor.

E.—Needham Market (A.M.). W.—Mildenhall (A.M.).

var. **pallida** Schrenk. E.—Mendlesham, Brockford (A.M.).

var. **punctata** Picard. E.—Mendlesham (A.M.).

A. lævis (Müller).

E.—Woodbridge (S.S.P.), Bentley and Ipswich (A.M.).

W.—Mildenhall Fen (A.M.).

Milax sowerbyi (Férussac).

E.—Woodbridge (S.S.P.), Ipswich (W. M. Webb in *J. of Mal.*, 1893).

*W.—Walsham-le-Willows (A.M.).

***M. gagates** (Draparnaud).

E.—St. Margaret's, Ipswich (W. M. Webb in *J. of Mal.*, 1893).

Vitrina pellucida (Müller). Very common.

E.—Blaxhall, Farnham, Leiston, Homersfield (G.T.R.), Tattingstone (C.M.), Offton, Shotley (Sheppard), Melton (Miss Powles), Ipswich, Barham, Old Newton (A.M.).

W.—Sudbury (King), Hopton, Stowlangtoft (A.M.).

Vitrea crystallina (Müller). Very common.

E.—Blaxhall (G.T.R.), Needham Market, Ipswich, Barham, Bentley (A.M.), Melton (Miss Powles).

W.—Sudbury (King), Chedburgh (C. Babington), Hopton, Stowlangtoft (A.M.).

***V. lucida** (Draparnaud).

E.—Ipswich (A. E. Boycott in Taylor's "Monograph").

V. cellaria (Müller). Common.

E.—Blythburgh, Wenhaston (A.S.K.), Blaxhall (G.T.R.), Burgh Castle (J. B. Beckett), Stowmarket, Mendlesham, Needham Market, Ipswich, Bentley, Barham, Bacton, Wetheringsett (A.M.).

W.—Felsham, Cockfield, Wetherden, Hopton, Knettishall, Mildenhall (A.M.).

V. rogersi B. B. Woodward. Common.

E.—Needham Market, Ipswich, Bentley, Felixstowe (A.M.).

W.—Chedburgh, Sudbury (C.B.), Knettishall, Hopton (A.M.).

V. alliaris (Miller). Rare.

E.—Blaxhall (G.T.R.), Friston (Sheppard).

W.—Sudbury (King), Cockfield, Felsham (C.B.), Wetherden (A.M.).

V. nitidula (Draparnaud). Very common.

E.—Blythburgh, Wenhaston, Thorington (A.S.K.), Blaxhall (G.T.R.), Offton (Sheppard), Bradwell (Beckett), Mendlesham, Ipswich, Needham Market, Stowmarket, Wetheringsett, Bentley (A.M.).

W.—Hopton, Knettishall, Mildenhall, Bury St. Edmunds, Wyverstone (A.M.).

V. pura (Alder). Not common.

E.—Old Newton (A.M.).

W.—Cockfield (C.B.), Tostock, Hopton (A.M.).

var. **margaritacea** Jeff. W.—Felsham (C.B.).

V. radiatula (Alder). Not common.

E.—Blaxhall (G.T.R.).

W.—Sudbury (King), Cockfield (C.B.), Knettishall, Hopton (A.M.).

Zonitoides nitidus (Müller). Moderately common.

E.—Wenhaston (A.S.K.), Oulton, Tatingstone (C.M.), Blaxhall (G.T.R.), Ipswich (A.M.).

W.—Sudbury (King), Bury St. Edmunds (Skepper), Knettishall, Mildenhall (A.M.).

***Z. excavatus** (Bean). Very rare.

W.—Hardwick (Bury St. Edmunds Museum, recorded in the Rev. C. Greene's list). The collection of local shells seems to have disappeared from the Bury Museum.

Euconulus fulvus (Müller). Moderately common.

E.—Blaxhall (G.T.R.), Melton (Miss Powles), Thwaite, Needham Market, Ipswich (A.M.).

W.—Sudbury (King), Chedburgh (C.B.), Hopton, Walsham-le-Willows (A.M.).

Arion ater (Linné). Common.

E.—Campsey Ash (A.S.K.), Blaxhall, Farnham (G.T.R.).

W.—Monks Eleigh, Stratford St. Mary (G.T.R.).

var. **brunnea** Roebuck.

W.—Stratford St. Mary (G.T.R.), Mildenhall (A.M.).

var. **brunneo-pallescens** Roebuck.

W.—Stratford St. Mary (G.T.R.).

var. **rufa** L.

E.—Blaxhall (G.T.R.). W.—Stratford St. Mary (G.T.R.).

var. **alba** L. W.—Bures St. Mary (G.T.R.).

A. intermedius Normand. Moderately common.

E.—Needham Market, Bentley (A.M.). W.—Whepstead (A.M.).

var. **plumbea** Collinge. E.—Mendlesham (A.M.).

A. hortensis Férussac. Common.

E.—Blaxhall (G.T.R.), Ipswich, Saxmundham (L. E. Adams in Taylor's "Monograph"), Ipswich, Stowmarket (A.M.).

W.—Fornham St. Martin (W. R. Burrell in Taylor's "Monograph"), Wetherden, Hopton, Bury St. Edmunds (A.M.).

Arion fasciatus Nilsson. Not common.

E.—Woodbridge (S.S.P.).

*W.—Brandon, Mildenhall, Drinkstone (A.M.).

Punctum pygmæum (Draparnaud). Very common.

E.—Between Baylham and Great Blakenham (Sheppard), Stoke Ash, Thwaite, Barham (A.M.).

W.—Sudbury (King), Bury St. Edmunds (Skepper), Clare (Brown in C.G.'s list), Hardwick (C.B.), Walsham-le-Willows, Hopton, Knettishall (A.M.).

Sphyradium edentulum (Draparnaud). Occasional.

E.—Blaxhall (G.T.R.), Offton, Friston, Somersham (Sheppard), Old Newton (A.M.), Melton (Miss Powles).

W.—Hardwick, Bury St. Edmunds (Skepper), Hopton, Haughley (A.M.).

Pyramidula rotundata (Müller). Common.

E.—Wenhaston (A.S.K.), Blaxhall, Kirton, Ipswich (G.T.R.), Martlesham (C.M.), Offton, Friston (Sheppard), Burgh Castle (J. B. Beckett), Melton (Miss Powles), Orford, Aldeburgh (A.M.).

W.—Cockfield, Felsham (C.B.), Hopton, Knettishall (A.M.).

Helicella virgata (DaCosta). Not abundant on a clayey soil.

E.—Blaxhall, Snape, near Minsmere Sluice, Leiston, Iken, Aldeburgh (G.T.R.), Woodbridge (S.S.P.), Bradwell, Burgh Castle (J. B. Beckett), Walberswick, Felixstowe, Ipswich, Creting (A.M.).

W.—Clare, Great Cornard, Sudbury (G.T.R.), Barton, Cavenham (C.B.), Elmswell (A.M.).

var. **lineata** Olivi.

E.—Blaxhall (G.T.R.), Woodbridge, Bentley (A.M.).

var. **subalbida** Poiret. E.—Ipswich (A.M.). W.—Elmswell (A.M.).

var. **albicans** Grateloup.

E.—Woodbridge, Ipswich (A.M.). W.—Elmswell (A.M.).

var. **subglobosa** Jeffreys.

E.—Aldeburgh (G.T.R.). W.—Elmswell (A.M.).

H. itala (Linné). Common.

E.—Marlesford, Woodbridge, Withersdale, Eye, Farnham (G.T.R.), Offton, Felixstowe (Sheppard), Witlesham (J. W. Horsley in C.G.'s list), Lowestoft, Oulton, Ipswich, Coddendam (A.M.).

W.—Clare, Cavendish, Monks Eleigh, Chelsworth (G.T.R.), Sudbury (King), Stanstead, Mildenhall, Stowlangtoft, Knettishall, Hopton (A.M.).

H. caperata (Montagu). Very common.

E.—Blythburgh, Wenhaston (A.S.K.), Blaxhall, Farnham, Iken, Bealings, Little Glemham, Grundisburgh, Saxmundham, Orford, Homersfield, Metfield, Withersdale, Claydon (G.T.R.), Corton (C.M.), Woodbridge (S.S.P.), Bradwell, Burgh Castle (J. B. Beckett), Ipswich, Aldeburgh, Felixstowe (A.M.).

W.—Bures St. Mary, Cavendish, Clare, Monks Eleigh (G.T.R.), Sudbury (King), Mildenhall, Great Barton, Knettishall, Hopton, Newmarket (A.M.).

var. **lutescens** Pascal.

E.—Blaxhall (G.T.R.), Creeting (A.M.).

W.—Wetherden (A.M.).

var. **alba** Picard. W.—Monks Eleigh (G.T.R.).

var. **fulva** Moquin-Tandon. W.—Wetherden (A.M.).

var. **ornata** Picard. W.—Wetherden (A.M.).

var. **bizonalis** Moquin-Tandon.

E.—Creeting (A.M.). W.—Wetherden (A.M.).

var. **major** Jeff. W.—Wetherden (A.M.).

H. cantiana (Montagu).

Common on sandy soil but very rare on the clay.

E.—Blythburgh, Wenhaston, Southwold, Dunwich (A.S.K.), Blaxhall, Snape, Walberswick (G.T.R.), Woodbridge (S.S.P.), Martlesham (C.M.), Oulton, Ipswich, Bentley (A.M.).

W.—Monks Eleigh, Stratford St. Mary, Hadleigh, Polstead (G.T.R.), Bardwell (C.B.).

var. **rubescens** Moquin-Tandon.

E.—Blaxhall (G.T.R.), Oulton (A.M.).

var. **albida** Taylor.

E.—Snape (G.T.R.), Woodbridge (S.S.P.).

W.—Chelsworth (G.T.R.).

var. **minor** Moquin-Tandon. E.—Walberswick (G.T.R.).

H. cartusiana (Müller).

E.—In a pit at Little Glemham (G.T.R.).

***Hygromia fusca** (Montagu).

W.—Cockfield, Felsham (C.B.).

H. granulata (Alder). Not common.

E.—Oulton (C.M.), Ipswich (A.M.).

W.—Bury St. Edmunds, Lackford, Icklingham (A.M.).

H. hispida (Linné). Moderately common.

E.—Blythburgh, Wenhaston (A.S.K.), Martlesham, Ipswich, Tattingstone (C.M.), Bradwell (Beckett), Blaxhall, Iken, Benhall, Farnham, Little Glemham, Woodbridge, Kirton, Snape (G.T.R.).

W.—Stratford St. Mary (G.T.R.), Mildenhall (A.M.).

***H. sericea** (Drap.). Common.

E.—Wenhaston, Campsey Ash, Blythburgh (A.S.K.), Mendlesham, Old Newton, Needham Market, Ipswich, Bentley (A.M.).

W.—Knettishall, Hopton, Walsham-le-Willows, Bury St. Edmunds (A.M.).

H. rufescens (Pennant).

E.—Rare in the extreme east of the county, but common elsewhere. Orford, Claydon, Whitton, Palgrave, Eye (G.T.R.), Woodbridge (S.S.P.), Barham, Stowmarket (A.M.).

W.—Very common. Sudbury (King), Hitcham (C.B.), Long Melford, Bures, Clare, Cornard, Elmswell, Monks Eleigh, Chelworth (G.T.R.).

var. **rubens** Moquin-Tandon.

E.—Mendlesham, Creeting (A.M.).

W.—Bury St. Edmunds (A.M.).

var. **alba** Moquin-Tandon.

E.—Creeting (A.M.).

W.—Bury St. Edmunds, Mildenhall (A.M.).

Acanthinula aculeata (Müller). Not uncommon.

E.—Blaxhall (G.T.R.), Melton (Miss Powles), Thwaite, Barham (A.M.).

W.—Bury St. Edmunds (Skepper), Sudbury (King), Hopton, Walsham-le-Willows (A.M.).

Vallonia pulchella (Müller). Moderately common.

E.—Blythburgh (A.S.K.), Blaxhall, Snape (G.T.R.), Ipswich (A.M.).

*W.—Sudbury (King), Barton, Cockfield (C.B.), Bury St. Edmunds (Skepper), Hopton, Brandon (A.M.), Stratford St. Mary (G.T.R.).

V. costata (Müller). Common.

*E.—Snape (G.T.R.), Ipswich, Walberswick, Needham Market, Barham (A.M.).

W.—Hopton, Knettishall (A.M.).

V. excentrica Sterki. Common.

*E.—Mendlesham, Needham Market, Ipswich (A.M.).

W.—Hopton (A.M.).

Helicigona lapicida (Linné). Occasional.

E.—Homersfield, Eye (G.T.R.), Somersham (Sheppard), Old Newton (A.M.).

W.—Wissington (G.T.R.), Bury St. Edmunds (Skepper), Sudbury (King), Haughley (A.M.).

H. arbustorum (L.). Confined to the river valleys.

E.—Blaxhall, Eyke, Ufford, Farnham, Marlesford, Woodbridge, Mendham (G.T.R.), Melton (Miss Powles), Ipswich, Needham Market (A.M.).

W.—Monks Eleigh, Bures, Long Melford (G.T.R.), Sudbury (King), Bury St. Edmunds (Miss Powles).

var. **flavescens** Moquin-Tandon.

E.—Blaxhall, Farnham, Marlesford (G.T.R.), Needham Market (A.M.).

W.—Stratford St. Mary (G.T.R.).

var. **conoidea** Westerlund. E.—Needham Market (A.M.).**Helix aspersa** Müller. Common throughout the county.var. **exalbida** Menke.

E.—Blaxhall (G.T.R.), Creeting (A.M.).

W.—Elmswell, Bures St. Mary (G.T.R.).

***H. pomatia** L.

E.—In a pit at Bramford, doubtfully indigenous (C.M.).

W.—Mr. W. Palmer has sent me specimens from a large chalk pit at Rickinghall, where, he says, there is a flourishing colony.

H. nemoralis L. Common.

E.—Blythburgh, Wenhaston, Southwold, Sudbourne, Campsey Ash, Butley (A.S.K.), Blaxhall, Snape, Langham, Farnham (G.T.R.), Ipswich (C.M.), Melton (Miss Powles).

W.—Felsham (C.B.), Bradfield St. George, Sudbury (J. W. Horsley in Carleton Greene's list), Bury St. Edmunds (Skepper).

var. **rubella** Moquin-Tandon.

E.—Ipswich (C.M.).

W.—Walsham-le-Willows (A.M.).

var. **roseolabiata** Taylor. W.—Long Melford (G.T.R.).**H. hortensis** Müller. More abundant than the preceding.

E.—Blythburgh, Wenhaston, Southwold (A.S.K.), Blaxhall, Farnham, Leiston (G.T.R.), Ipswich (C.M.), Offton, Holbrook, Friston (Sheppard), Melton (Miss Powles).

W.—Higham, Stoke-by-Nayland (Sheppard), Sudbury, Bradfield St. George (J. W. Horsley).

var. **lutea** Moquin-Tandon. E.—Ipswich (C.M.), Bentley (A.M.).

var. **lilacina** Taylor. E.—Needham Market (A.M.).

Ena montana (Draparnaud). W.—Cockfield, Lavenham (C.B.).

E. obscura (Müller).

Not abundant but fairly well distributed throughout the county.

E.—Blythburgh (A.S.K.), Homersfield, Snape, Campsey Ash, Blaxhall (G.T.R.), Ipswich, Spexhall, Friston, Offton (Sheppard), Woodbridge (S.S.P.).

W.—Sudbury (King), Cockfield, Lavenham, Brockley (C.B.), Stowlangtoft, Pakenham, Bury St. Edmunds (A.M.).

Cochlicopa lubrica (Müller). Common in damp places.

E.—Blythburgh, Sudbourne, Wenhaston (A.S.K.), Blaxhall, Benhall (G.T.R.), Oulton, Wetheringsett, Barham, Stowmarket (A.M.).

W.—Sudbury (King), Stratford St. Mary (G.T.R.), Hitcham, Cockfield (C.B.), Hopton, Wyverstone, Walsham-le-Willows (A.M.)

var. **lubricoides** Férussac. W.—Brandon (A.M.).

Azeca tridens (Pulteney). Very local.

E.—Friston (Sheppard).

*W.—Wyverstone (A.M.).

Cæcilioides acicula (Müller).

E.—Aldeburgh (J. E. Cooper, *J. of Conch.*, Jan., 1896), Melton (Miss Powles), Ipswich, Old Newton, Redgrave Fen (A.M.).

*W.—Sudbury (C.B.), Haughley, Ixworth-Thorpe churchyard (A.M.).

Jaminia cylindracea (DaCosta). On old ivy-covered walls.

E.—Blaxhall (G.T.R.), Woodbridge (S.S.P.), Melton (Miss Powles), Walberswick churchyard (A.M.).

W.—Sudbury (King), Stanton, Hopton, Knettishall, Bury St. Edmunds, Ixworth (A.M.).

J. muscorum (Linné). Common on sandy soil.

E.—Blythburgh (A.S.K.), near Minsmere sluice, Leiston (G.T.R.), Little Blakenham, Ipswich, Shotley (Sheppard), Melton (Miss Powles), Aldeburgh, Needham Market (A.M.).

W.—Sudbury (King), Bury St. Edmunds (Skepper), Barton Mills, Brandon (A.M.).

var. **edentula** Clessin.

E.—Blaxhall (G.T.R.), Ipswich, Felixstowe (A.M.).

W.—Knettishall, Brandon (A.M.).

var. **bigranata** Rossm.

W.—Knettishall, Brandon, Chalk Hill near Mildenhall (A.M.).

On visiting the spot at Brandon where Dr. Chaster found the tridentate form (*J. of Conch.*, vol. 11, p. 319) I had no difficulty in obtaining a good series.

Vertigo antivertigo (Drap.). On river-banks and near ditches.

E.—Blythburgh (A.S.K.), Blaxhall (G.T.R.), Needham Market, Ipswich, Redgrave Fen (A.M.).

W.—Sudbury (King), Knettishall (A.M.).

V. substriata (Jeffreys). Rare.

*W.—Among dead leaves on hedgebank at Hopton (A.M.).

V. pygmæa (Drap.). Fairly common.

E.—Blythburgh, Wenhaston (A.S.K.), Blaxhall (G.T.R.), Thwaite, Needham Market, Felixstowe, Ipswich, Redgrave Fen (A.M.).

W.—Hopton, Knettishall (A.M.).

***V. moulinsiana** (Dupuy).

E.—One dead shell, Redgrave Fen (A.M.).

W.—A single dead but fresh-looking specimen in flood rejectamenta at Knettishall (A.M.).

V. pusilla Müller. Rare.

E.—Blythburgh (A.S.K.).

*W.—Among dead leaves in two spots at Hopton (A.M.).

***V. angustior** Jeffreys.

E.—Aldeburgh (J. E. Cooper, *J. of Conch.*, Jan., 1896), Redgrave Fen (A.M.).

Balea perversa (L.). Not common.

E.—Blaxhall (G.T.R.), Woodbridge (S.S.P.), Thwaite, Old Newton (A.M.).

W.—Sudbury (King), Hitcham, Felsham, Cockfield (C.B.), Haughley, Hopton (A.M.).

Clausilia laminata (Mont.). Not abundant, but well distributed.

E.—Blaxhall, Farnham (G.T.R.), Offton, Great Blakenham, Friston (Sheppard), Woodbridge (S.S.P.).

W.—Whepstead (Skepper), Gedding, Felsham, Cockfield, Bury St. Edmunds (C.B.).

C. bidentata (Ström). Common.

E.—Sudbourne (A.S.K.), Blaxhall, Farnham (G.T.R.), Offton (Morley), Melton (Miss Powles), Woodbridge (S.S.P.).

W.—Lavenham (Skepper), Sudbury (King), Stratford St. Mary (G.T.R.), Gedding, Cockfield (C.B.), Hopton, Stanton, Ixworth, Bury St. Edmunds (A.M.).

var. **albina** Moquin-Tandon.

E.—Gislingham (Blatch in Rimmer's "L. and F.W. Shells").

var. **tumidula** Jeffreys. E.—Blaxhall (G.T.R.), Ipswich (C.M.).

Succinea putris (L.). Fairly common.

E.—Claydon, Oulton (C.M.), Blaxhall, Farnham, Leiston (G.T.R.), Woodbridge (S.S.P.), Campsey Mere (Sheppard), Melton (Miss Powles).

W.—Stratford St. Mary (G.T.R.), Mildenhall, Bury St. Edmunds (A.M.).

var. **vitrea** Moquin-Tandon. E.—Blaxhall (G.T.R.).

var. **solidula** Jeffreys. E.—Blaxhall (G.T.R.).

S. elegans Risso. Common.

E.—Blaxhall, Farnham, Snape, Iken, Leiston (G.T.R.), Blythburgh, Wenhaston (A.S.K.), Ipswich, Stowmarket, Oulton (A.M.).

W.—Bury St. Edmunds (Skepper), Knettishall, Hopton (A.M.).

Carychium minimum Müller. Very common among dead leaves in damp places.

E.—Campsey Ash (A.S.K.), Blaxhall (G.T.R.), Mendlesham, Thwaite, Needham Market, Ipswich, Stowmarket, Oulton (A.M.).

W.—Sudbury (King), Felsham (C.B.), Walsham-le-Willows, Hopton, Knettishall, Bury St. Edmunds (A.M.).

***Phytia myosotis** (Drap.). Common in the estuaries.

E.—Ipswich, Felixstowe, Aldeburgh, Orford, Woodbridge (A.M.).

var. **denticulata** Montagu. E.—Ipswich, Felixstowe (A.M.).

Ancylus fluviatilis Müller. Much rarer than the following species.

E.—Blaxhall (G.T.R.).

W.—Icklingham (Skepper), in the river Stour at Sudbury (C.B.).

Acroloxus lacustris (L.). Moderately common.

E.—Campsey Ash (A.S.K.), Blaxhall (G.T.R.), Woodbridge (Miss Powles), Needham Market (A.M.).

Limnæa auricularia (L.). Moderately common.

E.—Campsey Ash (A.S.K.), Blaxhall, Farnham (G.T.R.), Holbrook, Baylham (Sheppard), Ipswich, Needham Market, Stowmarket (A.M.).

W.—Lavenham (Skepper), Cockfield (C.B.), Bury St. Edmunds, Lackford, Icklingham (A.M.).

L. pereger (Müller). Common everywhere.

var. **lutea** Mont. — Sproughton (Sheppard), Needham Market (A.M.).

var. **ovata** Drap.—Blaxhall (G.T.R.), Needham Market (A.M.).

var. **vulgaris** Pfr.—Blaxhall, Farnham (G.T.R.), Mendlesham (A.M.).

var. **ampullacea** Rssm.—Blaxhall, Farnham (G.T.R.).

var. **lineata** Bean.—Walsham-le-Willows (A.M.).

var. **labiosa** Jeff.—Mendlesham (A.M.).

L. palustris (Müller). Moderately common.

E.—Campsey Ash, Wenhaston (A.S.K.), Oulton (C.M.), Blaxhall, Farnham, Leiston, Iken, Mendham, Homersfield, Dunningworth (G.T.R.), Ipswich (A.M.).

W.—Stratford St. Mary (G.T.R.).

var. **corva** Gmelin. W.—Knettishall (A.M.).

var. **lacunosa** Ziegler. W.—Mildenhall Fen (A.M.).

L. truncatula (Müller). Common by margins of rivers and in stagnant water.

E. — Blythburgh, Wenhaston (A.S.K.), Claydon, Holbrook, Stutton (Sheppard), Oulton (C.M.), R. Alde (G.T.R.).

W. — Higham (Sheppard), Icklingham (Skepper), Bury St. Edmunds (A.M.).

var. **elegans** Jeff. E.—Holbrook (Sheppard).

var. **albida** Jeff. E.—Levington (Sheppard), Mendlesham (A.M.).

L. stagnalis (L.). Very common.

E.—Campsey Ash (A.S.K.), Blaxhall, Farnham, Leiston, Theberton, Little Glemham, Homersfield, Mendham, Eye (G.T.R.).

W.—Stratford St. Mary, Tostock, Bury St. Edmunds (G.T.R.), Barton Mere (C.B.).

***L. glabra** (Müller). “Suffolk” (Jeffreys and Leith in Leach’s “Mollusks of Great Britain”).

Amphipeplea glutinosa (Müller).

*W.—Mildenhall (C.B.).

Planorbis corneus (L.). Common in West Suffolk, but not in the east of the county.

E.—Barnby Broad (C.M.), Ipswich, Redgrave Fen (A.M.).

W.—Bures St. Mary, in the Stour near Dedham (G.T.R.), Icklingham (C.B.), Bury St. Edmunds, Rushford, Hopton (A.M.).

P. albus Müller.

E. — Blythburgh, Wenhaston (A.S.K.), Tattingstone (C.M.), Ipswich, Bentley (A.M.).

W.—Bury St. Edmunds (A.M.).

var. **draparnaldi** Sheppard. Holbrook (Sheppard).

P. crista (L.). In ponds.

E.—Campsey Ash (A.S.K.), Iken (G.T.R.), Spexhall, Offton, Nettlestead (Sheppard).

*W.—Walsham-le-Willows, Knettishall, Norton (A.M.).

P. carinatus Müller. In rivers.

E.—Wenhaston (A.S.K.), Blaxhall, Farnham, Leiston (G.T.R.).

W.—Stratford St. Mary (G.T.R.).

P. umbilicatus Müller. Very common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Blaxhall, Farnham, Leiston, Snape, Iken (G.T.R.), Oulton (C.M.), Baylham, Holbrook (Sheppard).

W.—Higham (Sheppard), Hopton, Bury St. Edmunds, Lackford, Icklingham (A.M.).

var. **rhombea** Turton. E.—Bradwell (A.M.).

P. vortex (L.). Confined to rivers except in rare instances.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.).

W.—Felsham (C.B.).

***P. vorticulus** Troschel.

E.—One at Redgrave Fen (A.M.).

W.—Fossil, in a recent deposit at Knettishall. Mr. A. S. Kennard noticed this shell in a sample of peaty soil that I sent to him. Altogether more than a dozen specimens have been found in this place.

P. spirorbis (L.). Common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Farnham, Blaxhall, Little Glemham, Snape, Leiston, Homersfield, Mendham (G.T.R.), Ipswich (A.M.).

W.—Sudbury, Bures (G.T.R.), Knettishall (A.M.).

P. contortus (L.). Moderately common.

E.—Campsey Ash (A.S.K.), Blaxhall in the River Alde between Snape and Langham bridges (G.T.R.), Ipswich (A.M.).

W.—Cockfield (C.B.).

P. fontanus (Lightfoot). Not common.

E.—Campsey Ash, Baylham (Sheppard).

Segmentina nitida (Müller). Rare. W.—Tuddenham (Skepper).**Physa fontinalis** (L.). Abundant in rivers.

E.—Campsey Ash, Wenhaston (A.S.K.), Blaxhall, Farnham, Leiston, Iken, Newbourne (G.T.R.).

W.—Bury St. Edmunds (Skepper), Stratford St. Mary (G.T.R.).

Aplecta hypnorum (L.). In stagnant water.

E.—Saxmundham (G.T.R.), Bradwell (A.M.).

W.—Sudbury (King), Tostock (Skepper), Cockfield (C.B.), Mildenhall Fen (A.M.).

***Paludestrina confusa** (Frauenfeld).—Through the kindness of Mr. Claude Morley, who directed me to the spot at Oulton Broad where he found this species in the rejectamenta of the Broad, I succeeded in obtaining many living specimens crawling on the mud and under the fallen and decayed reeds. Mr. A. S. Kennard has since found a single shell at Blythburgh, some miles farther south.

***P. jenkinsi** Smith. Seems to occur near the coast from Lowestoft to Harwich. Abundant at Oulton Broad, in the river Blyth at Walberswick, the Alde at Aldeburgh, and the Orwell at Ipswich, and Orwell Haven.

var. **carinata** Smith. With the type at Oulton, Aldeburgh, and Walberswick. All the shells obtained from the Orwell were this form.

***P. ventrosa** (Mont.). Common.

E.—Blythburgh (A.S.K.), Southwold (G.T.R.), Lake Lothing, Thorpe, Aldeburgh, Walberswick, Orford, Ipswich, Woodbridge (A.M.).

var. **pellucida** Jeff.—Lake Lothing (A.M.).

***P. stagnalis** (Basterot). Exceedingly abundant in the estuaries of the Alde, Orwell, and Deben (A.M.), in the river Blyth (A.S.K.).

var. **albida** Jeff. Ipswich (A.M.).

var. **tumida** Marshall. Ipswich (A.M.).

Bithynia tentaculata (L.). Common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Blaxhall, Farnham, Leiston (G.T.R.), Tattingstone (C.M.).

W.—Cockfield, Icklingham (C.B.), Bury St. Edmunds (A.M.).

var. **producta** Menke.

E.—Blaxhall (G.T.R.). W.—Knettishall (A.M.).

var. **zonata** Baudon.

E.—Blaxhall (G.T.R.). W.—Knettishall (A.M.).

var. **marginata** West. E.—Blaxhall (G.T.R.).

B. leachii (Sheppard).—Moderately common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Blaxhall, Dunningworth (G.T.R.), Tattingstone (C.M.), Campsey Mere, Holbrook (Sheppard), Bramford, Ipswich (A.M.).

W.—Icklingham, Barton Mere (C.B.).

Vivipara vivipara (L.).—Not common.

E.—Leiston (G.T.R.). *W.—Sudbury, Icklingham (C.B.).

V. contecta (Millet).—Moderately common.

E.—Leiston, Minsmere, Theberton, Mendham (G.T.R.), Felixstowe (Sheppard), Needham Market, Ipswich (A.M.).

W.—Stratford St. Mary (G.T.R.).

Valvata piscinalis (Müller).—Moderately common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Blaxhall, Leiston, Farnham (G.T.R.), Tattingstone (C.M.), Bramford, Ipswich, Felixstowe (A.M.).

W.—Barton Mere (C.B.), Bury St. Edmunds (A.M.).

V. cristata Müller.—Moderately common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.); Blaxhall (G.T.R.), Mendlesham, Stowmarket, Needham Market, Ipswich, Oulton, Lowestoft (A.M.).

W.—Barton Mere, Cockfield, Livermere (C.B.), Bury St. Edmunds, Walsham-le-Willows (A.M.).

***Assemania grayana** Leach.

E.—Several specimens at Aldeburgh. One shell at the mouth of the river Orwell (A.M.), one specimen, Blythburgh (A.S.K.).

Pomatias elegans (Müller). Rare. W.—Sudbury (King).

Acicula lineata (Drap.). Very rare.

E.—Ipswich (C.B.). *W.—Sudbury (King).

Neritina fluviatilis (L.). Rather rare.

E.—Ipswich (A.M.).

W.—Sudbury (King), Stratford St. Mary (G.T.R.).

***Dreissensia polymorpha** (Pallas).

E.—The late Mr. J. B. Bridgman recorded the occurrence of this species in Breydon, half of which is Suffolk water.

Anodonta cygnæa (L.). Rather common.

E.—Campsey Ash, Barham (A.S.K.), Tattingstone (C.M.).

W.—Barton Mere, Cockfield (C.B.).

var. **anatina** L.

E.—Barham, Campsey Mere (Sheppard), Ipswich (A.M.).

W.—Bures (C.B.), Hopton (A.M.).

var. **zellensis** Jeff. E.—Blaxhall (G.T.R.).**Unio pictorum** (L.). Rare. E.—Ipswich (A.M.).

[***Sphærium rivicola** (Leach). There were at one time in Ipswich Museum some examples of this shell, labelled "Ipswich," but that they were really found in that locality is very doubtful].

S. corneum (L.). Common.

E.—Campsey Ash, Blythburgh, Wenhaston (A.S.K.), Stowmarket, Ipswich, Orford, Hoxne (A.M.).

W.—Cockfield (C.B.), Bury St. Edmunds, Hopton (A.M.).

S. lacustre (Müller). Not common.

E.—Blythburgh, Wenhaston (A.S.K.), Offton (Sheppard).

W.—Sudbury (King), Barton Mere (C.B.).

Pisidium amnicum (Müller). Not common.

E.—Ipswich (A.M.).

W.—Sudbury (King), Bury St. Edmunds (A.M.).

***P. henslowianum** (Sheppard). Occasional.

E.—Holbrook (Sheppard), Needham Market (A.M.).

W.—Sudbury (King), Mildenhall (A.M.).

P. subtruncatum Malm. *W.—Mildenhall (A.M.).**P. pulchellum** Jenyns. Not common. *W.—Mildenhall (A.M.).***P. nitidum** Jenyns. Not uncommon.

E.—Mendlesham (A.M.). W.—Wetherden, Mildenhall (A.M.).

P. obtusale Pfeiffer. Not uncommon.

*E.—Mendlesham, Lowestoft (A.M.).

P. gassiesianum Dupuy. W.—Knettishall (A.M.).

Vertigo antivertigo (Drap.) in Northants.—On Oct. 3rd, 1908, accompanied by two members of our Society, Messrs. Cattell and Freeman, I went to search a spot which I had previously noted as a likely habitat for species of *Vertigo* in a hitherto unworked corner of the county, near Wadenhoe and Aldwinkle. This is a considerable tract of bog land, with bog bean and cotton grass in places. Taking home a quantity of moss, etc., from the most promising spots, I found amongst the siftings three specimens of the above species, thereby adding another to the county list.—C. E. WRIGHT (Read before the Society, Nov. 11th, 1908).

LIMAX TENELLUS IN BUCKINGHAMSHIRE AND
HERTFORDSHIRE.

By CHAS. OLDHAM.

(Read before the Society, December 9th, 1908).

ON August 30th I took several examples of *Limax tenellus* on fungi among the dead beech leaves in Halton Wood, near Wendover, and subsequent search during September and October showed that this slug is widely distributed and abundant in beech-woods on the chalk downs of the Chiltern Hills in Bucks. and Herts. It feeds on various fungi, including the malodorous *Phallus impudicus*, but is not restricted to those growing on the ground, for at Watford and Berkhamsted Common I found it associated with *L. maximus*, *L. arborum* and, 'curiously enough, with *Arion subfuscus*, beneath the bark of decaying beeches; in one instance at a height of more than ten feet from the ground. It is a remarkably active creature, and, like *Agriolimax lævis*, will begin to crawl at once after being irritated or molested, even when held in the hand, behaviour which contrasts strongly with the lethargy of the *Arionidæ* under similar circumstances. With the exception of a specimen of the var. *cincta* at Great Missenden all the examples of *L. tenellus* that I collected were referable to the var. *cerea*, a name, by the way, which aptly describes the clear, waxy appearance of the slug. The following is a list of the precise localities in which I have actually taken *L. tenellus*, but, as they represent practically every place in which I looked for it, they may be regarded as merely representing and not as limiting its range in the district. Associated with it in every locality were *Arion ater*, *A. subfuscus* and *A. intermedius*. *Arion hortensis* and *A. circumscriptus* were also feeding on fungi in most of the woods, but these species were less abundant than their congeners. At Great Missenden on September 13th I took a single half-grown example of *L. cinereo-niger* var. *hedleyi*.

Buckinghamshire :—Halton Wood and Fugsdon Wood, near Wendover; Ivinghoe Common; Penn Wood, near Amersham; Great Missenden.

Hertfordshire :—Berkhamsted Common and Ashridge Park; Whippendell Wood, near Watford; High Scrubbs and Gearyshill, near Tring.



MOLLUSCAN RECORDS FROM GLOUCESTERSHIRE.

By CHARLES UPTON.

(Read before the Society, May 13th, 1908).

My researches have been made during the past twelve months principally in the neighbourhood of Stroud, and with very few exceptions all the recorded forms have been found in that locality. A more prolonged and extended search would probably result in further additions.

Stroud district being so singularly rich in mollusca, a few words descriptive of the area may perhaps be useful. The town is situated about midway between the northern and southern extremities of the Cotswolds, which consist almost entirely of Inferior Oolite limestone resting on Lias clays and limestones. The western escarpment of the hills is cut into at frequent intervals by long, narrow, sinuous and much-branched valleys, each having a stream running through it, resulting in a great number of "spurs" of an average elevation of 700 to 800 feet. The upper third of the hills is to a large extent covered by beech woods, the valleys being for the most part grass land, whilst between the grass "bottoms" and the tree belt, and also on the hill tops where the trees have disappeared, the land is ploughed. Most of the fields on the hills are separated by dry limestone walls, those in the valleys having hedges and ditches.

Stroud is situated in one of the valleys alluded to, and through the same valley runs the canal known from Stroud eastwards as "The Thames and Severn Canal," and westwards as "The Stroudwater Navigation." The canal constitutes—for the district—the division between "Gloucestershire East" and "Gloucestershire West." In addition to the canal and the streams, there is a considerable number of mill ponds, cattle and other pools, and natural springs.

The natural conditions being so favourable, an abundant molluscan fauna would naturally be expected, and such does, in fact, exist.

With regard to the specimens exhibited the following remarks may be made:—

Vitrea radiatula (Alder) appears to be very local. I have so far only taken it in one small mossy bog near Elcombe, but it is not uncommon there in association with *Zonitoides nitidus*, *Cochlicopa lubrica*, *Vallonia pulchella* (type), and *Carychium minimum*.

Helicella cantiana (Mont.) is also very local, being confined to a very restricted area on the hill side near Pitchcombe, where it is found in hedges, as usual by the roadside and near dwellings.

Cæcilioides acicula (Müller). This has been found very sparingly in several places but not in any abundance so far as my researches show, except in one grass field on the hill top near Stroud Hill.

Acicula lineata (Drap.) so far as known at present has only been taken by myself in a small, somewhat damp spot under decaying beech leaves, in Worgans Wood, near Stroud. The spot though in the shade during almost the whole day is by no means wet.

Ancylus fluviatilis Müller. The commonest form in this neighbourhood is the var. *albida*, which is very abundant in a stream near Brimscombe railway station. Both the type and the var., however, occur rather sparingly in other streams in the neighbourhood.

Neritina fluviatilis (L.). Large specimens are fairly common in the Gloucester and Berkeley Canal at Sharpness, but in a very restricted area. I am informed that a few specimens were taken from the Stroudwater Navigation some years ago, but I have no personal knowledge of the fact.

Vivipara contecta (Millet). This appears to be confined to a short length of the Thames and Severn Canal, near Chalford, near to where the condensing water from the waterworks is pumped into the canal. The specimens, in common with the other shells found in that immediate neighbourhood, are above the average in size, owing, as I imagine, to the extra warmth of the water. One shell which I have measures as much as 53 mm. in altitude and 41 mm. in breadth. Mr. Taylor tells me that this form is the var. *inflata* Villa.

Pisidium amnicum (Müller). This shell is not uncommon in the Slad stream, near Stroud, and occurs also sparingly in the canal.

Zonitoides nitidus (Müller).

Planorbis fontanus (Lightfoot).

P. contortus (L.).

Physa fontinalis (L.).

Valvata cristata Müller.

Pisidium pusillum (Gmel.).

All these forms are pretty generally distributed and are tolerably abundant, *V. cristata* being particularly plentiful. *P. fontinalis* is somewhat

variable in shape, those from near Gloucester having a more produced spire than those from the Stroud district, whilst those from the Gloucester and Berkeley Canal at Sharpness are much thicker and darker in colour, with a purplish lip.



Limax tenellus in Worcestershire.—On December 5th I found a single example of the var. *cineta* of this slug in the extensive oak-woods of the Wyre Forest, near Bewdley. The species is, apparently, a new record for the county.—CHAS. OLDHAM (*Read before the Society*, Jan. 13th, 1909).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

376th Meeting, Nov. 11th, 1908.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

“Supposed new Species of *Helicina* and *Bulimulus* from Costa Rica.” “Description of a new Sub-genus and Species of *Alycaeus* from Ke-lan-tan.” “Descriptions of four new Species of *Melania* from New Ireland and Ke-lan-tan.” “Descriptions of new Species of Land and Freshwater Shells from Central and South America.” “Descriptions of nine new Species of Land Shells from New Caledonia.” “Descriptions of two new Species of *Nassa* from Fiji and New Caledonia.” “Descriptions of four new Species of Marine Shells, probably from Ceylon.” “Description of a new Species of *Linnaea* from North-West Australia.” “Description of a new *Petneus* from Palestine.” “Diagnoses of new Species of *Corbula* and *Bithinella* from Lower Bengal.” “Descriptions of new Species of Marine *Pelecypoda* from the Philippine Islands.” “Descriptions of new Species of Marine Shells from Ceylon.” “Description of a new Species of *Clathurella* probably from Ceylon.” “Descriptions of new Species of Land, Freshwater, and Marine Shells from West Africa.” “Description of a new Species of *Rhagada* from Western Australia.” “Descriptions of new Species of Marine and Freshwater Shells in the Collection of the Indian Museum.” “Descriptions of new Species of Land, Marine, and Freshwater Shells from the Andaman Islands.” “Notes on Shells from the Victoria Falls, etc.”—all by H. B. Preston.

Reprints of the articles on Non-Marine Mollusca in the “Victoria History of the County of Yorkshire,” “— Cornwall,” “— Devon,” “— Hereford,” “— Leicestershire,” “— Staffordshire,” “— Worcestershire,” “— Warwickshire,” “— Sussex,” “— Somersetshire,” “— Kent,” “— Rutlandshire,” “— Essex,” “— Durham,” “— Buckinghamshire,” “— Berkshire,” “— Lancashire,” “— Bedfordshire,” “— Shropshire”—all by B. B. Woodward, with the assistance of others in special instances (*from the respective authors*); and the usual periodicals received in exchange.

Candidates Proposed for Membership.

Albert J. Moore, 9, Brook Street, Hull.

George H. Weaver, 31, Devonshire Road, Palmer's Green, London, N.

Members Deceased.

R. D. Darbshire.

Alfred Leicester.

The following resolution was passed in reference to the above :—“The Council and members of the Conchological Society desire to place on record the sense of the great loss which the Society has sustained through the lamented deaths of Mr. R. D. Darbshire and also of Mr. Alfred Leicester, and instruct the Secretary to convey to the relatives of the deceased gentlemen their most sincere condolence.”

Papers Read.

“*Helix nemoralis* in North-West Donegal,” by E. Collier.

“*Helix nemoralis* eaten by rabbits,” by Lionel E. Adams, B.A., and C. E. Wright.

“The Banding of *Helix nemoralis*,” by Canon J. W. Horsley.

“*Vertigo antievertigo* Drap. in Northants.,” by C. E. Wright.

“Some New Herefordshire Records,” by J. R. le Brockton Tomlin, M.A.

“Mollusca of Kendal, Westmorland,” by J. Wilfrid Jackson, F.G.S.

“Holocene Mollusca near Great Mitton, Yorks.,” by J. Wilfrid Jackson, F.G.S.

Exhibits.

By Mr. Thomas Taylor: A series of *Diloma nigerrima* Chem., *Purpura biconica* Hutton, and *Littorina mauritiana* Lam. from Wellington Harbour, New Zealand.

By Mr. G. D. H. Carpenter: A living example of *Testacella haliotidea* from Eton, Bucks.—a new locality for this species.

By Mr. R. Standen: *Murex denudatus* Perry, *Zemira australis* Sow., *Lotorium subdistortum* Lam., and *Myadora ovata* Reeve, dredged in West Port Bay, Victoria, by C. J. Gabriel; *Cancellaria agalma* Melv. and Stand., from Gulf of Oman; *Bythoceras iridescens* from Lake Tanganyika; and a large group of *Perna obliqua* Lam. *in situ* on branch of mangrove, from Jamaica (Manchester Museum collection).

By Mr. J. W. Baldwin: *Helix (Dorcasia) prunum* Fér. from Queensland.

By Mr. Kidson Taylor: Varieties of *Helix*, *Ilygromia*, and *Vitrea*; also *Ancylus fluviatilis* var. *albida*, *Bithynia leachii*, *Pisidium gassiesianum*, etc., from Yorkshire localities.

By Mr. J. Wilfrid Jackson: Series of specimens from Kendal and Great Mitton to illustrate his papers: *Paludestrina jenkinsi* from Warnemünde, Mecklenburg, Germany; *Clausilia bidentata* with the last whorl disjointed, from Marple; free and attached pearls of *Mytilus edulis* from the raised beach, Uddevalla, Sweden; *Helix pomatia* and dart extracted from matrix filling interior of shell, from Loess deposits near Eendingen, Kaiserstuhl near Freiburg.

By Mr. E. Collier: Specimens of *Helix nemoralis* from North-West Donegal to illustrate his paper.

By Mr. C. H. Moore: Land and freshwater and marine shells from Tenby.

By Mr. Charles Upton: The following new records for Gloucestershire:—*Econulus fulvus*, *Punctum pygmaeum*, *Acanthinula aculeata* and *Jamnia anglica*; also two very large *Vivipara contecta*, alt. 54 mm., breadth 38 mm., and two *Planorbis corneus* var. *albinus* showing traces of spiral bands, Chalford, Glos.

377th Meeting, Dec. 9th, 1908.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted:—

“Notes on Cheshire Land and Freshwater Mollusca,” by J. Wilfrid Jackson.
“Manual of Conchology,” part 77, by H. A. Pilsbry (*from the respective authors*); and the usual periodicals received in exchange.

New Members Elected.

Albert J. Moore, 9, Brook Street, Hull.

George H. Weaver, 31, Devonshire Road, Palmer's Green, London, N.

Candidates Proposed for Membership.

Fritz Haas, Zoological Institute, Heidelberg, Germany.

G. W. Brindley, Milford, near Derby.

Resignation.

J. T. Wadsworth.

Papers Read.

“Land and Freshwater Mollusca of Scarborough District,” by J. A. Hargreaves.

“On a Fossil Dart and Epiphragm of *Helix pomatia* found in the Loess Deposit of the Rhine Valley,” by J. Wilfrid Jackson, F.G.S.

“*Limax tenellus* in Buckinghamshire and Hertfordshire,” by C. Oldham.

Exhibits.

By Mr. R. Standen: *Anostoma octodentatum* from Parahyba, Eastern Brazil; *A. depressum* from the banks of the River Amazon; and *A. (Ringicella) ringens* from Rio Negro, Brazil—a fine series of these remarkable land shells for comparison with some equally peculiar fossils, viz.:—*Strophostoma anomphala* from Oligocene of Caylus, France; *S. anostomaformis* from Miocene of Normandy; and *S. tricarinatum* from Miocene of Hochheim, Frankfurt, in the Manchester Museum collection. Also *Jaminia anglica*, *Vitrea crystallina*, *V. pura*, *Acanthinula aculeata*, etc., from Red Brow Wood, Marple, Cheshire.

By Mr. J. Kidson Taylor: A fine series of *Helix nemoralis* and *H. hortensis*.

By Mr. C. H. Moore: *Helix lapicida*, *Vitrea pura*, *V. crystallina*, etc., from Miller's Dale; *Physa heterostropha* from Stalybridge.

By the Rev. Lewis J. Shackelford: Very dark-coloured specimens of *Voluta undulata* Lam. from Snake Island, Victoria.

378th Meeting, Jan. 13th, 1909.

Mr. B. R. Lucas in the chair.

Donations to the Library announced and thanks voted:

"Notes on the Natural History, Geology, and Antiquities of Duror, Argyllshire," by the Rev. G. A. Frank Knight. "Lincolnshire Non-Marine Mollusca: Addenda to Nov. 30th, 1908," by J. F. Musham. "Descriptions and Figures of some Land and Freshwater Shells from Mexico, believed to be new," by W. H. Dall (from the respective authors); and the usual periodicals received in exchange.

Donation to Cabinet: A series of *Helix caperata* from Suffolk localities by Mr. G. T. Rope.

New Members Elected.

Fritz Haas, Zoological Institute, Heidelberg, Germany.

G. W. Brindley, Milford, near Derby.

Candidate Proposed for Membership.

Mrs. Jessie Linton, Bank House, Bedale, Yorks.

Resignation.

W. Valentine Burgess.

Papers Read.

"On the Land and Freshwater Mollusca of South Wales," by John Williams Vaughan.

"*Limax tenellus* in Worcestershire," by Chas. Oldham.

"Addenda to Grange Mollusca," by H. Beeston.

Exhibits.

By Mr. R. Standen: Deformed specimen of *Physa heterostropha* Say from the Reddish Canal.

By the Rev. C. E. Y. Kendall: *Paludestrina jenkinsi* from the Grand Junction Canal at Leicester (vice-county 55). This shell now abounds just outside the town to the south but has never been noticed before.

By Mr. H. H. Bloomer: Specimens of *Unio tumidus* from the Birmingham district. A large number of specimens of this form from the Darbshire Collection showing relation to *U. pictorum* were also exhibited for comparison.

There was a special exhibit of *Helix caperata* and its vars. by Messrs. G. T. Rope, B. R. Lucas, E. Collier (a sinistral specimen from N. Devon, and very fine var. *alba* from Springdale, I. of W.), J. Kidson Taylor (var. *subscalaris*), J. W. Baldwin, E. C. Stump, J. W. Jackson, C. H. Moore (var. *alba*), and the Rev. C. E. Y. Kendall.

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JOURNAL
 OF
CONCHOLOGY.

*BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
 OF GREAT BRITAIN AND IRELAND.*

PUBLISHED QUARTERLY.

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|---|---|---|
| HON. EDITOR: J. R. LE B. TOMLIN, M.A., F.E.S., STONELEY, ALEXANDRA RD., READING. | HON. SECRETARY: REV. L. J. SHACKLEFORD, 66, GRANVILLE ROAD, BLACKPOOL. | HON. TREASURER: E. D. BOSTOCK, HOLLY HOUSE, STONE, STAFFS. |
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VOL. 12.

JULY, 1909.

No. 11.

ANNUAL MEETING—Notice to Members.

It is proposed to hold the next Annual Meeting in London, on Saturday, October 16th, and some of the London members have kindly offered to entertain members coming from the north. Any member who wishes to be put up from the Saturday to the Monday is requested to write forthwith to J. E. COOPER,

68, North Hill, Highgate, N.

**SCOTLAND AND THE CENSUS OF BRITISH LAND
 AND FRESHWATER MOLLUSCA.**

In response to the note printed in this *Journal* for April, and thanks to the willing co-operation of numerous conchologists, the census has advanced so rapidly in England and Ireland that, up to the time of writing this, 950 blanks have been filled up.

Of these, only forty are Scottish records, and thirty of these are from one collector, Mr. John Roseburgh, of Galashiels. I, therefore, venture to ask for special assistance as regards Scotland.

Marked lists for any particular county will be sent on request.

The species which Mr. Taylor is at present working up for his Monograph are *Punctum pygmæum*, *Pyramidula rupestris*, *P. rotundata* (for which two counties are still blanks: Aberdeen North and Longford), *Acanthinula aculeata*, and *A. lamellata*; and the completion of our records of these would at the present time be particularly opportune.

One suggestion to keen and lynx-eyed conchologists may be made: the possibility of finding alive in Britain certain species known here only as pleistocene or holocene fossils, but still living in Europe; such as *Eulota fruticum*, a species easily confounded with *Helicella cantiana*, but differing by its rounder whorls and wider umbilicus; and *Pyramidula ruderata*, which is closely allied to *P. rotundata*, but has fewer and rounder whorls and is without the characteristic brown fleckings.

HELIX NEMORALIS L. IN NORTH-WEST DONEGAL

BY EDWARD COLLIER.

(Read before the Society, November 11th, 1908).

IN September last I went with Dr. Chaster of Southport, Mr. C. E. Wright of Kettering, and Mr. Arthur Stelfox of Belfast for a few days' collecting in North-West Donegal, and when there Mr. Wright and I collected all the *Helix nemoralis* we could so that we might note the variation.

Our first stay was at Dunfanaghy, where we found a considerable area of sand-dunes, called Tramore Strand, which connects Horn Head with the mainland, as Horn Head is almost an island.

On one part of these sand-dunes there is a large stretch of sand, virtually level, without any herbage at all, where, when any wind is blowing, one was almost blinded with the driving sand, but further west and nearer the sea it is covered with bush and short grass. In some parts the sand-dunes are very high, rising to a height of 380 feet in the part nearer Horn Head.

On the lower portion, near the mainland, we found *H. nemoralis* fairly plentiful, but most of them the type 12345 in various bandings, a good many of them being (12)(345) and (12345) var. *coalita*. The proportion of var. *albolabiata* in them was very considerable, as fully one-third was that variety to two-thirds type. They were all *libellula*, and not a single specimen of *rubella*. I only got eight specimens without band, 00000, and two of them also were *albolabiata*.

There was not a single specimen of 00300, which is so common in most places. I got three specimens of 00305, all with the last band a very thin line, but distinct; one specimen of 10045 and an extremely thin line for no. 2 band; this specimen also was *albolabiata*; also two specimens of 10345, one of which also was *albolabiata*.

These shells from Tramore Strand were rather larger than the ones we got further down the coast, and much heavier shells than those we found on an old wall by the roadside near Dunfanaghy, where we found them much thinner and more variable in colour, some being *rubella*.

On leaving Dunfanaghy, we went to stay at Middletown, Bunbeg, which we found considerably the better district for collecting *Helix nemoralis*.

On Bunbeg sand-dunes I collected a large quantity, almost one-half of which were var. *albolabiata*, and in all the different band-

formulas in which we collected the type. Again I did not get a single 00300, and not a proper *rubella*, although some of them had a tendency to *rubella*.

Out of 250 specimens collected, 150 were type with five bands, and rather more than half of these were *albolabiata*, although I think I must have taken more of the var. *albolabiata*, simply because they had white mouths.

Out of those I took, sixty specimens were 00345, and of these twenty-two were *albolabiata*; of the rest, a few were 10345, with both dark and white mouths, and the remainder were bandless, nearly half of them being *albolabiata*, some almost pure white and some with a tendency to purple. The most striking thing about the specimens of *albolabiata* is that they look so much like *H. hortensis*, especially as they are only rather small shells, and about the size we find plenty of *H. hortensis* in England, and if they had been found by themselves they might easily have been put down as that species. Amongst them I found two specimens alive, with a very long extension of the mouth, which I believe to be due to their being old shells that had lived for a long time through the winters being mild, and had each year added a little more to the mouth.

One day whilst at Bunbeg we went across by boat to the peninsula of Carrickfin, opposite Bunbeg, and at the southern end we found a large colony of *H. nemoralis* var. *citriozonata*. I have never found this variety at all common, although I have taken specimens at several places, but never more than two or three in a locality; but at Carrickfin our party found over one hundred specimens, a good many of them in very fine condition. Owing to this variety being so very uncommon, we collected more of it, and neglected the others, although there was here a large proportion again of *albolabiata*. We also found a good many *libellula* 00000, with both white and dark mouths. What is the cause of such a colony of *citriozonata*? I was struck with one thing, and that was that all over the ground we worked there was a quantity of a yellow fungus, like a mushroom, and just about the same colour and size as the shell. Could it be that the fungus is poisonous to birds, and so they did not touch the var. *citriozonata*? Along with them we got a few of var. *roseozonata* as well.

Another day whilst at Bunbeg we went out to the islands of Inishmeane and Gola. On Inishmeane we could not find any *H. nemoralis* for a long time, but just before leaving Mr. Wright found some amongst stones and on an old wall. They were mostly rather thin specimens, and more richly coloured than on the mainland.

On Gola also we found a few very nice ones, and Mr. Wright got

a beauty, rich dark red 00(345), the broad black band being very distinct.

From Bunbeg we went on to Burton Port, the end of the railway, and worked Cruit Island the first day. Cruit Island is a long island running north, and at low tide can be reached on foot near the southern end, but we drove some considerable distance, and went by boat, and were landed nearer the northern end. Here we found *H. nemoralis* at once on the grass, as at Bunbeg, but more variable in colour, as we found several *rubella* 00000. Type and var. *albolabiata* were both again very plentiful, but some of the shells were rather smaller and higher in the spire. We also found here a few var. *citriozonata*, but not many.

The weather turned out so very wet that we could not go out to Aran Island, which is the largest island off this part of the coast; but as it is nearly all bog-land, we should most likely not have been very successful. So we took train back to Londonderry, where we stayed the night, and next morning, under the guidance of Mr. J. N. Milne, of Belfast, who had been with us all the time, we went on to Magilligan in County Derry, where there is a long stretch of sand-dunes. Here we were fortunate enough to come across a colony, restricted so far as we could make out to a very small area, of a new variety which I think is worthy of a name, as although I have collected for a very long time, I have never found anything like it before.

It is distinctly olive-coloured, going rather darker near the mouth, and the mouth also is the same colour. It is of various band formulas, like both *roseozonata* and *citriozonata*, and I prefer to call it *olivaceozonata*.

To sum up the result, there was nearly a total absence of var. *rubella*, none of the common band formula 00300, and a very large quantity of var. *albolabiata*. Can anybody explain the reason of this?



Land and Freshwater Mollusca from Tooting, London, S.W.—I have no doubt that it will surprise many conchologists—and particularly Londoners—to be told that Tooting is an excellent habitat for land and freshwater mollusca; and yet this is perfectly true, for in a field between Tooting and Merton and just outside the L.C.C. boundary I have taken fifty species. It was merely chance that led me to this spot, as, having a free afternoon on Nov. 3rd, 1906, I set out to look for Merton Abbey—a building which, I believe, now no longer exists, although indicated on the Ordnance Maps. Although the abbey is gone, the name still remains, as there is a station on the L.B. and S.C. Railway—Wimbledon line—called Merton Abbey, and it was while I was prowling round this that I noticed a rather tempting “watercress bed” on the opposite or southern side of the rail-

way. Having negotiated the railway, I found myself in a fairly large field, intersected by several large and many small ditches, and bounded on the east by the River Wandle. There were also two ponds abutting the railway, rectangular in shape, and very artificial looking. I at first thought that all these water-courses, etc., must have had some connection with the abbey, but I have no proof of this. On reaching this field, I soon found that my afternoon was not to be wasted, as my first scoopful brought up *Planorbis corneus* and *Bythinia leachii*. I subsequently visited the locality on several occasions, both alone and in company with my friend Mr. C. P. Harrington; and as this spot is bound to be built on in the next few years, I think it wise to publish a complete list of the species which I have taken there.

| | |
|--|---|
| <i>Limax arborum.</i> | <i>Succinea elegans</i> var. <i>pfeifferi</i> . |
| <i>Agriolimax agrestis.</i> | <i>Carychium minimum.</i> |
| <i>A. lewis.</i> | <i>Limnea pereger.</i> |
| <i>Vitrina pellucida.</i> | <i>L. palustris.</i> |
| <i>Vitrea crystallina.</i> | <i>L. truncatula.</i> |
| <i>V. cellaria.</i> | <i>L. stagnalis.</i> |
| <i>V. alliaria.</i> | <i>Planorbis corneus.</i> |
| <i>V. rogersi.</i> | <i>P. albus.</i> |
| <i>V. nitidula.</i> | <i>P. umbilicatus.</i> |
| <i>Zonitoides nitidus.</i> | <i>P. vortex.</i> |
| <i>Arion ater.</i> | <i>P. spirorbis.</i> |
| <i>A. subfuscus.</i> | <i>P. contortus.</i> |
| <i>A. intermedius.</i> | <i>P. fontanus.</i> |
| <i>A. hortensis.</i> | <i>Physa fontinalis.</i> |
| <i>A. fasciatus.</i> | <i>Aplecta hypnorum.</i> |
| <i>Pyramidula rotundata.</i> | <i>Bythinia tentaculata.</i> |
| <i>Helicella cantiana.</i> | <i>B. leachii.</i> |
| <i>Hygromia hispida.</i> | <i>Valvata piscinalis.</i> |
| var. <i>hispidosa.</i> | <i>V. cristata.</i> |
| <i>H. rufescens.</i> | <i>Neritina fluviatilis.</i> |
| <i>Vallonia excentrica.</i> | <i>Sphaerium corneum.</i> |
| <i>Helicigona arbustorum.</i> | <i>Pisidium subtruncatum.</i> |
| <i>Helix aspersa.</i> | <i>P. pusillum.</i> |
| <i>H. nemoralis.</i> | <i>P. obtusale.</i> |
| <i>Cochlicopa lubrica.</i> | <i>P. gassiesianum.</i> |
| <i>Succinea putris?</i> (young specimens). | |

All the above species were found still living, with the exception of *Helicigona arbustorum*, *Planorbis fontanus*, and *Neritina fluviatilis*. The specimens of these species taken may have come from the deposits along the bank of the Wandle; but I feel sure that further search would reveal living specimens at least of *H. arbustorum*. With the exception of *Vitrea nitidula*, *V. crystallina*, *Vallonia excentrica*, *Planorbis spirorbis*, and *Aplecta hypnorum*, all the species in the above list are abundant.—A. W. STELFOX (Read before the Society, Oct. 17th, 1908).

PISIDIUM SUPINUM A. Schmidt LIVING IN THE THAMES.

By J. E. COOPER.

(Read before the Society, February 10th, 1909).

Pisidium supinum has been known for six or seven years as a Holocene fossil in the valleys of the Thames and the Lea. The earliest notice of it as British is, I believe, in the *Essex Naturalist*, April, 1903. In the Gray Collection at South Kensington there are a few recent specimens labelled "Battersea," but with this exception it does not appear to have been taken alive in this country until last year when I found it living in sand in the Thames at Hampton Wick. It occurs there in fair numbers; it also lives sparingly in mud at Twickenham, and in a stream at Bedfont. It will probably turn up elsewhere.

For the identification of this shell, I am indebted to Mr. B. B. Woodward, F.G.S., who has made a special study of *Pisidium*. The shell of *P. supinum* is much more solid for its size than any other British *Pisidium*. The typical form is sharply triangular, with very prominent beaks. It often—but not always—has an appendiculum, similar to that of *P. henslowianum*. The hinge teeth are strong, as it lives in running water. At Hampton Wick its companion is *P. amnicum*.

Mr. J. W. Taylor writes me, under date 21st December, that he has just detected this *Pisidium* among some Lincoln shells.



Shell-Collecting in the Barmouth District.—The district round Barmouth is not exactly the finest collecting-ground for the conchologist with only a week at his immediate disposal, but several species are nevertheless to be discovered by the patient searcher. On the hill behind the somewhat straggling town *Helix nemoralis* and *H. hortensis* are to be found, and on the wall of the Llanaber Road, near the Catholic Chapel, is a flourishing colony of *Helix aspersa*. All the larger Helices are furnished with rather thin shells. Some rather large *Pyramidula rotundata* are also in the vicinity of the same road. *Hygromia hispida* and *Helicella caperata* occur somewhat sparingly near the viaduct; *Vitrea nitidula* and *V. cellaria* together with *V. rogersi* (the last a new record for Merionethshire) are to be found on the walls; *Jamiania cylindracea* is common, and *Linnaea truncatula* is to be gathered (small in size) from a rock pool in the vicinity of the Episcopal Church. At Arthog, a few miles away on the south side of the estuary, *Pyramidula rotundata* is common together with *Vitrea rogersi* and *Cochlicopa lubrica*; whilst *Jamiania*

cylindracea is found at Dolgelly, from which place a very fine specimen of *Vitrea rogersi* approaching var. *umbilicata* was also obtained. On the way to Fairbourne a specimen of *Helix aspersa* was seen lying on a wall by the road; this mollusc had evidently been serving as a breakfast for some bird, as the animal was dead and partially devoured. A visit to Harlech Castle produced *Pyramidula rotundata*, *Vitrea nitidula* and *V. rogersi*, *Jaminia cylindracea*, *Clausilia bidentata*, *Balea perversa*, *Cochlicopa lubrica*, and *Vitrina pellucida* (dead). On the shore *Natica catena*, *Venus gallina*, and *Tellina balthica* were found. The time, however, for shore collecting was a very bad one. The slug which is chiefly in evidence in the district is *Arion ater*, with several varieties, including one with a white sole, and another with a similar white sole but with a bright yellow band dividing the same from the black portion of the animal. A day at Aberystwyth included a few minutes at the old castle, where *Helicella virgata* (type and yellow variety), and *H. caperata*, *Pyramidula rupestris*, *Jaminia cylindracea*, *Cochlicopa lubrica*, and *Vallonia pulchella* were found. The far-famed Mochras, or Shell-Island, north of Barmouth, was also visited, with the customary poor results. *Helix nemoralis* and *H. aspersa* are living amongst the thin vegetation with which the island is clothed, but with the exception of some very fine coloured and banded varieties of *Littorina rudis* and large *Monodonta crassa* found living on the rocks, together with *Littorina littorea* and *L. obtusata*, and *Patella vulgata*, marine collecting is at a discount. Amongst the fragments of thousands of common bivalves and univalves with which the shore is covered were to be found dead specimens of *Gibbula magus*, *Nassa incrassata*, *N. reticulata*, *Hedropleura costata*, *Phasianella pullus*, *Bittium reticulatum*, *Trivia europæa*, *Scala clathrus*, *Actæon tornatilis*, *Natica catena*, etc.—C. H. MOORE (*Read before the Society*, December 11th, 1909).

***Helicella cantiana* (Mont.) in Shropshire.**—I have to record the occurrence of *H. cantiana* on waste ground not far from Buildwas Station, Salop. Specimens did not abound, indeed, the species was most local here, single examples being found on the wild yellow *Melilotus* (*M. officinalis*) and Mignonette (*Reseda lutea*). It may very possibly be an introduction; since certain alien plants occur in the immediate neighbourhood, but if I visit the locality, as I hope, this ensuing summer, I will notice the environment more particularly. It is, at all events, an interesting new record for a county that is none too well worked as regards mollusca.—J. COSMO MELVILL (*Read before the Society*, March 10th, 1909).

***Jaminia cylindracea* m. *sinistrorsum*.**—I am not aware that this monstrosity has ever been recorded, but my collection contains an example which was taken by Mr. J. T. Marshall in his garden at Torquay. It is not quite mature and lacks the thickening round the lip.—J. R. LE B. TOMLIN (*Read before the Society*, March 10th, 1909).

 NOTE ON TRIVIA COSTISPUNCTATA Gaskoin.

 BY J. COSMO MELVILL, M.A., F.L.S.

 (Read before the Society, May 12th, 1909).

IN a recent number of the "Nautilus" (xxii., p. 126), Dr. W. H. Dall reviews Señor J. G. Hidalgo's "Monografía de las Especies Vivientes del Genero *Cypræa*," so far, at least, as the North American species inhabiting, or said to inhabit, the Western Pacific coast are concerned.

He observes that "*Trivia costispunctata* Gaskoin, 1870, reported "from California, if correctly located, is probably only a mutation of "*T. radians* Lamk."

I conjecture that Dr. Dall has not seen the species, and as the type, originally in the Gaskoin collection, has been for many years in my possession, I should like to state that, in my humble opinion, it is a good species, not, indeed, so near *T. radians* as are *T. solandri* and the rarer and somewhat obscure *depauperata* Sowb. This last, of which I possess a co-type from the Prevost Collection, may, indeed, be a variety of *radians*, though much more material is required for examination before this is proved. Roberts, in Tryon, Man. Conch., v., p. 203, considers it a variety of *californica* (more correctly, as pointed out by Dall, *californiana* Gray), but it seems nearer either to *solandri* or *radians*.

T. costispunctata Gaskoin, however, is not so rudely constructed a shell as *radians*, nor so flattened and expanded basally. It is of a pale cinereous fawn colour, rounded at the base, the ribs closer and finer than in most of its allies; nor are they so "bulbous" at the dorsal sinus. It is true that some specimens of *radians* are occasionally lentiginous, but the mottling of the ribs in *T. costispunctata* is far more uniform and neat. I have seen, altogether, three or four examples of this species, but it is, as is *depauperata*, very uncommon in collections, and I imagine the locality of both is doubtful, probably occurring off the coast of Central America.

Another species which *T. costispunctata* might by some be made comparable with is the abundant Antillean *T. pediculus* L., and its variations are considerable. Such a specimen as is figured by Sowerby (Thes. Conch., xxxiv., p. 429), which shews slight lentiginous flecking of the dorsal ribs, for instance, might be considered akin, but, in my opinion, it is but a superficial resemblance. *T. costispunctata* is fairly well figured, though the coloration is not good (Thes. Conch., xxxv., pp. 452, 453), the drawings being taken from the type specimen exhibited on the present occasion. These figures have been copied in Man. Conch. *Cypræa*, pl. xxii., figs. 7, 8.

VERTIGO MOULINSIANA (Dupuy).

BY J. R. LE B. TOMLIN, M.A., AND THE REV. E. W. BOWELL, M.A.

(Read before the Society, March 10th, 1909).

(Concluded from page 215).

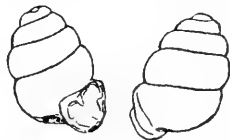
PLATE V.

SINCE the former part of this paper was submitted to the Society, we have received through Mr. A. S. Kennard several specimens of *Vertigo ventricosa* Morse. We owe these to the kindness of Mr. Bryant Walker, of Detroit, Michigan; they have been determined as *V. ventricosa* by Dr. Sterki. As we had supposed, judging from Binney's description, they turn out to be totally different from our species. We think it well to give Morse's original description, citing it from Binney, as we have not access to the magazine¹ in which it appeared.

Shell umbilicate, ovate-conic, smooth, polished; apex obtuse; suture deep; whorls four, convex; aperture semicircular, with five teeth, one prominent on the parietal margin, two smaller on the columellar margin, and two prominent within, contracting the aperture at the base; peristome widely reflected, the right margin flexuose, within thickened and coloured.

Length, .07 inch; breadth, .045 inch.

The accompanying figures of the shell of *V. ventricosa*, drawn from the specimens sent by Mr. Bryant Walker, have been reduced to the same scale as the drawings illustrating the former part of this paper.



The radulæ of *V. moulinsiana*, *V. lilljeborgi*, and *V. ventricosa* are figured on the accompanying plate. For the first two species Mr. R. A. Phillips most kindly supplied the material. We have also examined specimens of the radula of *V. moulinsiana* from several other localities, and find them to agree with that figured here. Entire half-rows of the unci of *V. lilljeborgi* and *V. ventricosa* are given; *V. moulinsiana* has about twenty-five pleural unci, of which the first

¹ Ann. N.Y. Lyc., viii., 1, figs. 1-3 (Nov., 1865).

three and the last are here shown, with the outline of cones and apex of an intermediate uncus.

V. moulinsiana exhibits the typical *Vertigo* form of uncus throughout the radula. Accessory cones occur even in the centrals. There is no distinction between admedians and externals, all the pleurals being of the same type, and in fact of the same type as the central. They are of the capital **E** form before alluded to.

Lilljeborgi may be said to have eight or nine admedians, while *ventricosa* only shows three or five. It is not, of course, possible to give such numbers with any great degree of precision, as the plate will show; but the transition between the two types in *ventricosa* is much more rapid. The form of admedian occurring in both these species is closely allied to that found in Succineids, and the form of the lacinia (best seen in isolated unci viewed laterally) is quite like that found in our smaller *Succineæ*. Attention should also be drawn to the great distinction in the shapes of the basal plates. Those of *V. moulinsiana* are remarkably regular in size and shape throughout; this suggests that the radula itself lies more flatly than usual, with its margins less curled back. Sections of the odontophore show that this is actually the case.

The size of these structures may be ascertained from the scale, each division of which is equivalent to .001 mm.

Our thanks are due to Mr. B. B. Woodward for many useful suggestions and much help in preparing these notes.



Vallonia excentrica Sterki in West Norfolk. — From among a small number of *Vallonia costata* (Müller), which I collected at Burnham Market in Norfolk (West) in November last, and sent on to my friend Mr. J. Davy Dean, of Lancaster, for verification, he has separated out one shell, which he says is undoubtedly *Vallonia excentrica* Sterki. I have since carefully compared it with some *excentrica* from the Lune Valley in my collection, and am convinced that he is right. *V. costata* seemed to be fairly plentiful; I hope to find on my next visit that *V. excentrica* is so too. In view of the confusion which has existed in regard to this group, it becomes important to place on record any occurrence of the several species, as our knowledge of their distribution is largely hidden under the old name *pulchella*. I have, therefore, written this note, hoping that the record of the occurrence of *excentrica* and also of *costata* in West Norfolk may be of some value to those members of the Society who are interested in the distribution of the genus *Vallonia*.—[Rev.] C. E. Y. KENDALL (Read before the Society, Feb. 10th, 1909).

LAND AND FRESHWATER MOLLUSCA IN THE SCARBOROUGH DISTRICT.

By J. A. HARGREAVES.

(Read before the Society, December 9th, 1908).

THE district examined is situated within a radius of six miles from Scarborough, and with one or two unimportant exceptions all the records are included in that area, which is also entirely in Vice-county 62.

The geological structure is entirely Oolitic, ranging from the Lower Oolites to the Upper. It is chiefly, however, in the Middle Oolites, and the soil is generally calcareous, as the strata include Limestones and Calcareous Sandstones. On the coast the rocks are, in districts, covered with sand and Boulder Clay; whilst the Carrs, which are flat and intersected with ditches, are alluvial on the surface.

The district is diversified, rising to a height of 500 feet above sea level on Oliver's Mount, and 600 feet on Seamer Moor. There are no valleys of importance except the well-known Forge Valley, which is of post-glacial age, and cuts through the Middle Oolites. It is extremely rich in molluscan life notwithstanding its small area.

There are no canals, but the Derwent flows through Forge Valley, and has an overflow stream to the sea near Scalby, whilst the River Hertford drains the Carrs. Ponds are numerous.

Raincliffe, Forge Valley, and Hackness are not only well wooded, but contain an unusually large number of different kinds of trees, and are equally prolific in the variety of the smaller forms of vegetable life.

The district was well and completely worked more than a generation ago by the great conchologist Bean, by Leckenby, and others. Unfortunately the only records available are a list of names in Theakston's "Guide to Scarborough." As this list includes such species as *Clausilia biplicata*, *Helix lapicida*, *Unio margaritifera*, and *Paludina listeri*, none of which occurs within many miles of Scarborough, it is evident that Bean gave the name Scarborough a very extended signification, and his list cannot be relied upon as an indication of what occurs in the immediate neighbourhood. Since that time other workers have given short lists in various periodicals, for instance, Mr. Miller Christy, Rev. W. C. Hey, and Mr. Chas. Ashford, but, so far as I know, no approximately complete list has been made, and the following has been compiled during the last few years.

I am indebted to the Rev. W. C. Hey for many records, particularly in the western part of the district; to Messrs. A. Harman and

E. A. Wallis for many more, especially the smaller and rarer forms; and most of all to Mr. Gyngell, whose notes made during many years have been placed unreservedly at my disposal, and who has materially assisted in the preparation of these records.

Testacella maugei Férussac.—In a garden on South Cliff, 1900. Possibly introduced with plants.

Testacella haliotidea Draparnaud.—In a garden on the South Cliff.

Testacella scutulum Sowerby.—Very abundant in Walshaw's Gardens, Scarborough, where it has been known for fifty years. Scalby, in Walshaw's Gardens.

Limax maximus Linné.—Common all round Scarborough. Harwood Dale, West Ayton.

var. **cinereo-niger** Wolf.—Rare. Hayburn Wyke, Harwood Dale, Forge Valley.

var. **ferussaci** Moquin-Tandon.—Scarborough.

var. **obscura** Moquin-Tandon.—Oliver's Mount, Scarborough.

Limax flavus Linné.—Common in various parts of the town, West Ayton.

Limax arborum Bouchard-Chantereaux. — Hayburn Wyke, Hackness, very common, Spa Grounds, Scarborough.

Agriolimax agrestis (Linné).—Very abundant all round Scarborough.

Agriolimax lævis (Müller). — Well distributed and common round Scarborough in marshy places. White Nab, Forge Valley, Raincliffe, Scalby.

Milax sowerbyi (Férussac).—Common in suitable places in the town. Filey.

Vitrina pellucida (Müller).—Abundant and thoroughly distributed.

Vitrea crystallina (Müller).—Common and well distributed.

Vitrea cellaria (Müller).—Common.

Vitrea alliaria (Miller).—Common in woods.

var. **viridula** Jeffreys.—Common in Forge Valley.

Vitrea nitidula (Draparnaud).—Very common throughout the district.

var. **nitens** Michaud.—Forge Valley.

Vitrea pura (Alder).—Not uncommon. Suffield, Yedmandale, Forge Valley, Raincliffe, Hayburn Wyke, Castle Hill.

var. **nitidosa** Gray.—Much rarer than type. Yedmandale, Suffield.

Vitrea radiatula (Alder).—Not common, but well distributed north and south of Scarborough. Stepney Hill, Forge Valley, Oliver's Mount, Hayburn Wyke, Yedmandale, Bedale.

var. **viridescenti-alba** Jeffreys.—Hayburn Wyke, Nov., 1901.

Zonitoides nitidus (Müller).—Bog on Castle Hill, 1896 to 1900: now probably extinct.

Zonitoides excavatus (Bean).—Hayburn Wyke, rare. Forge Valley near Stoggs Farm.

Euconulus fulvus (Müller).—Common in suitable localities all round Scarborough; fine in Forge Valley. Yedmandale, Hayburn Wyke.

var. **alderi** Gray.—Raincliffe, Forge Valley.

Arion ater (Linné).—Common throughout the district.

var. **brunnea** Roebuck.—Raincliffe, common at times in Forge Valley.

var. **rufa** Linné.—Langdale End.

Arion subfuscus (Draparnaud).—Harwood Dale, Y.N.U., 1904.

Arion intermedius Normand.—Hayburn Wyke, Harwood Dale, Seamer Moor.

Arion hortensis Férussac.—Very abundant throughout the district.

Arion fasciatus Nilsson.—Castle Hill, south of Scarborough, common in Forge Valley.

Punctum pygmæum (Draparnaud).—Well distributed. Raincliffe, Forge Valley, East Ayton Quarry, abundant Nov., 1904; Hackness.

Sphyradium edentulum (Draparnaud).—Common. Occurs on *Lastræa*, *Iris*, *Carex pendula*, *Spiræa*, etc.; Hackness, Forge Valley, Raincliffe, cliffs south of Scarborough.

var. **columella** G. von Martens.—Forge Valley.

Pyramidula rotundata (Müller).—Very abundant throughout the district.

var. **turtoni** Fleming.—Scalby Beckside, Ayton.

var. **alba** Moquin-Tandon.—Hackness, 1896; Yedmandale, Forge Valley, Wrench Green.

Helicella virgata (DaCosta).—Perhaps our most abundant species. Varies enormously in colour, size, and markings. Thoroughly distributed.

var. **depressa** Requien.—Near Ayton.

var. **lineata** Olivi.—Common.

var. **leucozona** Taylor.—Common near Seamer.

var. **maculata** Moquin-Tandon.—Castle Hill, Ayton Road.

var. **rufulozonata** Taylor.—Rare near Seamer.

var. **radiata** Hidalgo.—Ayton Road, near Seamer.

var. **nigrescens** Grateloup.—Near Seamer, Forge Valley, Seamer Moor. A very dark violet form occurs.

var. **lutescens** Moquin-Tandon.—Common.

var. **subalbida** Poiret.—Common throughout the district.

var. **albicans** Grateloup.—Common, Castle Hill.

var. **hyalozona** Taylor.—Rare. Castle Hill, Ayton Road, Seamer.

m. **scalariforme**.—Several, Castle Hill.

m. **sinistrorsum**.—One near Seamer (Gyngell).

Helicella itala (Linné).—Abundant where it occurs. Castle Hill, North Cliffs, Osgodby, northern escarpment of the Wolds, Sufield, Silpho, Yedmandale, cliffs at Filey, near Ayton.

var. **leucozona** Moquin-Tandon.—Rare, Castle Hill.

var. **hyalozonata** Cockerell.—Rare, Castle Hill.

Helicella caperata (Montagu).—Generally distributed both in Scarborough and to the north, west, and south. A very handsome form occurs at Osgodby. Seems partial to *Sedum acre*.

vaa. **gigaxii** Charpentier.—Not uncommon.

var. **subscalaris** Jeffreys.—Osgodby.

var. **bizonalis** Moquin-Tandon.—Forge Valley, rare.

var. **ornata** Picard.—Forge Valley, Wheatcroft, Ganton, Lindhead.

var. **fulva** Moquin-Tandon.—Burniston, near Seamer, Seamer Moor, Forge Valley.

var. **lutescens** Pascal.—With type.

var. **alba** Picard.—Rare, Forge Valley.

m. **sinistrorsum**.—One specimen found by Mr. Gyngell in Ayton Quarry.

Helicella cantiana (Montagu).—Has not been observed north of Scarborough. Stepney Hill, Seamer Road, Musham Bank, Ganton, Staxton, Hunmanby and district. Common where it occurs.

var. **albida** Taylor.—Musham Bank, Stepney Hill.

Hygromia fusca (Montagu).—Very common in several localities. Forge Valley, Hackness, Yedmandale, Raincliffe, Hayburn Wyke, Scalby.

var. **vitrea** Farrer.—Forge Valley.

Hygromia granulata (Alder).—"Perhaps the commonest shell in Forge Valley" (Rev. W. C. Hey). Yedmandale, Scalby Beckside.

Hygromia hispida (Linné).—Common in most localities.

var. **hispidosa** Mousson.—Less common than the type, but generally distributed.

var. **depilata** Alder:—Yedmandale, Red Cliffe, Castle Hill, Forge Valley.

var. **subrufa** Moquin-Tandon.—Almost as common as type.

var. **albida** Jeffreys.—Castle Hill, rare. Burniston, common. Forge Valley, rare.

Hygromia rufescens (Pennant).—Very local, but abundant where it occurs. Scarborough, Scalby, Suffield, Hackness, Hunmanby, West Ayton in a garden.

var. **rubens** Moquin-Tandon.—Scalby.

var. **alba** Moquin-Tandon.—Suffield.

Acanthinula aculeata (Müller).—Widely but sparingly distributed. Hackness, Cloughton, Raincliffe, Forge Valley, Yedmandale, White Nab, Hayburn Wyke.

Acanthinula lamellata (Jeffreys).—Sparingly distributed. Hackness, Suffield, Raincliffe, Forge Valley, Hayburn Wyke, common in Yedmandale. Affects dead holly and beech leaves.

Vallonia pulchella (Müller).—Brompton, near Ayton, Yedmandale.

Vallonia costata (Müller).—Ruston, Ayton Road, Castle Hill, Seamer Moor, Suffield, Hackness.

Vallonia excentrica Sterki.—Ayton Road, rare.

Helicigona arbustorum (Linné).—Generally distributed and common. Cliffs north and south of Scarborough, Forge Valley, Yedmandale, Raincliffe, Ganton, Hayburn Wyke.

var. **alpestris** Ziegler.—Castle Hill.

var. **fuscescens** Duch.—Not uncommon on Castle Hill.

var. **cincta** Taylor.—Cliffs north and south of Scarborough.

var. **flavescens** Moquin-Tandon.—Castle Hill, Scalby Road, Spa Grounds.

Helix aspersa Müller.—Generally distributed and common in suitable localities. Occasionally gathered by fishermen for bait.

var. **conoidea** Pascal.—Castle Hill.

var. **undulata** Moquin-Tandon.—Castle Hill.

var. **zonata** Moquin-Tandon.—Castle Hill.

Helix pomatia Linné.—An attempt was made in 1868 to introduce this species in Forge Valley. No living specimens have been obtained for many years, but a dead shell was found in 1907.

Helix nemoralis Linné.—Well distributed throughout the district, especially on the cliffs.

var. **compressa** Terver.—Ganton.

var. **ponderosa** Malm.—This variety occurs in a small chalk-pit at Binnington. Out of seventy specimens of *H. nemoralis* taken at random five specimens weighed '02 oz.; thirty-three, '03 oz.; nineteen, '04 oz.; seven, '05 oz.; two, '06 oz.; three, '07 oz.; two, '08 oz.; and one weighed '12 oz., or six times the weight of the lightest. Variation in other respects in this quarry was remarkable.

var. **albolabiata** von Martens.—Binnington and Flixton.

var. **rubella** Moquin-Tandon.—Castle Hill, Forge Valley.

var. **libellula** Risso.—Fairly common.

var. **roseozonata** Cockerell—Castle Hill.

var. **hyalozonata** Taylor.—Castle Hill.

var. **citrinozonata** Cockerell—Castle Hill.

var. **undulata** Gentil.—Castle Hill.

Helix hortensis Müller.—Commoner than *H. nemoralis*, except on the cliffs, and well distributed.

var. **roseolabiata** Taylor.—Stepney Hill, Scalby Road, Scalby Beckside.

var. **fuscolabiata** von Martens.—Stepney Hill, Scalby Road.

var. **albina** Moquin-Tandon.—Castle Hill, rare.

var. **lutea** Moquin-Tandon.—Very common.

var. **olivacea** Taylor.—Scalby Road, about ten per cent. of the specimens on Stepney Hill, Stainton Dale, Throxenby.

var. **arenicola** Macgill. — Ruston, Cayton Bay, Castle Hill, Gristhorpe, Scalby Road.

Ena obscura (Müller).—Generally distributed in woods and hedgerows.

Cochlicopa lubrica (Müller).—Very generally distributed.

var. **lubricoides** Férussac.—Fairly common.

var. **morseana** Doherty.—Hackness, rare.

Azeca tridens (Pulteney).—Very local. Forge Valley only.

Cæcilioides acicula (Müller).—Small quarry on Irton Road. Dead shells abundant on Castle Hill; Cayton Bay, Folkton.

Jaminia anglica (Férussac).—At intervals in suitable places on the cliffs from Speeton to Hayburn Wyke. Its usual habitat is moss with water slowly trickling through it. Forge Valley, Bedale, Intake Wood, Scalby.

var. **pallida** Jeffreys.—Cliffs in South Bay, Forge Valley, rare.

Jaminia cylindracea (DaCosta).—Well distributed and occasionally extremely abundant.

Jaminia muscorum (Linné).—Not so common as the last species. Castle Hill, Forge Valley, Low Dales near Hackness, Stepney Hill, Wolds near Sherburn, very common on wall at Brompton.

var. **edentula** Clessin.—East Ayton Quarry, rare.

var. **brevis** Baudon.—East Ayton Quarry, rare.

Vertigo antivertigo (Draparnaud).—Very abundant on Castle Hill before the bog was drained; Throxenby Mere, Forge Valley, Seamer, rare on South Cliff.

Vertigo substriata (Jeffreys).—Boggy ground, Raincliffe, Forge Valley, cliffs beyond Spa. Most easily found on leaves of *Iris*.

Vertigo pygmæa (Draparnaud).—In 1896 in great abundance under stones in a ravine in Forge Valley, hundreds of specimens being taken. Rare on Castle Hill, Intake Wood, near Seamer station, Suffield, Seamer Moor.

Vertigo pusilla Müller.—Wall at West Ayton, rare.

Balea perversa (Linné).—Abundant on wall at Suffield, Forge Valley, Sawdon, also found in Raincliffe and at Hay Brow.

Clausilia laminata (Montagu).—Fairly common in Forge Valley, Yedmandale, Hackness, Low Dales, Scalby Beckside.

Clausilia bidentata (Ström).—Generally distributed. Hackness, Forge Valley, Filey, Castle Hill, Scalby, Harwood Dale, Ruston, Brompton.

Succinea putris (Linné).—Fine and deeply-coloured specimens in Forge Valley; also occurs on cliffs north and south of Scarborough, the Carrs, Folkton, Flixton, Seamer, Low Dales, Stainton Dale.

Succinea elegans Risso.—Boggy ground south of Spa, rare; Forge Valley with *Jaminia anglica*, rare.

Carychium minimum Müller.—In suitable localities throughout the district.

Ovatella bidentata (Montagu).—Dead specimens on shore, 1908. Said to have lived on the piers some years ago, but cannot now be found, and cannot have lived there for many years. More probably drifted down the coast.

Ancylus fluviatilis Müller.—Peasholme Beck, Scalby Beck, Burniston Beck, fine; Harwood Dale, Low Dales, River Derwent.

Acroloxus lacustris (Linné).—River Derwent in Forge Valley, ponds in Cayton Bay, Beast Cliff, Harwood Dale, Cayton.

Limnæa auricularia (Linné).—Hackness Lake, Scalby Cut, River Derwent at Ayton.

var. **acuta** Jeffreys.—Hackness Lake, River Derwent.

Limnæa pereger (Müller).—Occurs all over the district abundantly, and is very variable both in size and condition. Sinistral specimens, labelled "Scarborough," are in the British Museum of Natural History. Bean called this form a separate species, *L. lineatus*.

Both long and short-spined forms occur, and vars. *ovata*, *oblonga*, and *succineiformis* also can be obtained.

Limnæa palustris (Müller).—Very common. Scarborough Mere, Throxenby Mere, Cayton Bay; ditches at Folkton, Flixton, Willerby, and Cayton; fine on cliffs near Filey.

var. **elongata** Moquin-Tandon.—Seamer Carrs, one.

var. **conica** Jeffreys.—Seamer Carrs.

var. **roseolabiata** Jeffreys.—Common with type.

Limnæa truncatula (Müller).—Occurs on and near the cliffs, from Cloughton to Speeton Cliffs in ponds, marshes, and streams, occasionally in drinking troughs.

var. **microstoma** Drouet.—North Cliff.

Limnæa stagnalis (Linné).—Formerly very fine in Scarborough Mere, now probably exterminated; common in pond in Cayton Bay, and rarer in ditches on Seamer and Folkton Carrs; Rivers Hertford and Derwent.

var. **fragilis** Linné.—Pond on Filey Road, now drained.

Limnæa glabra (Müller).—Pond in Cayton Bay, now extinct; Langdale End and Harwood Dale, rare. A remarkably decollate form has persisted many years in a small marsh frequently dry in Lady Edith's Drive, along with small typical form.

m. **sinistrorsum**.—One in Lady Edith's Drive (*J. of Conch.*, vol. 12, p. 191).

Amphipeplea glutinosa (Müller).—There are specimens in Scarborough Museum said to have been taken in the Valley, but no trace of this species is now to be found.

Planorbis corneus (Linné).—Castle Hill, Scarborough Mere, ditches Seamer and Folkton Carrs, rare; River Hertford, pond on Seamer Moor, introduced.

Planorbis albus Müller.—Widely distributed, but not usually very common. Castle Hill, Scalby, Hackness, Wykeham, Derwent at Ayton, and Sherburn, Folkton and Seamer Carrs.

Planorbis glaber Jeffreys.—Observed in only one shallow pond at Suffield. Abundant on *Elodea canadense*. It has the characteristic transverse markings. A scalariform specimen was obtained in 1901.

Planorbis crista (Linné).—Abundant where it occurs. Scar-

borough Mere, Carnelian Bay, cliffs south of Spa, Cayton, East Ayton, Castle Moat, West Ayton, River Derwent.

var. *lævigata* Adami.—Scarborough Mere.

Planorbis carinatus Müller. — Formerly abundant in Scarborough Mere; still occurs on the Carrs at Folkton, Flixton, and Seamer.

var. *disciformis* Jeffreys.—Scarborough Mere.

Planorbis umbilicatus Müller.—Not uncommon on the Carrs from Folkton to Seamer.

Planorbis vortex (Linné).—Known only from Scalby Cut near Wyngate.

Planorbis spirorbis (Linné).—Very abundant in ponds and ditches north and south of Scarborough and on the Carrs; Throxenby Mere. Some years ago a small pond in Cayton Bay yielded hundreds of scalariform monstrosities, but diligent search has failed to find any in subsequent years.

Planorbis contortus (Linné).—Abundant where it occurs. In ditches at Wyngate, throughout the Carrs, Snainton brickponds, Derwent at Ayton.

Planorbis fontanus (Lightfoot).—Ponds near railway between Cayton and Lebberston, rare.

Physa fontinalis (Linné).—Ditches on Folkton and Seamer Carrs, River Hertford, Derwent from Ayton to Yedingham. Very fine specimens have been obtained from near Folkton, the animal being darker than the ordinary form.

Aplecta hypnorum (Linné).—Abundant in ditches near Flixton, Folkton, Seamer, and East Ayton; Throxenby Mere.

Bithynia tentaculata (Linné).—Formerly in Scarborough Mere and ditches near. Abundant on Carrs from Cayton to Folkton and Seamer, millrace at Scalby, Snainton brickponds.

Vivipara contecta (Millet).—Specimens were introduced from Askern into a pond in Cayton Bay in Nov., 1903, and have considerably increased in numbers.

Valvata piscinalis (Müller).—Common in the Derwent from Ayton to Sherburn, rare in ditches at Folkton, Flixton, and Sherburn; River Hertford.

Valvata cristata Müller.—Ditch near Seamer, pond on Carrs, Derwent at Ayton.

Pomatias elegans (Müller).—Formerly on Oliver's Mount, Forge Valley on both sides of the river.

Acicula lineata (Draparnaud). — Raincliffe, one; Hackness, Yedmandale, Forge Valley, not uncommon. Occurs on moss, dead wood, and under stones buried rather deeply in the ground.

Neritina fluviatilis (Linné).—Derwent from Ayton to Yedingham, scarce.

Unio pictorum (Linné). — River Hertford in company with *Anodonta*, in proportion of 4 per cent. of *Unio* to 96 per cent. of *Anodonta*.

Unio tumidus Retzius.—Dead shells recently from turf near Irton, probably the site of ponds belonging to the monks. The molluscs had been dead many years.

Anodonta cygnæa (Linné).—Scarborough Mere, small but fine, and with clean epidermis; common in the Valley pond, River Hertford, Everley.

var. **anatina** Linné.—Abundant in Scalby Cut and River Hertford. A small form occurs in Burniston Beck.

var. **arenaria** Schröter.—River Hertford.

Sphærium corneum (Linné).—Abundant in Scarborough Mere and adjoining ditches, Carrs from Folkton to Seamer, Cayton Bay, Wyngate.

Sphærium lacustre (Müller).—Well distributed, but not common. Scarborough Mere and ponds, Burniston, Suffield, Cloughton.

Psidium amnicum (Müller).—Abundant. Scalby Cut, Derwent at Ayton, ditch at Ganton, Burniston Beck, millrace between Burniston and Cloughton.

Psidium subtruncatum Malm.—Near Wykeham, fine; ditch at Flixton, Hackness, by Scarborough Mere, Carnelian Bay, Throxenby.

Psidium pusillum (Gmelin).—Common in Lady Edith's Drive, Stepney Hill, Folkton Carrs, Scarborough Mere, Wyngate, ditches at Cayton, cliffs in South Bay.

Psidium nitidum Jenyns.—Rare, Folkton Carrs.

Psidium obtusale Pfeiffer.—Near Flixton, Oct., 1896, rare.

Psidium gassiesianum Dupuy.—Formerly very abundant in a pond on Burniston Road, now exterminated.



Phytia myosotis Drap. in Westmorland.—The shells of *Phytia myosotis* shewn at the April meeting were found in August, 1907, at Lower Meathop, Westmorland. They are fairly common at the roots of grasses growing on the edges of the narrow channels on the marsh, near the eastern bank of the River Winster.—G. H. TAYLOR (*Read before the Society, April 14th, 1909*).

VERTIGO ALPESTRIS (Alder):

Its Distribution in North Lancashire and Westmorland, and its
Association with *Vertigo pusilla* Müller.

BY J. DAVY DEAN AND THE REV. C. E. Y. KENDALL, B.A.

SUPPLEMENTARY NOTE.

(*vide antea pp. 209-211*).

PLATE IV.

SINCE the publication of our article last summer we have been able to extend somewhat our knowledge of the distribution of these two species, and in this we have been greatly aided by Mr. F. H. Sikes, M.A., of Rochester, and late of Windermere, to whom our best thanks are due, as he has given us up-to-date information about several localities from which the species had not been recorded for some time.

We therefore submit a Supplementary List of new or newly-verified localities, along with a map, which we hope clearly shows the frequency with which these species occur in the district we have been working. We now find that the distinction 'always on a limestone soil' is as a rule only applicable to *V. pusilla* habitats, and, from the nature of many of the more northern localities, we believe that the distribution of *V. alpestris* is more relative to a woodland type than to a calcareous soil.

In Westmorland (V.C. 69):—

| | | | |
|--------------------|---|---|---------------------------------|
| Grasmere | - | - | confirmed by F. H. Sikes, 1908. |
| Ambleside to Rydal | | " | " |
| Windermere | - | - | " |
| Crook | - | - | F. H. Sikes, 1908. |
| Troutbeck Bridge | - | - | " |
| Kendal | - | - | confirmed by W. Gyngell, 1908. |
| Underbarrow | | } | J.D.D. and C.E.Y.K., 1908. |
| Crosthwaite | | | |
| Whitebeck | - | | |
| Meathop | - | | |

In Furness (V.C. 69):—

Sawrey (on Windermere) confirmed by F. H. Sikes, 1908.



MOLLUSCA OF KENDAL, WESTMORLAND.

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, November 11th, 1908).

THE following contribution to the mollusca of the Kendal district has been written with a view of drawing together and placing on record in a more accessible form the conchological work done in the neighbourhood by many of the older workers, more especially that of Dr. Thomas Gough, of Kendal, one of the founders of the Kendal Natural History and Scientific Society, established in 1835. As a naturalist, Gough was pre-eminently an all-round man. He was the son of the "blind philosopher," John Gough, and was born at Middleshaw, Old Hutton, on November 30th, 1804. In his professional career as a medical man he was in every respect successful. He finally retired from practice in 1872, and his death took place on July 17th, 1880.

Geology was during the greater part of his life his favourite subject, but he was equally well versed in other branches of natural history. He seemed to have an aversion to committing his observations to paper in a form suitable for publication, and as the published results of his fifty years' study and observation there remain only two small works, viz. :—"Personal Reminiscences of the Habits of Animals," and "The Heronry of Dallam Tower." It is true that he published many short articles, signed "S.H.," in the columns of the local newspapers, but most of his molluscan records were published through the instrumentality of friends with whom he corresponded, the Kendal records given by Capt. Brown, Lowe and others being obtained in this way. In 1853 he supplied a list of land and freshwater shells found in the neighbourhood of Kendal to the publisher of the fourth edition of "Wordsworth's Guide to the Lakes," and it is from this list mainly that the following records are taken.

I have visited the district myself on more than one occasion, and have added my own observations to the list. For ready reference, a bibliography of the books and papers referred to is appended. It will be noticed that one or two of Gough's records refer to places some little distance from Kendal; these I have thought it advisable to include, in order to keep the list in its entirety.

I trust this small contribution will prove an incentive to further molluscan research in the somewhat neglected county of Westmorland.

Limax maximus Linné.—"In gardens and outhouses" (Gough).

Limax flavus Linné.

var. ***umbrosa*** Philippi.

sub-var. **colubrina** Pini (*vide* W.D.R.). — On a wall in Kendal (J.W.J.). [Mr. Roebuck writes me that the specimen I submitted to him is the best example of the sub-variety he has seen for some time].

Limax arborum Bouchard-Chantreaux. — Serpentine Walks, Kendal (J.W.J.).

Agriolimax agrestis Linné. — “In gardens” (Gough).

var. **pallida** Schrenk. — Common under stones on Kendal Fell; near the castle; Serpentine Road and Serpentine Walks (J.W.J.).

var. **reticulata** Moquin-Tandon. — Almost as common as the above and in the same localities (J.W.J.).

Vitrina pellucida (Müller). — “Under stones, not uncommon” (Gough). Common in the Serpentine Walks and near the castle (J.W.J.).

Vitrea crystallina (Müller). — “Serpentine Walks; Hyning Wood. Not common” (Gough).

Vitrea cellaria (Müller). — “Serpentine Walks and many other places” (Gough). Common in the neighbourhood of Serpentine Road and Walks (J.W.J.).

Vitrea alliaria (Miller). — “Serpentine Walks” (Gough). Serpentine Walks (J.W.J.).

Vitrea nitidula (Draparnaud). — “Serpentine Walks” (Gough). Serpentine Walks (J.W.J.).

Vitrea radiatula (Alder). — “Kendal” (Lowe, *vide* Gough).

Euconulus fulvus (Müller). — “Serpentine Walks; Kendal; Hyning Wood” (Gough). Fairly common in first locality (J.W.J.).

Arion ater Linné. — “Abundant” (Gough). Specimens noticed near Kendal Castle (J.W.J.).

Arion subfuscus (Draparnaud). — Serpentine Walks (J.W.J.).

Arion hortensis Férussac. — “Kendal” (Lowe, *vide* Gough). Under stones on Kendal Fell; abundant in the Serpentine Walks (J.W.J.).

Arion fasciatus Nilsson.

var. **circumscriptus** Johnston. — Under stones on Kendal Fell; Serpentine Road and Walks (J.W.J.).

Punctum pygmæum (Draparnaud). — “Kendal” (Lowe, *vide* Gough).

Sphyradium edentulum (Draparnaud). — “On Kendal Fell. Not common” (Gough).

Pyramidula rupestris (Draparnaud). — “On Kendal Fell. Abundant” (Gough). Scout Scar; Serpentine Road and Walks (J.W.J.). “In specimens collected at Kendal in the mouth of

August the fry in the interior of the shell had a whorl and a half completely formed" (Jeffreys).

Pyramidula rotundata (Müller).—"Common under stones. Large on Kendal Fell" (Gough). Serpentine Walks, with var. *turtoni* Fleming (J.W.J.).

Helicella virgata Da Costa.

var. **albescens** (? *subalbida* Poiret) and

var. **leucozona** Taylor.—Kendal (Rev. H. Friend: Exhibits, *J. of C.*, vi., July, 1890, p. 240).

Helicella itala Linné.—"On Kendal Fell. Common" (Gough).

var. **minor** Moquin-Tandon.—"Kendal" (Jeffreys).

Helicella caperata Montagu.—"Kendal Fell. Morecambe Bay. Not common" (Gough).

Hygromia hispida (Linné).—"On Kendal Fell under stones" (Gough).

var. **hispidosa** Mousson.—"Kendal Fell, and under stones in shady places" (Gough). Near the castle (J.W.J.).

var. **albida** Jeffreys.—"In osier-beds, as well as on the limestone at Kendal" (Jeffreys).

Hygromia rufescens Pennant.—"Abundant" (Gough). Scout Scar; Serpentine Road and Walks, abundant and very variable (J.W.J.).

Acanthinula aculeata (Müller).—"Near Beck Mills, Low Groves, and Oxenholme" (Gough).

Vallonia pulchella (Müller).—"On a garden wall at Green Bank, and many other places" (Gough).

Vallonia costata (Müller).—"Among moist moss near Sizergh Fellside" (Gough).

Helicigona arbustorum (Linné).—"Canal banks and about the castle" (Gough). One dead shell found at the latter place in 1908 (J.W.J.).

Helix aspersa Müller.—"In gardens. Too common" (Gough). Abundant among nettles on Serpentine Road (J.W.J.).

Helix nemoralis Linné.—"In gardens and hedges. Large on Kendal Fell" (Gough). Scout Scar (J.W.J.).

Helix hortensis Müller.—"In gardens and hedges" (Gough).

Ena obscura (Müller).—"On Kendal Fell and Sizergh Fellside" (Gough).

Cochlicopa lubrica (Müller).—"Under stones. Common" (Gough). Serpentine Walks (J.W.J.).

Azeca tridens (Pulteney).—"On Kendal Fell. Not common" (Gough).

Cæcilioides acicula (Müller).—"At Arnside. Not common" (Gough).

Jaminia secale Draparnaud. — "Kendal Fell. Abundant" (Gough). "Kendal, Westmorland, 1835" (Glover). "Limestone in the neighbourhood of Kendal" (Dixon and Watson).

Jaminia cylindræa (DaCosta).—"Kendal Fell. Very common" (Gough). Scout Scar; Serpentine Walks (J.W.J.).

var. **rufilabris** nov.—I have given this name to a form similar in all respects to the type, except the lip, which is reddish. It is not var. *semproni* (Charp.), as this is smaller and toothless. I have found this form accompanying the type in a great many places up and down the country. It is very common at Grange, Silverdale, etc. Serpentine Walks (J.W.J.).

Jaminia muscorum (Linné).—"Kendal Fell" (Gough).

Vertigo substriata (Jeffreys).—"Serpentine Walks. Scarce" (Gough).

Vertigo pygmæa (Draparnaud).—"On Kendal Fell. Old walls. Common" (Gough).

Vertigo alpestris (Alder).—"Kendal Fell" (Gough). Kendal, 1908 (Gyngell).

Vertigo pusilla Müller.—"Hawes Bridge, Serpentine Walks, and near Mint House. Not common" (Gough). Common on wall in Serpentine Walks, 1908 (J.W.J.).

Balea perversa (Linné).—"On old walls, among moss. On a wall near Fowl Ing. Very abundant on old walls near Bowness" (Gough).

Clausilia laminata (Montagu).—"Kendal Fell, Helsfell Wood, in a fence near Madgehill, Helsington, and Arnside Knot. Abundant near Boundary Bank" (Gough).

Clausilia bidentata (Ström).—"On old walls and trees on the castle walls. Common" (Gough). Serpentine Walks (J.W.J.).

Succinea putris (Linné).—"In the canal" (Gough).

Carychium minimum Müller. — "Hyneing Wood and Cuns-
wick, on decayed leaves a few inches under ground" (Gough).
Serpentine Walks, common (J.W.J.).

Ancylus fluviatilis Müller.—"In rivulets. Common. Large in the canal" (Gough).

Acroloxus lacustris (Linné).—"On Benson Knot" (Gough).

Limnæa auricularia (Linné).—"Canal?" (Gough). "Kendal, in the canal, scarce and poor" (Lowe, *vide* Gough).

Limnæa pereger (Müller).—"Canal, Kent, and brooks. Common" (Gough).

Limnæa palustris (Müller).—“In the Kent, below Water Crook, and on Brigsteer Moss” (Gough).

Limnæa truncatula (Müller).—“In ditches, and in wet places near the limekilns” (Gough).

Limnæa glabra (Müller).—“Ellerflat Tarn near Docker Garths” (Gough).

Amphipeplea glutinosa (Müller).—“In Windermere” (Gough).

Planorbis albus Müller.—“Canal, Brigsteer Moss, and milldam at Cowan Head” (Gough). Canal, 1908 (J.W.J.).

Planorbis crista (Linné).—“Copy Tarn and Brigsteer Moss” (Gough).

Planorbis carinatus Müller.—“Brigsteer Moss” (Gough).

Planorbis umbilicatus Müller.—“Brigsteer Moss” (Gough).

Planorbis vortex (Linné).—“Brigsteer Moss” (Gough).

Planorbis spirorbis (Linné).—“Brigsteer Moss and Aikrigg Tarn” (Gough).

Planorbis contortus (Linné).—“Brigsteer Moss” (Gough).

Physa fontinalis (Linné).—“Canal, Brigsteer Moss and Windermere” (Gough).

Bithynia tentaculata (Linné).—“Canal, Brigsteer Moss” (Gough). Common on *Elodea* in the canal, 1908 (J.W.J.).

Valvata piscinalis (Müller).—“Brigsteer Moss. Large in Castle Mills race” (Gough).

Valvata cristata Müller.—“Brigsteer Moss” (Gough).

Pomatias elegans Müller.—“At the roots of fern on Arnside Knot” (Gough).

Neritina fluviatilis (Linné).—“In the Lune near Kirkby Lonsdale” (Gough). “Rivers Bela and Lune” (Lowe, *vide* Gough).

Unio margaritifer (Linné).—“In the Mint, Kent, and Gowan” (Gough).

var. **minor** Rossm.—“Inhabits the Mint near Kendal” (Brown, *vide* Miss E. T. Thomson and Thos. Gough, Esq.).

Anodonta cygnæa Linné.—“Canal” (Gough). “Canal at Kendal ; ligament rises at a tolerable angle, and at its extremity the valves fall at an angle of 45 deg. in a straight line for two inches in length. Umbones very thin. Lower half of shell yellowish-green ; upper part a decided green, being mottled with brown in places. Inside of the valves white. Length, $5\frac{1}{2}$ inches ; breadth, 3 inches ; and width in most ventricose part, $1\frac{5}{8}$ inches. Other specimens from ditches on a peat bog, called Brigsteer Moss, near Morecambe Bay,

were much more ventricose, with broad umbones, and the colour a darker green" (Lowe, *vide* Gough).

var. **anatina** Linné.—"Brigsteer Moss" (Gough).

Sphærium corneum (Linné).—"In a ditch near Helm Lodge and Brigsteer Moss" (Gough). "Two varieties found near Kendal; the first in the mud of a small mountain tarn, which is very diminutive, almost white, and very slightly ventricose; the second from ditches on peat bog, near Morecambe Bay, it varies but little, except in size, from the common form of *Cyclas cornea*" (Lowe, *vide* Gough). Scarce in the canal (J.W.J.).

Pisidium henslowianum (Sheppard).—Fairly common in the canal below the castle (J.W.J.).

Pisidium pusillum (Gmelin).—"In the Kent, and Brigsteer Moss" (Gough).

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Crepidula fornicata L. on the Coast of Kent.—On April 9th I picked up on the beach near Sandwich two specimens of *Crepidula fornicata*. One was dead, the other contained the animal, and was attached to a large *Chrysodomus antiquus*. This *Crepidula* has been known for some time in the Essex rivers and, I believe, in the Humber, but I am not aware of its having been found hitherto on the coast of Kent.—J. E. COOPER (*Read before the Society*, April 14th, 1909).

CONCHOLOGICAL NOTES FROM THE ARGENTINE AND URUGUAY.

BY LIONEL E. ADAMS, B.A.

(Read before the Society, September 9th, 1908).

THE results of a month's collecting in the neighbourhood of Montevideo, and another month's exploring at several places along the Parana from San Nicolas to Colastiné, about three hundred miles up the river from Buenos Aires, may interest English collectors.

At Montevideo the River Plate is sixty-four miles wide, and considerably salt, species of *Mytilus*, *Mactra*, and *Trochus* being found on what is practically the sea-shore. The country is perfectly flat for fifty miles round, with the exception of the "Cerro," a conical-shaped hill, nearly five hundred feet high, from which the name Montevideo is said to be derived. Where the land is uncultivated, it is very exasperating to wander on account of all sorts of cactus, and one has to be careful not to sit down for miles together, for where there is a spot clear of cactus, there are sure to be ants. Moreover, the shell collector finds absolutely no land species except *Helix aspersa* and *Helix lactea*, which are European importations. These are sold in the Montevideo markets at about sixpence a pint. However, there is a muddy little river—the Miguelete—flowing into the harbour, which I visited several times after a flood, and secured a good set of *Ampullaria d'orbignyana* Phil., *Anodonta rotunda* Spix, and two species of *Planorbis*.

In places this river overflows into swamps, one of which was very prolific in *Physa (Aplecta) aurantia* Carpenter, some of which I kept alive for some days to watch. They exhibit the same curious irritability so characteristic of our *fontinalis*, jerking their bodies sideways violently when coming in contact with each other. They are likewise thread-spinners. The mantle completely conceals the shell, overlapping along the back.

After discharging at Montevideo, we proceeded up the Parana to load for the homeward passage at several places between Arguerich and Colastiné. The Parana is not a single stream with a well-defined centre current, but a mass of water thirty to sixty miles wide, meandering through a maze of wooded islands and scrub-covered swamps, with stretches of open water ten miles wide here and there. Beyond the swamps, the country extends along a dead level to the Andes on the west and to the hills of Uruguay on the east. Now and then the river-bank rises to the height of a hundred feet, and upon these

elevated parts of the country towns are built above the flood limit. The country is mostly under cultivation, but viscachas and tuco-tucos are often as common as rabbits and moles in England. On the open country no land species of mollusks are to be found, but the swamps proved fruitful and interesting, though rather tiring to explore.

It is somewhat of a handicap to one's enthusiasm to have to struggle through a tangled mass of prickly scrub on a very hot day, ankle deep in mud and ooze, encumbered with a long hooked stick for raking the great snails towards one out of the slimy mud, a revolver, numerous tins and often pockets full of heavy *Ampullariæ*, eaten alive all the time by mosquitoes and biting flies—the mosquitoes here are as active in the day as at night; keeping a sharp look-out for poisonous snakes, many of which I killed and preserved. This sort of country alternates with a barren plain, where it is impossible to sit down for miles, owing to cactus and ants. However, I enjoyed it, and secured a fine set of the following species:—

Ampullaria insularum d'Orb.—Very common at Colastiné, San Nicolas, and Arguerich.

Ampullaria scalaris d'Orb.—Common at Colastiné, Santa Fé, and Rosario.

Marisa cornu-arietis L.—Moderately common at Colastiné.

Paludina spixii d'Orb.—Abundant at Colastiné, San Nicolas, and Arguerich.

Castalia ambigua Lam.—Local at Colastiné.

Besides these, I found two species of *Planorbis*, a *Paludina*, a *Paludestrina*, and a (?) small *Bulimulus*, none of which I have been able to identify. If any specialist in these genera can help me, I shall be glad to present him with the specimens.

Two- and three-denticed forms of *Jaminia muscorum* L.—On September 5th last, whilst hunting with Mr. W. G. Clarke for neolithic flint implements on the warrens and "brecks" to the west of Thetford, Norfolk, I came across a tract of land very similar in character to Lingheath Common, Brandon, where the tridentate form of *Jaminia* is found. The soil is chalky and full of shallow depressions—the remains of pits made by the flint-diggers in getting material for the gun-flint industry. On looking under the stones and lumps of chalk that lay strewn about, we found half-a-dozen specimens of *Jaminia muscorum*, four of which were the variety *bigranata* and two were tridentate. The spot is near St. Helen's Well on the western border of the parish of Thetford St. Peter, and about four miles east of the Brandon site.—A. MAYFIELD (*Read before the Society*, Sept. 9th, 1908).

**PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.**

379th Meeting, February 10th, 1909.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

"Thoughts on Natural Philosophy and the Origin of Life," by A. Biddlecombe, and the usual periodicals received in exchange.

Donation to Cabinet announced and thanks voted :

By Mr. J. E. Cooper: A set of *Pisidium supinum* A. Schmidt from River Thames at Hampton Wick.

New Member Elected.

Mrs. Jessie Linton, Bank House, Bedale, Yorkshire.

Papers Read.

"Non-Marine Mollusca found in the Parish of Morteheo, North Devon," by Mrs. G. B. Longstaff, F.G.S.

"Notes on the Mollusca of the Valley of the Colne," by J. E. Cooper and A. Loydell.

"*Pisidium supinum* A. Schmidt living in the Thames," by J. E. Cooper.

"*Vertigo alpestris* Alder. Its distribution in North Lancashire and Westmorland and its association with *Vertigo pusilla* Müll."—Supplementary Note—by J. Davy Dean and the Rev. C. E. Y. Kendall, B.A.

"*Vallonia excentrica* Sterki in West Norfolk," by the Rev. C. E. Y. Kendall, B.A.

Exhibits.

By Rev. C. E. Y. Kendall: *Jamnia muscorum* from Burnham Market, East Norfolk; and *Vallonia costata* and *V. excentrica* from various Norfolk localities to illustrate his note.

By Mr. R. Standen: A large collection of small West Indian Marine Shells, formerly belonging to the late Mr. R. D. Darbishire, and specially interesting on account of the labels shewing that they had originally been collected by Prof. C. B. Adams, and mostly named by Mr. Hugh Cuming.

By Messrs. J. E. Cooper and A. Loydell: A series of the Mollusca of the Colne Valley to illustrate their paper (mostly additions to the Census): *Vitreva scharffi*, Harefield; *Vitrina pellucida*, Harefield; *Punctum pygmaeum*, Harefield; *Acanthinula aculeata*, Harefield; *Vallonia pulchella*, Yiewsley; *V. excentrica*, Harefield; *Vertigo antivertigo*, Yiewsley; *Paludestrina jenkinsi*, Uxbridge; *Pomatias elegans*, Harefield; *Pisidium henslowianum*, Uxbridge; *P. casertanum*, Uxbridge; *P. nitidum*, Uxbridge; *P. supinum*, Hampton Wick.

By Miss A. L. Massey: *Paludestrina jenkinsi* from Ben Head, co. Meath; *Leuconia bidentata* from Rush, co. Dublin, and from Malahide estuary; and *Alexia denticulata* from Portmarnock.

By Mr. E. Collier: Fine specimens of *Helicella acuta* from various localities.

By Mr. C. H. Moore: *L. pereger* var. *ovata* from Millbrook, Stalybridge.

380th Meeting, March 10th, 1909.

Mr. J. Cosmo Melvill in the chair.

The Librarian reported the usual periodicals received in exchange.

Donations to Cabinet announced and thanks voted :

By Mrs. J. Carphin: *Helix caeperata* from Craighleith, near Edinburgh, and *Valvata cristata* from Davidson's Mains.

Papers Read.

"Obituary of Mr. R. D. Darbishire," by J. Cosmo Melvill, M.A., F.L.S.

"*Vertigo moulinsiana* Dupuy," by J. R. le B. Tomlin, M.A., and the Rev. E. W. Bowell, M.A.

"*Jamiania cylindracea* m. *sinistrorsum*," by J. R. le B. Tomlin, M.A.

"*Helicella cantiana* in Shropshire," by J. Cosmo Melvill, M.A.

Exhibits.

By Mr. J. Cosmo Melvill: *Diplommatina pagodula* from Ban Lao, and *Streptaxis dædalus* from Pat-Kha, Tonkin.

By Mr. J. D. Dean: *Limax flavus* from Lancaster.

By Mr. C. H. Moore: *Achatina knorri* var. *prunum* from Liberia, and *Ach. semidecussata* from Natal.

By Mr. R. Standen: *Cardium hians*, Algiers; *Voluta junonia*, dredged off West Florida; *Latiaxis marwæ*, a fine series from Hong Kong; *Buccinum leucostomum*, Japan; *Rapa papyracea*, Philippines; *Columbarium pagoda*, Japan; *Trophon triangulatus*, California; *Covona adamsoni*, New Granada; and *Helicostyla garibaldiana*, Philippines—all from the "Darbishire" collection in the Manchester Museum, and in long suites of the finest specimens procurable.

A fine series of the beautiful cones belonging to the Section Cylinder was shewn by Messrs. J. C. Melvill, J. Wilfrid Jackson, J. Kidson Taylor, and from the "Cholmondeley," "Walton," and "Darbishire" collections in the Manchester Museum. With a very few exceptions all the species and named varieties of this attractive group were represented, and Mr. Melvill gave an interesting account of certain specially distinguished members of the group, e.g., *C. gloria-maris*, *C. panluccie*, *C. racemosus* and *C. euetrios* (of the two last he shewed the unique "types"), and the numerous varieties of *C. textile* and *C. omaria*.

381st Meeting, April 14th, 1909.

Mr. E. Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange.

Resignation.

W. J. Kimber.

Member Deceased.

Rev. Herbert Milnes, M.A.

Papers Read.

"*Crepidula fornicata* L. on the coast of Kent," by J. E. Cooper.

"*Phytia myosotis* Drap. at Lower Meathop, Westmorland," by G. H. Taylor.

Exhibits.

By Mr. J. Wilfrid Jackson: *Helix hortensis*, *H. cantiana*, *H. hispida*, *H. caperata* and var. *ornata*, *H. itala*, *Vitrina pellucida*, *Ena obscura*, *Clausilia bidentata*, *Ancyclus fluviatilis*, etc., collected the previous day at Much Wenlock and Farley, Shropshire, and shewn alive at the meeting.

By Mr. R. Standen: *Solen pellucidus* Pennant from Firth of Clyde, 22 fathoms; and specimens of *Teredo megotara* Hanley, shells and animals, from drift-wood, Blackpool shore.

By Mr. C. H. Moore: *Cassis sulcosa* Brug. from Borneo.

By Mr. G. H. Taylor: *Phytia myosotis* Drap., to illustrate his note.

Special Exhibit.

A series of shells from Lake and shores of Tanganyika was shewn by Messrs. E. Collier, T. H. Platt and R. Cairns. The fine set from the Manchester Museum

(R. D. Darbshire collection) was also exhibited by Mr. Standen, and a number of species from Lake Nyassa, the Albert Nyanza, and Congo River for comparison.

382nd Meeting, May 12th, 1909.

Lt.-Col. H. H. Godwin-Austen, F. R. S., in the chair.

The Librarian reported the usual periodicals received in exchange.

Donations to Cabinet announced and thanks voted:

By Mr. F. H. Sikes: *Sphaerium lacustre*, *Pisidium obtusale*, *Acroloxus lacustris* from Warbleton, E. Sussex, and *Planorbis carinatus* from Shoreham, W. Sussex.

By Mr. J. N. Milne: Sixty-four "voucher sets" of non-marine shells from Cos. Down, Antrim and Donegal.

Resignation.

H. A. Soames.

New Members Proposed.

J. W. Milton, Harrison House, Crosby.

Robert Cecil Dickson, Dalhousie Villa, Carnoustie, N.B.

Papers Read.

"Note on *Trivia costis-punctata* Gaskoin and its allies," by J. Cosmo Melvill, M. A., F. L. S.

"*Carychium minimum* var. *elongatum* var. nov. from Chatburn," by J. W. Baldwin.

"Notes on Shropshire Mollusca," by J. Wilfrid Jackson, F. G. S.

"Periodic variation in *Limnaea pereger* Müll.," by J. Davy Dean.

"On the former occurrence of *Unio (Margaritana) margaritifera* L. in the River Thames," by J. Wilfrid Jackson, F. G. S.

Exhibits.

By Mr. J. Cosmo Melvill: The "type" specimen of *Trivia costis-punctata* Gaskoin, and a series of allied species to illustrate his note.

By Mr. R. Standen: *Trivia costis-punctata*, *T. solandri*, and *T. radians*: a fine series of dredged specimens to illustrate Mr. Melvill's paper.

By Mr. J. W. Baldwin: A series of numerous locality sets of *Carychium minimum* to illustrate his note.

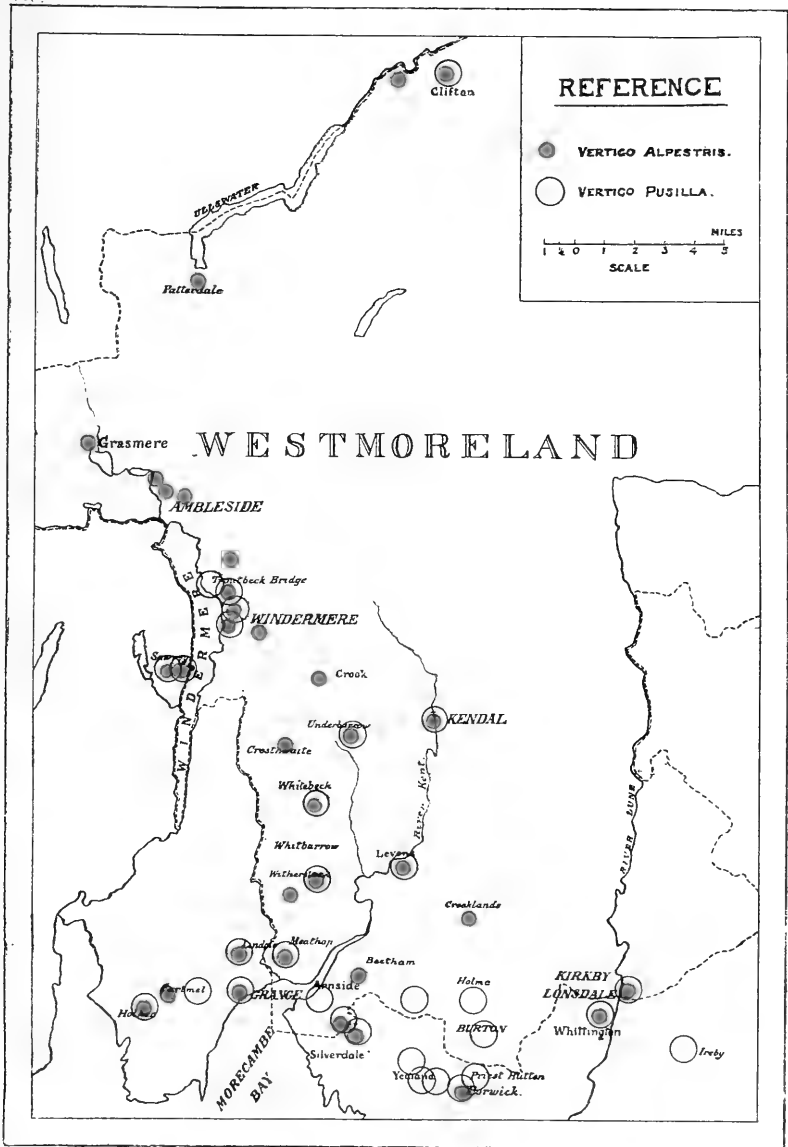
By Mr. J. Kidson Taylor: A very beautifully marked set of *Pecten maximus* showing great range of coloration and variation; believed to come from the Irish coast.

By Mr. J. Wilfrid Jackson: A series of large fossil *Unio margaritifera* dredged from the Thames gravel at Mortlake, to illustrate paper by himself and Mr. A. S. Kennard.

By Mr. Fred Taylor: *Testacella scutulium*, from Broadbottom, Cheshire, where it has recently turned up in great numbers in an old garden.

By Mr. R. Cairns: *Opisthostoma* 22 species, *Opisthoporus* 4, *Spiraculum beddomei* Bfld., and *hispidum* Pearson, *Rhiostoma jousseaumei* De Morgan, and *Pterocyclos* 9 species.

By Mr. Edward Collier: *Punctum pygmaeum*, *Sphyradium edentulum*, *Pyramidula rupestris*, *P. rotundata* and vars. *turtoni* and *alba*, and m. *sinistrosum*, *P. ruderata* collected at Arolla, Switz., over 7,000 ft. *Operculata*: *Opisthoporus*, 12 species; *Rhiostoma*, 2 species; *Spiraculum*, 2 species; *Pterocyclos*, 17 species.



J. H. BURMAN, M.Sc., del.

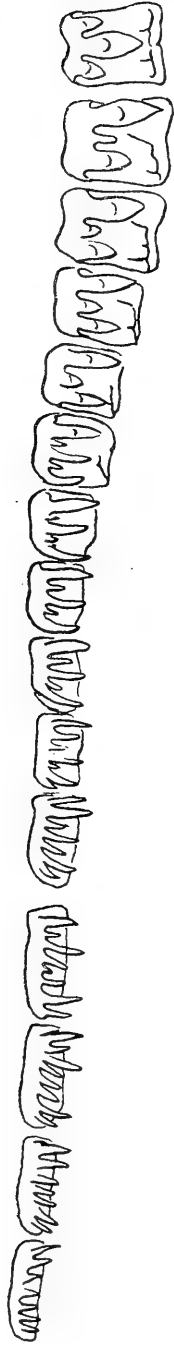
Sketch Map showing Distribution of *Vertigo alpestris* (Alder) and *V. pusilla* Müller in Westmoreland (see p. 309).



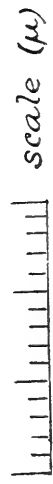
Vertigo moulinsiana (Dupuy).



Vertigo liljeborgi Westerlund.



Vertigo ventricosa Morse.



see p. 297.

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JOURNAL
 OF
CONCHOLOGY.

*BEING THE ORGAN OF THE CONCHOLOGICAL SOCIETY
 OF GREAT-BRITAIN AND IRELAND.*

PUBLISHED QUARTERLY.

HON. EDITOR:
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JOURNAL OF CONCHOLOGY.

VOL. 12.

OCTOBER, 1909.

No. 12.

ON THE FORMER OCCURRENCE OF UNIO (MARGARITANA) MARGARITIFER Linné IN THE RIVER THAMES.

By J. WILFRID JACKSON, F.G.S., AND A. S. KENNÁRD, F.G.S.

(Read before the Society, May 12th, 1909).

THE following account of a hitherto unrecorded discovery of shells of the above species in the bed of the Thames will no doubt be of great interest to many conchologists, especially as the species has not yet been taken in a living state in the south-east of England.

About twenty years ago a number of large *Unios* was dredged from the bed of the Thames at Mortlake. Some of these shells were taken by the workmen to the well-known dealer, Mr. G. Lawrence, of Wandsworth, from whose hands they passed into those of Professor W. Boyd Dawkins, and several valves were afterwards placed in the Manchester Museum. Further dredging operations were carried on in the same neighbourhood about nine years ago, and again a large number of the shells was obtained. The workmen picked out the largest specimens, and they passed through the same dealer's hands, and eventually became the property of Dr. Frank Corner, F.G.S., of Poplar, who kindly placed them at our disposal.

Mr. Lawrence informs us that the shells were dredged well out in the river, and at a fair depth in the gravel bed, not near the surface. The valves are of an exceedingly large size, the greater number measuring six inches in length and three inches in breadth. Two examples measure six and a half inches by three inches, and six and a quarter by three and a quarter respectively. They are extremely well preserved, periostracum and hinge ligament being present in many cases. They appear to be by far the largest examples of this species hitherto recorded. A very large series of specimens from numerous localities, both British and continental, has been examined and measured, but no individuals have been found to approach the Thames examples in size. Most of the specimens appear to be the var. *sinuata* Lam.

There can be no doubt that these shells were obtained from the gravel of the Thames, for all the specimens show what is known amongst archæologists as the "Thames mark." This is a deposit of carbonate of lime which is commonly found on objects dredged from the Thames or Lea, and which has probably been caused by algæ. This deposit was nearly half-an-inch thick on some of the shells. We may, we think, thus conclude that at some previous period *Margaritana margaritifer* was living abundantly in the Thames, and it now remains for us to endeavour to fix the age.

The gravel in which the shells occur, is not a modern deposit, for it is very different from the ordinary Thames "ballast," being firmly concreted together by the deposit of carbonate of lime referred to above; it is only dredged with difficulty.

It is very clear that the present slow-moving Thames is altogether unsuitable to the existence of *Margaritana*, and the conditions therefore must have been very different when the species lived there, and from geological evidence we know that at a former period the necessary conditions existed.

At the close of the Pleistocene period the land stood at a much higher level than it does to-day, and the Thames was then a quick-flowing stream in a deep and narrow gorge, of which the numerous borings, excavations for the piers of bridges and so forth, afford ample evidence, as existing under the present channel. It is to this period—the close of the Pleistocene—that we would venture to assign these shells.

The cause of the extinction of the species is easily explained by the fact that as the land sank the river became more sluggish and silt and mud commenced to accumulate. Such conditions would prove highly detrimental to its welfare and the species soon ceased to exist.

This record is all the more interesting as Dr. R. F. Scharff, in his *European Animals*,¹ lays special stress on the absence of this species from the south-east of England—the area so characteristic of the Germanic species.

Though the first authentic record of the occurrence of the species in a fossil state in this country, it is not the first record for the Continent, as Locard in his *Malacologie Lyonnaise*² cites it as occurring in the middle Pleistocene of Dauphiné and Jura, under the specific rank of *Unio sinuatus* Lam.

1 London, 1907, p. 72.

2 Lyon, 1877, p. 106.

SEXUAL DIFFERENCES IN THE SHELL OF *CYCLOSTOMA ELEGANS*.

By A. E. BOYCOTT.

(Read before the Society, June 9th, 1909).

It is stated¹ that in *Cyclostoma elegans* the last whorl "is more tumid and voluminous in female than in male individuals." I recently collected a number of specimens at Ashtead (Surrey) for the further examination of this matter. Most of them were taken actually *in copula*. The specimens were separated into males and females by dissection and the shells then examined. It is clearly necessary to obtain some numerical expression of tumidity and voluminousness, and I have sought to do this by ascertaining the relation between height and breadth according to methods described elsewhere.² The altitude is measured from the apex to the most distant part of the peristome along a line parallel with the columella. In the present series I have taken two diameters: one (diameter a) at right angles to the axis of the shell from the outer edge of the peristome to the furthest point on the last whorl; the other (diameter β) is the greatest diameter obliquely across the last whorl, excluding the peristome. Diameter a might be influenced by variations in the degree to which the mouth of the shell projects; diameter β is not influenced by this, and though there are some points of uncertainty, I think that one or other or both of these measurements give a fair measure of the fatness of the last whorl. The ratio between these figures and the altitude gives one then a measurement of the tumidity: $\frac{\text{altitude} \times 100}{\text{diameter } a}$ gives coefficient A, $\frac{\text{altitude} \times 100}{\text{diameter } \beta}$ gives coefficient B. These coefficients are expressions of tumidity which are independent of variations in the absolute figures for altitude and diameter. The lower the coefficient the greater the tumidity.

Of the 89 specimens examined, 45 were males and 44 females. The average maximum and minimum measurements (in millimetres) may be summarised as follows:—³

| | Males. | | | Females. | | | Both Sexes. |
|---------------|--------|------|----------|----------|------|----------|-------------|
| | Max. | Min. | Average. | Max. | Min. | Average. | Average. |
| Altitude | 14.3 | 12.0 | 12.90 | 15.1 | 13.1 | 13.97 | 13.42 |
| Diameter a | 10.2 | 8.2 | 9.30 | 10.4 | 9.1 | 9.87 | 9.58 |
| " β | 8.8 | 7.7 | 8.22 | 9.5 | 8.1 | 8.70 | 8.46 |
| Coefficient A | 148 | 129 | 139 | 150 | 129 | 142 | 140 |
| " B | 166 | 146 | 157 | 169 | 152 | 160.5 | 159 |

¹ J. W. Taylor, Mon. L. & F. W. Moll. Brit. Isles, vol. 1, 1894, p. 26.

² Mollusca of Herefordshire (Woolhope Club), 1900, p. 19; Science Gossip, vol. 4, 1897, p. 161.

³ The individual measurements may be taken as correct to 0.2 mm.

It appears from these figures that the diameter in the females is about 0.5 mm. greater than in the males, but if the striking difference in altitude is taken into account, it is found that this does not mean that the females are more tumid than the males. The coefficients are in fact a trifle higher in the females, indicating that they are, if anything, rather slimmer than the males.

On this the point immediately arises that there may be some relation between the tumidity coefficients and the absolute altitude. Grouping the shells to the nearest half millimetres of altitude, we obtain the following average coefficients:—

| Group. | Number of | | Coefficient A. | | Coefficient B. | | Both Sexes. | |
|----------|-----------|----------|----------------|----------|----------------|----------|-------------|-----------|
| | Males. | Females. | Males. | Females. | Males. | Females. | Coeff. A. | Coeff. B. |
| 12.0 mm. | 5 | — | 140 | — | 151 | — | 140 | 151 |
| 12.5 | 15 | — | 137 | — | 157 | — | 137 | 157 |
| 13.0 | 13 | 3 | 142 | 141 | 159 | 160 | 140 | 158 |
| 13.5 | 9 | 14 | 137 | 139 | 158 | 158 | 139 | 158 |
| 14.0 | 3 | 12 | 139 | 142 | 164 | 160 | 141 | 161 |
| 14.5 | — | 12 | — | 144 | — | 162 | 144 | 162 |
| 15.0 | — | 3 | — | 145 | — | 166 | 145 | 166 |

These results indicate pretty clearly that there is a definite relation between tumidity and size in the sense that the larger shells are rather less tumid. The results for coefficient A among the smaller shells (male) are irregular. This is due to the fact that the smallest ones have no fully developed peristome; when this appears the diameter is thereby suddenly increased and the coefficient falls. If, then, the females are larger, they will tend on that account to be slimmer. Is this the whole explanation of the slightly greater tumidity of the males which appears in the crude averages? The material is not sufficiently extensive to enable a very absolute conclusion to be drawn, but the answer seems to be in the affirmative, for comparing males and females of equal altitude (13.0 and 13.5 mm.), there is no appreciable sexual difference in the coefficients. The conclusion is therefore that males and females are equally fat.

It is possible that these results apply only to the particular batch of *Cyclostoma* examined. They appear, however, to be rather particularly significant, since practically all the individuals concerned were actually observed to be sexually active towards one another. Taylor's figures (*loc. cit.*) give, however, altogether different measurements,¹ and I should be glad to examine batches of *Cyclostoma* from other localities. It is extremely important to avoid bias in collecting such material. Without having any idea that the females were larger than the males, I took 18 shells out of the box, as I thought, purely at

¹ Approximate measurements give for the male 13.1 × 11.5 × 10.2 with coefficients of 114 and 128; for the female 13.2 × 12.5 × 11.5 and 105 and 115.

random and certainly with no conscious selection, for dissection: 16 proved to be females. If in the field the sexes had been separate and the same unconscious preference for quite the largest specimens had been exercised, I should have arrived at the startling result that female *Cyclostoma* were eight times as numerous as male individuals. The present data do not of course afford any evidence to the contrary; single females might all have been underground. It would be interesting to determine the point accurately. In this series there was no sexual difference in colour: 6 males and 7 females were of the pale unmarked form.

After drying to constant weight at 90°C., the shells were weighed. The males averaged 0.123 gms., the females 0.172 gms., a ratio of 100:119. This is in almost precise relation to the calculated volume. Assuming that the shell is a regular cone with a base equal to half the sum of the two diameters, the males have an average volume of 258 mm.³, the females 314 mm.³, a ratio of 100:122. There is therefore no evidence that there is any sexual difference in shell thickness.

Some preliminary observations were made on the radulæ. Ten male radulæ taken at random varied in length from 5.2 to 7.2 mm., and the number of rows from 94 to 119; the averages were 5.99 mm. and 107 rows. In the same way ten females gave a length of 6.64 (6.4 to 7.4) mm. with 109 (102 to 126) rows. The male to female ratio is therefore for length 100:111 and for number of rows 100:102. The female radula appears from this to be relatively small and the teeth possibly relatively large or widely spaced. I have some evidence in the case of *Tachea* that the size of radula and number and size of teeth is proportional to the diameter rather than the calculated volume of the shell, and the same may hold in *Cyclostoma*.

CONCLUSIONS.

- 1.—Female *Cyclostoma* are definitely larger than male *Cyclostoma*.
- 2.—No evidence was obtained that there is any sexual difference in the tumidity of the shells.

Carychium minimum var. **elongatum** nov. from Chatburn.—In looking over my specimens of this interesting little shell, which I have taken in various localities and counties, I find that those obtained at Chatburn are of a beautiful slender elongated form, differing considerably from specimens exhibited from other districts, with the exception of those from Long Preston, a village wide of Hellifield, which is also near the same branch of the Lancashire and Yorkshire Railway as Chatburn. This form I propose to call var. *elongatum*.—J. W. BALDWIN (*Read before the Society, May 12th, 1909*).

NOTES ON
THE MOLLUSCA OF THE VALLEY OF THE COLNE.

BY J. E. COOPER AND A. LOYDELL.

(Read before the Society, Feb. 10th, 1909).

IN working out the census of Middlesex shells we have been struck by the abundance and variety of mollusca in the Colne Valley.

At Harefield, which is the first village in the north-west of the county, is the only patch of chalk in Middlesex. Although it only covers about one square mile, it has afforded six county records, besides several species which are uncommon elsewhere. In or near the chalk-pits are to be found *Arion subfuscus*, *Pyramidula rotundata* var. *rufula*, *Vitrina pellucida*, *Vallonia costata*, *V. excentrica*, *Helicella virgata*, *H. caperata*, *Helicigona arbustorum*, *Jamiania muscorum*, and *Pomatias elegans*. In a wood near by we have taken *Acanthinula aculeata*, *Punctum pygmeum*, and *Euconulus fulvus* on dead holly leaves. Eight species of *Vitrea* occur here. There is a fine colony of *V. scharffi* by the river-bank, in which all the animals are blue, with large thin shells. A smaller colony in the great chalk-pit has thicker shells with rather darker animals. The latter might be taken for *V. lucida* from their external appearance, but from an examination of the radula we refer them to *V. scharffi*.

The river at Harefield is not very productive, but the ditches and backwaters (more particularly those towards Denham Lock) yield a considerable number of freshwater species. We have obtained five species of *Pisidium* here, viz. :—*P. amnicum*, *P. subtruncatum*, *P. pulchellum*, *P. obtusale*, and *P. gassiesianum*. Our total for Harefield and neighbourhood (Middlesex portion only) is 65 species.

Following the Colne for a few miles we reach Uxbridge. Here the land shells are not so much in evidence. *Sphyradium edentulum* used to live in a copse which was destroyed when the new railway line was built. Unfortunately, we have not yet discovered another Middlesex locality for this species. Freshwater shells are abundant. In the stream called Frayswater, or Frays River, are fine *Limnæa auricularia*, also *Pisidium henslowianum*. A small piece of marsh contains a flourishing colony of *Paludestrina jenkinsi* and *Pisidium casertanum*. In a ditch near we have taken *Valvata cristata*—rather a scarce shell in Middlesex. In Uxbridge Marsh we have met with small examples of *Vivipara contecta*.

Following the canal south, we come next to Yiewsley. Just where the Slough branch canal crosses the Colne, there is a prolific little marsh. *Hygromia granulata* and *Zonitoides nitidus* are abundant.

Succinea putris is exceptionally fine. Among the rarer species are *Arion intermedius*, *Punctum pygmaeum*, *Vallonia pulchella*, *Vertigo anti-vertigo*, *Segmentina nitida*, *Neritina fluviatilis*, and genuine *Pisidium pusillum* (as distinct from *P. casertanum*). In the Slough canal are *Bithynia leachii*, *Unio pictorum*, *U. tumidus*, and *Sphaerium rivicola*. The railway bank at West Drayton gives shelter to numerous snails, including *Helicella caperata*. In and around West Drayton we have found 57 species of mollusca.

Colnbrook lies about two miles away. Near this village is the Middlesex locality for *Vertigo moulinsiana*. Mollusca are abundant in this neighbourhood, but the species are much the same as at West Drayton and Viewsley.

Keeping near the county boundary, we soon reach Staines Moor. A pond here yields very fine examples of *Vivipara costata*; and in one of the branches of the Colne are *Neritina fluviatilis* and *Valvata piscinalis*.

Our total for the whole valley is 85 species.



PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

383rd Meeting, June 9th, 1909.

Mr. R. Standen in the chair.

Donations to the Library announced and thanks voted:

"A Preliminary List of Recent Middlesex Mollusca," by J. E. Cooper and A. Loydell. "Manual of Conchology," part 78, by H. A. Pilsbry (*from the respective authors*). "Guide to the Coral Gallery," "Guide to the Shell and Starfish Gallery," "Guide to the Fossil Invertebrate Animals" (*presented by the Trustees of the British Museum*); and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted:

By Mr. J. A. Hargreaves: *Acicula lineata*, *Jamania anglica*, and *Acanthinula lamellata* from Forge Valley, Scarborough.

By Mr. A. E. Boycott: *Cyclostoma elegans*, males and females.

New Members Elected.

J. H. Milton, Harrison House, Crosby.

Robert Cecil Dickson, Dalhousie Villa, Carnoustie.

Resignation.

F. H. Gravely.

Papers Read.

"A Preliminary Conchological Survey of Monmouthshire, with Notes on Brecknockshire," by F. H. Sikes, M.A.

"On a Habitat of *Acicula lineata*," by J. A. Hargreaves.

"Sexual Differences in the Shell of *Cyclostoma elegans*," by A. E. Boycott.

Exhibits.

By Mr. J. A. Hargreaves: Sets of *Acicula lineata*, *Jamiania anglica*, and *Acanthinula lamellata*, photograph of habitat, and specimens of the tufaceous earth from same, to illustrate his paper.

By Mr. A. E. Boycott: *Cyclostoma elegans*, males and females, to illustrate his paper.

By Mr. C. H. Moore: *Helicella caperata*, from West Kirby and Hoyle; *Vitrea cellaria*, from Stalybridge; *Vitrea nitidula*, *V. rogersi*, *Zonitoides excavatus*, *Pyramidula rotundata*, *Limnaea stagnalis*, *L. truncatula*, *L. pereger*—one with curiously-divided lip, *Vivipara vivipara*, and a very high-spired yellow form of *Ancylus fluviatilis*, all from Romiley, Cheshire.

By Mr. R. Standen: A fine series of *Succinea putris* and *S. elegans*, from the collection of the late Mr. R. D. Darbishire, with examples of the large and beautiful specimens from Budapest (Hazay collection) for comparison with those from British localities.

384th Meeting, September 8th, 1909.

Mr. B. R. Lucas in the chair.

Candidates Proposed for Membership.

Mrs. Frances Mary Fisher, Higham, Bassenthwaite Lake, Cockermouth.

Henry Charles Huggins, 13, Clarence Place, Gravesend, Kent.

J. S. M. Ward, B.A., The Whym, Gomshall, Surrey.

Resignation.

John Hardy.

Deceased.

Sergt.-Major Robert Drummond.

Papers Read.

"Land and Freshwater Mollusca at Cloghane, Co. Kerry," by J. R. le Brockton Tomlin, M.A.

"*Crepidula fornicata* on the Lincolnshire Coast," by Walter Gyngell.

"*Hygromia rufescens* m. *sinistrorsum* at Peterborough," by Walter Gyngell.

"Abnormal Radula of *Vitrea lucida*," by J. E. Cooper.

"Note on Decollated Shells," by J. E. Cooper.

"*Pisidium supinum* A. Schm. in Bucks.," by J. E. Cooper.

"*Assemanina grayana* in East Suffolk," by J. E. Cooper.

Exhibits.

By Mr. J. W. Baldwin: Shells from Marian Glas, Anglesea, including *Sphyradium edentulum*, *Cochlicopa lubrica*, *Helix granulata*, *Acicula lineata*, *Vitrea crystallina*, *Vallonia costata*, *Carychium minimum*, and *Pyramidula rupestris*.

By Mr. Fred. Taylor: Abnormally thick internal shells of *Limax arborum*, from Peel Road, Douglas, Isle of Man.

By Mr. C. H. Moore: *Planorbis albus*, *Limnaea truncatula*, and *Pisidium fontinale*, from Bramhall; *Vallonia pulchella* and *Pupa cylindracea* from Lytham.

ADDENDA TO GRANGE MOLLUSCA.

BY HARRY BEESTON.

(Read before the Society, January 13th, 1909).

THE following additional notes have come to hand since the first instalment appeared in the *Journal* for October last, and will bring the information for the Grange district quite up to date.

Limax maximus Linné.—Near Flookburgh. Scarce. September, 1908 (J.W.J.).

var. **fasciata** Moquin-Tandon.—One specimen on church-yard wall at Grange, September, 1908 (J.W.J.).

*var. **cinereo-niger** Wolf.—A fine specimen in Eggerslack Wood, September, 1908 (R.S.).

Limax arborum Bouchard-Chantereaux.—Several specimens noted in wood below Bigland Scar, near Holker, September, 1908 (J.W.J.).

Agriolimax agrestis (Linné).—Wood, Bigland Scar; also near Flookburgh, September, 1908 (J.W.J.).

Vitrina pellucida (Müller).—Wood, Bigland Scar; also near Flookburgh, September, 1908 (J.W.J.).

***Vitrea lucida** (Draparnaud).—Fourteen adult specimens found at the cliffs on Lindale Road, Grange, September, 1908 (J.W.J.). About half the number were alive, the largest measuring 15 mm. in diameter.

Vitrea cellaria (Müller).—

var. **scharffi** Kennard.—Wood, Bigland Scar; Flookburgh, September, 1908 (J.W.J.).

var. **albina** Westerlund.—A fine specimen in upper part of Eggerslack Wood (F. H. Sikes).

Vitrea alliararia (Miller).—Wood, Bigland Scar, September, 1908 (J.W.J.).

Vitrea nitidula (Draparnaud).—Flookburgh, September, 1908 (J.W.J.).

***Zonitoides excavatus** (Bean).—Scarce, in wood below Bigland Scar, Holker, September, 1908 (J.W.J.).

***Euconulus fulvus** (Müller).—Bigland Scar, September, 1908 (J.W.J.).

var. **viridula** Taylor.—One specimen taken in Eggerslack Wood, September, 1908 (R.S.).

var. **mortoni** Jeffreys.—Fairly common at Meathop Marsh. Seen by Mr. J. W. Taylor (F. H. Sikes).

Arion ater (Linné).—Abundant, Flookburgh.

*var. **plumbea** Roebuck.—Cliffs on Lindale Road, Grange, September, 1908 (J.W.J.).

*var. **brunnea** Roebuck.—Cliffs on Lindale Road, Grange, September, 1908 (J.W.J.).

Arion hortensis Férussac.—Wood, Bigland Scar, Holker, September, 1908 (J.W.J.).

Arion circumscriptus Johnson.—Wood, Bigland Scar, Holker, September, 1908 (J.W.J.).

Sphyradium edentulum (Draparnaud).—Wood, Bigland Scar, Holker, September, 1908 (J.W.J.).

Pyramidula rotundata (Müller).—Flookburgh; wood, Bigland Scar, Holker, September, 1908 (J.W.J.).

Hygromia rufescens (Pennant).—Flookburgh, September, 1908 (J.W.J.).

Acanthinula aculeata (Müller).—Grange Fell Road, near cemetery, September, 1908 (R.S.).

Helix aspersa Müller.—On several occasions we searched for shells at night with a lamp, and found this and other species absolutely in thousands, and in all stages of growth, crowding the walls of gardens near Grange Church.

var. **undulata** Moquin-Tandon.—Flookburgh, banding 1(23)45; Humfrey Head, September, 1908 (J.W.J.).

Helix nemoralis Linné.—Abundant.

var. **rubella** Moquin-Tandon.—00300. Flookburgh.

var. **libellula** Risso.—00000, 00300, 123(45), (123)(45), Flookburgh; 00300, 12345, 12(345), Humfrey Head, September, 1908 (J.W.J.).

Helix hortensis Müller.—

var. **lutea** Moquin-Tandon.—00000, Humfrey Head; 12345, (12)(345), Meathop Fell.

var. **coalita** Moquin-Tandon.—Humfrey Head, September, 1908 (J.W.J.).

Cochlicopa lubrica (Müller).—Flookburgh, September, 1908 (J.W.J.).

Jaminia cylindracea (Da Costa).—Common on walls, Bigland Scar; Flookburgh.

Vertigo antivertigo (Draparnaud).—We found this species fairly abundant among flood débris in the meadow opposite Meathop Fell, the habitat of *Z. nitidus*, September, 1908 (J.W.J.).

Vertigo alpestris (Alder).—Wood, Bigland Scar, September, 1908 (J.W.J.).

Balea perversa (Linné).—Common on mossy walls at Bigland Scar, Holker, September, 1908 (J.W.J.).

Clausilia bidentata (Ström).—Common on walls at Bigland Scar; Cark; Flookburgh.

var. **cravenensis** Taylor.—Very abundant, along with type. No intermediate forms. I consider this a good species. Bigland Scar; Cark, September, 1908 (J.W.J.).

Pisidium obtusale Pfeiffer.—Common in ponds on Hampsfell, September, 1908 (J.W.J.).

Pisidium nitidum Jenyns.—Common in ponds on Hampsfell, September, 1908 (J.W.J.).

On a habitat of *Acicula lineata*.—Although I have been able to get *Acicula lineata* in small numbers for years past in Hackness, Forge Valley and Yedmandale, I have altogether obtained but few, by far my best result being sixteen in one day. This spring I have got it in larger numbers, and I think the information might be of service to other members of the Society who have overlooked one of its habitats as I have done. In Forge Valley, near Scarborough, are one or two boggy places where *Pupa anglica* can be had in numbers. In these bogs grows in abundance the moss *Stereodon cupressiforme* Mitt., which is a plant well known to be affected by this species, as at Shipley Glen, near Bradford, various places on the coast between Speeton and Ravenscar, and elsewhere. In all these places the moss is kept damp by percolating water, and a luxuriant growth is the result. In Forge Valley, the underlying stratum is a calcareous tufa, deposited by the water surcharged with calcium carbonate. When broken, this tufa yields *Succinea putris*, *Cochlicopa lubrica*, *Limnaea truncatula*, &c., all, however, as far as I know, being recent species. Where the moss is very luxuriant and thick, a dense mass of rootlets forms of a dark brown, almost blackish colour, and in these dense masses *Acicula lineata* occurs. Continuous searching in the moss yielded only one or two specimens, but on looking at the roots, better results were obtained at once, and on taking home a paper bag full and turning it over at intervals during two or three days, over forty specimens were obtained. Later examination confirms this habitat, and I think it probable the species may be found in similar positions elsewhere. Most of the specimens were dead, but in excellent condition, and quite clean. Presumably the *Acicula* were hibernating in the roots, and died, or were attacked and devoured by the other numerous inhabitants of the bog. In company with *Acicula* were *Helix lamellata*, *H. fusca*, *H. granulata*, *H. hortensis*, *H. arbustorum*, *H. rotundata*, *Hyalinia alliaris*, *Hy. pura*, *Hy. crystallina*, *Hy. cellaria*, *Hy. nitidula*, *Hy. radiatula*, *Euconulus fulvus*, *Succinea putris*, *Vertigo edentula*, *Jamnia muscorum*, *Carychium*, *Arion ater*, *A. fasciatus*, *Limax levis*, and very abundantly *Pupa anglica*, of which one visit yielded over sixty specimens, whilst subsequent visits have produced even larger numbers crawling on dead sycamore leaves. Perhaps for its size (it is only a few yards each way) this is the most conchologically prolific piece of ground in Yorkshire. My friend, Mr. Harman, was the first to find this particular habitat for *Acicula lineata* when we were searching for it together.—J. A. HARGREAVES (Read before the Society, June 9th, 1909).

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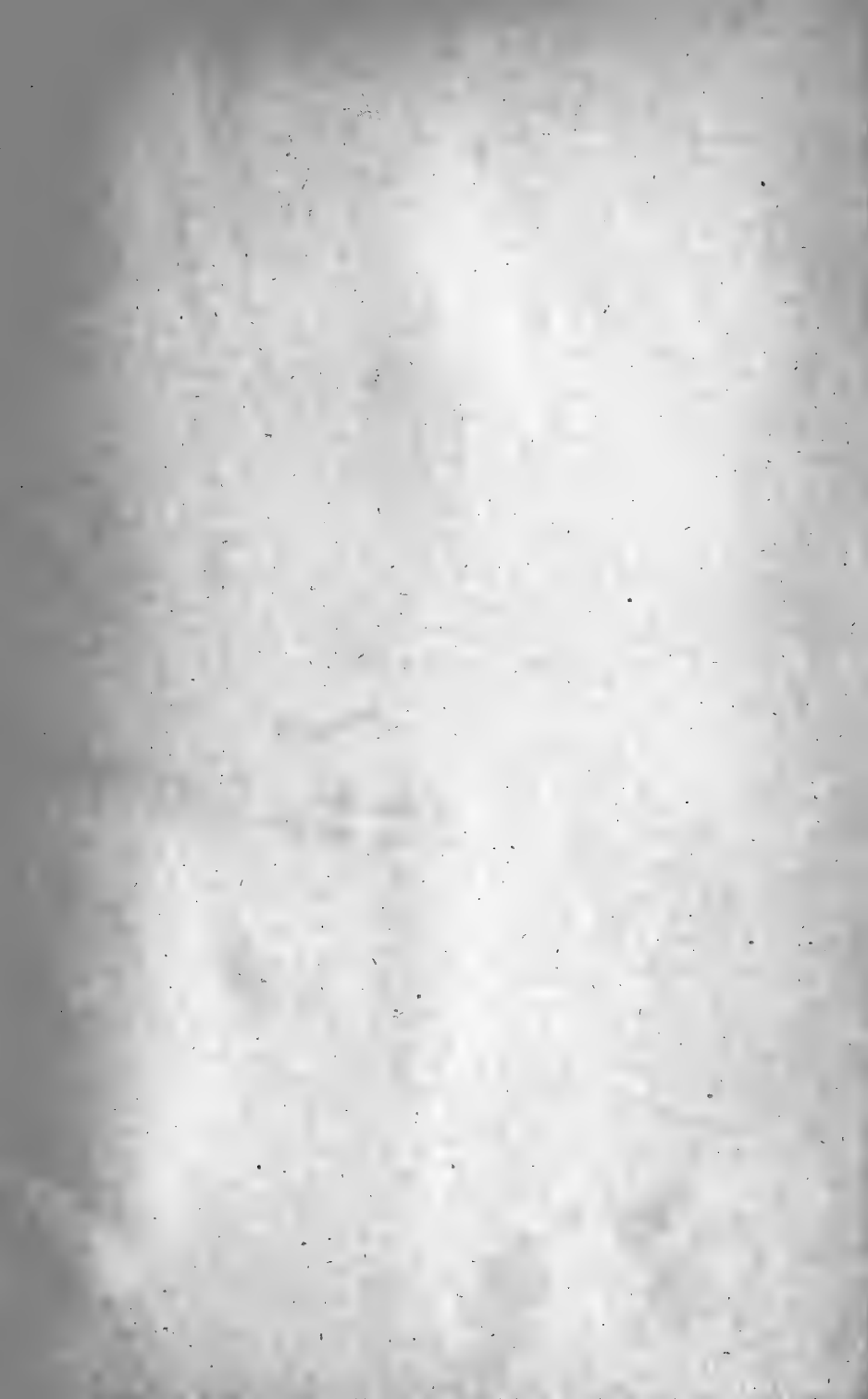
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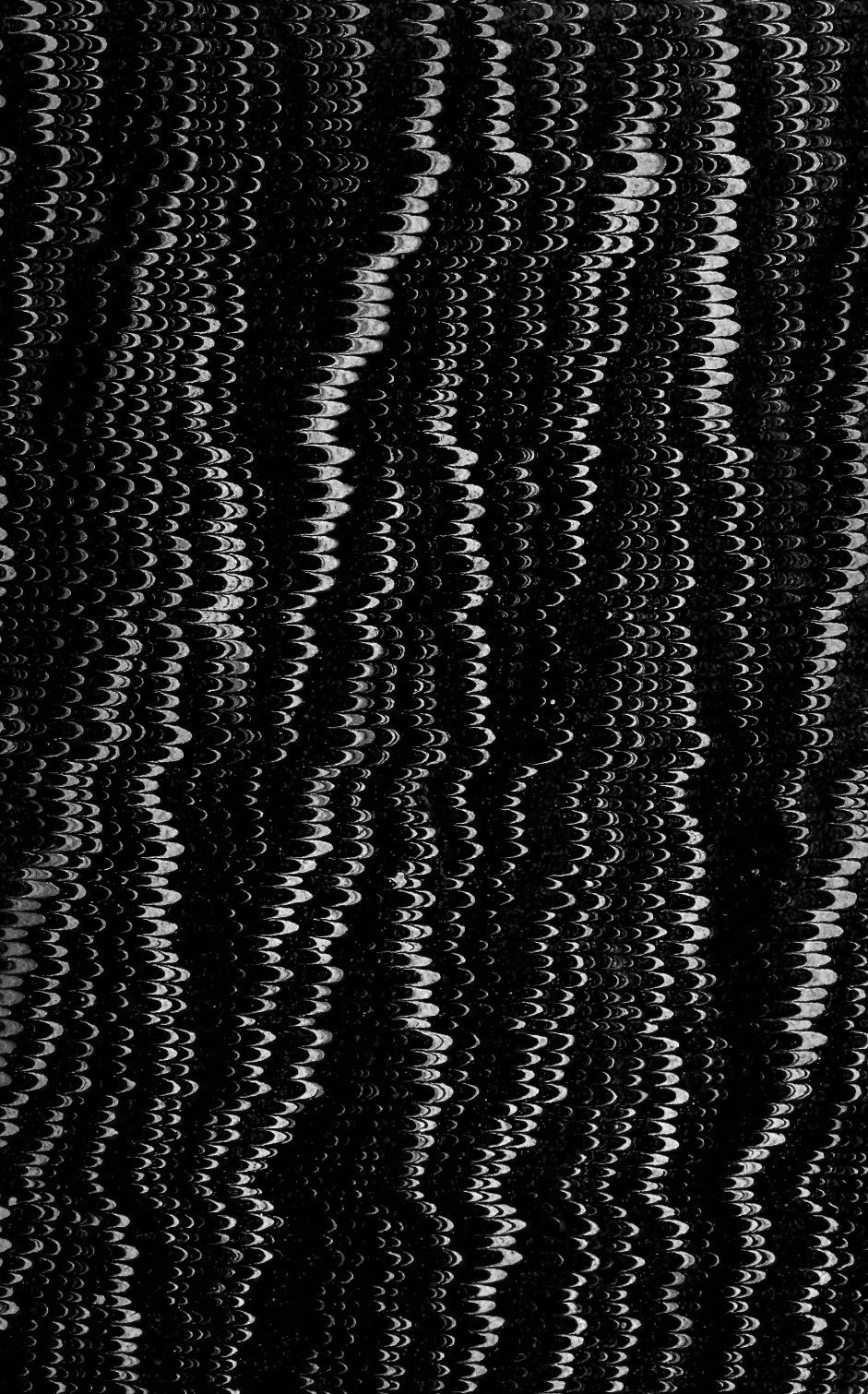
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