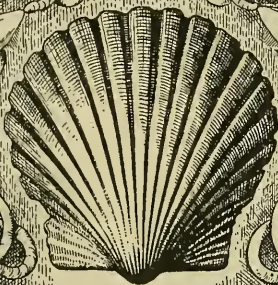


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THE

JOURNAL OF CONCHOLOGY:

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

EDITED, UNDER THE DIRECTION OF THE COUNCIL,
BY

J. R. LE B. TOMLIN.

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1910—1912.

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THE

JOURNAL OF CONCHOLOGY.

VOL. 13.

JANUARY, 1910.

No. 1.

CONSTITUTION OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

- 1.—This Society shall be called “**The Conchological Society of Great Britain and Ireland.**”
- 2.—Its object shall be the promotion of the science of Conchology, by the holding of Meetings for the reading and discussion of original papers, by the publication of proceedings, and by the formation of a Library and Collections illustrative of the science.
- 3.—It shall consist of Ordinary and Honorary Members.
- 4.—Ordinary Members shall be proposed by two Members at one meeting, and balloted for at the next. They shall pay, in advance, on the 1st January in each year, a subscription of 5/—, or may compound for life by the payment of Three Guineas. If on December 31st of any year a member shall be three or more years in arrear with his or her subscription, the Council shall erase his or her name from the list of members, and shall take whatever steps seem desirable for recovery of the arrears. The Council shall further report the erasure of such names to the next meeting of the Society with a view to their publication in the Journal.
- 5.—Composition Fees shall be invested in Books, Cabinets, or other permanent property, or in such other manner as the Council may think most conducive to the benefit of the Society.
- 6.—The number of Honorary Members shall be limited to ten, and they shall be exempt from all payments and have the privileges of Ordinary Members.
- 7.—It shall be governed by a Council, consisting of a President, four Vice-Presidents, a Treasurer, a Secretary, a Curator, a Recorder, a Librarian, an Editor, and six other members, who shall be elected annually by ballot; the voting paper issued to be returned to the Secretary, under cover of sealed envelope, addressed to the Scrutineers. Any two of the following offices may be held by one person, viz. :—Treasurer, Secretary, Curator, Recorder, Librarian, and Editor. The President and Secretary of the Leeds and London Branches and such other branches as may afterwards be accepted at an annual meeting shall, *ex officio*, also be members of the Council of the Society.
- 8.—The Presidency shall not be tenable for more than two years continuously, and the President is expected to give an address.

- 9.—The meetings shall be held monthly, at the time and place fixed by the Council, who shall also have power to arrange such additional meetings as they may think desirable.
- 10.—Three shall be a quorum at all meetings.
- 11.—The Annual Meeting shall be held at such time and place as may be fixed at the previous Annual Meeting, to receive the Reports and Balance Sheet of the out-going Council, and to elect a Council and Officers for the ensuing year.
- 12.—The accounts, before being presented, shall be audited by two members, appointed at a previous meeting.
- 13.—The proceedings shall be published periodically, under the direction of the Council.
- 14.—The Capital and Property shall be vested in two Trustees, elected by the Society.
- 15.—No alterations in the rules shall be made, unless by a majority of three-fourths of the members present at a meeting which has been specially summoned.

The Annual Subscription is Five Shillings, due on the 1st January in each year.

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PRESIDENT, REV. CANON J. W. HORSLEY, M.A.

HON. SECRETARY - J. E. COOPER.

LIST OF MEMBERS.

Corrected to Dec. 17th, 1909.

(With year of election; O = founder, or original member; L = Life Member; P = has filled the office of President; *post packets have been returned undelivered).

HONORARY MEMBERS.

(Limited to ten in number).

- 1889. Bergh, Prof. Dr. Rudolph, 6 Malmögade, Copenhagen.
- 1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
- 1889. Cossmann, Maurice, 95, Rue de Maubeuge, Paris.
- 1897. Dall, Wm. Healey, A.M., D.Sc., Smithsonian Institution, Washington, D.C., U.S.A.
- 1878. Kobelt, Dr. Wilhelm, Schwanheim, Frankfurt-am-Main.
- 1905. Pelseneer, Prof. Paul, 53, Boulevard Léopold Grand, Ghent, Belgium.
- 1906. Pilsbry, H. A., Academy of Natural Sciences, Philadelphia, Pa., U.S.A.
- 1889. Sars, Prof. G. O., Universitet, Christiania, Norway.
- 1889. Simroth, Dr. Heinrich Rudolph, Kregelstrasse 12, Leipzig-Gautsch.
- 1905. Strebel, Dr. Hermann, Naturhistorisches Museum, Hamburg.

ORDINARY MEMBERS.

- 1903. Abbott, G., 83, Russell Street, Kettering.
- 1906. Adams, F. E., St. Milburga's, Kingsland, Shrewsbury.
- 1885.^P Adams, Lionel Ernest, B.A., Oak Hill, Chart Road, Reigate, Surrey.
- 1895. Arnold, Bernard, F.L.S., Milton Lodge, Gravesend.
- 1908. Bacchus, A. D. R., National Provincial Bank of England, Exeter.
- 1907. Baily, Joshua L., jr., Haverford, Pa., U.S.A.
- 1907. Baker, Mrs. A. L., 167, Hoddle Street, Richmond, Melbourne, Australia.
- 1908. Balch, F. N., 60, State Street (Rooms 504-507), Boston, Mass., U.S.A.
- 1897. Baldwin, D. D., M.A., Hamakuapoko, Maui, Hawaiian Islands.
- 1899. Baldwin, Joseph W., 61, Queen Street, Bromley Cross, near Bolton, Lancs.
- 1907. Bartsch, Dr. Paul, Smithsonian Institution, Washington, D.C., U.S.A.
- 1907. Bavay, A., 82, Rue Lauriston, xvi^e, Paris.
- 1905. Becker, Dr. H., F.L.S., F.S.A., Grahamstown, Cape Colony.
- 1901. Beeston, Harry, Sunnymead, South Street, Havant, Hants.
- 1904. Bellini, Prof. Raffaello, R. Scuola Tecnica, Chivasso, Torino, Italy.
- 1904. Benn, C. A., M.A., F.G.S., Rodwell Hall, Trowbridge
- 1901. Bentley, R. H., 60, Rosebery Road, Muswell Hill, London, N.
- 1897. Blackburn, Rev. Ed. Percy, Ryecroft Manse, 7, Brook Street, Gloucester.
- 1899. Bladen, W. Wells, Stone, Staffordshire.
- 1897. Blake, Wm. Charles, 2, Acacia Villas, Ross, Herefordshire.
- 1895. Bles, Edward J., M.A., D.Sc., The Mill House, Iffley, Oxford.
- 1897. Bliss, Joseph, Boar Bank Hall, Grauge-over-Sands.
- 1907. Bloomer, H. H., 35, Paradise Street, Birmingham.
- 1899. Blundell, Mrs. Jessie M., Argyll House, Cirencester.
- 1904. Booth, Fred, 18, Queen's Road, Shipley, Yorks.

1884. Bostock, Edwin D., Holly House, Stone, Staffordshire.
 1906. Boulton, J. W., 50, Washington Street, Newland, Hull.
 1897. *L* Boycott, Arthur Edwin, 7, The Square, Carshalton, Surrey.
 1908. Brainerd, Mrs. H. D., Captiva, Lee Co., Florida, U.S.A.
 1879. *Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill Street, Sydney, N.S.W.
 1909. Brindley, G. W., Millford, near Derby.
 1900 *L* Broadbent, Dr. G. H., 8, Ardwick Green, Manchester.
 1899. Brookesbank, Hugh, M.B., College Road, Windermere.
 1905. Bromehead, C. N., Beverston Rectory, Tetbury.
 1897. *L* Bullen, Rev. Robert Ashington, B.A., F.G.S., etc., Englemoor, Heathside Road, Woking, Surrey.
 1897. Burnup, Henry Clifden, Box 182 P.O., Maritzburg, Natal.
 1879. Butterell, J. Darker, Manor House, Wansford, Hull.
 1906. Butterfield, W. Ruskin, Corporation Museum, Hastings.
 1902. Button, Fred. L., Bacon Building, Oakland, California.
1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne.
 1906. Carpenter, Geoffrey D. H., B.A., 73, Elsham Road, Kensington, 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.
 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.
 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., Balure, Perth.
 1880. Collier, Edwd., Glen Esk, Whalley Range, Manchester.
 1898. *PL* Collinge, Walter Ed., M.Sc., F.L.S., F.E.S., North Road, Berkhamsted.
 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.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1899. Crowther, J. E., Portland Street, Elland, Yorks.
 1879. Cundall, Jas. W., 3, Orlando Road, Clapham Common, London, S.W.
1897. Dacie, John Charles, 30, Montserrat Road, Putney, London, S.W.
 1904. Dalglish, Gordon, 29, Larkfield Road, Richmond, Surrey.
 1899. Darnbrough, Frederick, 12, West End Terr., Yarm Rd., Stockton-on-Tees.
 1897. *L* Dautzenberg, Ph., 213, Rue de l' Université, Paris.
 1909. Dawes, L., Hambledon, Hants.
 1898. Dean, J. Davy, 84, Dale Street, Lancaster.
 1909. Dickson, Robert Cecil, Dalnousie Villa, Carnoustie, N.B.
 1909. Diver, Cyril, Priory House, Dover College, Dover.
 1892. Dixon, James Bassett, Ribblesdale House, Preston, Lancs.
 1907. Dupont, Evenor, Mauritius.
1908. Edgar, H. F., 14, Woodside Park Gardens, North Finchley, N.
 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.
 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.
 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.
 1909. Fisher, Mrs., Higham, Bassenthwaite Lake, Cockermouth.
 1884. *L* Fitzgerald, Rev. H. Purefoy, F.L.S., Lidwells, Goudhurst, Kent.
 1898. Fitzsimons, J. B., M.D., The Cottage, Lymptone, S. Devon.
 1906. Fogerty, Harry, Edenville, Ballinacurra, 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, River Side, Kew, near London.
1907. *L* Gabriel, Charles J., 293, Victoria Street, Abbotsford, Victoria, Australia.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., Meadow Bank, Accrington.
 1908. Gill, Mrs. A. E., 2, Stanley Bank, Steven Street, Stretford.
 1886. *L* Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1897. *P* Godwin-Austen, H. H., Lt.-Col., F.R.S., etc., Nore, Hascombe, Godalming.
 1906. Gomez, A. da Costa, 23, Clifton Place, Brooklyn, N.Y., U.S.A.
 1902. Gower, Harry D., 55, Benson Road, Croydon.
 1904. Gray, Arthur A., 509, Exchange Buildings, Boston, Mass., U.S.A.
 1905. Green, Wm. A., 4, Salisbury Terrace, Chichester Park, Belfast.
 1904. Grierson, P. H., Kilcarberry House, Clondalkin, Dublin.
 1906. Grint, Miss Grace M., 33, Goring Road, Bowes Park, London, N.
 1907. Gripper, F. H., Springfield, Camden Park, Tunbridge Wells.
 1901. Gubbins, Mrs., Westward Ho!, N. Devon.
 1890. Gude, G. K., F.Z.S., 45, West Hill Road, Wandsworth, London, S.W.
 1886. Gwatkin, Rev. Prof. H. M., D.D., M.A., 8, Scrope Terrace, Cambridge.
 1907. Gwyer, C. D., 303, Putnam Avenue, Brooklyn, N.Y., U.S.A.
 1907. Gyngell, Walter, 13, Gladstone Road, Scarborough.
1909. Haas, Fritz, Zoological Institute, Heidelberg, Germany.
 1905. Hainsworth, Sam, 60, George Street, Saltaire.
 1906. *Hall, C. M., 33, Goring Road, Bowes Park, London, N.
 1895. Hann, Rev. Adam, Kingarth, Radcliffe, Manchester.
 1895. Hardy, John Ray, The Museum, The University, Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough.
 1907. Harrington, Chas. P., Langlands, King's Avenue, Clapham Park, London, S.W.
1909. Harrison, Richard, 19, Allen Street, Hulme, Manchester.
 1904. Harrison, Russell C., 117, Tooting Bec Rd., Upper Tooting, London, S.W.
 1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorks.
 1887. Harvard, T. Mawson, 4, Queen's Leaze, Forest Hill, London, S.E.
 1907. Hawkins, H. L., University College, Reading.

1903. Hawkins, John, J.P., 35, Avenue Road, Grantham.
 1887. Heathcote, Wm. Henry, F.L.S., 119a, Fishergate, Preston, Lancs.
 1907. Henderson, J. B., jr., 16th Street and Florida Avenue, Washington, D.C., U.S.A.
 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, Pike's Villa, Little Eaton, near Derby.
 1886. L Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1907. Hindley, R. T., Challis, 112, Southchurch Road, Southend-on-Sea.
 1906. Hirase, Y., Karasumaru, Kyoto, Japan.
 1891. Horsley, Rev. Canon J. W., St. Peter's Rectory, Walworth, London, S.E.
 1907. Horwood, A. R., Ivanhoe, Gwendolen Road, Leicester.
 1907. Howard, Vernon, Carlton Lodge, Eastgate, Louth.
 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., The National Museum of Wales, Cardiff.
 1895. Hudson, Rev. Hy. A., 445, Stretford Road, Manchester.
 1909. Huggins, Henry C., 13, Clarence Place, Gravesend.
 1905. Hutton, W. Harrison, 44, Dial Street, Leeds.
1901. Jackson, J. Wilfrid, F.G.S., The Museum, The University, 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.
 1908. Jolliffe, J. E. A., 8, Dorchester Road, Weymouth.
 1894. Jones, Kenneth Hurlstone, M.B., F.L.S., R.N. Barracks, Portsmouth.
 1901. Jukes Browne, A. J., F.G.S., Floriston, Cleveland Road, Torquay.
1907. Kendall, Rev. C. E. Y., 88, King Richard's Road, Leicester.
 1897. L Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902. L Kensett, Percy F., Broadmeadow, Coombe Lane, Wimbledon, London, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 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 Cronier, B.A., M.B., Winchester House, Swansea.
 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, Sidney, Manitoba, Canada.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1906. Letson Bryan, Mrs. Elizabeth, Sc.D., Box 38, Honolulu, Hawaiian Islds.
 1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1909. Linton, Mrs., Ye Olde Mill House, Castle Hill, Northallerton.
 1897. L Lodder, Miss Mary, 193, George Street, Launceston, Tasmania.
 1908. Longstaff, Mrs. G. B., Highlands, Putney Heath, London, S.W.
 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.

1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire.
 1903. McClelland, Hugh, Bryn, Somerville Road, Sutton Coldfield.
 1885. McKean, Kenneth, Lambridge Lodge, St. Saviour's Road, Bath.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1906. 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.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880.*P* Melvill, James Cosmo, M.A., F.L.S., Meole Brace Hall, Shrewsbury.
 1909. Mercer, Jas. W., 13, King Street, Kettering.
 1891. Middleton, Robert, Sheepscar Foundry, Leeds.
 1904. Milne, James N., Foylemore, St. Jude's Avenue, Belfast.
 1907. Milner, Miss Lucinda, Clevelands, Ellesmere Park, Eccles, Manchester.
 1909. Milton, J. W., Harrison House, Crosby.
 1906. Monterosato, Il Marchese di, 2, Via Gregorio, Ugdalena, Palermo, Sicily.
 1902.*L* Moore, Chas. H., 5, Mill Street, Stocks Lane, Stalybridge.
 1908. Moore, Albert J., 9, Brook Street, Hull.
 1907. Morey, Frank, F.L.S., Elm Grove, Newport, Isle of Wight.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
 1906. Murdoch, R., Wanganui, New Zealand.
 1907. Musham, J. F., 53, Brook Street, Selby, Yorks.
1905. Napier, H. C., Headington Hill, Oxford.
 1903. Nash, P. B., Bruce Mines, Algona, Ont., Canada.
 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, Berkhamsted.
 1903. Northey, Rev. A. E., M.A., Lisworney, Torquay.
 1901. Norton, Miss E. M., 20, Eastfield Road, Westbury-on-Trym, near Bristol.
1887. Oldham, Charles, Essex House, Wellington Road, Watford.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, 18, Tudor Road, Sutton Coldfield.
 1905.*L* Owston, Alan, Yokohama, Japan.
1903. Pace, S., Milneholme, Hounslow.
 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.
 1908. Phillips, R. A., Ashburton, Cork.
 1906. Plant, James R., M.R.C.S., L.R.C.P., 107, Hinckley Road, Leicester.

1904. Platt, Thos. H., 52, Bishop Street, Moss Side, Manchester.
 1886. Ponsoyby, John H., F.Z.S., 15, Chesham Place, London, S. W.
 1905. Poole, W. G., South Lawn, Godalming.
 1895. Powell, Mrs. A., Nant-y-Velin, Crickieth, 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. *L* Pritchard, G. B., F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.
1906. *L* 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, Caerleon, Whyteleafe Road, Caterham.
 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. Root, 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.
 1908. Rumney, Thos., Watford Lodge, New Mills, near Stockport.
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., Bosch en Duin, Huister Heide, Utrecht, Holland.
 1895. *L* Schill, C. H., The Elms, Byrom Lane, Macclesfield.
 1886. Scott, Thomas, LL.D., F.L.S., 280, Victoria Road, Torry, Aberdeen.
 1893. Shackleford, 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., Woodstone, Rochester, Kent.
 1905. Simpson, James, c/o G. Sim, Esq., A.L.S., 52, Castle Street, Aberdeen.
 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, c/o Farmer's Loan and Trust Co. (of New York), 41, Boulevard Haussmann, Paris.
 1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, London, S. W.

1900. Solly, E. H., 3, South Street, Deal, Kent.
 1886. Sowerby, Geo. Brettingham, F.L.S., River Side, Kew, near London.
 1907. Spence, G. C., 27, Pine Grove, Monton, Eccles, Lancs.
 1906. Stalley, Henry J., Thorntona, Oxted, Surrey.
 1886. Standen, Robert, The Museum, The University, Manchester.
 1903. Stelfox, A. W., Delamere, Chlorine Gardens, Belfast.
 1906. Step, Edward, F.L.S., Oakwood House, Ashstead, Surrey.
 1908. *L* Stobart, H. J. S., Belbroughton, Stourbridge.
 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., Priory Lodge, 16, New Walk, Leicester.
 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., Fair Oaks, Addlestone, Surrey.
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.
 1908. Thomas, Rev. R. E., M.A., St. Martin's Clergy House, Salisbury.
 1907. *L* 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., St. Pierre, Victoria Parade, Deal.
1907. Upton, Charles, Homebush, Instow, N. Devon.
1899. Vaughan, J. Williams, J.P., Pen-y-maes, Hay, *via* Hereford.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea.
 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.
 1909. Ward, J. S. M., B.A., The Whym, Gomshall, Surrey.
 1902. *L* Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1886. *P* Watson, Rev. R. Boog, LL.D., F.L.S., etc., 11, Strathearn Pl., Edinburgh.
 1908. Weaver, G. H., 31, Devonshire Road, Palmer's Green, London, N.
 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., Brookside, Darley Knowle, Warwickshire.
 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.E.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

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“**Monograph of the Land and Freshwater Mollusca of the British Isles,**”
 by JOHN W. TAYLOR (part 16, pp. 145-224 [not 244 as on cover] and 5 plates).

Part 16 gives us the conclusion of *Zonitidae*, the *Endodontidae*, and the beginning of *Helicidae*. Mr. Taylor does not transfer *Sphyradium* to the *Endodontidae*, as some authors now do, and presumably retains it in the *Pupidae*. Dr. Pilsbry's arrangement is followed throughout, and it is a matter for great satisfaction that we have at length a universally accepted system of classification for the *Helicidae* and allied families. Considerable space in this part is devoted to brief notices of our fossil species, and a rather fuller account is given of *Pyramidula ruderata* Studer on the chance of its still surviving in some of the unexplored parts of Scotland. How problematical is the position of many of these fossil snail shells may be judged from the fine Oligocene species *pseudoglobosa* d'Orb., which has been variously referred to the genera *Helicostyla* or *Thersites*, while Pilsbry suggests a relationship to *Helix pomatia*. Judging by Mr. Taylor's figures, the shape of immature examples seems to negative the last suggestion; adults certainly remind one of Australian shells of the *fraseri* and *incei* type.

The illustrations are as admirable as ever, and we should like to call special attention to the coloured plate of *Vitrina* and *Hyalinia*. We have never seen individuals of the latter genus so successfully depicted. Among the *Vitrinae* three figures are given of *V. hibernica* Taylor.

NOTES ON THE LAND AND FRESHWATER MOLLUSCA OF SOUTH WALES.

By JOHN WILLIAMS VAUGHAN.

(Read before the Society, January 13th, 1909).

WHEN the last edition of the "Census of the British Land and Freshwater Mollusca" was issued in 1902, very little seems to have been known of South Wales, and with the exception of those for the counties of Glamorgan and Pembroke the lists were very meagre, consisting of 24 species for Breconshire, 12 only for Radnorshire, 25 for Carmarthenshire, and 24 for Cardiganshire. Since that time I have done what I could to show that South Wales is much richer in mollusca than would appear from these lists. I have done nothing in Glamorganshire. In Pembrokeshire I do not think there is much more to be done since the very complete list of "Tenby and Neighbourhood Land and Freshwater Shells" was read before the Society on the 14th February, 1900. I have, however, had the pleasure of adding one species to this list, viz: *Vertigo pygmaea*, of which I found a specimen under a stone near Gumferston. My principal researches have been confined to Breconshire and Radnorshire. Breconshire now has 64 records, and Radnorshire 47. In Carmarthenshire I have had two days' collecting at Laugharne, and also some time in the neighbourhood of Llandovery. I have added 19 species to the Census. In Cardiganshire my researches have been confined entirely to the neighbourhood of Borth and Aberystwith, which seems to me to be a very poor locality for mollusca. I have only added four species to the list, making the very meagre total of 28. I hope next year to try the southern part of the county, and to bring it a little more into line with its five sister counties. I have to thank Messrs. C. Oldham, F. Taylor, and J. W. Taylor for their kindness in verifying my finds, and also Mr. Roebuck for his assistance with the slugs.

BRECONSHIRE AND RADNORSHIRE.

Arion ater (L.).—Common everywhere.

var. **brunnea** Roebuck.—Near Erwood village.

var. **aterrima** Taylor.—Occurs on all the hills.

Arion subfuscus (Drap.).—In a wood in Crickadarn parish, and the Darran Wood, Radnorshire.

var. **cinereofusca** Drap.—Llaneglwys Grouse Hill, Breconshire.

Arion hortensis Fér.—Common.

Arion intermedius Norm.—Fairly common under stones.

var. **grisea** Roebuck.—Near Pant Llyn Pool, Gwenddwr. I took a specimen of this mollusk on Llaneglwys Grouse Moor, at an

altitude of over 1,000 feet, on peaty soil. Mr. W. Denison Roebuck says: "This is a most interesting record as it extends the altitudinal range to over 1,000 feet, and the habitat to peaty ground."

Arion circumscriptus Johnston.—Common in both counties.

Limax maximus L.—Occurs in both counties, but is not very abundant.

var. **obscura** Moq.-Tan.—Gwenddwr, Breconshire.

var. **mülleri** Moq.-Tan.—Cafan-twm-bach, Radnor.

var. **nigra** Dum. & Mort.—Breconshire.

var. **fasciata** Moq.-Tan.—Llangorse, Gwenddwr, Breconshire.

Limax cinereo-niger Wolf.

var. **luctuosa** Moq.-Tan.—One specimen, near Aberedw, Radnorshire.

Limax flavus L.—One specimen in Brecon on the pavement in Free Street.

Limax arborum Bouch.-Chant.—Very plentiful on tree trunks and under stones.

var. **alpestris** L. & P.—Near Pant Llyn Pool, Gwenddwr.

var. **obscura** Moq.-Tan.—Upper Llaneglws, Gwenddwr.

var. **bettonii** Sordelli.—Aberedw Rocks, Radnorshire.

Agriolimax agrestis (L.).—Much too plentiful everywhere.

var. **reticulata** Moq.-Tan.—Near Aberedw, Radnorshire.

Agriolimax lævis Müller.—Only in one locality, viz: The island in Llangorse Lake, where it occurs in considerable numbers under stones and on flags and reeds in company with *Zonitoides nitidus*.

Zonitoides nitidus (Müller).—Plentiful on island in Llangorse Lake.

Punctum pygmæum (Drap.).—In moss, Cwmbach Dingle, Glasbury, Radnorshire.

Balea perversa (L.).—My son, Mr. J. C. A. Vaughan, found a specimen on a tree trunk in a small wood close to the Wye, near Erwood, Breconshire.

Azeca tridens (Pult.).—One specimen, Skreen Darran, near Erwood Station, Radnorshire.

Carychium minimum Müller.—In moss, Gwenddwr and Crick-adarn, under stones on Llangorse Island, Breconshire, and under stones in Cwmbach Dingle, Radnorshire.

Planorbis spirorbis (L.).—Very plentiful and fine in a ditch running into Llangorse. I have not yet found it in Radnorshire.

Planorbis carinatus Müller.—The same remarks apply to this species.

Planorbis contortus (L.).—Very plentiful in Llanbucklyn Pool, Radnorshire, and sparingly among water-lilies at the lower end of Llangorse Lake.

Planorbis glaber Jeff.—A few in a small stream, about half a mile from Llangorse Lake.

Limnæa palustris (Müller).—Very plentiful, but of small size in Llangorse Lake.

Physa fontinalis (L.).—I have found a few in Llangorse Lake, but they are scarce and very small.

Unio pictorum (L.).—Very abundant in a pool near Glasbury, one of a chain of pools which mark an old course of the river Wye; also in Llangorse Lake.

Pisidium amnicum (Müller).—

var. **læviuscula** Moq.-Tan.—This var. seems to be the only form of this shell found in Llangorse.

Pisidium obtusale Pfr.—Very abundant in Llangorse Lake.

Pisidium gassiesianum Dup.—A few in the pools at Glasbury.

CARMARTHENSHIRE.

Arion ater (L.).—Very abundant everywhere.

Arion subfuscus (Drap.).—Common at Laugharne.

Arion hortensis Fér.—Abundant.

Arion intermedius Normand.—Laugharne.

Milax sowerbyi (Fér.).—Under stones at Laugharne.

Limax arborum Bouch.-Chant.—In a wood on the Towy, near Llandovery.

Vitrea lucida (Drap.).—Laugharne.

Vitrea cellaria (Müller).—Near Llandovery.

Vitrea alliaria (Miller).—Llandovery.

Vitrea radiatula (Alder).—In moss on road-side.

Vitrea pura (Alder).—Parish of Llandeusan.

Vitrea crystallina (Müller).—Near Llangatdog.

Pyramidula rotundata (Müller).—Common everywhere.

Acanthinula aculeata (Müller).—In moss, Laugharne.

Carychium minimum Müller.—In moss, Laugharne and Llanwnda.

Planorbis spirorbis (L.).—Common, Laugharne Marshes, and in a pond at Llanwnda Station.

Pisidium pusillum (Gmelin).—Abundant, Laugharne Marshes and Llanwnda.

Pisidium gassiesianum Dup.—Laugharne Marshes.

PEMBROKESHIRE.

Vertigo pygmæa (Drap.).—Gumferston, near Tenby.

CARDIGANSHIRE.

Planorbis spirorbis (L.).—Common in Borth Marsh, and near Aberystwith.

Planorbis crista (L.).—Abundant in pools at Borth.

Pisidium pusillum (Gmelin).—Borth Marsh and pool near Aberystwith.

Pisidium nitidum Jenyns.—Pool, near Aberystwith.

Note on Decollated Shells.—When collecting near Southwold this summer I met with many decollated specimens of *Bithynia tentaculata*, *B. leachii*, and *Limnæa peregra* in brackish ditches near the river Blyth. The decollation was most marked in *Bithynia tentaculata*, some shells being reduced to $2\frac{1}{2}$ or 3 whorls; many specimens were also badly eroded. The shells of *Limnæa peregra* were also much eroded and very thin. In most cases the animals were in poor condition, from which I deduce that the deformity was due to the saltness of the water. *Sphærium lacustre* was plentiful and large in some of these brackish ditches, but *S. cornucum* was absent. Among the *Limnæa peregra* was one scalariform specimen.—J. E. COOPER (*Read before the Society*, Sept. 8th, 1909).

Pisidium supinum A. Schm. in Bucks.—Among some *Pisidia* collected in the Colne at Iver, Bucks., are a few *P. supinum*. They were living in mud. This species seems to be found only in running water, and the finest examples live in sand.—J. E. COOPER (*Read before the Society*, Sept. 8th, 1909).

Assemanina grayana in East Suffolk.—As this shell has been found very sparingly in Suffolk hitherto (see *Journal of Conchology*, xii., p. 281), it may be worth noting that it lives in abundance on the banks of the Blyth near Blythburgh. In size these specimens equal the finest I have from Sandwich and the Thames, and in colour they are superior, some of them being unicolorous of a deep claret-red tint.—J. E. COOPER (*Read before the Society*, Sept. 8th, 1909).

Crepidula fornicata L. on the Lincolnshire Coast.—I found some twenty specimens, dead shells, somewhat worn, of this interesting mollusc on the shore at Cleethorpes, early this year.—WALTER GYNGELL (*Read before the Society*, Sept. 8th, 1909).

Hygromia rufescens m. *sinistrorsum* at Peterborough.—Having an hour only at my disposal in this city last month, I found the above in a nettle-bed within a mile of the railway station. Though a dead shell, it is full grown, regularly and otherwise perfectly formed. As usual with sinistral monstrosities, further careful search revealed no further specimens.—W. GYNGELL (*Read before the Society*, Sept. 8th, 1909).

NON-MARINE MOLLUSCA FOUND IN THE PARISH OF MORTEHOE, NORTH DEVON.

By M. JANE LONGSTAFF, F.L.S.

(Read before the Society, February 10th, 1909).

IN 1907 a preliminary list of the non-marine mollusca collected in the parish of Mortehoe was given at the end of my husband's list of the Insecta taken in the district.¹ These mollusca were found between September 9th and October 10th, 1906, and between August 9th and September 30th, 1907. I have revised this list, and am adding the names of specimens found between July 18th and the end of September, 1908. It happened that during both the earlier periods a dry east wind prevailed for a considerable time, especially during September, 1907, and I generally find that land mollusca are extremely shy of showing themselves when the wind is from that quarter. During my collecting time in 1908 every variety of weather was experienced, but the period was chiefly characterised by the prevalence of high winds, sometimes amounting to gales.

The parish of Mortehoe occupies the north-west corner of Devonshire, and extends about three-and-a-half miles from north to south, and about three miles from east to west; it contains 4,246 acres, and has a coast-line of about five miles. The north-eastern corner of the parish extending like a horn almost severs the western end of the parish of Ilfracombe; but, for the purpose of this paper, this, the ancient manor of Warcombe (lying between Lee and Bull Point Lighthouse) is treated as part of Mortehoe; the same is the case with the slopes of Pickwell Down (in the parish of George Ham) lying above Venten.

The character of the district cannot be regarded as favourable to the existence of a large number of mollusca, both on account of its bleakness and its geological structure. A great portion has a considerable elevation, being more than 500 feet above the sea—the highest point attaining 688 feet—and is, therefore, much exposed. The prevalence of slates (Morte) and sandstones (Pickwell), the absence of limestone, and the scarcity of woods, form great hindrances to many land forms finding suitable habitats, though the extensive dunes along the shore afford a wide range to the sand and sea-loving species. Aquatic species do not fare much better, for there is no river, the streams are very small and mostly swift-flowing, and there are but few stagnant ponds or ditches.

All the ponds from which shells have been collected are connected with streams which run into them, and after a more or less short course flow into the sea. With regard to the streams at Borough, both that running from the pond, and the distinct one at some little distance off, join a larger stream which falls into the sea at Lee. It may be noted that *P. personatum* occurs both in the pond and in the stream at Borough, whereas *P. casertanum* has only been found in the stream. The stream which runs into the sea near Bennetts-Mouth flows from Damage Pond, and *P. casertanum* occurs in both. The small stream in Church Close, where *P. personatum* is the only form hitherto taken, rises in the field above and has a very short course of about one mile to the sea.

It is somewhat remarkable that I have not met with a single species of *Planorbis* in the district, though they occur in the ditches at Braunton Burrows about six miles off.

Inland the most abundant species are *Helix nemoralis*, *H. aspersa*, *Vitrea cellaria*, and *Arion ater*; near the sea, *H. virgata* on the sand dunes and walls; *H. aspersa* also occurs on the latter.

It has been thought advisable to include in the list several of the rarer species taken at Croyde, Braunton, and Ilfracombe, some of which have not been found in the parish. These are all placed in square brackets, as well as the notices of species found by other persons. The rocks at Croyde and Braunton being of more or less similar structure, though of later age, do not render that part more favourable for land shells, but the numerous nearly stagnant ditches harbour many aquatic species. Limestone (Devonian), however, occurs at Ilfracombe, which makes that neighbourhood much richer in land mollusca. As these have been so ably worked out by Messrs. Tomlin, Beeston, and Wright, very little reference has been made to recent finds there. I may state, however, that I found, as they noted, *Pyramidula rotundata* var. *alba* very abundant at Hele in July, 1908, but I only met with two dead specimens of *Vitrea lucida* Drap. in Rapparee Lane.

The number of species found is fifty-seven; of varieties, thirty-two. Of these, twelve species and one variety were only taken outside the strict limits of the parish.

The nomenclature adopted is that of the *List of British Non-Marine Mollusca*, prepared by B. B. Woodward, and published by the Conchological Society, 1904; with the exception of the genera described by J. W. Taylor in his *Monograph of the Land and Fresh-water Mollusca of the British Isles*, 1908.

I must acknowledge my indebtedness to Mr. B. B. Woodward for kindly naming the *Pisidia*; also to Mr. Taylor, Mr. W. Denison Roebuck, and Mr. F. Partridge for similar help with other specimens.

Limax maximus Linné.—Not frequent. Wall of church; Twitchen garden and wood.

var. **fasciata** Moquin-Tandon.—Twitchen, on a tree in the wood. Identified by J. W. Taylor, and stated by him to be “much redder than usual.”

var. **mülleri** Moquin-Tandon.—Twitchen, two specimens under stones, one remarkably fine. Identified by W. Denison Roebuck.

Limax cinereo-niger Wolf var. **ornata** Lessona. — Borough Wood. Confirmed by Mr. Taylor. Two specimens under logs. One large, nearly black, keel greyish-white, with a row of elongated grey spots on each side, and indications of a second row near the shield. The other specimen is smaller, has a brownish tinge, and two complete rows of spots on each side of the keel. This seems to be the first recorded instance of the species being found in Devonshire. Also another specimen in 1908 by the Rev. C. Chichester in the same spot. It is not in the last Census of the *British Land and Freshwater Mollusca* by L. E. Adams, 1902, nor in the List of Non-Marine Mollusca in the *Victoria History of Devon*, 1906, nor in Taylor's *Monograph*.

Limax arborum Bouch.-Chant.—Twitchen, wood. Numerous on trees, more especially on the deciduous ones; they occur in clusters on the bark under moss, in which they make a hole and which they loosen all round. Sometimes also in the armpits of branches of firs covered by bundles of needles. One example was observed on the wall of the house. Identified by Mr. Taylor. None were met with in September, 1907, it being apparently too dry. Very abundant in 1908, in similar positions, and in addition two specimens were taken at Lee under stones.

Agriolimax agrestis Linné.—Twitchen, Borough Wood, Lee, etc. Common everywhere.

[**Milax gagates** Drap.—Saunton. Typical form taken under stones at the roots of herbage on the cliffs. Identified by Mr. Taylor. Not recorded from North Devon in the last Census, nor in the *Victoria History*, but given by Mr. Taylor from North Devon, p. 147 and p. 281].

var. **plumbea** Moquin-Tandon.—Borough Field. In 1908 three specimens were taken under stones, one in company with *Arion ater*, the others with *Agriolimax agrestis*. Twitchen garden, another example under a stone. Identification confirmed by Mr. Roebuck.

Milax sowerbii Férussac.—Twitchen, Lee. [Also Braunton Burrows, by Dr. G. B. Longstaff. One of the specimens from the latter place had a remarkably bright amber-coloured keel, and the shell tinged with the same colour].

sub-var. **plumbea** Collinge.—Fire Beacon Hill, in a hedge. Identified by F. Partridge.

Vitrina pellucida Müller.—Twitchen Wood, Woolacombe Golf Links, Fire Beacon Hill at the roots of grass in a quarry. [Croyde, among moss on the sandhills. Braunton, by Mr. G. C. Champion].

Vitrea crystallina Müller.—Twitchen, numerous in moss at the foot of trees, adjoining the garden; near Bennett's Mouth, among moss; Borough Wood, two specimens found by the Rev. C. Chichester and given to me. Not in the last Census, and no locality recorded for it in the *Victoria History*. [Taken by Mr. J. R. le B. Tomlin on Lundy (*J. of Conch.*, vol. xii., 1908, p. 121)].

Vitrea cellaria Müller.—Twitchen, Borough, Lee, etc. Common throughout the district under moss, dead leaves, logs of wood, and stones. There appear to be two varieties: one paler and flatter, the other deeper in colour and slightly more convex.

Vitrea alliaria Müller.—Twitchen, wood and near the reservoir, Borough Wood; near Bennett's Mouth; Flagstaff Hill, Lee. [Croyde]. Not so abundant as *V. cellaria* and *V. nitidula*.

var. **viridula** Jeffreys.—Flagstaff Hill, Lee. Three specimens taken under stones in an old quarry; they all smelt strongly of garlic, and one is remarkably fine, being fully 6 mm. in width. The animal was much paler in colour than typical examples, only the head and tentacles being dark grey. This variety does not appear to have been recorded previously from this neighbourhood. The only notice of its occurrence in North Devon I have met with is that of Mr. Taylor, who states that Mr. L. E. Adams found it at Countesbury in August, 1892 (*op. cit.*, part 14, 1907, p. 62).

Vitrea nitidula Drap.—Twitchen, Borough, Lee, etc. Common.

var. **nitens** Mich.—In the same localities as the type and as frequent. [Ilfracombe].

Vitrea pura Alder.—Borough Wood. Two specimens, both white, taken by Dr. Longstaff in 1907. Confirmed by Mr. Taylor. Not in the last Census, and though recorded in the *Victoria History*, no locality is given. [Taken by Mr. J. R. le B. Tomlin at Hele and Combe Martin, *J. of Conch.*, vol. v., 1887, p. 182].

Vitrea radiatula Alder.—Lee, two under stones, and another under a log in fields. Confirmed by Mr. Taylor. Rare, only three specimens, two alive, the other dead. [Braunton Burrows, one under a stone in a ditch. Croyde, one among damp moss]. Not in the last Census, nor the *Victoria History*. The absence of this species from the district is especially remarked on in the latter work.

[**Zonitoides nitidus** Müller. — Braunton Burrows, one living specimen under a stone in a dried-up ditch. Croyde, one dead

among damp moss. Not recorded in the last Census for North Devon. Messrs. Beeston and Wright found it scarce at Braunton Burrows, and Mr. Tomlin common on Lundy (*J. of Conch.*, vol. xi., 1904, p. 79, and vol. xii., 1908, p. 121). Ilfracombe is the only locality given for North Devon in the *Victoria History*].

[**Euconulus fulvus** Müller.—Braunton Burrows, one specimen under a stone in the same ditch as the last. Messrs. Beeston and Wright found it rare at the same locality. Mr. Tomlin states that it is not uncommon on Lundy. Not recorded in the last Census. Ilfracombe is the only locality given for North Devon in the *Victoria History*].

Arion ater Linné.—Twitchen. Abundant.

var. **aterrima** Taylor.—Twitchen, garden.

var. **castanea** Dum. and Mort.—Twitchen, garden; Borough Wood, under a log. The specimen from the garden has the body a darker shade and the fringe brighter than that from Borough. The latter confirmed by Mr. Taylor.

var. **plumbea** Roebuck.—Twitchen, garden. One form pale grey all over the body, the other darker on the back, paler on the sides; foot fringe of both orange.

[var. **succinea** Müller sub-var. **melanocephala** Férussac.—Rapparee Lane, Ilfracombe, one specimen found by Dr. Longstaff. I record the occurrence of this sub-variety though outside the district as it does not appear to have been previously noted from North Devon. Mr. Taylor, however, states that Miss D. Mason found the variety and its sub-var. *livida* at Okehampton (*op. cit.*, part 11, 1905, p. 182)].

Arion subfuscus Drap.—Twitchen, garden and wood; Borough Wood; Lee; near Bennett's Mouth. Under stones and logs. First specimen taken at Twitchen identified by Mr. J. W. Taylor and recorded by him (*op. cit.*, p. 287). This species is not recorded from North Devon in the last Census, nor in the *Victoria History*.

var. **aurantiaca** Locard.—Twitchen, donkey path, under a stone; near Bennett's Mouth, numerous young ones. [Ilfracombe]. Not previously recorded from North Devon. The last-named specimen was confirmed by Mr. Roebuck.

Arion intermedius Normand.—Borough, under a stone in a field, by Dr. Longstaff. Neither in the last Census, nor in the *Victoria History* from North Devon, but Mr. Taylor records the type from Westward Ho, and the vars. *pallida* Moq.-Tand. and *plumbea* Collinge, from Okehampton (*op. cit.*, part 12, p. 246).

var. **plumbea** Collinge.—Near Bennett's Mouth, in a boggy place. Both this and the type were confirmed by Mr. Roebuck.

Arion hortensis Férussac.—Twitchen; Lee. Typical form, abundant under stones.

Arion circumscriptus Johnston.—Twitchen, wood, among moss and dead leaves; near Bennett's Mouth. Confirmed by Mr. Roebuck.

[**Sphyradium edentulum** Drap.—Braunton Burrows, one dead specimen in a ditch. Stated to be common on Lundy by Mr. Tomlin (*J. of Conch.*, vol. xii., p. 121)].

Pyramidula rotundata Müller.—Common everywhere.

Helicella virgata Da Costa.—Woolacombe, Fire Beacon Hill, etc. [Croyde, Braunton Burrows]. Extremely common on the sand dunes and cliffs near the sea.

var. **leucozona** Taylor.—Braunton Burrows, by Dr. G. B. Longstaff. Identified by Mr. F. Taylor.

var. **lutescens** Moq.-Tand.—Woolacombe. [Croyde].

var. **rufulozonata** Taylor.—Woolacombe. Identified by Mr. J. W. Taylor. This is much darker than the other specimens, which are yellowish like the type. [Croyde].

var. **albicans** Grateloup.—Woolacombe. [Croyde].

var. **subdeleta** Cockerell.—Fire Beacon Hill; Woolacombe; Vention. Identified by Mr. J. W. Taylor.

Helicella caperata Montagu.—Twitchen, garden; Woolacombe, sand dunes; Fire Beacon Hill; Bull Point Lighthouse; Lee. [Croyde, Braunton Burrows]. Very common.

var. **ornata** Picard.—Woolacombe, golf-links; Borough; Lee. [Croyde].

[m. **sinistrorsum**.—Woolacombe, sand dunes, Aug., 1904, E. Collier].

Helicella barbara Linné.—Woolacombe, sand dunes, and walls near the shore. Numerous, but not widely distributed.

var. **strigata** Menke.—Woolacombe, with the type.

Hygromia hispida Linné [= *Helix concinna* Jeffreys].—Twitchen, Borough. Not recorded in last Census from North Devon, but taken by Messrs. Beeston, Wright, and Tomlin.

var. **hispidosa** Mousson.—Woolacombe; Lee. [Braunton].

Hygromia rufescens Pennant.—Twitchen, strawberry beds, wood, etc. Abundant.

var. **rubens** Moq.-Tand.—Twitchen, one specimen under a stone in the garden.

var. **albo-cincta** Cockerell.—Twitchen. Frequent.

var. **alba** Moq.-Tand.—Twitchen, one specimen on a wall in the garden, by Dr. Longstaff.

[All the above varieties were also taken at Hele, Ilfracombe].

[**Acanthinula aculeata** Müller.—Woolacombe. One specimen found by Mr. J. R. le B. Tomlin recorded in *J. of Conch.*, vol. v., 1887, p. 182. The Rev. C. Chichester has also taken this species at Woolacombe and has given me specimens].

[**Vallonia excentrica** Sterki.—Croyde. Among the roots of grass at the base of a wall near the shore. This was erroneously recorded in 1907 as *V. pulchella* Müller. Mr. B. B. Woodward corrected the identification].

[**Vallonia costata** Müller.—Saunton. Among the roots of grass at the base of a wall in a lane. Neither this form nor the preceding recorded in last Census, but Mr. F. Partridge exhibited specimens of this from Braunton at the meeting of the Midland Malacological Society, October, 1898].

Helix aspersa Müller.—Twitchen, Woolacombe, etc. Abundant.

var. **grisea** Moq.-Tand.—Twitchen. Identified by Mr. J. W. Taylor. A thin brownish-yellow shell, somewhat translucent and almost unicolorous, the five bands being narrow and scarcely discernible.

var. **flammea** Picard.—Twitchen, on walls; this with slight variations is the commonest form in the garden.

var. **zonata** Moq.-Tand.—Woolacombe, on the sand dunes.

[var. **exalbida** Menke.—Woolacombe. Recorded by H. Beeston and C. E. Wright (*J. of Conch.*, vol. xi., 1904, p. 78)].

Helix nemoralis Linné.—Mortehoe, Woolacombe, etc. Abundant in the gardens and hedgerows. Specimens of a reddish or yellow colour with a single dark band are more numerous than those with several bands. My husband drew my attention to three individuals on *Pinus insignis*, apparently feeding on the flower buds.

Helix hortensis Müller.—Mortehoe; Lee. Abundant in garden and hedgerows. Specimens of a yellow colour with five brown bands are numerous. There also occur: var. *lutea* Moq.-Tand., without bands; var. *arenicola* MacGill.; var. *roseolabiata* Taylor.

Cochlicopa lubrica Müller.—Twitchen; Fire Beacon Hill; Lee; Woolacombe; etc. Widely distributed at the roots of grass and among moss.

Jaminia cylindracea Da Costa.—Fire Beacon Hill; Woolacombe golf links; Lee, Flagstaff Hill. [Croyde; Braunton, by Dr. G. B. Longstaff and Mr. Champion]. Not in the last Census, and no locality given for it in the *Victoria History*. [Recorded from the neighbourhood by Messrs. Beeston, Wright, and Tomlin. The latter found it common on Lundy].

[**Jaminia muscorum** Linné.—Braunton Burrows, by Dr. Longstaff and Mr. Champion. I found another example there under a stone in 1908].

Vertigo antivertigo Drap.—Near Bennett's Mouth, one specimen on a stone. [Braunton Burrows, by Mr. Champion. Among *Typha latifolia*].

Vertigo pygmæa Drap.—Fire Beacon Hill, on a wall. [Braunton Burrows, by Mr. Champion].

[**Vertigo moulinsiana** Drap.—Braunton Burrows, numerous, in a ditch on rushes. I am indebted to the Rev. C. Chichester for introducing me to this locality].

Balea perversa Linné.—Twitchen, on the base of a wall in the garden; also on trees in the adjoining wood. Rare. [Braunton Burrows, one on a wall; Mr. Tomlin records it as abundant on Lundy].

Clausilia bidentata Ström.—Twitchen; Borough; Woolacombe; Lee; etc. Common on trees, walls, stones, and among moss.

Succinea putris Linné.—Near Bennett's Mouth. Numerous. Not recorded in the last Census. [Taken by Messrs. Beeston and Wright at Braunton].

var. **subglobosa** Jeffreys.—Identified by Mr. Taylor. Woolacombe, on the leaves of *Veronica beccabunga*. [Saunton, on the leaves of *Alisma plantago*; Braunton Burrows, by Mr. Champion]. Most of the specimens are small.

[**Succinea oblonga** Drap.—Braunton Burrows, numerous on the ground. The Rev. C. Chichester kindly introduced me to this locality].

Carychium minimum Müller.—Near Bennett's Mouth and Borough Wood, one specimen in each locality among moss. [Single examples taken in a ditch at Braunton Burrows, and in moss at Croyde]. Not recorded in the last Census, and no locality given for it in the *Victoria History*. Found by Mr. Tomlin at Hele, and by Mr. Oldham on Lundy (*J. of Conch.*, vol. v., 1887, p. 183, and vol. xii., 1908, p. 140).

Ancylus fluviatilis Müller.—Twitchen, reservoir; Borough, stream; Lee, stream; Woolacombe, pond. Abundant.

Limnæa peregra Müller.—Twitchen, pond in garden; sluice near station. [Saunton and Braunton, ditches]. Abundant.

var. **boissii** Duprey.—Woolacombe, pond and stream. Shells small. Identified by Mr. J. W. Taylor.

var. **vulgaris** Moq.-Tand.—Borough pond, numerous. Identified by Mr. J. W. Taylor. All the specimens are decollated, and the erosion begins when they are quite young.

[**Limnæa palustris** Müller.—Braunton, by Mr. Champion; also taken there by Messrs. Beeston and Wright. Not in the last Census].

Limnæa truncatula Müller.—Borough; Woolacombe, on the leaves of *Iris pseudacorus*. [Braunton by Mr. Champion].

var. **minor** Moq.-Tand.—Borough, at the edge of little streams. Numerous. Confirmed by Mr. J. W. Taylor.

[***Planorbis spirorbis*** Müller var. **leucostoma**.—This variety was identified by Mr. J. W. Taylor. Braunton, by Mr. Champion. Not in last Census, and though recorded in *Victoria History*, no locality is given. The species was also found at the same place by Messrs. Beeston and Wright].

Pomatias elegans Müller [= *Cyclostoma* Auctt.].—Woolacombe, on the golf-links. Many dead specimens taken in 1906-7. In July, 1908, the Rev. C. Chichester brought me four living specimens from the golf-links, and informed me that he had frequently taken them alive before. I afterwards found six others on a different part of the links. There had been rain in the morning, which had evidently induced them to come to the surface, and they were lying mouth downwards, partially buried in the sand under privet and herbage.

Sphærium lacustre Müller var. **ryckholtii** Norm.—Damage, pond. Variety identified by Mr. J. W. Taylor. Abundant in company with *Pisidium casertanum* Poli. Not recorded in the last Census. [Braunton Burrows is the only locality given for the species in North Devon in the *Victoria History*, and Messrs. Beeston and Wright state that they found it scarce in the dykes near there].

[***Pisidium subtruncatum*** Malm [= *P. fontinale* Jeffreys].—Saunton, ditch; Braunton].

Pisidium casertanum Poli [= *P. fontinale* of most continental writers, and also *P. cinereum* Alder]. Twitchen, pond in garden; Woolacombe, pond; extremely abundant at Damage; near Bennett's Mouth and Borough Stream. The specimens from these two last localities are stated by Mr. B. B. Woodward to be more roundly oval than usual. [Saunton, ditch. The largest specimen taken measures 5.0 mm. in length and 5.5 mm. in breadth. Mr. B. B. Woodward remarks that many of the specimens from this locality are remarkably thick, heavy and tumid].

[***Pisidium nitidum*** Jenyns.—Saunton, ditch].

Pisidium obtusale Pfeiffer.—Woolacombe, pond.

Pisidium gassiesianum Dupuy.—Twitchen, pond in garden. [Braunton, by the Rev. C. Chichester].

Pisidium personatum Malm.—Church Close, stream, numerous; Borough, stream; Borough, pond. [Also specimens from ditches at Braunton and Croyde are probably this species]. Mr. B. B. Woodward considers all the specimens more oval than the type.

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

385th (Annual) Meeting, October 16th, 1909.

Held in the Institute of Journalists, London, E.C.

Lt.-Col. H. H. Godwin-Austen (President) in the chair.

Among the members present were Mrs. Longstaff, Messrs. Cooper, Jackson, Collier, Kennard, E. A. Smith, Baldwin, Booth, J. W. Taylor, Roebuck, Bostock, L. E. Adams, Winkworth, Masefield, Reynolds, H. B. Preston, Tomlin, Jones, Dacie, Fulton, Salisbury, Weaver, Hindley, Parritt, Vincent, Gripper, Carpenter, Beeston, Christy, Sikes, Brooksbank, Thos. Edwards, Oldham, and Canon Horsley.

The Librarian reported that the usual periodicals had been received in exchange.

Appointment of Auditors.

Messrs. C. H. Moore and Fred Taylor were again appointed auditors.

Appointment of Scrutineers.

Messrs. Fred Booth and J. R. B. Masefield were appointed scrutineers.

New Members Elected.

Mrs. Frances Mary Fisher, Higham, Bassenthwaite Lake, Cocker mouth.

Henry Charles Huggins, 13, Clarence Place, Gravesend.

J. S. M. Ward, B.A., The Whym, Gomshall, Surrey.

Candidates Proposed for Membership.

Cyril Diver, Priory House, Dover College, Dover.

James W. Mercer, 13, King Street, Kettering.

L. Dawes, Hambledon, Hants.

Resignations.

A. Abercrombie.

Jas. C. Blackmore, F.C.S.

V. B. Crowther-Beynon, M.A., F.S.A.

Miss Glover.

Mrs. Skilton.

J. Grafton Milne.

G. Bartlet Span.

Members Deceased.

Miss J. E. Linter.

W. J. O. Holmes, F.L.S.

Reports and Balance Sheet.

The Annual Report of the Council (see p. 26), and the Treasurer's Report, including Balance Sheet for 1908 and interim Balance Sheet up to October 13th, 1909 (see p. 27), were presented and adopted.

Reports of the Leeds and London Branches (see p. 30) were presented and adopted.

Election of Officers and Committee.

The Scrutineers reported that thirty-seven valid papers had been received, and that the Officers and Council as nominated had been unanimously elected (see p. 2).

President's Address.

Lt.-Col. H. H. Godwin-Austen, F.R.S., then delivered an Address, entitled : "The Importance of the Animal in the Land Mollusca shown by certain Evolutionary Stages in some Genera of the Zonitidæ."

Votes of thanks to the President for his address, and to the London members for their hospitality were unanimously passed.

A vote of thanks was also accorded to the University Authorities at Manchester, for the use of the Museum buildings.

Exhibits.

By Lt.-Col. Godwin-Austen : Specimens of *Macrochlamys richilaensis*, *M. zemoensis*, *M. hardwickei*, *Austenia gigas*, *Khasiella vidua*, to illustrate his address.

By Mr. L. E. Adams : Non-marine shells from Uruguay and the Argentine.

By Mr. J. W. Baldwin : A sinistral *Pupa muscorum* from Abersoch, North Wales, also *Helix aspersa* var. *exalbida*.

By Mr. H. Beeston : A large series of Cornish non-marine shells.

By Mr. F. Booth : Some choice examples of Somaliland land shells, including *Buliminus somaliensis* Smith, and *Otopoma poirieri* Bourg.

By Mr. F. G. Bridgman : Rare *Olivide* ; a series of rare British *Buccinidæ* (including *Lionesus dalei* and *Tritonofusus jeffreysianus*) ; also a number of shell sections.

By Mr. E. Collier : A series of Irish non-marine shells, including a fine series of *Helix nemoralis*, *H. itala*, *Succinea oblonga*, *Pupa anglica*, *Vertigo angustior*, *Limnæa involuta* and *L. praetenuis*.

By Mr. J. E. Cooper : Two drawers of small British marine molluscs ; a series of *Pteropoda* and *Heteropoda* ; "pens" of *Loligo media* to illustrate the variation in this species ; a collection of caddis-cases formed of shells ; decollated *Bithynia tentaculata* and *B. leachi*, and *Pisidium supinum* from the Thames.

By Mr. J. C. Dacie : A long series of *Littorina rudis*, *L. obtusata*, *L. littorea*, and *Purpura lapillus*.

By Mr. Thos. Edwards : *Buccinum undatum*, m. *acuminatum*, m. *carinatum*, m. *scalariforme*, m. *sinistrorsum*, m. *bioperculatum* ; *Neptunea antiqua*, m. *sinistrorsum* ; all from the coast of Thanet. *Maetra glauca* type and var. *luteola* from Jersey. Also a fine example of *Cardium pseudolima*.

By Mr. G. K. Gude : An album of original drawings of Helicoids.

By Mr. W. Gyngell : Some remarkable specimens of *Anodonta cygnea*, type and var. *incrassata*, from Scarborough.

By Rev. Canon Horsley : Fine series of *Papuina tayloriana*, *Xesta citrina* and *Helicella splendida*. Also sinistral *Helicella virgata* and *H. cantiana*, and a dextral *Physa acuta*.

By Mr. J. W. Jackson : Photo-micrographs of *Vertigines*, etc. ; photos. of typical habitats of North of England species of mollusca.

By Mr. J. R. B. Masefield : A prettily banded *Cochlicopa lubrica*, and a fine example of *Acanthinula aculeata*.

By Mr. Chas. Oldham : *Pisidium supinum* from several Herts. localities, and some very fine *Sphærium lacustre*.

By Mrs. Longstaff ; *Pleurodonte acuta* in great variety ; also a fine series of Jamaican Helicoids ; several species of *Alcadiu* from Jamaica, *Corilla rivollii* from Ceylon.

By Mr. H. B. Preston : Land shells from Fak Fak, Dutch New Guinea.

By Mr. W. D. Roebuck : Sinistral *Limnæa auricularia*.

By Mr. F. H. Sikes : A series of non-marine mollusca from Friesland.

By Mr. J. Simpson : Some very rare marine shells from the Faroe channel, including *Laeocochlis granosa* and *Danilia ottaviana*.

By Mr. E. A. Smith : An exceptionally large *Littorina littorea*, also a fine sinistral example and some curious abnormal forms.

By Messrs. Sowerby and Fulton : Fine specimens of *Xenophora solaris*, *X. exuta*, *X. calculifera*, *X. conchyliophora* ; some very choice *Spondylus*; etc.

By Mr. J. Winkworth : A very good series of *Helicella virgata* from the chalk of Wiltshire and from the district between Winchelsea and Hythe.

By Mr. C. E. Wright : Northants Mollusca, comprising some excellent sets of *Helix nemoralis*, *H. pomatia*, *Physa acuta*, *Hyalinia lucida*, *H. itala*, scalariform and sinistral, and many other species.

By Mr. R. Standen : Young forms of *Anodonta cygnea* and *Unio margaritifer* ; *Clausilia bidentata* var. *gracilior* from Killarney ; *Balea perversa* in situ on *Orthotrichum*.

ANNUAL REPORT.

The Council is sorry to have to report a slight decrease in the membership of the Society. On the date of the last Annual Meeting there were 327, excluding the Honorary Members. Between that date and the end of the year, three members were elected, four resigned, one was struck off the list in accordance with rule 4, and two died, leaving 323. Since January, five have been elected, four have resigned and four have died, leaving 320 on the list—a decrease of seven for the year.

The six members who have been removed by death are Messrs. R. D. Darbishire, Valentine Burgess, Alfred Leicester, Herbert Milnes, Robert Drummond and Miss J. E. Linter ; all of these, having been enthusiastic members of the Society of long standing, and having rendered good service in the cause of Conchology, will be much missed. Obituary notices of some of these have appeared in the *Journal of Conchology*, and it is a matter for congratulation that, through the generosity of a few of our members to whom Mr. R. D. Darbishire was personally known, such an excellent portrait of the deceased gentleman has been secured as the frontispiece of the just completed XIIth volume of the *Journal of Conchology*. Mr. Darbishire was an ex-President of the Society, and one of its first members. To the last he took the most lively interest in its welfare. He enriched the already fine shell collections of the Manchester Museum by large and valuable suites of specimens—the finest to be procured, and these through the courtesy of the Museum authorities are available for examination and comparison—a privilege of great service and value, often imparting much additional interest to our monthly meetings.

Ten such meetings have been held during the year, the attendances being satisfactory. In addition to these meetings, two rambles for conchological search have been enjoyed by the northern members of the Society—one to Ingleton, the other to the Silverdale district. A rather larger number of communications and papers has been contributed by members, many giving interesting local details and locality lists of great service in determining the distribution of species.

Many new records have been established and some of doubtful authenticity have been confirmed.

TREASURER'S REPORT.

The Statement of Income and Expenditure for the year 1908, by an oversight, does not seem to have been placed before you at the same time as usual. It reads as follows:—

Statement of Income and Expenditure FOR THE YEAR 1908.

Receipts.	£ s. d.	Expenditure.	£ s. d.
Cash in hand ...	55 17 11	Library Cards ...	0 11 6
Subscriptions ...	37 4 11	Printing <i>Journal</i> for Oct., 1907	14 12 8½
Two Life Membership Fees	6 1 0	Do. do. Jan., 1908	11 17 5
Advertisement ...	0 7 0	Do. do. Apr., 1908	11 10 10½
Sale of Publications ...	3 1 11	Illustrations ...	0 14 3
		Reprints ...	3 2 6
		Stationery ...	3 1 10
		Bookbinding ...	1 15 0
		Secretary's Expenses to Sept.	
		30th, 1908 ...	4 9 8
		Treasurer's Expenses ...	2 10 0
		Recorder's Expenses ...	0 4 8
		Cash in hand ...	48 2 4
	<u>£102 12 9</u>		<u>£102 12 9</u>

From this it will be noticed that there was a balance in hand of £48 2s. 4d.

The finances of the Society as shown by the Interim Statement of Income and Expenditure for the present year, made up to October 13th, seem to be in a satisfactory condition. There is at the moment a cash balance in hand of £25 11s. 7d., with outstanding liabilities of about £20.

The subscriptions still to be paid amount to £36.

Interim Statement of Income and Expenditure

TO OCTOBER 13th, 1909.

Receipts.	£ s. d.	Expenditure.	£ s. d.
Cash in hand ...	48 2 4	Cost of <i>Journal</i> for July, 1908	12 8 11½
Subscriptions ...	41 1 0	Do. do. Oct., 1908	13 2 0
Two Life Subscription Fees	6 6 0	Do. do. Jan., 1909	13 2 3½
Sale of Publications ...	17 2 6	Do. do. Apr., 1909	13 7 0
Advertisements ...	2 15 0	Do. do. July, 1909	13 0 0
		Illustrations ...	7 19 0
		Reprints ...	6 10 0
		Stationery ...	3 11 9
		Library Cards ...	0 13 4
		Taylor's Monograph, part xv.	0 5 3
		Curator's Expenses ...	1 0 0
		Editor's Expenses, 1908 ...	0 14 0
		Secretary's Expenses, 1908	2 1 8
		Treasurer's Expenses, 1909	2 0 0
		Balance in hand ..	25 11 7
	<u>£115 6 10</u>		<u>£115 6 10</u>

REPORT ON THE ACCELERATION OF THE CENSUS IN 1909.

At the beginning of the year an effort was made to accelerate the completion of the Census, to which appeal conchologists very generously responded.

A circular was printed and sent out by Mr. W. Denison Roebuck, of Leeds, in conjunction with the Official Recorder.

One side of this circular contained a list of British Land and Freshwater Mollusca, for the purpose of indicating the blanks to be filled up for a particular county, and the other side contained lists of the counties and vice-counties for indicating the blanks to be filled up for a particular species.

About 150 of these circulars were sent out, and the result—thanks to the active and hearty co-operation of British conchologists—has been eminently satisfactory.

No fewer than 1213 of the blanks have been filled up for 106 counties and vice-counties, and the total number of authentications on the books now amounts to 9790, averaging 65·7 per cent. of species authenticated for each county or vice-county.

The amount of the work done may be further appreciated, when it is borne in mind that the blanks filled up by the special effort this year amount to about an eighth part of the total number of authentications accumulated during a quarter of a century's steady work.

The following is a list of the vice-counties of the British Isles, showing the present state of the authentication-records—both the 1909 additions and the total to date. The counties are arranged in the order in which they have been least investigated.

No.	Name of Vice-County	Additions in 1909.	Total to date.	No.	Name of Vice-County	Additions in 1909.	Total to date.
133	Longford ...	—	2	77	Lanark ...	2	40
93	Aberdeen N. ...	—	7	98	Main Argyll ...	—	41
102	Ebudes S. ...	—	15	101	Cantire ...	—	43
97	Westerness ...	—	16	68	Cheviotland ...	15	44
112	Shetland Isles	—	19	118	Tyrone ...	12	44
106	Ross East ...	—	23	79	Selkirk ...	11	44
104	Ebudes N. ...	—	25	81	Berwick ...	6	47
109	Caithness ...	—	25	84	Inlithgow ...	—	48
72	Dumfries ...	2	26	88	Perth Mid ...	...	48
111	Orkney Isles ...	1	26	89	Perth North ...	—	48
96	Easterness ...	—	27	107	Sutherland E....	—	48
92	Aberdeen S. ...	—	28	46	Cardigan ...	13	49
94	Banff ...	—	29	75	Ayr ...	—	49
103	Ebudes Mid. ...	—	29	86	Stirling ...	1	50
99	Dumbarton ...	—	31	73	Kirkcudbright	—	50
108	Sutherland W.	—	31	43	Radnor ...	29	51
95	Elgin ...	2	32	140	Galway East ..	11	51
74	Wigtown ...	16	33	48	Merioneth ...	1	51
91	Kincardine ...	—	33	50	Denbigh ...	1	51
105	Ross W. ...	—	34	121	Cavan ...	4	54
137	Mayo E. ...	—	34	90	Forfar ...	—	54
110	Hebrides ...	—	35	44	Carmarthen ...	2	55
134	Roscommon ...	—	35	71	Isle of Man ...	10	59
78	Peebles ...	—	36	18	Essex S. ...	9	59
71	Flint ...	3	40	143	Tipperary N. ...	4	59
132	Westmeath ...	3	40	76	Renfrew ...	2	59

No.	Name of Vice-County	Additions in 1909.	Total to date.	No.	Name of Vice-County	Additions in 1909.	Total to date.
100	Clyde Isles ...	—	59	5	Somerset S. ...	38	80
80	Roxburgh ...	18	60	70	Cumberland ...	22	80
125	Kildare ...	15	60	8	Wilts S. ...	2	80
131	King's Co. ...	1	60	119	Donegal ...	21	81
2	Cornwall E. ...	32	61	67	Northumberland S.	6	81
120	Fermanagh ...	25	61	56	Suffolk ...	—	81
49	Carnarvon ...	11	62	26	Suffolk W. ...	6	82
1	Cornwall W. ...	2	62	33	Gloucester E....	4	82
87	Perth S. ...	—	62	24	Bucks ...	32	83
31	Hunts. ...	19	63	29	Cambridge ...	24	84
127	Wexford ...	16	64	66	Durham ...	—	84
116	Armagh ...	4	64	41	Glamorgan ...	11	85
117	Monaghan ...	—	64	28	Norfolk W. ...	1	85
136	Sligo ...	12	65	114	Antrim ...	43	87
	Average per County		65·7	37	Worcester ...	7	87
0	Channel Isles ...	20	66	123	Meath ...	4	88
130	Queen's Co. ...	17	66	124	Dublin ...	22	89
85	Fife and Kinross	—	66	146	Cork N. ...	13	89
135	Leitrim ...	3	67	141	Clare ...	6	89
45	Pembroke ...	2	68	60	Lancashire W.	3	89
47	Montgomery ...	—	68	122	Louth ...	1	89
113	Londonderry ...	20	69	16	Kent W. ...	9	91
40	Salop ...	6	69	32	Northants ...	7	91
9	Dorset ...	2	69	38	Warwick ...	5	91
82	Haddington ...	—	69	129	Kilkenny ...	5	92
126	Wicklow ...	3	70	34	Gloucester W.	4	92
148	Kerry ...	13	71	13	Sussex W. ...	1	93
12	Hants. N. ...	5	71	6	Somerset N. ..	5	94
35	Monmouth ...	29	72	15	Kent E. ...	16	96
145	Waterford ...	2	72	27	Norfolk E. ...	6	96
30	Bedford ...	—	72	61	York S.E. ...	3	96
65	York N.W ...	—	73	25	Suffolk E. ...	27	97
147	Cork S. ...	25	74	22	Berks ...	15	98
7	Wilts N. ...	5	74	23	Oxford ...	11	98
52	Anglesey ...	1	74	11	Hants S. ...	4	98
139	Galway W. ...	25	75	3	Devon S. ...	24	100
138	Mayo W. ...	13	75	20	Herts ...	15	100
144	Tipperary S. ...	7	75	59	Lancashire S....	6	100
83	Edinburgh ...	4	75	57	Derbyshire ...	—	101
58	Cheshire ...	3	75	21	Middlesex ...	17	102
42	Brecon ...	44	76	53	Lincoln S. ...	4	102
128	Carlow ...	26	76	39	Staffordshire ..	4	104
142	Limerick ...	13	77	62	York N.E. ...	1	107
36	Hereford ...	4	77	54	Lincoln N. ..	2	110
115	Down ...	35	78	17	Surrey ...	12	112
4	Devon N. ...	18	78	63	York S.W. ...	2	113
10	Isle of Wight ...	20	79	64	York Mid W.	—	114
14	Sussex E. ...	4	79				
69	Westmorland with Lake Lancashire	4	79		Totals ...	1213	9790
19	Essex N. ...	—	79		Averages ...	11·44%	65·7%

It is perhaps not out of place to offer a suggestion, that, when the total number of authentications reaches the round figure of 10,000, which it will in all probability do within the next few months, the *Journal of Conchology* should print either a new Census or a table of the blanks yet to be filled up.

Meanwhile, it is much to be desired that special attention be paid to the working out of Scotland, for which there have been only 65 new records during the year. This portion of the kingdom is especially interesting in respect of the thinning out of our fauna as we go northward, and the interesting problems of geological and climatological influences and their effect on distribution. The greatest difficulty has been experienced in obtaining Scottish material or informations, doubtless in part attributable to the fact that Scottish malacologists are but few in number and widely scattered, which makes it needful that a special effort be made during the coming season to work up this portion of our islands. Therefore the Recorder would be glad if all conchologists who have Scottish material in their possession, or who would volunteer to assist by making Scotland the scene of investigation, would place themselves in communication with him.

A few remarks on the blanks for certain generally distributed species may be of interest.

Agriolimax agrestis is still needed from Carmarthenshire only.

Arion ater is needed from Sussex East, Ross W. and E., and Longford.

Vitrina pellucida is needed from Wilts. N., Hants. N., Aberdeen N., Ebudes S., Shetlands, Longford and Mayo E.

Hyalinia cellaria is needed from Aberdeen N., Westernness, Sutherland W., and Longford.

Pyramidula rotundata is still needed from Aberdeen N. and Longford.

Cochlicopa lubrica is needed from Linlithgow, Aberdeen N., Banff, Elgin, Ebudes S., Longford and Roscommon.

REPORT OF THE LEEDS BRANCH

FOR THE TWENTY-ONE MONTHS ENDING SEPTEMBER, 1909.

Our report in the past has been the Annual Report of the Branch, issued in December of each year. The Annual Meeting of the parent Society being held in October, we have given our report to the end of the previous December, which, in the opinion of the Editor of the *Journal*, is a little antiquated.

On his suggestion, we have this year brought our report up to modern times by giving the particulars up to the end of September, 1909, which covers twenty-one months instead of twelve. During this period we have had twenty-four meetings—fourteen in the field and ten indoors—with an average attendance of six members, exclusive of visitors.

The indoor meetings were held alternately at Leeds, in the Institute of Science and Art; and at Bradford, in the Cartwright Hall. Our field meetings were held in the neighbourhood of the following places:—9th May, 1908, Agbrigg, for the Barnsley Canal; 27th June, 1908, Keighley, for the old river bed and a visit to the Museum; 18th July, 1908, Malham Tarn; 15th August, 1908, Micklefield and Aberford; 12th September, 1908, Ingleton (Joint Annual Ramble with the members from Manchester); 12th April, 1909, Southport; 8th May, 1909, Market

Weighton; 22nd May, 1909, Darton, for Haigh Canal; 12th June, 1909, Bulcliffe Woods and the Coxley Valley; 10th July, 1909, Skipton; 2nd August, 1909, Sedbergh; 11th September, 1909, Silverdale (Joint Annual Ramble with the members from Manchester); 25th September, 1909, Collingham Bridge.

Our indoor meetings were devoted to the exhibition of specimens. In regard to the British land and freshwater shells, the exhibits were commenced in the order adopted by the Society's list, and we have now reached *Hygromia rufescens*, having commenced with *Vitrina* and *Hyalinia*. Mr. J. W. Taylor, F.Z.S., has, as in the past, given papers on the habits, morphology, and distribution of each species down for exhibition. That the members have fully appreciated Mr. Taylor's interesting and instructive remarks is shown by their attendance during the winter months, when only on rare occasions has any member been absent.

Three other papers were given—two by Mr. W. H. Hutton, one on the Feeding Habits of *Arion ater*, and a second on the Breeding Habits of *Helix aspersa*; Mr. F. Rhodes gave a paper on the *modus operandi* he pursued in making shell sections.

There was no addition to the Yorkshire list of mollusca during this period, nor is it likely, as the list is apparently complete. Several additions were made, however, to many of the Yorkshire drainage areas, notably *Milax gagates*, from a garden at Shipley; *Testacella scutulum* from Idle; and *Paludestrina jenkinsi* from the river Aire at Skipton, and from the canal at Darton near Barnsley; thus giving three localities in the West Riding for this species.

The Branch has been officially represented at the meetings of the Yorkshire Naturalists' Union, and reports when made have appeared in the *Naturalist*.

The membership at the present time is nineteen, with two corresponding members.

F. BOOTH, *Hon. Sec.*

ANNUAL REPORT OF THE LONDON BRANCH.

Since our last Annual Report ten meetings have been held. Five of these were field meetings. The localities visited were Rickmansworth on May 1st, 1909; Runemede on July 10th; Hampton Wick on August 7th; Iver on September 4th; and Burnham Beeches on September 25th. Rain interfered with outdoor work on four occasions, and but few members were present.

Of the mollusca collected, the following are worth mentioning:—Fine *Vivipava contecta* at Runemede; a good gathering of *Pisidium supinum* at Hampton Wick; *Ancylus fluviatilis*, *Neritina fluviatilis* var. *nigrescens* and *Pisidium henslowianum* at Iver; *Vitrea radiatula*, *Acanthinula lamellata*, *A. aculeata*, *Limax tenellus*, and *Acicula lineata* at Burnham Beeches.

We have again to thank Canon Horsley for kindly placing a room at our disposal for the winter evening meetings. There was a fair attendance at these; many interesting shells were exhibited, and several notes read.

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

386th Meeting, November 10th, 1909.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

"Manual of Conchology," part 79, by H. A. Pilsbry; "The Cephalopoda Dibranchiata of the Coasts of Ireland," by Anne L. Massy (*from the authors*); and the usual periodicals received in exchange.

New Member Elected.

Cyril Diver, Priory House, Dover College, Dover.

Candidate Proposed for Membership.

Richard Harrison, 19, Allen Street, Hulme, Manchester.

Papers Read.

"On the Habitat of *Vitrea lucida* Drap. at Grange-over-Sands," by J. Wilfrid Jackson, F.G.S.

"*Limax tenellus* Müller in Oxfordshire," by Chas. Oldham.

"*Limax cinereo-niger* Wolf in North Hampshire," by Chas. Oldham.

"On the Range of *Pisidium supinum* Schmidt," by Chas. Oldham.

"*Limax tenellus* Müller in Staffordshire," by J. R. B. Masefield, M.A.

"*Paludestrina jenkinsi* in West Sussex," by Lionel E. Adams, B.A.

"Non-Marine Mollusca of Friesland," by F. H. Sikes, M.A.

"Localities for *Hygromia revelata* Michaud," by J. R. le Brockton Tomlin, M.A.

"*Pisidium supinum* Schmidt in the Midlands," by H. Overton.

"*Vertigo pusilla* Müller and *Vertigo alpestris* Alder at Keswick," by W. J. Farrer.

"*Paludestrina jenkinsi* in the New River," by Geo. H. Weaver.

"The Marine Mollusca of the Yorkshire Coast and the Dogger Bank," by J. A. Hargreaves.

Exhibits.

By Mr. J. Wilfrid Jackson : Series of mature and immature *Vitrea lucida* from Grange-over-Sands, to illustrate his paper.

By Mr. J. Kidson Taylor : *Vitrea lucida* from Grange-over-Sands; and a fine set of *Valvata piscinalis* from Haweswater, Silverdale.

By Mr. Fred Taylor : Living specimens of *Testacella haliotidea* from Brighouse, and of *T. scutulium* from Broadbottom.

By Mr. G. C. Spence : Internal shells of *Limax maximus* from Withington; *Pyramidula rotundata* var. *alba* from Castleton, Derbyshire; *Helicella caperata* from Port St. Mary; *Helix hortensis* from Deeside, Aberdeen, and Ludgershall, Wilts.; and a very fine fossil *Vitrea pellucida*, obtained from material filling the interior of one of the large *Helix nemoralis* from Dogs' Bay, Roundstone.

By Mr. C. H. Moore : A large series of shells obtained at Bardsley, Dyserth, Monsal Dale, Miller's Dale, Ilfracombe, Lynmouth, Clovelly, Braunton, etc.

By Mr. Chas. Oldham : *Spherium lacustre* var. *brochoniana*, Weston Turville Reservoir, near Aylesbury, Bucks.; *Pisidium amnicum* var. *flavescens*, Grand Junction Canal, Harefield, Middlesex; *Jamnia secale*, Aldbury, Herts.; *Bithynia leachi* and *Paludestrina jenkinsi*, River Colne, Watford, Herts.; *Pyramidula rotundata* var. *alba*, Aldbury, Herts.; *Pisidium pulchellum* Aldenham, Herts.; *Vertigo antivertigo*, Watford, Herts.; and *Pisidium supinum* from various localities, to illustrate his note on that species.

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THE

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APRIL, 1910.

No. 2.

THE IMPORTANCE OF THE ANIMAL IN THE LAND
MOLLUSCA, SHOWN BY CERTAIN EVOLU-
TIONARY STAGES IN SOME GENERA
OF THE ZONITIDÆ.

(Presidential Address delivered at the Annual Meeting, October 16th, 1909).

BY LT.-COLONEL H. H. GODWIN-AUSTEN, F.R.S.

I IMAGINE there can be very few field conchologists, who, after a certain number of years' work, do not find themselves taking occasional notice of the animals of the shells they are collecting, attracted either by colour, form or habit. As such observations increase, notes and comparisons are made of the form of the foot, of the eye-tentacles and other external parts of the body of species met with, until at last the interest is divided between the shell and the animal. Having reached this stage, a further advance is in view of the conchologist, an advance, if he makes it, he will never regret, viz. : the examination of the internal characters, bringing about a knowledge of the general plan of the organs of the body, and the functions they have to perform. When this stage of research has been reached, interest in the mollusca is more than doubled, the ultimate results are far reaching, extending and leading on to phylogeny and physiology.

Having myself gone through these stages from the purely conchological to the more detailed malacological, it is my excuse this evening for selecting the latter as the subject of my address to this Society, and I shall try to show by a few examples that the animal is well worthy of attention. I will go even further to show that the exclusive study of the shell, which represents after all, only what the animal constructs in its lifetime, is unsatisfactory, because it leads to no true result. Species after species may be created on shell character with all minute differences in the shell described, yet their accurate classification based on this single character must be faulty, and deductions having regard to distribution and relationship of comparatively little weight. Deduc-

tions of this nature can only be attempted when every character of the animal is put in the scale; not a single character should be omitted on the plea of its being unimportant.

When saying so much in favour of the animal, it must not be understood that I underrate the work of the conchologist. The study of the shell has occupied the minds and time of a long list of naturalists, who have made the shells of the mollusca, as it were, time-pieces in geology; what a blank would that science be without the mollusca. For combined with the biological side, it gives us an insight into the physical conditions existing when strata were laid down, and conchology and malacology thus work side by side.

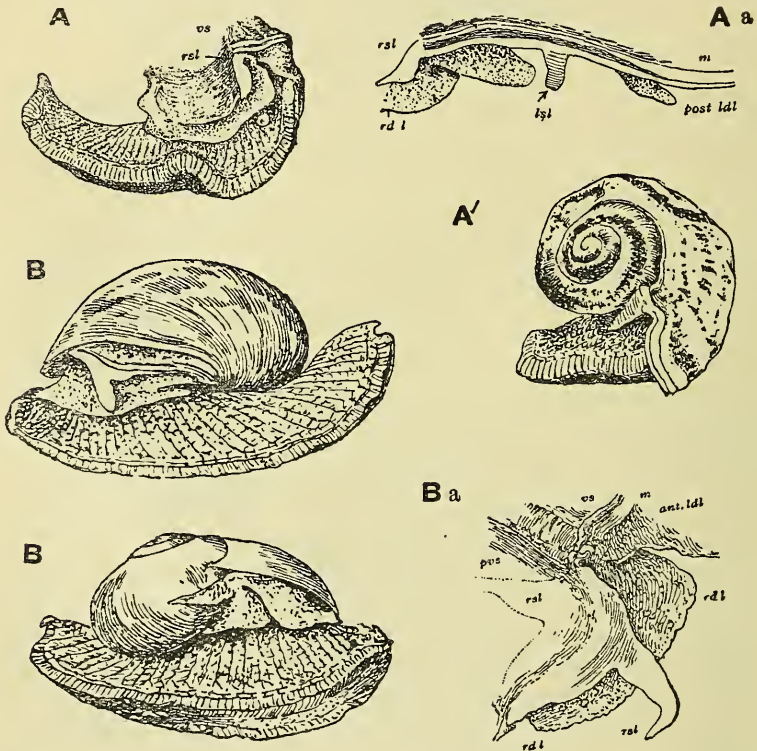


FIG. 1.—Shell lobes. A.—*Macrochlamys indica* Godwin-Austen. Viewed from the right side. Aa.—*M. petrosa* Hutton, mantle edge removed, showing shell lobes. B.—*Parvatella flemingi* Pfr., natural size. View of right and left side. Ba.—The right shell-lobe and right dorsal lobe, $\times 3$. A1.—*Macrochlamys richilaensis* Godwin-Austen. Right side, shell removed, $\times 2$.

For my Presidential address, I have therefore thought a few instances of evolution that have come under my observation might interest the members of this society, evolution being certainly one of the most absorbing branches of natural history work. It will recall at once to the minds of our members the work of Professor Darwin. The great master's name will, this year, appear in the Presidential addresses of many societies, both in this country and abroad, and it must not be absent from the pages of our own. The memory and labours of the eminent zoologist, to whom all naturalists owe so much in stimulating research, has met with due honour this summer, the great assemblage of scientific men at Cambridge, from every quarter of the globe, testified most strikingly to the reverence in which his name and work is held.

The evolutionary stages I have to describe were noticed in certain genera of the Zonitidæ, a family which has an enormous tropical and sub-tropical range, and is therefore one better known to those who have collected in the east. Some well marked characters distinguish the family one, viz. : the construction of the foot being remarkably different from that of the Helicidæ. Mr. B. B. Woodward very recently in his Presidential address¹ to the Malacological Society, when referring to the work of Darwin, says very truly and tersely—"Every organism possesses an inherent capacity to vary in a greater or less degree in certain directions more or less peculiar to itself." This cannot be better exemplified than in the diversity of form presented by the extremity of the foot in the Zonitidæ. The mucous gland varies from being flat, wide and open, or overhung by a lobe, which may be short, curving over, or very elongate ; in other cases the foot is compressed at the sides, keeled, truncate, the mucous gland a narrow slit, or this last becomes very small and hidden by a lengthened fleshy lobe. From South Africa, I have very lately received through the kindness of two of our members, Messrs. Burnup and Ponsonby, a species with the extremity of the foot quite unlike anything I have seen from India or the Malay Archipelago. Thus more often a specific character, it is in some cases of generic value. The next very variable external character is found in the mantle, particularly in what have been called the shell-lobes. To exemplify the various forms that these lobes assume, I show in the Figures 1 to 3 those of the genera, A., A¹.—*Macrochlamys*; B.—*Parvatella*; B¹.—*Euaustenia*; C.—*Cryptaustenia*; D.—*Austenia*; E.—*Girasia*; and F.—*Cryptogirasia*. In *Macrochlamys*, which has a well formed coiled shell, these lobes are in the earliest stage of development, they are more or less tongue shaped, short, or extremely long as in *M. petrosa* (Fig. 1 Aa).

When the animal is in full activity, during the rainy season, these lobes are in constant movement from side to side over the surface of the shell, contracting and expanding to their full length. Passing to *Euaustenia* and *Parvatella*, more closely allied to *Macrochlamys* than

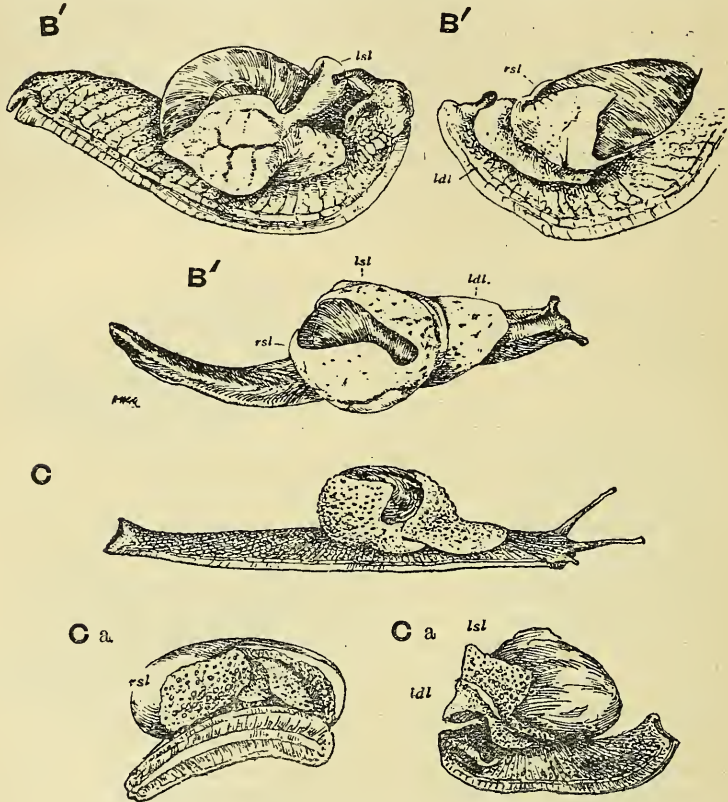


FIG. 2.—Shell lobes. B'.—*Euaustenia cassida* Hutton.
View of right and left side.
C.—*Cryptaustenia succinea* Reeve.
From life, natural size.
Ca.—Ditto.
From spirit specimen, right and left side, $\times 2$.

any of the other genera we are dealing with, and to *Cryptaustenia*, both with well formed shells, the shell lobes have become much broader, given off lower down on the side of right dorsal lobe, forming on the right side of the animal a broad rounded lobe, and on the left side, parallel with the mantle zone and above the left neck lobe, another broad lobe, but you must note they are not united. They can be expanded to such an extent as to come in contact, and thus they completely hide the shell.

In *Austenia* we have a somewhat similar form of shell-lobe, only

that they are both smaller, they do not meet, the left is marginal over

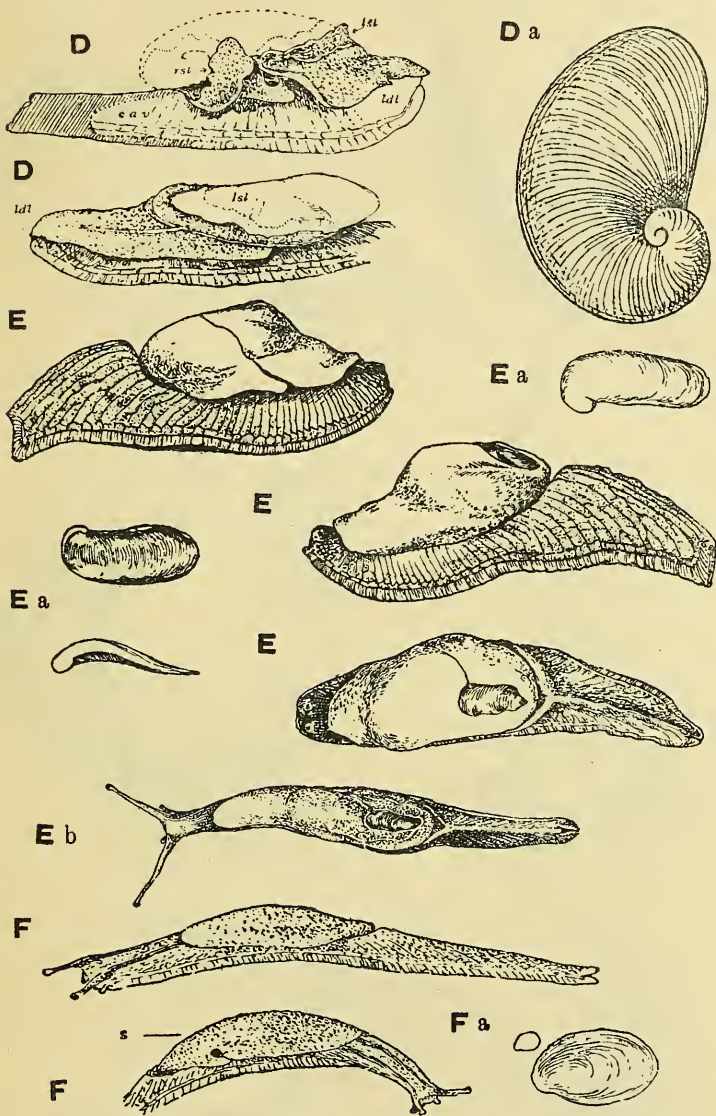


FIG. 3.—Shell lobes. D.—*Austenia gigas* Benson. Animal spirit specimen, shell removed, dotted line on viscera sac marks extension of shell-lobes in life. Da.—*Austenia butleri* Godwin-Austen. E.—*Girasia hookeri* Gray. Viewed from right, left, and dorsal side. Three-quarters natural size. Ea.—Shell. Three-quarters natural size. Eb.—*Girasia crocea* Godwin-Austen. From life. $\frac{3}{4}$ natural size. F.—*Cryptogirasia rubra* Godwin-Austen. Right and left side, from life. Fa.—Shell magnified, and natural size.

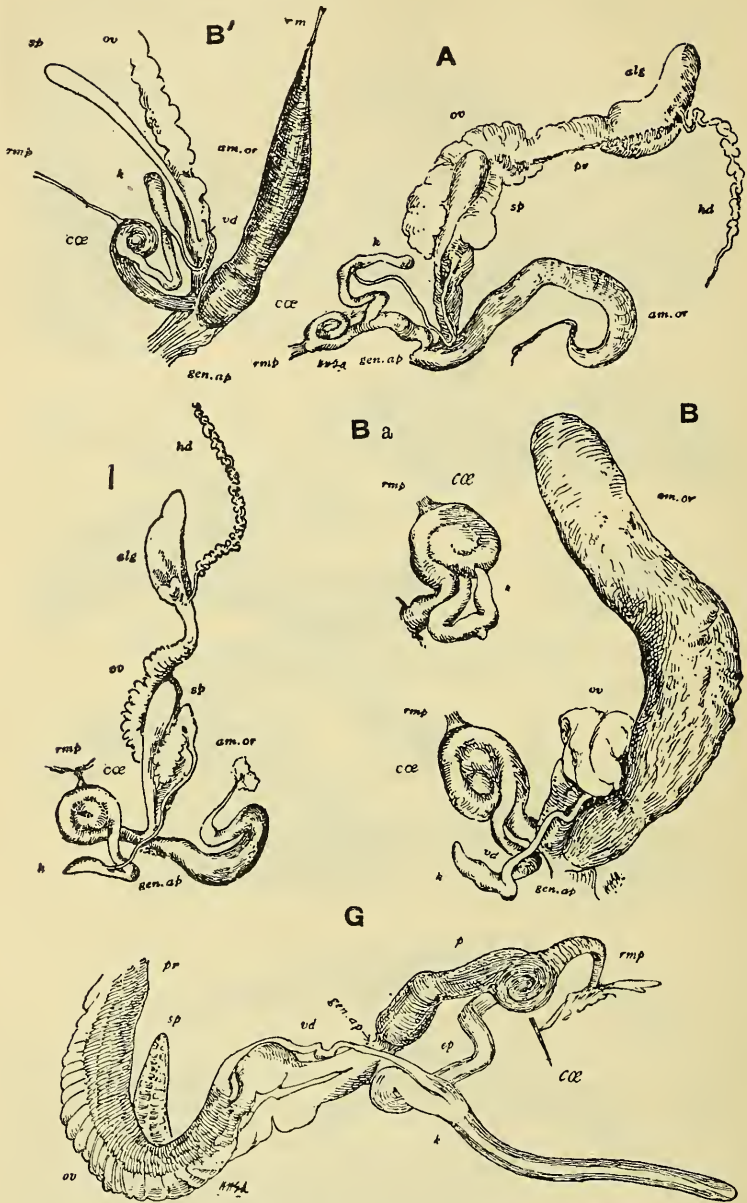


FIG. 4.—Genitalia. A.—*Macrochlamys indica* Godwin-Austen, × 3. B¹.—*Euaustenia cassida* Hutton. B.—*Parvatella flemingi* Pfr. Ba.—Ditto. Coiled Cœcum from the other side. G.—*Syama annandalei* Godwin-Austen. I.—*Oxytes orobia* Benson.

the peristome, and they leave the greater part of the shell exposed. This shell is spatulate with few whorls (Fig. 5 Da). Next, coming to *Girasia* (Fig. 3 E and Fig. 5 E) the shell-lobes are still further developed, and are not only in contact but are actually united and grown together, leaving but a small part of the shell exposed to view; the line of junction is marked by a distinct cicatrix, from the place of origin of growth of the lobes near and above the respiratory orifice. It is interesting to note that with this expansion and development of the shell-lobes, the shell of *Girasia* is a very rudimentary membranaceous one (Fig. 3 Ea).

Coming in as a link between the genera *Austenia* and *Girasia*, we have the large Burmese *Girasia resplendens* and *G. magnifica*, the shells of which are like those of *Austenia gigas*, the type of the genus, and as another intermediate link, we find a form from the base of the Darjiling Hills not so rudimentary in shell character as presented in *Girasia hookeri*.

Lastly, we have the genus *Cryptogirasia* (F.), in which the shell is reduced to a small calcareous disc (Fa), covered completely by the mantle, and in which no cicatrix can be detected marking the junction of the shell lobes.

We have here a most beautiful and instructive sequence from species with large substantial coiled shells, to others more simple, to one where the shell is almost lost, while the course of evolution in the direction of the slug-like form is indicated by the growing together of the shell-lobes. Here environment plays a prominent part in producing the growth of these shell-lobes. Where these species are found in the finest stages of growth, the rain fall is very heavy, and lasts for a long time in the summer months. The heat is very great, and the air is usually in a state of complete saturation, conditions most suitable to the rapid growth of the animal, but less favourable to the formation of shell. Species of *Girasia* removed from the open air to the drier atmosphere of a room, very soon begin to lose vitality, and the extensible shell-lobe soon shrinks and dries up.

The life history of these eastern molluscs and the variation of form they present foster the views held by several malacologists, that our European genera, *Limax*, *Arion* and *Geomalacus*, are the outcome of a similar phase of development, from shell-bearing genera long passed away. We can imagine (the distribution of land and sea being different) that this part of the world enjoyed a far warmer and moister climate, that with subsequent changes to colder and drier conditions the ancestral genera became extinct, leaving a great gap and scanty evidence of relationship to the genera they are now associated with.

I next take a case of modification occurring in the internal anatomy

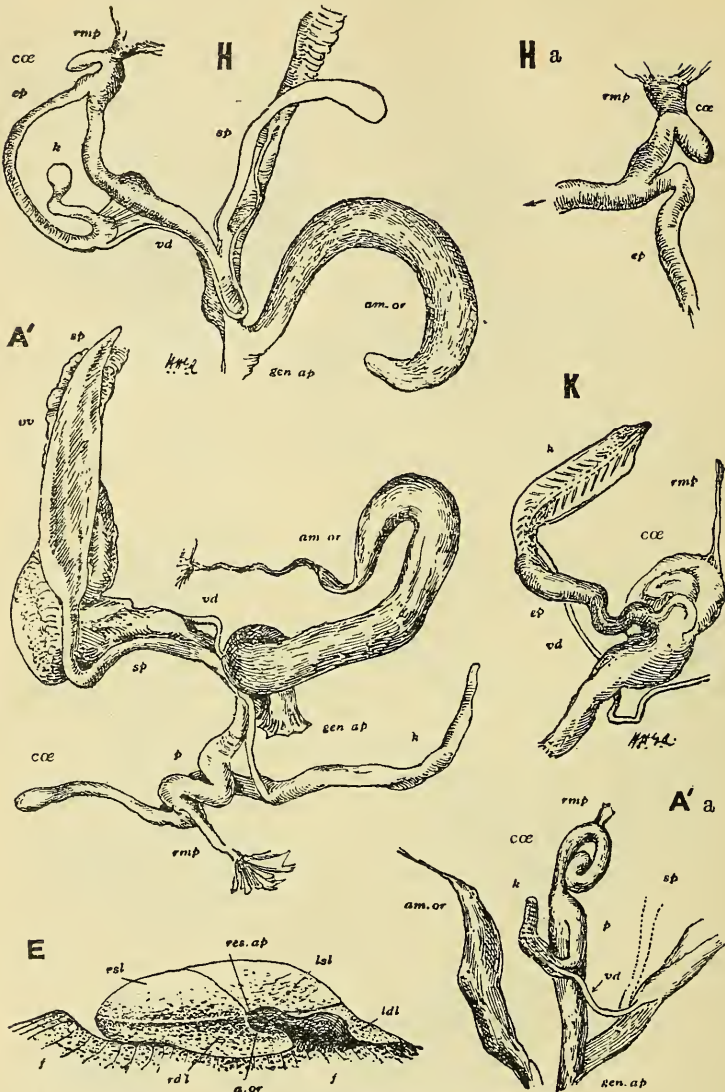


FIG. 5.—Genitalia. A¹.—*Macrochlamys richilaensis* Godwin-Austen.

A¹a.—*M. zemoensis* Godwin-Austen.

H.—*Khasiella vidua* Hanley and Theobald (W. Blanford, mss.).

Ha.—Caecum more enlarged.

K.—*Bousonia jacquemonti* von Martens.

var. *kurramensis* Godwin-Austen.

E.—*Girasia hookeri* Gray.

Position of shell and dorsal lobes, the former grown together on the line running from the respiratory aperture; left dorsal lobe turned back to show the position of the respiratory and anal orifices.

al.g. albumen gland; *a.or.* anal orifice; *am.or.* amatorial organ; *cœ.* caecum of the retractor penis; *ep.* epiphallus; *f.* foot; *k.* kalc-sac; *gen.ap.* generative aperture; *h.d.* hermaphrodite duct; *l.d.l.* left dorsal lobe; *l.s.l.* left shell lobe; *or.* oviduct; *r.m.p.* retractor muscle of penis; *r.s.l.* right shell lobe; *pr.* prostate; *sp.* spermatheca; *v.d.* vas deferens.

which throws some light on the evolution of the family we are dealing with. In the genera which compose the sub-family *Macrochlamyinae*, viz. : Figs. 4 and 5, A and A¹.—*Macrochlamys*; B¹.—*Euaustenia*; B.—*Parvatella*; G.—*Syama*; H.—*Khasiella*; I.—*Oxytes*; K.—*Bensonia*; the retractor muscle of the male side of the genitalia is attached to the periphery of a peculiar tightly wound cœcum. In some genera, such as *Oxytes* and *Bensonia*, this is hidden in a mass of muscular tissue, partly concealing the coil. Its more general form is very well exemplified in *Macrochlamys hardwicki* (A.), and it is invariably present in both the large and the smaller species of the sub-family, in fact it is its most distinguishing character. The exception to the rule has occurred in two species from Sikhim, viz. : *M. rhichilaensis* (Fig. 5A) and *M. zemoensis* (Fig. 5A¹a). In the first the male organ differs remarkably from that of typical *Macrochlamys*—the calc-sac is very long, quite a flagellum, and close to where the retractor muscle is given off there is a long free cœcum openly coiled; this undoubtedly represents the closely wound cœcum in the type species and the sub-family generally, to the side of which the retractor muscle is usually attached. In the other species, *M. zemoensis*, the retractor muscle is attached to the side of a free cœcum, having a slight but open coil. Other species will perhaps be found (an enormous number have yet to be dissected) in which this character will occur, and I would submit this variation is indicative of the free cœcum being the ancestral and oldest form, the coiling being a subsequent packing away of this accessory organ. This departure in form, as it were, in the genitalia of these eastern Himalayan species, appears to me of considerable interest in the gradual modification of special organs, organs the function of which can only be guessed at.

It shows (and it must have been a very slow process indeed) how evolution has effected morphological changes in this family of land molluscs, changes in the animal going on quite irrespective of changes in the shell. In the genera I have referred to in this address, the form of the shell is most variable, as many members of the society know well, and a glance at the examples I have brought here illustrating the genera will show this to those who are not so well acquainted with them.

In conclusion, I would beg the members of this society to consider what a service they would be doing for our branch of natural history, if they would preserve a few of the animals of the species they collect; even some species of our own island fauna are not thoroughly known. This applies with greater force to those who may go abroad, and to those whose friends are collecting for them in distant quarters of the globe.

LIMAX TENELLUS Müller IN STAFFORDSHIRE.

By J. R. B. MASEFIELD, M.A.

(Read before the Society, November 10th, 1909).

DURING the week-end, 16th to 18th October, I had the pleasure of staying with my friend Mr. Charles Oldham, at Watford, and he kindly showed me the Hertfordshire habitat of this slug, which used to be considered a rare species. We found it in some numbers crawling up beech trunks, and under pieces of decaying bark. Returning to Staffordshire I went on Saturday, 23rd October last, to Dimminsdale, near Cheadle, where there is a number of old dead and decaying beech trees, covered with *Polyporus versicolor* and other species of fungi. Here I soon found several specimens of *Limax arborum*, *L. cinereo-niger*, and *Arion subfuscus*, and my son, Mr. W. G. Masefield, on removing a loose piece of bark, revealed a slug which I at once recognised as *Limax tenellus*. All the slugs we found have been submitted to Mr. C. Oldham and Mr. W. Denison Roebuck, and the latter kindly reports upon them as follows:—

Limax tenellus var. *cerea*, one, a fine adult.

„ *cinereo-niger* var. *luctuosa*, two, minute.

„ „ var. *efasciata*, several, small.

„ *arborum*, type, numerous, immature.

„ „ var. *bettonii*, one, immature.

Arion subfuscus var. *cinereo-fusca*, one nearly full grown, several immature.

The county record of Staffordshire now includes all the British slugs except *Testacella scutulum* and *T. maugei*.

Since writing the above I again visited Dimminsdale, near Cheadle, Staffs., on the 4th November, and searching with a lantern on the beech trees took three more specimens of *L. tenellus*, which shows, I think, conclusively that this slug is indigenous in this dale, but has been overlooked before. Mr. Roebuck has seen and identified these further specimens and also specimens of *L. cinereo-niger*, *L. arborum*, *Arion circumscriptus*, and *A. subfuscus* var. *brunnea*, taken the same night. Mr. Roebuck, in returning the species, says:—“The consignment is interesting by its collocation of species and the only likely one that is absent is *A. intermedius*. *L. cinereo-niger* and *A. subfuscus* are always likely to occur where *L. tenellus* does.”

◆◆◆◆◆

Limax cinereo-niger Wolf in North Hampshire.—On October 10th, 1909, I found several immature examples of this slug feeding on fungi in the pine-woods near Silchester.—CHAS. OLDHAM (Read before the Society, November 10th, 1909).

NOTES ON THE NOMENCLATURE OF SOME
LIFU SHELLS.

BY J. R. LE B. TOMLIN, M.A.

(Read before the Society, March 9th, 1920).

Mangilia (Cythara) euselma M. & S. (*J. of C.*, viii., p. 284).

Mangilia eudeli Sow. (type in Brit. Mus.) described in *J. of Malac.*, viii., p. 102, is identical. The brown banding varies very much in extent and character, sometimes becoming rather blotchy, sometimes reduced to a few dots. The name *euselma* has four years' priority.

Mangilia (Glyphostoma) latirella M. & S. (l.c., p. 287).

Examples of *gaidei* Herv., and its var. *brachyspira* Herv. in the Brit. Mus., received *ex auct.*, make it clear that *latirella* and *gaidei* var. *brachyspira* are identical, and the latter name has priority. I may add that Mr. Melvill very kindly had the type specimen of *latirella* down at the Brit. Mus. for comparison.

Clathurella episema M. & S. (l.c., p. 294).

This name yields in priority to *euzonata* Herv., which was described in the *Journ. de Conch.*, vol. 44, no. 2. This number of the *Journ. de Conch.* bears date April 1896, but did not appear till October 1897 (cf. Melvill in *J. of Conch.*, viii., p. 419), which gives the name *euzonata* a priority of one month!

The identity of the two species is established by an author's example of *euzonata* in the Brit. Mus. Mr. Melvill has very kindly verified the dates for me. Mr. Edgar Smith entirely confirms the three identifications given above.

Mangilia (Glyphostoma) notopyrrha M. & S. (l.c., p. 288).

This very pretty and distinct little species has been recently distributed under the name of *albostrigatum* Baird. An examination of Baird's type, however, which is in the Brit. Mus., and was described in 1873, shows that his species is the same as *apiculatum* Montrouzier (1864)—a common New Caledonian species. Mr. Smith also concurs in this identification.

Pleurotoma (Drillia) regia Beck (*J. of Conch.*, viii., p. 94).

The rather common Lifu species catalogued under this name was described and figured by Souverbie as *P. rougeyroni* (*Journ. de Conch.*, 1874, p. 187). It is unquestionably close to *regia* Beck, but in the

latter the granules are much finer and less prominent, the aperture is somewhat more elongate, and the colour is pink and not red. On the whole I should consider the two distinct. *P. regia* was described from Amboina. In the same volume of the *J. of C.*, p. 397, the authors of the Lifu List also catalogue "*Drillia rougeyroni* Souv. = *D. barkliensis* H. Adams." This record and that of *D. regia* presumably refer to the same species, but in that case the authors must have been misled by the worn state of their specimens into identifying them with *barkliensis*—a well known and readily distinguishable Mauritian species.

Pleurotoma abbreviata Reeve.

The Lifu form has been recently described by Sowerby as var. *lifuisis* (Proc. Malac. Soc., 1907, p. 300).

Rissoina catholica M. & S. (*J. of Conch.*, viii., p. 306).

R. zonula M. & S. (ibid. p. 308).

Except for the rufous banding of *R. zonula*, I fail to see any difference between these two, after a careful examination of descriptions and figures, and of examples in the British Museum received from the Manchester Museum, and consider that they should be united. Colour is never a constant characteristic in *Rissoina*, in species where it occurs—e.g., in *R. rugulosa* Hutton, *R. variegata* Angas, and *R. fasciata* A. Ad. The banded form may stand as var. *zonula*.

Mr. Melvill fully agrees in the propriety of uniting these two species.

Rissoina (Zebina) curta Adams (*J. of C.*, viii., p. 119).

The author's name should be 'Sowerby,' as given later on p. 412. The prior name for this species is *R. tridentata* Michaud. Mr. Melvill is surely right in considering *Eulima dentiens* Dkr. the same species.

Rissoia pyrrhacme M. & S. (l.c., p. 309).

This species has been made the type of *Obtortio*, a new sub-genus of *Odostomia* (v. Hedley in Mem. Aust. Mus., 1899, vol. iii., p. 412; and Dall & Bartsch's Mon. of West Amer. Pyramidellid Mollusks, 1909, p. 16).

Syrnola jaculum M. & S. (*J. of C.*, viii., p. 304).

This is almost certainly identical with *Odostomia aciculina* Souverbie in *Journ. de Conch.*, 1865, p. 150, from New Caledonia. A specimen of the latter, received from Mr. Sowerby, agrees in every respect; and I find that M. Bavay has also surmised the identity of these two species.

Syrnola violacea M. & S. (*J. of C.*, viii., p. 304).

Identical with *Odostomia bulimoides* Souverbie, which has priority.

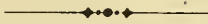
It is somewhat variable in colour, like *Syrnola lutea* Garrett, and may also be reddish-brown or violaceous with a yellow apex.

The name *violacea* may stand varietally for the violet form.

Pyrgulina gliiriella M. & S. (l.c., p. 303).

See also *J. of C.*, ix., p. 185, where the new genus *Herviera* is created by Messrs. Melvill & Standen for this species and another. Dall & Bartsch, in their recently-published Monograph referred to above, consider *Herviera* to be synonymous with *Elodiamea* De Folin, but this does not yet seem certain.

I have lately received *Herviera gliiriella* from Jinituan Island, one of the Philippines (coll. Quadras).



Pisidium supinum Schmidt in the Midlands.—On August the 21st last, while on an excursion with the Birmingham Natural History and Philosophical Society to Wyre Forest, I had the good fortune to secure two specimens of *Pisidium supinum* Schmidt. On the way back to Bewdley Station our path skirted the Severn for some distance; here I noticed the river bed appeared very hard and stony and seemed a likely habitat for this shell. I examined the spot and was delighted at securing two specimens (one immature) in the living state; these I at once sent to Mr. B. B. Woodward who kindly verified them for me. This is the second locality recorded for this species and I feel sure there is no reason to doubt it will be found in many other districts. Last Easter I had the good fortune to collect a very fine series of this shell in the Thames at Twickenham. Other species I noticed at Bewdley were the following:—*Agriolimax agrestis*, *A. lævis*, *Arion ater*, *A. subfuscus*, *A. hortensis*, *Pyramidula rotundata*, *Limnea truncatula*, and *Bithynia tentaculata*, and no doubt had I had more time at my disposal many other species would have revealed themselves.—H. OVERTON (*Read before the Society*, November 10th, 1909).

Helicella caperata m. *sinistrorsum* at Lewes.—Mr. C. H. Morris, of Lewes, informs me that on October 30th last he was fortunate in finding on the golf links at Lewes a full grown sinistral shell of this species. The shell is perfectly adult with a form and markings of typical character.—JNO. W. TAYLOR (*Read before the Society*, December 8th, 1909).

Milax gagates (Drap.) at Eccles.—On November 20th, 1909, I found under rockery stones (limestone) in a friend's garden at Eccles, near Manchester, two *Milax gagates* associated with *Arion hortensis*, *Limax maximus* and *Agriolimax agrestis*.—G. C. SPENCE (*Read before the Society*, December 8th, 1909).



NOTES ON SHROPSHIRE MOLLUSCA.

 BY J. WILFRID JACKSON, F.G.S.

(Read before the Society, May 12th, 1909).

LAST Easter I visited Shropshire with a party of geologists, and during a stay of seven days made a few notes on the mollusca of this somewhat neglected county. Our centre was at Craven Arms, and excursions were made each day to the various places of geological interest round about. The results are somewhat disappointing, but this is due to the fact that it was, on the whole, rather too early for many species of mollusca. The weather, too, was not altogether suited to their requirements, the nights being very cold and at times frosty. Again, one had necessarily to keep in view the main object of the expedition—geology—and, therefore, I was unable to devote as much time to shell-hunting as I should have liked.

The following notes are copied verbatim from my diary.

Quarries in Aymestry limestone, Weo Edge, near Craven Arms:—*Arion ater* var. *rufa*, *A. subfuscus*, *A. circumscriptus*, *Agriolimax agrestis* var. *sylvatica* and var. *reticulata*, *Vitrina pellucida*, *Vitrea crystallina*, *V. cellaria*, *V. nitidula* var. *helmi*, *V. pura* and var. *nitidosa*, *Pyramidula rotundata*, *Helicigona arbustorum*, *Helix nemoralis*, *Cochlicopa lubrica*, *Clausilia bidentata*, all occurred fairly commonly under the loose stones in the quarries.

Arion circumscriptus and *Vitrea nitidula* were also common in a quarry in the Upper Ludlow near Onibury; *Helix nemoralis* was abundant on roadside banks from Onibury to Norton. On the slopes of Norton Hill (Lower Ludlow) just above the river Onny I found *Agriolimax agrestis* var. *sylvatica* and var. *reticulata*, *Vitrea nitidula*, *Arion hortensis*, *A. circumscriptus*, *Hygromia hispida*, and *Cochlicopa lubrica*. *Limnea pereger* occurred in a brook near Stokesay Castle Hotel.

On the Onny river near Horderley—Caradoc sandstones, shales, etc.:—*Limax maximus*, *Agriolimax agrestis*, *A. lævis*, *Vitrina pellucida*, *Vitrea crystallina*, *V. nitidula*, *Arion ater*, *A. hortensis*, *Pyramidula rotundata*, *Helix nemoralis*, *Cochlicopa lubrica*, and *Clausilia bidentata*, all under stones at river side.

Arion ater (type) was also exceedingly common on the banks of the Bishops Castle Railway, and *Helix nemoralis* and *H. hortensis*—dead adult and living juvenile shells—were common amongst herbage at the roadside.

Quarry in Wenlock limestone near Much Wenlock :—*Agriolimax agrestis*, *Vitrina pellucida*, *Vitrea cellaria*, *V. alliaria*, *V. nitidula*, *Arion hortensis*, *Pyramidula rotundata*, *Helicella itala*, *H. caperata* and var. *ornata*, *Hygromia hispida*, *Helix nemoralis*, *Ena obscura*, and *Clausilia bidentata* var. *parvula*, amongst stones and scanty vegetation.

Ancylus fluviatilis and *Anodonta cygnæa* were noticed in Belswardine Brook, Shineton; and *Helix hortensis* vars. and *H. cantiana* were very common on hedge-banks from Buildwas, through Farley, to Much Wenlock (Wenlock shales and limestone) Dr. J. Cosmo Melvill was the first to record *H. cantiana* for this neighbourhood (*J. of Conch.*, 12, p. 295).

At Ludlow—Lower Old Red sandstone—*Agriolimax agrestis*, *Vitrea cellaria*, *Arion ater* var. *castanea* and var. *succinea*, *A. circumscriptus*, *Hygromia hispida*, *Helix aspersa*, *H. nemoralis*, and *H. hortensis*, were common among refuse in a sandpit.

Agriolimax agrestis and *Vitrina pellucida* were also common under stones at Ludlow Castle.

Bridges near Ratlinghope—purple slate of Upper Longmyndian :—*Vitrina pellucida*, *Vitrea alliaria*, and *Hygromia hispida*, common under slabs of slate.

Whilst in the district, I visited Shrewsbury Museum, and on looking over the magnificent series of Roman remains from Uriconium I noticed a bowl full of *Helix aspersa*, labelled "*H. pomatia*." This has no doubt been rectified by now, but I mention it here in case the species has been recorded as *H. pomatia*. Errors of this kind have unfortunate powers of vitality. NOTE (added Jan., 1910).—I find to my great regret that I am, unfortunately, too late to prevent the above wrong identification from being placed on record, as on referring to 'The Roman Fort at Manchester, 1909,' p. 68 (footnote) I notice the following remark :—" . . . specimens of *Helix pomatia* were found at Wroxeter and are preserved in the Shrewsbury Museum." From the few observations I was able to make, I certainly think the district of South Shropshire shows promise of yielding a fairly large list of species if systematically worked.

Paludestrina jenkinsi in the New River.—I recently found this species in the New River at Palmer's Green (Middlesex), where both the type and var. *carinata* are very plentiful; in fact, it is certainly the commonest mollusc in that portion of the New River. I have also met with it in the New River at Ches-hunt (Herts.).—GEO. H. WEAVER (*Read before the Society*, Nov. 10th, 1909).

PERIODIC VARIATION IN *LIMNÆA PEREGER* (Müller).

By J. DAVY DEAN.

(Read before the Society, May 12th, 1909).

THE following notes are the outcome of original observations made for the purpose of finding out the causes for periodic variation in certain colonies of *Limnæa pereger*. The facts obtained would seem to show that we may have here, not only an explanation of the specific phase, but a clue also to the wider subject—the arrested variation of freshwater mollusca.

In the first place, the life-history of *Limnæa pereger* is largely governed by the nature of the habitat, and it is not unusual to find the finest shells in a small ditch which, in the heat of summer, is not water so much as jungle—a dense patch of high grass and yellow-flag. And it is found that so much does the regular and natural occurrence of such extremes as this affect variation, and govern the life-history of any particular colony subjected to these conditions, that we are compelled to consider the aspect as one of primary importance. For those colonies, so subjected to extremes, are nevertheless perfectly self-contained and perfectly balanced by a natural law.

To give, then, the primary analysis so gained by the facts provided.

- I.—UNRESTRICTED LOCALITIES :—by which is meant a sheet of water which provides the species with the necessary conditions for life at all seasons of the year, and at which the seasonal variations in temperature, food supply, etc., are not sufficient to do more than cause a temporary or individual deviation from a recognized form. It is probable that under this heading may be classed most of the smaller short-spined forms.
- II.—RESTRICTED LOCALITIES :—by which is meant a small water area which is liable to extremes of temperature, water-supply, sudden access of current, drought, food-supply, and seasonal variations which are sufficient to cause individual and racial variation in the form of the shell, and to affect and completely alter the life-history of the species. It is probable that under this heading may be classed the larger forms, *acuminata*, *oblonga*, *ovata*, *patula*, etc.

The *pereger* fall into two groups corresponding with these divisions, thus :—

I.—The ANNUAL forms.

II.—The BIENNIAL forms, showing three phases :

A.—*Simple alternation.*

B.—*Reverting alternation.*

C.—*Arrested gradation.*

I.—The Annual Forms: Unrestricted Localities.

These forms may be considered to be, to a certain extent, fixed, although individual variation is present.

A number of localities in the south of England as well as several of the North Lancashire localities have been placed under observation. The results all tend to show that the average life of all the smaller forms is a matter of from 13—16 months. The breeding season seems to be annually fixed, but may be early or late according to the nature of the locality; it may be short or prolonged, but is more often a short period of a few weeks' duration. More frequently the breeding season is in the early summer, and the young *pereger* grow during the summer and autumn a shell varying from $3\frac{1}{2}$ — $3\frac{3}{4}$ whorls. Then, as in all the groups, a winter check-period of about three months intervenes, lasting till the end of February, when no growth of the shell goes on. The next season, the reproductive period again comes on, and the final quarter or half whorl is added to the shell. The mature *pereger* then rapidly die off, giving place to the young of the new generation. But, probably owing to the extreme cold of some of the more northern waters, it is not uncommon to find instances where the breeding season is deferred to a short period in August, and it is only an exceptionally hot summer that has any effect on the regularity of that period.

Most of these forms are very small, with perhaps an average size of 11—12 mm. length. The spire varies only slightly, the shells ranging through the smaller lacustrine forms to the more acuminate *truncatula*-like shells of the limestone wells. It will be remembered that at these latter localities the conditions are often as constant for a considerable period as those obtaining in the larger water-areas. In all these shells the one definite winter growth-check is a marked feature. Shells from normal localities show this growth-mark at the end of the third or between the third and fourth whorl. Shells from a retarded locality show it generally at the completion of the second whorl. It is extremely rare for individuals, even at a late locality, to survive a second winter, provided the reproduction period has been given normal conditions.

Before going on to consider in detail the phases in life-history of the Biennial forms, it may be of interest to notice the effect of exceptional circumstances in the case of a habitat which, under normal conditions, possesses all the essential features of an unrestricted locality. This habitat is a small artificial trough placed at the base of a limestone cliff and receiving water from fissures in the limestone. The form of shell is similar to the shells of the limestone wells described above. The animals breed in August, and attain maturity

the following year. During the wet summer of 1907 the tank-water was in constant flow. The *pereger* were of a dwarf size and did not deposit egg-masses till the summer of the year following, and, having passed through an additional growth-period, by this time the shells were quite unlike any taken previously.

The important point here is the possible relationship of climatic influence with development, and consequently with the vital question of reproduction. Unfortunately for the simplification of a theory, however, the clue to a fuller solution seems to begin and end here, for we find in similar localities a dissimilar state of things for the same period.

II.—The Biennial Forms: Restricted Localities.

A.—*Simple alternation.*

In the first place, we may take as a generally accepted fact that the larger forms are usually longer-lived. What is the life-history? Observations show that these large forms exceed the average life of the smaller forms by *ten to fourteen months*, and, what is more remarkable, that these larger forms may make their appearance one year and not the next. Such periods may be regularly alternate, year in and year out—in other words the variation may be biennial.

The fuller explanation of the phase will be given by the life-history. Egg-masses are deposited in May and June, and the young *pereger* grow by the late autumn a shell of two complete whorls. There is no evidence of a reproduction period the summer following, but the steady addition of shell-growth is maintained until by the late autumn a shell of four complete whorls has been formed. In the early summer of the third year the final growth is added, and reproduction takes place. By the end of July the mature individuals have died off, and the new generation has taken their place. An examination of the matured shells shows the two distinct growth-checks at the completion of the second and fourth whorls.

It is, perhaps, unfortunate that only one instance of this phase has presented itself, but the example is valuable as showing the simplest form of periodic variation. The form of shell is intermediate between the annual types and the larger ovate and acuminate forms of the following groups.

B.—*Reverting alternation.*

So far the matter has been fairly simple. There has been throughout the constant appearance of a racially distinct type, and the first stage towards development is shown in the case of simple alternation just given.

But there is another feature present in the life-history of most of these larger *pereger*, and it is from this stage that the subject becomes

a more difficult one. For it is here that we have to deal with those localities which are liable to the greatest extremes in temperature and vegetation growth and subject to agricultural interference.

The life-history, however, of certain colonies of large acuminate and ovate forms seems to be the same. Taking that history forward from the time of the appearance of the large form, we find egg-masses beginning to be deposited at the end of March or beginning of April, and the young grow during the first year a shell of from 3—3½ whorls. A slight further increase takes place the following spring, but now note the discrepancy in size coupled with the following fact: We find these small individuals—some of them only one-third the size of their parents—depositing egg-masses, and many of them forming a lip to the shell.

The following statistics from two quite parallel cases are from averages:—

Size of shell in	1906		1907		1908		1909
<i>ovata</i>	- 20 mm.	-	10 mm.	-	↓	-	23 mm.
<i>acuminata</i>	20 mm.	-	7 mm.	-	↓	-	18 mm.

A division in the colony now seems to take place, and a period of high mortality follows, what we may term the intermediate period of reproduction. At such a time a collector will be very puzzled to know whether or not he is examining mature *pereger*, and he will incline to the belief that the shells are full-grown because a certain number show a well-defined lip.

To distinguish between the two forms, we may call the larger the "Alternates" and the small intermediate form the "Revertives." The idea being that these latter represent a force which reverts to the normal type, and, further, that it is because of the presence of this force that we have arrested variation in freshwater mollusca.

Now follows the most vital period in the life-history of the colony. The struggle for existence is becoming acute, and apparently the battle is all in favour of the young of the new generation. Their development is, at any rate, on a different scale to that of the preceding and still existent generation. For it must be remarked that each appearance of the mature Alternates is followed immediately by a multitudinous progeny, and if we consider the restricted nature of many localities, we may find that the growth and consequent development of individuals is inversely proportionate to the number present; and, conversely, that the Alternates attain their finest development at a time when that number is below the normal.

The next season shows an apparently inexplicable state of things, if contrasted with that of two seasons ago, or if judged apart from the preceding facts.

Assiduous working of the locality will reveal a number of immature shells, still very small, and perhaps isolated examples of the Alternate type, which latter we may presuppose to be the direct descendants of the former generation of Alternates. (This period in the phase is indicated in the example given by an arrow, thus ↓). A year later the big form again makes its appearance, reproduction takes place, and so the history repeats itself.

Thus we have in these cases of Revertive Alternation a period of three years elapsing between each appearance of the major form.

C.—*Arrested gradation.*

It is not possible at the present to do more than suggest the nature of this phase. There are localities at which a large ovate form of *pereger* makes a regular appearance each year. Once every five or six years a maximum size is seen to be attained, to be frequently followed by a considerable falling off the following year. It is probable that at these localities the circumstances favourable to extreme variation have reached the optimum. It seems fairly evident that both Alternation and Reversion are present during the same period, and in this connection it should be noted that there is ample proof that cross-breeding between the two generations takes place. With these facts alone, it will be seen that it becomes extremely difficult to get conclusive evidence, and we can only take the facts obtained and consider them in the light of the preceding phases.

A final word as to the support given to these facts by the observations of other workers.

In the Proceedings of the Woolhope Naturalists' Field Club, Messrs. Boycott and Bowell instance the following cases of periodic variation under *Limnæa limosa* L. :—

“Owing to various causes we have not been able to give this periodic variation sufficient study, but the general result of our researches is to show that in a series of favourable seasons the size of average specimens gradually increases till a maximum is attained; and then, as a rule, these large-sized specimens produce a very numerous progeny of small specimens, which in their turn present us with offspring larger than themselves, and so on. In a pond under observation, at Sissinghurst in Kent, a biennial change has occurred with some regularity during the last few years, a *labiosa* form producing large *limosa*, and these in their turn reverting to *labiosa* in successive seasons.”

ON THE RANGE OF *PISIDIUM SUPINUM* Schmidt.

BY CHAS. OLDHAM.

(Read before the Society, November 10th, 1909).

DURING the past summer I have taken *Pisidium supinum* at several places in the Grand Junction Canal; in Middlesex, at Harefield; in Hertfordshire, at Rickmansworth, Tring and Wilstone; in Buckinghamshire, at Marsworth and Slapton; and in Northamptonshire, at Blisworth. In every case this species was associated with *P. amnicum* and *P. henslowanum*, and usually with *P. subtruncatum*. The bed of the canal is, in most places, stony, but here and there some silt and mud provide congenial quarters for bivalve mollusca. Perhaps the favourite habitat of *supinum* was in the silt that had collected about the roots of *Potamogeton pectinatus*, a plant that grows sparingly in patches in the stony bed, but at Slapton I took several specimens in thick black mud in which *Unio tumidus* and *U. pictorum* were living. In all the localities I have mentioned the dominant form is the type, in which the umbones are furnished with appendicula similar to those in *P. henslowanum*, but at Harefield, Wilstone and Marsworth I took a variety in which the appendicula are lacking. At Marsworth, associated with the other two, a third form occurs. This is oval, not unlike typical *P. pusillum* in outline, very glossy, strongly striated, and lacks the appendicula. It may be worth mentioning that in embryonic shells of the typical form that I extracted from specimens taken at Rickmansworth in July, the appendicula were situate in the middle of the valves, as they are in *P. henslowanum* of that age, and not at the umbones as they are in mature shells.

Mr. B. B. Woodward, in looking over my collection recently, kindly called my attention to specimens of *P. supinum* which I had overlooked. I collected them in the Union Canal at Aylestone, near Leicester, in July, 1892, and in a pond at Kelsall, Cheshire, in June, 1894. The shells, in both cases, are of the non-appendiculate variety.



Localities for *Hygromia revelata* (Michaud).—This species has been recorded from "Plymouth," but this rather vague indication covers such an extensive area that I feel justified in recording that I recently found the shell in a typical habitat on the cliffs above ¹Whitsand Bay, beyond Rame Head. This is, of course, on the Cornish side of Plymouth Sound. I have also collected *H. revelata* at the Lizard, Land's End, and Kynance Cove.—J. R. LE B. TOMLIN (Read before the Society, November 10th, 1909).

1 The usual local spelling.

**DESCRIPTIONS OF FOUR SUPPOSED NEW LAND
SHELLS FROM BRITISH SOMALILAND.**

By J. R. LE B. TOMLIN, M.A., F.E.S.

(Read before the Society, March 9th, 1910).

THE four following species which I describe as new came from a small collection of mollusca made by Mr. W. Feather, of the British Somaliland Fibre and Development Company, and have been placed in my hands by Mr. Fred. Booth.

They were all collected on Gan Libbah, at an elevation of about 5,600 feet above sea-level, in British Somaliland.

Buliminus (Cerastus) featheri n.sp.

Shell broadly ovate, somewhat elongate, perforate, pale fawn colour; whorls $8\frac{1}{2}$, first whorl flattened at apex, later whorls closely obliquely striate, the striæ on the earlier whorls regular and closely set, less so on the penultimate and on the last whorl irregular or obsolete; suture rather lightly impressed; the umbilical area considerably excavated; perforation deep, narrow; columella reflexed over the umbilical area; aperture oblong, slightly angled at the base of the columella; labrum narrowly reflexed.



Alt. 29 mm. ; diam. maj. 14 mm. ; diam. min. 10 mm.

Aperture, alt. 13 mm. ; diam. 8 mm.

Only a few specimens were collected, all of which were dead; in the specimen figured the upper whorls are more or less bleached. Though there is nothing very remarkable about the appearance of this species, I am unable to find that it has already been described.

I name this species after Mr. W. Feather, who made this collection in Somaliland.

Buliminus (Cerastus) boothi n.sp.

Shell ovate, perforate; colour pale buff, sparsely and very irregularly dotted with darker markings, which are translucent when the shell is held up to the light; whorls $8\frac{1}{2}$, closely and regularly obliquely

striate from the second whorl onwards, the striæ on the last whorl becoming less regular, and sometimes obsolescent; suture slightly impressed; umbilical area rather narrow, and the perforation extremely small; columella considerably reflexed over the umbilical area; aperture long, oval; labrum very slightly reflexed.



Alt. 19 mm. ; diam. 10 mm.

Aperture, alt. 9 mm. ; diam. 6 mm.

It appears to be rather a variable species in dimensions; another adult example measures alt. 22 mm. ; diam. 11 mm.

The spots are most irregularly placed, and sometimes tend to coalesce into small blotches. This species was found alive in some numbers, but very few were adult. It is dedicated to Mr. F. Booth.

***Ennea orestias*¹ n.sp.**

Shell cylindrical, perforate; whorls $11\frac{1}{2}$, broadest at the sixth and seventh whorls, and thence to the base gradually decreasing in diameter; sculpture consisting of oblique, rather distant, longitudinal striæ, with lines of growth often visible between the striæ; suture impressed; umbilicus very small and deep; labrum and columella widely reflexed; aperture almost square, with one prominent parietal lamella, and on the columella two rather less strong lamellæ, seated deeply within the aperture.



Alt. 6.5 mm. ; diam. 3 mm. (in the broadest part).

This shell is not unlike *Ennea uvula* Desh. from Réunion, but is smaller, narrowed below, not so strongly striated, and has lamellæ on the columella. The latter are too far inside the aperture to be visible in the figure.

1 ὄρεστίας, belonging to the mountains.

Buliminus (Zebrina) libbahensis n.sp.

Shell elongate, fusiform, rimate, smooth, and shining; suture lightly impressed; whorls $10\frac{1}{2}$, cream coloured, very beautifully and closely painted with narrow, longitudinal, wavy lines of white, and also sparingly and irregularly with broader lines of various shades of brown; body-whorl with a narrow, rather faint peripheral dark line; aperture auriform, dull red inside; labrum very slightly reflexed; columella strongly thickened and reflexed, margined with white, with a strong internal fold.



Alt. 21 mm. ; diam. 7 mm.

Aperture, alt. 7 mm. ; diam. 4 mm.

Two living specimens.

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

387th Meeting, December 8th, 1909.

Mr. R. Standen in the chair.

Donations to the Library announced and thanks voted:

“On the Evidences of a Former Landbridge between Northern Europe and North America,” by Dr. R. F. Scharff (*from the author*); and the usual periodicals received in exchange.

New Members Elected.

Richard Harrison, 19, Allen Street, Hulme, Manchester.

James W. Mercer, 13, King Street, Kettering.

L. Dawes, Hambledon, Hants.

Candidates Proposed for Membership.

Rev. T. T. Levett, F.Z.S., Frenchgate, Richmond, Yorks.

F. R. Tindall Lucas, Lampton Lodge, Spring Grove, Isleworth.

J. Moorecock, 91, Broadfield Road, Catford, S.E.

Miss Hilda Townend Gnosspelius, Silver Holme, Newby Bridge, Ulverston, Lancs.

Resignation.

Reginald H. Barker.

Member Deceased.

Thomas Bird Hall.

Papers Read.

“*Helicella caperata* m. *sinistrorsum* at Lewes,” by Jno. W. Taylor.

“*Milax gagates* (Drap.) at Eccles, near Manchester,” by G. C. Spence.

Exhibits.

By Mr. G. C. Spence: Living specimens of *Milax gagates* to illustrate his note; also photographs of various slugs.

By Mr. Walter Gyngell: Some fine examples of *Anodonta cygnea* from Scarborough.

By Mr. R. Standen: A fine series of *Ancylus*, *Physa*, *Testacella*, *Parmacella*, etc., from the “Darbshire” collection in the Manchester Museum; among the *Physa* were two remarkably fine specimens of *Physa gigantea* Michaud, from the Rilly Limestone (Lowest Eocene) of Rilly-la-Montagne, near Rheims.

It was decided to have the following special exhibits at future meetings:—

British Clausiliidæ	...	...	...	January 12th, 1910
Genus Eulima	...	...	...	February 9th, 1910
Cylindrellidæ	...	...	...	March 9th, 1910

388th Meeting, January 12th, 1910.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted:

“A Catalogue of Recent Cephalopoda, second supplement, 1897-1906,” by Dr. W. E. Hoyle; “Non-Marine Mollusca of Norfolk,” by A. Mayfield; “Four New Land Shells from the Philippine Islands,” by Paul Bartsch; “A Monograph of West American Pyramidellid Mollusks,” by W. H. Dall and P. Bartsch; “Report on a Collection of Shells from Peru, with a Summary of the Littoral Marine Mollusca of the Peruvian Zoological Province,” by W. H. Dall; “Revision der Unterfamilie der Orthalicinen,” by Dr. H. Strebcl; “Mollusques Terrestres et Fluviales [Nova Guinea],” by A. Bavay (*from the respective authors*); and the usual periodicals received in exchange.

New Members Elected.

Rev. T. T. Levett, F.Z.S., Frenchgate, Richmond, Yorks.

F. R. Tindall Lucas, Lampton Lodge, Spring Grove, Isleworth.

J. Moorcock, 91, Broadfield Road, Catford, S.E.

Miss Hilda Townend Gnosspelius, Silver Holme, Newby Bridge, Ulverston, Lancs.

Candidates Proposed for Membership.

M. K. Saggi, M.R.A.S., etc., Common Room, Lincoln's Inn, London, W.C.

H. O. N. Shaw, F.Z.S., Skreen's Park, Roxwell, near Chelmsford.

R. Woodcock, Fauvic, Jersey.

Resignation.

Henry Suter.

Members Deceased.

A. Loydell.

Kenneth McKean.

Papers Read.

“New Herefordshire Records,” by J. R. le B. Tomlin, M.A.

“Additional Notes on the Non-Marine Mollusca of Morteheo,” by M. Jane Longstaff.

“Obituary of A. Loydell,” by J. E. Cooper.

Exhibits.

By Mr. J. Kidson Taylor: A fine series of *Helicostyla*, including *H. pudibunda*, *H. carinata*, *H. electrica*, *H. cryptica*, *H. semperi*, and many other rare and beautiful species and varietal forms, chiefly from the "Quadrans" collection.

By Mr. R. Standen: Shells of *Placenta orbicularis*, and a specimen of the same which had actually been in use as a "window-pane" at Goa, Western India (from Manchester Museum collection).

By Mr. E. Arnold Wallis: A remarkable malformation of *Anodonta cygnea*, from the Valley pond, Scarborough.

By Mr. J. Davy Dean: A series of local forms of *Helix*, *Vitrea*, and *Succinea*, from the collection of the late Mr. C. S. Coles, chiefly from Hampshire and Surrey localities. Mr. Coles, although never a member of the Conchological Society, was well known to many members of it as an enthusiastic collector of shells, and his demise will be a matter of deep regret to his numerous correspondents and personal friends.

By Mr. C. H. Moore: A small series of Lifu mollusca.

A large series of the British Clausiliidæ was shown by Messrs. R. Standen, J. Kidson Taylor, E. C. Stump, C. H. Moore, E. Collier, and the Manchester Museum ("Oldham" collection). Mr. Collier's series included white forms of *C. bidentata* and *laminata*; sections of *C. bidentata* and *cravenensis*; and clausia of *C. bidentata*.

389th Meeting, February 9th, 1910.

Mr. R. Standen in the chair.

Donations to the Library announced and thanks voted:

"Diagnoses of New Cephalopods from the Hawaiian Islands," by S. S. Berry;
 "Notes on the Philippine Pond Snails of the Genus *Vivipara*, with Descriptions of New Species," "Three New Land Shells from Mexico and Guatemala,"
 "A New Species of *Cerithiopsis* from Alaska"—all by P. Bartsch; "On the Mollusca from the 'Cave Earth,' Dog Holes, Warton Crag," by J. W. Jackson;
 "On the Geographical Distribution of Mollusca in South Lonsdale," by Rev. C. E. Y. Kendall, J. D. Dean, and W. M. Rankin (*from the respective authors*);
 and the usual periodicals received in exchange.

New Members Elected.

M. K. Saggi, M.R.A.S., etc., Common Room, Lincoln's Inn, London, W.C.
 H. O. N. Shaw, F.Z.S., Skreen's Park, Roxwell, near Chelmsford.
 R. Woodcock, Fanvic, Jersey.

Candidates Proposed for Membership.

Norman G. Hadden, Levant Lodge, Earls Croome, Worcester.
 George Shrubsole, Ellesmere, Fields Park Road, Newport, Mon.

Papers Read.

"Note on *Carychium minimum*," by H. Fogerty.

"*Pyramidula rotundata* var. *alba* at Meathop Fell, Westmorland," by J. Wilfrid Jackson, F.G.S.

Exhibits.

By Mr. J. Wilfrid Jackson: *Pyramidula rotundata* var. *alba*, from Meathop Fell and Eggerslack Wood, Grange; *Jaminiia muscorum*, type and var. *edentula*, *Vallonia costata* and *V. excentrica*, Meathop Fell; *Acanthinula aculeata*, *Eucanolus fulvus*, *Jaminiia secale*, *Clausilia bidentata* and abnormality, *Helicella caperata* vars., Grange-over-Sands; *Neritina fluviatilis* from brook at Cark; *Paludestrina stagnalis* from the marsh near Grange; *Jaminiia secale*, *Cochlicopa lubrica*, *Helicella itala*, *Limnaea pereger* and *L. truncatula* from Kendal.

By Mr. F. Taylor: Land and freshwater shells from the Isle of Man, collected September, 1909, including several new county records—*Aplecta hypnorum*, *Pisidium subtruncatum*, *P. nitidum*, *P. obtusale*, *P. pusillum*. Mr. Taylor reported finding several specimens, type and vars., of *Limax cinereo-niger*, *Agriolimax levis*, and *Arion intermedius*, in the Ramsey district, these being new county records.

By Mr. G. C. Spence: From canal, Lancaster, Jan. 11th, 1910—*Dreissensia polymorpha*, *Bythinia tentaculata*, *Neritina fluviatilis*, *Sphaerium corneum*, *Limnaea pereger*, *Physa fontinalis*, *Planorbis vortex*, *Valvata piscinalis*, and *Pisidium henslowianum*.

By Mr. C. H. Moore: A number of Olives of various species.

390th Meeting, March 9th, 1910.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted:

"The Luminous Organs of some Cephalopoda from the Pacific Ocean," by W. E. Hoyle; "The Marine Fauna of Zanzibar and British East Africa from collections made by Cyril Crossland in the years 1901 and 1902;—On some Species of Solenidae," by E. A. Smith and H. H. Bloomer; "Anatomy of *Tagelus gibbus* and *T. divinus*," "On the Anatomy of *Ensis macha*, *Solen fonesii* and *S. viridis*," "On the Anatomy of certain species of Solenidae," "Anatomy of various species of Solenidae: Addenda et Corrigenda," "On the Anatomy of *Ensis (Solen) magnus* Schumacher," "Anatomy of species of *Siliqua* and *Ensis*," "The Anatomy of *Pharella orientalis* Dunker and *Tagelus rufus* Spengler," "Classification of the British species of the Genus *Solen* Linné," "On the origin and function of the Fourth Aperture in some Pelecypoda," "The Anatomy of certain species of Ceratisolen and Solecurtus," "The Anatomy of the British species of the Genus *Solen*," pts. i., ii., iii., iv., "On some malformed specimens of *Anodonta cygnea* L.," "Notes on some further malformed specimens of *Anodonta cygnea* L." (1900), "Notes on some further malformed specimens of *Anodonta cygnea* L." (1902), all by H. H. Bloomer (*from the respective authors*), and the usual periodicals received in exchange.

New Members Elected.

Norman G. Hadden, Levant Lodge, Earls Croome, Worcestershire.
George Shrubsole, Ellesmere, Fields Park Road, Newport, Mon.

Candidates Proposed for Membership.

C. Theodore Cribb, The Vicarage, Shipley, Yorks.
Harry L. Stephenson, 73, Colwyn Road, Dewsbury Road, Leeds.
Herbert H. Booker, 153, Albert Road, Heeley, Sheffield.
W. T. Elliott, D.D.S., F.Z.S., 63, Temple Row, Birmingham.

Papers Read.

"Observations on the pairing of *Arion ater* (L.)," by Lionel E. Adams, B.A.

"Upon certain species of Land Mollusca living in the Southern Limestone Alps," by Maxwell Smith.

"*Crepidula fornicata* and *Petricola pholadiformis* in the Medway," by F. H. Sikes.

"Notes on the nomenclature of some Lifu shells," by J. R. le Brockton Tomlin, M.A., F.E.S.

"Descriptions of four supposed new Land Shells from British Somaliland," by J. R. le Brockton Tomlin, M.A., F.E.S.

Exhibits.

By Mr. F. H. Sikes: Specimens of *Crepidula fornicata* and very large *Petricola pholadiformis* from the Medway, to illustrate his note.

By Mr. B. R. Lucas: A number of living examples of Terrestrial Mollusca, collected during a recent visit to Madeira.

By Mr. G. C. Spence: *Clausilia bidentata* var. *gracilior*, *Hyalinia fulva*, *H. pura*, *H. crystallina*, *H. nitidula*, *Hygromia hispida* and a number of other terrestrial species collected during February last at Marple, Cheshire; also *Clausilia bidentata*, *C. laminata*, *Cochlicopa lubrica*, *Hygromia rufescens*, *Hyalinia nitidula*, *Hy. glabra* and others from Brungerley Bridge, Waddington, near Clitheroe, all taken during February last.

By Mr. C. H. Moore: An interesting series of New Zealand marine shells.

By Mr. R. Standen: Sets of *Conus musicus* from various Polynesian localities, and a string of "shell-money" from the Admiralty Islands, composed of the apical portions of this cone rubbed flat and formed into regular discs of uniform size.

By Mr. J. Kidson Taylor: A beautiful series of varietal forms of *Helix aspersa*; curiously eroded *Planorbis corneus*, *H. cantiana* var. *albida*, and *H. virgata* var. *maculata* from Scarborough; *H. arbustorum* var. *fusca* from Durham; white varieties of *H. hispida*, *Clausilia laminata*, *Cl. biplicata* and *Jaminiia cylindracea*; *Cypræa rashleighana*, *Cyp. sulcidentata* var. *xanthochrysa*, *Cyp. cribraria* var. *translucida* and a number of other fine examples of *Trivia* and *Cypræa*; *Conus zonatus* from Andaman Islands, *C. vittatus* from Panama, *C. nebulosus* from West Indies, and a very beautiful series of *C. ammiralis* from Mauritius, Ceylon, Moluccas, and Philippines.

As a special exhibit, very fine series of *Cylindrellidæ*, including about one hundred of the known species, were shewn by Messrs. Ed. Collier, R. Standen, J. W. Baldwin, and Mrs. Gill. The "Layard," "Darbishire," and general collections in the Manchester Museum were also exhibited. Mr. Collier gave an interesting résumé of the life-history and geographical distribution of the group—which according to the latest classification must now be known under the name *Urocoptide*. He drew attention to the eccentric form, and beauty of sculpture, which characterise many of these curious shells.

Pisidium personatum Malm at Morteheo—a correction.—Mr. B. B. Woodward writes me as follows: "*Pisidium personatum* from Church Close, Morteheo (v. supra p. 23) proves—or at least the specimens received from Mrs. Longstaff prove—on a recent and more thorough investigation to be *P. nitidum*. This is an addition to the Morteheo list."—ED.

A PRELIMINARY CONCHOLOGICAL SURVEY OF
MONMOUTHSHIRE,

With some Notes on Brecknockshire.

By F. H. SIKES, M.A.

(Read before the Society, June 5th, 1909).

A FORTNIGHT of leisure, and a request from the Recorder of the Monograph were the two pre-disposing causes that induced me to turn my attention last Easter to Monmouthshire, and, indeed, one cannot help wondering, when one thinks that it has for its eastern boundary the most beautiful of British rivers, namely, the winding Wye, that more conchologists have not, before this, been tempted to take a trip, in which the study of shells and scenery could be profitably combined.

At any rate, the ill wind which has left so many gaps in the census list blew me some considerable good, and at the end of the tour I was able to add 28 fresh records to the Monmouth list and 11 to that of Brecknock.

My head-quarters were made at Chepstow, Monmouth, and Abergavenny, in order to include as much of the county as possible, and I have set down a full list of the shells found, in case any other collector may wish to make a more systematic survey than was possible in the time at my disposal.

Should this be the case, I should recommend the beautiful Piercefield Woods at Chepstow, the ponds by the railway at Troy, Monmouth, and the Clydach Valley, which extends to both counties, as being likely to produce some of the still missing species.

The weather was fine when I searched there and so far as could be made out some of the species (e.g. *Pomatias elegans*) had not come out, and in addition I could only give part of a day to each place.

Perhaps one might add that many of the previous records were due to Mr. E. J. Lowe, who lived at Chepstow, but, as I was there informed, when asking for his address, he has been dead some years.

All the shells and slugs have been sent to Mr. W. D. Roebuck.

* = Monmouthshire records; † = Brecknockshire records.

Arion ater.—Common.

var. **castanea.**—Wynd Cliff, Chepstow; Piercefield Woods, Chepstow; Clydach Valley, Brecon.

var. **succinea.**—Wynd Cliff, Chepstow; Piercefield Woods, Chepstow; Monmouth.

var. **bicolor.**—Piercefield Woods, Chepstow.

- Arion hortensis.**—Wynd Cliff, Chepstow; Piercefield Woods, Chepstow.
- Arion circumscriptus.**—Wynd Cliff, Chepstow; Llanerchoeddland Wells, Brecon; Piercefield Woods, Chepstow.
- ***Vitrina pellucida.**—Common.
- Hyalinia cellaria.**—Common.
var. **complanata.**—Wynd Cliff, Chepstow.
- Hyalinia alliaria.**—Wynd Cliff, Chepstow.
- *†**Hyalinia helvetica.**—Abergavenny; Wynd Cliff, Chepstow Llanerchoeddland Wells, Brecon.
- Hyalinia nitidula.**—Common.
- Hyalinia pura.**—Common.
var. **nitidosa.**—With type.
- ***Hyalinia crystallina.**—Common.
- ***Euconulus fulvus.**—Wynd Cliff, Chepstow; Piercefield Woods, Chepstow; Symonds Yat; Penpergwm, Abergavenny; Clydach Valley, Brecon; Rhyd Goch Falls, Brecon.
- †**Zonitoides excavatus.**—Clydach Valley, Brecon.
- *†**Punctum pygmæum.**—Wynd Cliff, Chepstow; Symonds Yat; Rhyd Goch Falls, Brecon.
- *†**Pyramidula rupestris.**—Wynd Cliff, Chepstow; Clydach Valley, Brecon.
- †**Pyramidula rotundata.**—Common.
var. **pallida.**—Chepstow (Castle).
var. **pyramidalis.**—Chepstow (Castle).
- *†**Acanthinula aculeata.**—Wynd Cliff, Chepstow; Symonds Yat; Rhyd Goch Falls, Brecon; Llanerchoeddland Wells, Brecon; Erwood, Brecon.
- Helix aspersa.**—Common.
var. **undulata.**—Chepstow (Castle).
- Helix nemoralis.**—Most varieties common.
var. **undulata.**—Piercefield Woods, Chepstow.
- Helix hortensis.**—Most varieties common.
m. aff. **scalariforme.**—Monmouth.
- Helicigona arbustorum.**—Chepstow; Piercefield Woods, Chepstow; Monmouth; Penpergwm, Abergavenny; Clydach Valley, Brecon; Symonds Yat.
var. **flavescens.**—Chepstow; Monmouth; Clydach Valley, Brecon.
var. **canigonensis.**—Clydach Valley.
- Helicigona lapicida.**—Wynd Cliff, Chepstow; Chepstow; Llanerchoeddland Wells, Brecon; Clydach Valley, Brecon.
- Helicella virgata.**—Chepstow.

† *Helicella caperata*.—Common.

var. *fulva*.—Caldicot Level.

var. *subscalaris*.—Caldicot Level.

Hygromia rufescens.—Piercefield Woods, Chepstow ; Symonds Yat ; Penpergwm, Abergavenny ; Abergavenny.

Hygromia hispida.—Common.

var. *concinna*.—Common.

* *Hygromia fusca*.—Piercefield Woods, Chepstow ; Clydach Valley, Brecon.

Vallonia pulchella.—Caldicot Level ; Piercefield Woods, Chepstow.

Ena obscura.—Common.

* *Pupa cylindracea*.—Common.

* *Clausilia laminata*.—Piercefield Woods, Chepstow ; Penpergwm, Abergavenny.

var. *alba*.—Piercefield Woods, Chepstow.

Clausilia bidentata.—Common.

var. *everetti*.—Monmouth.

Cochlicopa lubrica.—Wynd Cliff, Chepstow ; Piercefield Woods, Chepstow.

Succinea putris.—Chepstow ; Caldicot Level ; Monmouth ; Symonds Yat.

var. *alba*.—Caldicot Level.

Succinea elegans.—Troy, Monmouth.

* *Carychium minimum*.—Common.

Pomatias elegans.—Common (dead shells).

* *Limnæa palustris*.—Penpergwm, Abergavenny.

Limnæa truncatula.—Common.

var. *elegans*.—Boughrood, Brecon.

Limnæa pereger.—Common.

var. *inflata*.—Troy, Monmouth.

var. *acuminata*.—Abergavenny.

var. *boissyi*.—Caldicot Level.

var. *ovata*.—Abergavenny ; Caldicot Level.

* *Limnæa auricularia*.—Canal (Mon. & Brec.).

* *Physa fontinalis*.—Troy, Monmouth.

* *Aplecta hypnorum*.—Caldicot Level.

Planorbis albus.—Monmouth.

* *Planorbis crista* var. *lævigata*.—Caldicot Level.

* *Planorbis umbilicatus*.—Canal ; Caldicot Level.

* *Planorbis spirorbis*.—Caldicot Level ; Penpergwm, Abergavenny ; Canal.

Ancylus fluviatilis.—Monmouth; Canal.

var. **capuloides.**—Llanerchoeddland Wells, Brecon.

***Acroloxus lacustris.**—Troy, Monmouth.

†**Vivipara vivipara.**—Canal (Brecon).

Bythinia tentaculata.—Common.

*†**Valvata piscinalis.**—Caldicot Level; Troy, Monmouth; Canal (Brecon).

***Anodonta cygnæa.**—Canal (Mon. & Brecon.).

*†**Anodonta anatina.**—Canal (Mon. & Brecon.); Symonds Yat.
var. **moulinsiana.**—River Wye at Monmouth.

***Sphærium corneum.**—Tintern; Symonds Yat; Canal.

var. **flavescens.**—Canal (Mon.).

***Pisidium annicum.**—Troy, Monmouth; Canal.

***Pisidium fontinale.**—Troy, Monmouth.

***Pisidium pusillum.**—Penpergwm, Abergavenny; Caldicot Level.

***Phytia myosotis.**—River Wye.

Paludestrina jenkinsi.—Caldicot Level.

OBITUARY.—A. LOYDELL.

By J. E. COOPER.

(Read before the Society, January 12th, 1910).

THE Society loses an energetic, if unobtrusive, member in A. Loydell, who died after a short illness on January 1st, 1910. Mr. Loydell was born near Northampton, but lived nearly all his life in London. He was a keen naturalist, though, being of a retiring disposition, he probably did not get the credit for all his field-work. As a conchologist he contributed to the county records of Northamptonshire and Middlesex—a list for the latter was published only last year in collaboration with the present writer. Geology claimed part of his brief holidays and for several years past he had been accumulating material for a new "Flora of Middlesex" in co-operation with some of his botanical friends.

Vertigo pusilla Müll. and **Vertigo alpestris** Alder at **Keswick.**—I was fortunate enough yesterday (September 15th) to find a colony of the above two species on the Borrowdale Road, Keswick. Both species were found together, in the proportion of about one of the former to two of the latter, beneath the top stones of a dry wall. In about fifteen minutes I took over 100 specimens.—W. J. FARRER (Read before the Society, November 10th, 1909).

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No. 3.

**ON THE HABITAT OF *VITREA LUCIDA* (Drap.)
 AT GRANGE-OVER-SANDS.**

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, November 10th, 1909).

IN 1903, whilst spending a holiday at Grange-over-Sands, I had the good fortune to come across two examples of *Vitrea lucida* (Drap.) (one dead and one living) whilst working the cliffs on Lindale Road for mollusca. This addition to the Census was recorded in a paper I wrote in conjunction with Mr. C. H. Moore.¹ This discovery remained unique for several years, and in 1906² I expressed the opinion that the shells might have arrived there with greenhouse refuse, probably thrown down from gardens above. I had not, however, then visited the top of the cliffs and could only judge from down below. On the occasion of the joint ramble of the Society to Grange on June 10th, 1908, another specimen (dead) was taken by Mr. J. Davy Dean,³ and in August of the previous year Mr. G. H. Taylor found an empty shell of this species on the cliffs.⁴ In 1908 I visited Grange again in company with Mr. R. Standen and Mr. J. Kidson Taylor, and a systematic search among the herbage on the cliffs resulted in the acquisition of fourteen examples,⁵ all adult and half the number living. The largest, found by my wife, measured 15 mm. in diameter. These were all found on the rock-ledges at no great distance from the ground.

This year I have had exceptional opportunities of thoroughly investigating the habitat, having obtained permission to explore the wood and grounds above the cliffs. The habitat, which forms part of

¹ *J. of Conch.*, xi., pp. 45-46.

² *J. of Conch.*, xi., p. 361.

³ *J. of Conch.*, xii., p. 221.

⁴ *J. of Conch.*, xii., p. 156.

⁵ *J. of Conch.*, xii., p. 329.

the extensive grounds attached to Blawith House, consists of quite primitive woodland, more or less clothed with a thick natural wood composed mainly of hazel, ash, oak and hawthorn, with occasional hollies and other trees and shrubs, the relics, no doubt, of the dense primeval forests recorded by Tacitus as covering almost every part of the coast and the interior of the country around Morecambe Bay—with the exception of some portions of the higher ground—at the time of the great invasion of the district by the Romans under Agricola, A.D. 79.

The hazel is by far the most abundant tree and the locality was formerly well-known for its rich harvest of nuts each autumn. There is no trace at all of it ever having been a garden and no introduced trees, such as conifers, have been planted there. Practically no soil covers the surface of the ground, which consists principally of angular limestone débris, resulting from the disintegration of the underlying rock. A series of small rock terraces, covered in places with moss and ivy, occurs along the western side, and on the south the area is bounded by the steep cliffs on Lindale Road. The general appearance and slope of the ground afford ample evidence, that, before the cutting of the road and railway, the woodland extended right down to high-water mark, similar to Arnside Park point on the opposite shore of the Kent.

In dry weather, and during the day, the shell is very difficult to procure, but may be found in fair numbers concealed amongst the large tufts of grass, oxeye daisy, and other plants growing on the ledges and in the crevices of the limestone cliffs. Though seeming to prefer the more open and exposed ledges of the cliffs, the species also occurs in the woodland above, among loose stones, dead leaves and moss, rarely under fallen timber. One striking feature of the habitat is its extreme dryness; there appears to be little, or no, percolation of water down the face of the cliffs, and, even after continuous and heavy rains, one or two dry days reduce it to its ordinary parched-up condition.

The species is associated on the cliffs with several of its congeners, and large numbers of *Helicella caperata* and *Hygromia rufescens*, *Ena obscura*, *Clausilia bidentata*, and a number of other smaller species also occur, more or less abundantly. A few examples of *Arion ater*, *Agriolimax agrestis*, etc., may be found in the long grass at the foot of the cliffs, but living specimens of *V. lucida* appear to be scarce so low down. Dead shells of *H. caperata* and *H. rufescens* especially, are to be found abundantly on the ledges and in "pockets," along with numerous dead mature shells of *V. lucida*. From the comparatively fresh condition of many of the two former species, it seems not

improbable that they have fallen a prey to the carnivorous propensities of *V. lucida*. Its habits in captivity lend strong support to this conclusion, as a number of individuals I had under observation refused vegetable matter if supplied with freshly killed animals of other species. Living species, even *Succineæ*, placed with them in the box, were speedily killed and the shells beautifully cleaned out. It was really very amusing on one occasion to see a *V. lucida* at each end of a dead body of *Planorbis albus* pulling away like two ducks at a worm. *Vitrea lucida* is a species which continues to breed well on in the year, and during September last, Mr. J. Kidson Taylor, who was again a member of our party, obtained a specimen which commenced to lay eggs immediately it was placed in the collecting tube. Fourteen eggs altogether were deposited.

During our stay at Grange another habitat for the species was discovered on the Furness Railway embankment, quite a third of a mile from the Lindale Road cliffs. Judging from the number of examples, both living and dead, and the large size of some of the individuals, the species appears to be well established in this new locality. Some of its companions here were *Vitrea cellaria*, *Pyramidula rotundata*, *Hygromia rufescens*, *Agriolimax agrestis*, *Arion ater* and *A. subfuscus*. The conditions under which it lives here are pretty much the same as on the Lindale Road cliffs; it occurs among stones and clinkers, overgrown with moss, ivy, and small clumps of nettles.

Though, in all probability, the species was introduced here on laying the railway line, the original specimens being carried from the cliffs either with timber or stones for building up the track,¹ no doubt exists in my mind as to it being indigenous in the Grange district, and it is quite possible that it will yet be found in other places in the neighbourhood, especially where patches of the old woodland have remained untouched.

There appears to be some considerable difficulty among collectors in distinguishing *V. lucida* from its near ally *V. cellaria*, especially in its young state. In the adult stage there is no mistaking the species, as the characteristic enlargement of the last whorl as it approaches the aperture, coupled with its large size, distinguishes it at once from any of its allies. But in its immature stages it is often extremely difficult to decide whether it is *lucida* or the large convex variety of *cellaria* (var. *compacta* Jeff., probably, *V. scharffi* Kenn., in part) which occurs so abundantly in certain areas. Immature shells of *V. lucida* resemble this form very closely, both in shell and colour of animal.

¹ Since writing this paper Mr. F. Booth tells me that he found a dead shell of the species on the railway embankment near Holme Island, which might indicate another similarly introduced colony.

In *V. lucida*, however, the deep blue colour, in all specimens I have observed, always extends over the footsole, though here it is usually paler; in *V. cellaria* var., the footsole is almost white, the blue colour finishing off abruptly at the margins of the side-areas. A little attention to this point often settles the question at once. In extreme cases of doubt anatomical examinations will soon decide the matter. I am strongly in favour of this latter course when dealing with immature shells, as I know of several instances where these large forms of *cellaria* have been placed on record as *lucida*. So far I have not succeeded in finding any fixed characters to distinguish the shells of immature *lucida* from those of the above mentioned variety of *cellaria*, and on this account I am somewhat reticent in recording, as *V. lucida*, several fossil shells obtained, along with scores of *V. cellaria*, from the cave-earth at Dog Holes, Warton Crag.¹ These shells have a remarkable resemblance to *V. lucida*, and differ altogether from *V. cellaria*. They are, unfortunately, immature, and until further mature examples are found, it would, perhaps, be unwise to record them as *V. lucida*, especially as hitherto this species has not been found fossil in this country—the few doubtful specimens from the Happaway Cavern, Devonshire, being excepted.



New Herefordshire Records.—The three following species, which I took last summer, are new to Herefordshire, viz.:—*Planorbis vortex* (L.), Huntsham Pool; *Pisidium subtruncatum* Malm, and *P. gassiesianum* Dup., common in a pond at Ham Green, between West Malvern and Mathon. The following additional localities may be noted: *Agriolimax levis* (Müll.), Mordiford, Whitbourne, Hay, Hardwick, Cusop Dingle; *Hygromia fusca* (Mont.), Kerne Bridge, Whitchurch, Kilpeck, Cusop, and very common on the Great Doward; *H. arborum* (L.), Sapey Bridge; *Azeca tridens* (Pult.), Cusop Dingle, common; *Clausilia laminata* (Mont.), Hardwick, Cusop, Great Doward; *Sphyradium edentulum* (Drap.), Kerne Bridge, Colwall, Ledbury, Great Doward; *Neritina fluviatilis* (L.), common in the Teme near Whitbourne; *Anodonta cygnea* var. *anatina* L., West Malvern; *Sphærium lacustre* (Müll.), Mathon and Holme Lacey.—J. R. I.E. B. TOMLIN (*Read before the Society*, January 12th, 1910).

Paludestrina jenkinsi in West Sussex.—Early in September of this year (1909) I found *P. jenkinsi* in characteristic quantities for a mile in the ditches connected with the river Adur at Beeding. I could find none in the river itself, but it is quite possible for the shells to be washed inland, as the river is tidal some miles above Beeding. At Shoreham Baltic timber is unloaded. The shells were all of the uncarinated form.—LIONEL E. ADAMS (*Read before the Society*, November 10th, 1909).

¹ For list of shells see *Lancashire Naturalist*, Oct.—Dec., 1909.

THE NON-MARINE MOLLUSCA OF FRIESLAND.

By F. H. SIKES, M.A.

(Read before the Society, November 10th, 1909).

THE distribution of land and freshwater shells in Friesland being, so far as I could make out, entirely unknown or at any rate unpublished, it seemed a good district to visit this summer, and though the results are a trifle disappointing—forty species, with some interesting varieties, were all that I managed to find—I have tabulated them for the benefit of anyone that may hereafter intend to make a more lengthy and systematic survey of the country.

The Friesland meres cover about 50,000 acres, ten times the size of the Norfolk Broads, and in the 600 square miles, wherein they are to be found, there is the most intricate network of waterways imaginable.

Over the greater part of these I sailed during the sixteen days I was abroad, and took soundings whenever there was a chance of finding anything, but for all practical purposes I might have confined myself to Heerenveen, as every species but five existed there.

The reason for the paucity of land shells is not far to seek, as most of the country is partially, and sometimes completely, water-logged. Heerenveen, however, proved to be a little oasis in a watery desert, and closer search than I was able to devote may turn out more than the thirteen new species that resulted from the two days I was there.

Owing, also, to a wreck in the middle of a large lake, which nearly brought my shell-collecting to a summary close, I was unable to visit a likely wooded district near Stavoren.

The freshwater shells are generally the same throughout (with varieties) as the canals run one into the other and rivers are non-existent.

Succinea oblonga, which may be considered the best discovery, occurred plentifully in a marsh at Heerenveen, thereby differing considerably from its habitat in Georghenthal, Thuringia, where I found it far from water in two disused quarries.

Dreissensia polymorpha occurred at Grouw, where there are timber-yards, and may, I suppose, be considered a Russian import; it seems to have spread pretty freely and most favoured the shells of *Anodonta cygnea*.

Perhaps it would be well to add that I am indebted to Mr. J. W. Taylor for verifying or altering my conclusions, except in the case of the slugs, which I was unable to send.

- Arion ater* (L.).—Passim.
 var. *rubra* Baudon.—Heerenveen.
 var. *succinea* Müll.—Heerenveen.
 var. *castanea* Dum. & Mort.—Heerenveen.
Zonitoides nitidus (Müll.).—Heerenveen.
Hyalinia crystallina (Müll.).—Heerenveen.
Euconulus fulvus (Müll.).—Heerenveen.
 var. *alderi* Gray.—Heerenveen.
Pyramidula rotundata (Müll.).—Heerenveen.
Helix nemoralis L.—
 var. *rubella* Moq.—Heerenveen.
Helicigona arbustorum (L.).—Heerenveen.
 var. *undulata* Sikes.—Heerenveen.
Hygromia hispida (L.).—Heerenveen.
Cochlicopa lubrica (Müll.).—Heerenveen.
 var. *fusca* Moq.—Heerenveen.
Succinea putris (L.).—Passim.
 var. *charpyi* Baud.—Heerenveen.
Succinea elegans Risso.—
 var. *berilloni* Baudon.—Heerenveen.
Succinea oblonga Drap.—Heerenveen.
Carychium minimum (Müll.).—Heerenveen.
Limnæa stagnalis (L.).—Passim.
 var. *vulgaris* West.—Sneek.
Limnæa palustris (Müll.).—Passim.
 var. *tincta* Jeffreys.—Heerenveen and Sneek.
 var. *maritima* Clessin.—Sloten.
Limnæa pereger (Müll.).—Passim.
 var. *inflata* Kobelt.—Heerenveen.
 var. *acronica* Studer.—Heerenveen.
 var. *lacustrina* Clessin.—Sloten.
Limnæa auricularia (L.).—Heerenveen.
 var. *acuta* Jeffreys.—Heerenveen and Sloten.
 var. *reflexa* Nelson.—Heerenveen.
Physa fontinalis (L.).—Passim.
Planorbis corneus (L.).—Passim.
 var. *anthracia* Bourg.—Sneek.
Planorbis albus Müll.—Heerenveen.
Planorbis carinatus Müll.
 var. *disciformis* Jeff.—
Planorbis umbilicatus Müll.—Passim.
 var. *major* Pascal.—Heerenveen.
Planorbis vortex (L.).—Passim.
Planorbis contortus (L.).—Sneek.

Acroloxus lacustris (L.).—

var. **compressa** Jeffreys.—Heerenveen.

Vivipara contecta (Millet).—Passim.

Bithynia tentaculata (L.).—Passim.

var. **producta** Menke.—Heerenveen, Heeg, and Sloten.

m. **decollatum**.—Sloten.

Bithynia leachi (Shepp.).—Sloten.

Valvata piscinalis (Müll.).—Heerenveen and Sneek.

Unio tumidus Retz.—Passim.

var. **acuta** Pascal.—Uilst.

Unio pictorum (L.).—Heeg.

Anodonta cygnæa (L.).—Passim.

Anodonta anatina (L.).—Sneek and Heeg.

var. **piscinalis** Nilsson.—Heeg.

Sphærium corneum (L.).—Passim.

var. **nucleus** Studer.—Heerenveen.

Sphærium rivicola (Leach).—Heerenveen, young specimens.

Sphærium lacustre (Müll.).—Heerenveen.

var. **rotunda** Jeff.—Heerenveen.

Pisidium fontinale Drap.—Heeg.

Pisidium henslowanum (Shepp.).—Heeg.

Pisidium gassiesianum Dupuy.—Heeg.

Pisidium pusillum (Gmelin).—Heeg and Sneek.

Pisidium obtusale Pfeiff.—Heerenveen.

Dreissensia polymorpha (Pall.).—Heeg, and on *Anodonta cygnæa* at Grouw.



Limax tenellus Müller in **Oxfordshire**.—A search in the extensive beech woods on the Chilterns in the neighbourhood of Checkendon, near Reading, early in September, 1909, was rewarded by finding examples of *Limax tenellus* var. *cerea*. The slugs, which were feeding on fungi, were associated with *Arion subfuscus*, *A. intermedius* and var. *grisea*, and *A. ater* with its varieties *castanea*, *succinea* and *oculata*. Beneath a prostrate tree trunk in one wood I found a single specimen of *Limax cinereo-niger* var. *hedleyi*.—CHAS. OLDHAM (*Read before the Society*, November 10th, 1909).

Carychium minimum near **Limerick**.—At the end of January while walking ‘cross country’ I came across a deposit of drift of various kinds, and thinking that it might contain some shells I took home just one handful to examine at my leisure. On doing so I found a few species represented, but *Carychium minimum* seemed to be rather plentiful, so much so that I started to count them and from one small parcel of drift, composed of sticks, leaves, grasses, etc., I obtained no less than 217 specimens of *Carychium minimum*. I intend to gather some more of the drift, and if any reader wishes some, I will endeavour to supply it on receipt of address.—HARRY FOGERTY (*Read before the Society*, February 9th, 1910).

OBITUARY NOTICE.

G. W. CHASTER, M.R.C.S., L.R.C.P.

By EDWARD COLLIER.

CONCHOLOGY has suffered a very great loss by the death of my old friend, Dr. G. W. Chaster, which occurred on Thursday morning, May 5th, at his residence, 42, Talbot Street, Southport, after a very short illness, at the early age of 47.

Dr. Chaster was the son of Mr. G. W. Chaster, of Wigan, who removed to Southport when his son was still very young. He received his training at University College, Liverpool, where he had a very successful career. He was Jones scholar in 1882, and took the Bronze Medal for Anatomy and Physiology in June of that year. In 1883 he became Torr Gold Medallist, and in 1885 was appointed assistant demonstrator in Physiology at the University. In 1886, he took the Bronze Medal for Histology, and the Silver Medal for Pathology in 1887. In 1889 he won the Holt Tutorial Scholarship, and became assistant demonstrator in Anatomy, and clinical assistant at the Liverpool Royal Infirmary. In 1896 Dr. Chaster was appointed honorary assistant on the medical staff of the Southport Infirmary. In 1903 he was appointed one of the honorary medical officers, and fulfilled the duties attached to this office until the year 1907, when he had a very serious illness, and retired, but was appointed consulting medical officer to the Infirmary, which position he retained to the time of his death.

Dr. Chaster, all his life, was a student of Natural History, and other scientific subjects. He was a keen conchologist and collected largely, not only land and freshwater shells, but marine as well, especially the smaller ones, on which he was a great authority. He was also a very good coleopterist, and had a large collection. He joined the Conchological Society as a member in 1895, and was President in 1904-5 and 1905-6, when he gave a presidential address on "Species and Variation," which he treated in a thorough, scientific manner. He was one of the committee appointed in 1902 by the Council of the Conchological Society to prepare a "List of the British Marine Mollusca and Brachiopoda," and spared no pains to bring the part entrusted to him thoroughly up to date in classification and nomenclature.

He contributed many papers and short notes to the Journal of the Society, including: "Shell hunting in Merionethshire," "A contribution towards a list of the Marine Mollusca and Brachiopoda of the neighbourhood of Oban," "On the occurrence of *Pulsellum*

lofotense Sars, in the Irish Sea," "*Adeorbis unisulcatus*, n.sp., from the Irish coast," "A cross between *Limnæa stagnalis* and *Limnæa auricularia*," "Changes in the generic names in the Pyramidellidæ," &c.

He also wrote several papers for the "Irish Naturalist," as he had visited Ireland very often, and generally of late years had spent most of his holidays there. The United Irish Field Clubs hold a conference every three years, and we were both invited to them, along with others, as they knew we had collected considerably in Ireland, and often after the conference was over, Dr. Chaster and I stayed on and worked some neighbouring district. We have been together to Kenmare and Killarney, Galway, Aran Islands and Roundstone in Connemara for Dog's Bay, Enniskillen, Sligo and Bundoran, with a visit to the Island of Inishmurray, Ballycastle and district, Horn Head, Bunbeg and Burton Port in N.W. Donegal, and last year we went to Achil Island, and by invitation of the Royal Irish Academy we helped to work out the molluscan fauna of Clare Island in Clew Bay, where we spent a delightful week. On Clare Island a considerable number of land shells had already been found by some of the Irish naturalists, but there was one, *Acme lineata*, which Dr. Chaster said should be there, and he worked all likely localities for it. Sure enough he ultimately found it by bringing to the hotel damp moss and drying it and then looking carefully amongst what was left.

He was also a great lover of Irish antiquities, and collected pre-historic remains from the "kitchen middens" along the coast. He also collected celts, flint implements, and particularly ancient lamps and primitive lighting appliances.

With him I have visited many an Irish cottage, often far away from any doctor, and if he ever found anybody unwell he was soon prescribing for them, and as he always carried a small box of medicines with him he would tell them to send down to the hotel and he would give them something to help to cure them.

I well remember our visit to the Island of Inishmurray, off the coast of Sligo, as when there we found a youth, who had received a wound in the knee, when landing some fish into his boat, and this had caused blood-poisoning to set in. Dr. Chaster said he could only have lived a few days, so he advised the father to let us bring the youth off the island, which we did, and conveyed him to the infirmary at Sligo, where he was ultimately cured, and the last we heard of him was that he was a sailor on one of the large American liners.

Dr. Chaster was one of the founders of the Southport Natural Science Society, along with other well-known Southport gentlemen. For a number of years he was editor of the "Proceedings" of that

Society, contributing various papers of great interest to Southport, dealing largely with the Foraminifera of the district. The Society was established in 1890, and the first report of its proceedings contains a paper by him which is considered quite a classic on the subject. This paper was so highly regarded that it was specially referred to in connection with the meeting of the British Association at Southport in 1903, on the committee of which Dr. Chaster played a prominent part. He also contributed to the handbook prepared for that occasion some important chapters dealing respectively with the Protozoa-Foraminifera, Coleoptera (in conjunction with Mr. E. J. Burgess Sopp, F.E.S.), and Mollusca of the Southport district. He was elected President of the Society in 1897, and his Presidential Address was "The Stone Age," when he exhibited many interesting objects from his fine collection of Irish and other prehistoric implements and weapons.

He was an ardent microscopist, and extremely ingenious in inventing little appliances for facilitating the collection and preparation of specimens, and nearly always had something fresh to show us in this line when we met on our annual excursions.

B I B L I O G R A P H Y.

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

Manual of Conchology, Structural and Systematic: Second series. — Pulmonata, vols. xix. and xx. (parts 73-78), by H. A. PILSBRY, D.Sc.

These two volumes contain monographs of the families *Oleacinidae* and *Ferussacidae*. The former family was monographed by Tryon in the first volume of this series with a classification mainly borrowed from Pfeiffer's *Nomenclator Helicorum Viventium*, and based upon conchological grounds. Anatomical investigations and the discovery of numerous new species made a revision advisable. Many types from the collection of C. B. Adams are now figured for the first time.

The *Oleacinidae* are chiefly confined to tropical America, but the single genus *Poiretia*, typified by the well-known *algira* Brug., is a native of the Mediterranean region. Of this genus there are three or four recent species and numerous fossil ones throughout the tertiary formations of Europe, as far north as the Isle of Wight, and one species occurs in the Cretaceous of Provence. Probably, therefore, the recent species of *Poiretia* are survivors of a stock which is dying out. The family is placed by Pilsbry in the superfamily *Agnathomorpha*, along with *Aperidae*, *Rhytididae*, *Streptaxidae*, and *Circinariidae*. The superfamily *Agnatha* (families *Testacellidae*, and *Trigonochlamydidae*) is primarily distinguished therefrom by the presence of distinctly developed pedal grooves.

As classified by Pilsbry, *Oleacinidae* contains eleven genera, viz.: *Pseudosubulina*, *Spiraxis*, *Varicella*, *Oleacina*, *Rectoleacina* (n.g. for Cuban species of *Streptostyla*), *Streptostyla*, *Oryzosoma* (n.g. for a single species of *Streptostyla* with perforate axis), *Strebelia*, *Poiretia*, *Salasiella*, and *Euglandina*. The familiar name *Glandina* falls

before *Oleacina* of Bolten. It appears that only about half of these genera are at all adequately known anatomically, three being totally unknown, so that a stable classification is not yet possible.

It may be noted that the new specific name of *Poiretia woodi* is given to ¹*Bulinus convexus* S. V. Wood (1877), *nec Pfeiffer* (1855), an Oligocene shell from the Isle of Wight of somewhat uncertain position.

The other family, *Ferussacidae*, Dr. Pilsbry tells us he retains "simply as a temporary arrangement, pending more exact knowledge of the several genera." He would not hesitate to include *Cochlicopa*, *Azeza*, and *Cæcilioides* in the *Achatinellidae* (? *Achatinidae*), were it not that some place must be found for *Coilostele*, *Glessula*, and other genera, of whose anatomy the knowledge is not yet forthcoming.

As constituted, *Ferussacidae* consists of ten genera, *viz.*: *Ferussacia*, *Cryptazeca*, *Calaxis*, *Digonaxis*, *Azeza*, *Cochlicopa*, *Hohenwartiana*, *Cæcilioides*, *Coilostele*, and *Glessula*; but Pilsbry evidently anticipates its eventual dismemberment, as he says that, while the pallial organs of *Cochlicopa* only are known, the other organs differ so widely in this genus and *Ferussacia*, that they can hardly be members of one family.

Under *Cochlicopa*, he gives a very complete and exhaustive account of *C. lubrica* (Müller), with all its races and varieties. Two sinistral examples from the continent are on record. He considers that all the variously named dwarf forms are local races, corresponding to drier local conditions, rather than a homogeneous race, and groups them under the name of var. *lubricella* "Ziegler" Stabile.

Dr. Pilsbry has already given the ²reasons which induce him to call our *Azeza A. menkeana goodalli* Fér., but we do not feel convinced of the necessity for adopting this rather cumbersome name. The well-known *Chondrula tridens* (Müller) was described as a ³*Helix*, and it does not seem to us to follow that because this species was subsequently placed by ⁴Gmelin in *Turbo*, Pulteney's *Turbo tridens* falls, however faulty the description or whatever the misconception, provided that there is no real doubt what Pulteney's shell was. The possibility of doubt, as Dr. Pilsbry admits, is quite set at rest by Montagu.

Under *Cæcilioides acicula* (Müller) we have the history of the name *C. anglica*, which was described by ⁵Bourguignat simply from Reeve's figure of *C. acicula* in the *Conch. Icon.*, this figure being also reproduced on a larger scale. Bourguignat differentiates our shell on the ground of its larger size, more convex whorls, deeper suture, rounded aperture, and strongly truncate columella. Whether these characters are constant, and of specific or subspecific value, is a point that has never—as far as we know—been discussed by English conchologists.

A Guide to the Natural History of the Isle of Wight. Edited by FRANK MOREY, F.L.S. (The County Press, Newport, Isle of Wight; and Wesley and Son, 28, Essex Street, Strand, W.C.; price 8/6 net).

This comprehensive volume of 560 pages, with 28 full-page photographs, 4 cliff-sections, and an excellent map, consists (as the title-page tells us) of a series of contributions by specialists relating to the various branches of natural history and kindred subjects. These contributions take the form of complete and well-annotated lists, with interesting introductions to each.

There is a capital outline of the geology of the island by Mr. G. W. Colenutt, F.G.S.

1 *cf* Taylor's Mon. L. and F.W. Moll. Brit. Is., II., p. 29.

2 *J. of Conch.*, vol. 12, p. 137.

3 Müller, Verm. Hist. (1774), II., p. 106.

4 Gmelin, Syst. Nat. (1788), p. 3611.

5 Rev. et Mag. de Zool. 1856, p. 384, pl. 12, figs. 4, 5.

The whole work has been very thoroughly done, and the more obscure orders are throughout adequately dealt with: thus, the botanical part includes chapters on Marine Algæ, Freshwater Algæ, and Hepatics; and separate sections are devoted to such inadequately studied creatures as the Infusoria, Porifera, Cœlenterata, and Myriapoda.

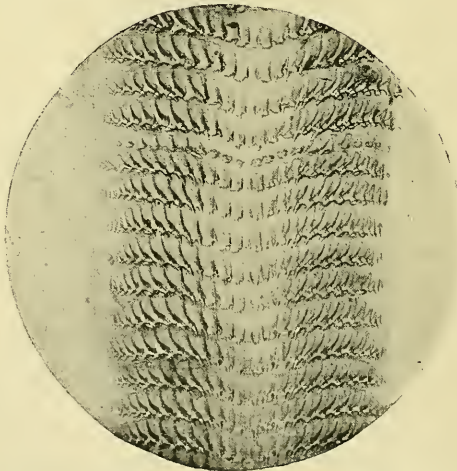
The chapter on Mollusca is written by the Editor himself. The land and freshwater list records 93 species, among which may be specially noted *Vertigo minutissima* and *V. moulinsiana*, the latter from marshy ground near Totland Bay and Brading. These localities are additions to the list given in the *J. of Conch.*, vol. 12, p. 214. Mr. Morey points out that the records of *Succinea oblonga* given in the *Victoria County History* of the Isle of Wight probably refer to specimens found in an alluvial deposit. Of marine shells the list is rather disappointing, totalling only 140 species, nearly the whole of these being either littoral species or dead shells washed ashore from the Laminarian zone. It is remarkable that, apart from the few species recorded in the *Victoria History*, this is the first published marine list for the island.

ABNORMAL RADULA OF *VITREA LUCIDA* (Drap.).

BY J. E. COOPER.

(Read before the Society, September 8, 1909).

THE illustration below is that of the radula of an exceptionally fine *Vitrea lucida* collected at Castle Rising in 1907. It is remarkable



for the row of deformed teeth nearly in the centre of the radula. I cannot suggest any cause for this. Mr. W. Moss informs me that in his experience such aberrations are very rare.

LAND AND FRESHWATER MOLLUSCA AT CLOGHANE,
co. KERRY.

By J. R. LE B. TOMLIN, M.A.

(Read before the Society, September 8th, 1909).

THE following list of some fifty species is the result of a week's stay at the little village of Cloghane in April, 1909. It must be admitted that coleoptera and not mollusca were the primary object of the visit, or, no doubt, the list would have been longer. It will be obvious that hardly any search was made for freshwater species. Cloghane is situated on the north side of the big Dingle peninsula of County Kerry, at the head of Brandon Bay, some eight or nine miles west of Castlegregory, which is the terminus of the northern branch of the Tralee and Dingle Railway. It is practically shut in on the land side by high mountains, of which Brandon—the nearest and highest—rises to a height of 3,127 feet, with several tarns on its slopes. Away from the coast line the land consists entirely of the familiar boggy fields, divided by high gorse-grown banks. Of the shore a considerable part, between Cloghane and Castlegregory, is low sandhills, bordered by a narrow strip of marshy land which proved a prolific hunting-ground.

Slugs were extremely plentiful, especially under stones on the tops of the banks, though generally immature owing to the time of year.

I am indebted to Mr. W. D. Roebuck for very kindly examining and naming consignments of slugs.

Limax maximus L.—The few examples observed all belonged to the var. *sylvatica* Morelet.

Limax cinereo-niger Wolf.

var. **maura** Held.—Young specimens of both type and variety occurred not uncommonly on Brandon Mountain at an elevation of 2,500—3,000 feet.

Limax arborum Bouch.—Not uncommon in woods. One example occurred of var. *bettonii* Sordelli sub-var. *obscura* Esmark.

Agriolimax agrestis (L.).

var. **reticulata** Moq.—The common form.

var. **violacea** Gassies.—One specimen.

Agriolimax lævis (Müller).—Rare, in marshy ground near the sea; a new record for co. Kerry.

Milax gagates (Drap.).—Not at all common.

var. **rava** Williams.—Rare.

Vitrina pellucida (Müller).—Only dead shells seen.

Vitrea crystallina (Müller).—Abundant in damp moss.

Vitrea cellaria (Müller).

Vitrea alliaria (Müller).

var. **viridula** Jeff.

Vitrea nitidula (Drap.).

Vitrea pura (Alder).

var. **nitidosa** Gray.

Vitrea radiatula (Alder).—All the above occurred sparingly.

var. **viridescenti-alba** Jeff.—Two specimens.

Zonitoides nitidus (Müller).—Only noted in some swampy ground close to the shore.

Euconulus fulvus (Müller).—Common.

Arion ater (L.).—Abundant.

var. **castanea** Dum. & Mort.—Common.

var. **bicolor** Roebuck.—Several, but not quite characteristic.

var. **aterrima** Taylor.—Not uncommon on Brandon Mountain above 2,500 feet. "The blackest I have ever seen" (Roebuck).

Arion subfuscus (Drap.).—Common.

Arion circumscriptus Johnston.—Not common.

Punctum pygmæum (Drap.).—A few in damp moss.

Sphyradium edentulum (Drap.).—Common, especially when sweeping long, thick herbage with a strong net for coleoptera. My experience everywhere is that *S. edentulum* is always the commonest shell obtained in this manner. Sometimes it can be swept by scores.

Pyramidula rotundata (Müller).—Very common.

Helicella itala (L.).

var. **instabilis** Zgl.

var. **leucozona** Taylor.—A very abundant species on the sandhills, and invariably of the small, high-spired *instabilis* form, averaging 7 mm. in breadth. The commonest coloration is that of the var. *leucozona*.

Helicella caperata (Montagu).—Common, but small.

Hygromia hispida (L.).

var. **hispidosa** Mousson.

Hygromia rufescens (Pennant).

Acanthinula aculeata (Müller).—In damp moss, rare.

Vallonia pulchella (Müller).

Vallonia costata (Müller).—Both these forms were scarce, and only occurred in the damp ground near the shore.

Helix aspersa (Müller).—Common.

var. **tenuior** Shuttleworth.—Rather common on the sandhills near Brandon.

var. **conoidea** Picard.—By no means uncommon at Brandon.

var. **nigrescens** Moq.—One specimen.

var. **flammea** Picard.—Rare.

var. **albofasciata** Jeff.—Two specimens at Brandon.

Helix nemoralis L.—Fairly common on the sandhills and under stones on the tops of the hedge-banks. Far the commonest formula noted was 00300, generally in very richly coloured var. *rubella*. Most of the shells were unusually thin.

var. **olivacea** Risso.—One specimen.

var. **libellula** Risso.—Fairly common.

Cochlicopa lubrica (Müller).—Very common.

Jamnia anglica (Fér.).—Not common, always in thick feathery moss.

var. **pallida** Jeff.—Two or three with the type.

Jamnia cylindracea (DaCosta).—Very common.

var. **curta** West.—Occasional.

Jamnia muscorum (L.).—Under stones near the shore.

Vertigo antivertigo (Drap.).—Common in marshy ground near the shore.

Vertigo substriata (Jeff.).—One with the last.

Vertigo pygmæa (Drap.).—Common.

Vertigo angustior (Jeff.).—Extremely local, but not uncommon under stones on the banks of a small stream, close to where it entered the sea. Rather variable in size.

Balea perversa (L.).—Not uncommon, especially on old gorse-bushes—a predilection I have often noticed in *Balea* before.

Clausilia bidentata (Ström).—Most of the specimens noticed were of the var. *everetti* Miller.

Succinea elegans Risso.—Common in marshy ground near the shore.

Carychium minimum Müller.

Ancylus fluviatilis Müller. Occurred in the greatest profusion in a series of small tarns about 2,500 feet up Brandon Mountain. The shells are so thin as to be almost transparent, and considerably eroded. The tarns form a series of rock basins, destitute of any obvious vegetation, and consist entirely of rain-water. I could not discover any other species of mollusca inhabiting them.

Limnæa pereger (Müller).

Limnæa palustris (Müller).

Limnæa truncatula (Müller).

Planorbis spirorbis (L.).

Aplecta hypnorum (L.).—Abundant in little mossy drains on the sandhills. All the specimens were rather small and of a deep red colour, often iridescent (var. *rubra* Tryon).

Pisidium pusillum (Gmelin).

THE MARINE MOLLUSCA OF THE YORKSHIRE COAST
AND THE DOGGER BANK.

BY J. A. HARGREAVES.

(Read before the Society, November 10th, 1909).

THE following is an annotated list of the marine mollusca of the coast of Yorkshire and the Dogger Bank.

"The Dogger Bank occupies the centre of the North Sea, is 200 miles in length and from 30 to 50 miles broad, commencing about 60 miles from the Yorkshire coast, and intermediate between the shores of England and Denmark. Its average depth is 15 fathoms, though in a few places it is only seven, with pits of deep water here and there, the most notable of which are the Great and Little Silver Pits, and the Well Pit. The Bank gradually slopes into deeper water ranging from 40 to 50 fathoms, and it is here that the rarer species of *Fusi*, &c., are obtained, the fauna of the Bank itself corresponding to that found in shallow water near the shore" (Leckenby).

I have consulted the following works, the abbreviations under which they are subsequently referred to being given in brackets:—

"British Mollusca," Forbes & Hanley, 4 vols., 1853 (F. & H.).

"British Conchology," J. G. Jeffreys, 5 vols., 1862-69 (Jeff.).

"British Association Report," 1875 (Brady).

"Natural History Transactions of Northumberland and Durham," 1867 (Brady).

"Additions to British Conchology," by J. T. Marshall, six parts published in the *Journal of Conchology*, 1893-1902, and one part for private circulation, 1903 (Marshall).

"Notes on the British species of *Buccinum*, *Fusus*," &c., by J. T. Marshall, *Journal of Malacology*, vol. 8, 1902, (Marshall).

"Revision of British Mollusca," Canon Norman, *Annals & Mag. of Nat. History*, 1890-99 (Norman).

"Report of the Cleveland Naturalists' Field Club," 1896-97-98 (D.F., D. Ferguson, author of "Natural History of Redcar and Neighbourhood," 1860; J.H., late Rev. J. Hawell, Ingleby Greenhow; M.L.T., M. L. Thompson).

"Marine Mollusca of Sandsend," by Miss M. V. Lebour, *The Naturalist*, May, 1902 (M.V.L.).

"North Sea Dredging," by Leckenby and Marshall, *Ann. & Mag. of Nat. History*, December, 1875 (L. & M.).

"Dredging on the Dogger Bank," by G. H. Parke, *The Naturalist*, December, 1864 (Parke).

"List of Scarborough Mollusca," by Bean, in "Theakston's Guide to Scarborough," 1866 ed. (Bean).

Journal of Conchology.

The Naturalist.

"Transactions of the Hull Scientific and Field Naturalists' Club,"
1903 (T.P., T. Petch).

Journal of the Marine Biological Association, May, 1908 (M.B.A.).

Victoria History of Yorkshire, 1907 (M.B.A., &c.).

Other abbreviations used are:—

(Sc. Mus.) for specimens in Scarborough Museum.

(Y. Mus.) for specimens in York Museum.

(Bean) for specimens in Bean's collection.

(Bull.) for "Bulletin des Résultats, &c., Conseil Permanent International pour l'Exploration de la Mer."

(D.) Davis in *Victoria History of Yorkshire*.

The list of the shell-bearing mollusca by Bean (died December 22, 1866) is wonderfully complete, but includes several importations which I have omitted. In all instances marked "Scarborough (Bean)," the coast of Yorkshire or the Dogger Bank may be meant, no definite localities being given, and a similar latitude may be assigned to Scarborough Museum specimens. I have also had notes from the Rev. W. C. Hey, whose recent death is so much to be deplored, and from Messrs. Harman and Gyngell, of Scarborough, who have made notes of their observations for many years. In all these cases I have given the name of the recorder. For all notes without initials I am responsible. I have spent considerable time in examining shells and from the shore at Scarborough, which I have found productive in species, but not so in specimens except of the commonest kinds, and I am indebted to Mr. J. R. le B. Tomlin for examining and naming for me all the smaller and more critical species. Without his assistance these notes would not have been compiled.

Chætoderma nitidulum Lovén.—In Silver Pit, east of Hull, 37 fathoms, by German Expedition (*fide* Norman).

Lepidopleurus cancellatus (G. B. Sowerby).—Scarborough (Bean).

Hanleya hanleyi (Bean).—Scarborough (Bean); North Bay, one specimen.

Tonicella marmorea (Fabricius).—Robin Hood's Bay, 30 fathoms, rare (Brady); Scarborough (Bean); not uncommon in North Bay some years ago.

Tonicella ruber (Lowe).—Redcar (W.C.H.); common at the roots of *Laminaria digitata*, Sandsend (M.V.L.); both bays, Scarborough.

Callochiton lævis (Montagu).—Scarborough (Bean and Sc. Mus.).

Craspedochilus onyx (Spengler).—Dogger Bank (Brady); Tees Mouth and off Whitby (M.B.A.); off Scarborough, 15 fathoms (W.C.H. and Sc. Mus.); Cayton Bay and Hayburn Wyke (D).

Craspedochilus cinereus (Linné).—Abundant.

Acanthochites fascicularis (Linné). — Redcar (W.C.H.); common, Sandsend (M.V.L.); found occasionally in both bays, Scarborough; Filey (D.).

Nucula nucleus (Linné).—Generally distributed.

var. **radiata** Forbes & Hanley.—Dogger Bank (L. & M.).

Nucula nitida G. B. Sowerby.—Widely distributed.

var. **turgida** Marshall.—Dogger Bank (L. & M.).

Nuculana minuta (Müller).—Dogger Bank, moderately common (Brady and others); Scarborough (Sc. Mus.); Withernsea (M.B.A.).

var. **brevirostris** Jeff.—Off Scarborough (Jeff.).

var. **curta** Marshall.—Dogger Bank (Marshall).

Nuculana tenuis (Philippi).—Dogger Bank (Brady); one in shellsand, Sandsend (M.V.L.); Scarborough (Bean and Sc. Mus.); one fresh specimen in shellsand, South Bay, Scarborough.

Anomia ephippium Linné.—Abundant.

var. **squamula** Linné.—Dogger Bank (L. & M.); Scarborough (Bean).

var. **aculeata** Müller.—Dogger Bank (Brady and L. & M.); common, Sandsend (M.V.L.); Scarborough (Bean and M.B.A.).

Anomia patelliformis Linné.—Redcar (D.F.); off the coast, Scarborough (J. S. Edwards); with *A. ephippium* at Scarborough, but much rarer; Bridlington Bay, Flamborough (M.B.A.).

Glycimeris glycimeris (Linné). — Dogger Bank (L. & M.); Scarborough (Bean and Sc. Mus.); occasionally brought into Scarborough by trawlers.

Barbatia lactea (Linné).—Filey (Strickland); Dogger Bank, single valves (Parke); Scarborough (Bean).

Arca tetragona Poli.—Dogger Bank (L. & M.); off the Tees (M.B.A.); rare, Scarborough (Bean).

Arca nodulosa Müller.—Dogger Bank (L. & M.).—Identified by Jeffreys as *Arca imbricata* Poli, but as above by Leckenby.

Mytilus edulis Linné.—Common.

var. **galloprovincialis** Lamarck.—North Bay, common.

var. **pellucida** Pennant.—Scarborough (Bean); Bridlington.

var. **incurvata** Pennant.—Scarborough (Bean and Sc. Mus.); Scalby Mills.

Volsella modiolus (Linné).—Common.

Volsella barbata (Linné).—Staites (A. T. Watson); rare, on rocks and stony ground in 18 fathoms, Scarborough (Bean).

Of late years has several times been recorded for the Yorkshire coast, but in every case where I have been able to see the specimens they have proved to be *V. modiolus*.

Volsella phaseolina (Philippi).—Scarborough (Bean).

Modiolaria marmorata (Forbes).—Dogger Bank (Brady and Parke); very large (L. & M.); Redcar, at roots of seaweed (D.F.).

In numbers on Scarborough Pier when the trawlers land *Pecten opercularis*. Ascidians in numbers are mixed with the Pectens, and quite ten per cent. contain *Modiolaria*, generally *marmorata*, but quite frequently *discors*, and very rarely *Saxicava rugosa*.

Modiolaria discors (Linné).—See *M. marmorata*.

Scarborough (Bean); Cayton Bay, alive (Harman); between Withernsea and Hornsea (M.B.A.).

Modiolaria discrepans (Leach).—Dogger Bank, to 45 fathoms (Brady and others); dead shells off Staithes, 25 fathoms (Brady); rare at Scarborough (Bean); in deep water opposite Hornsea; known to fishermen as the "corduroy mussel."

Crenella rhombea (Berkeley).—Scarborough (Bean).

Crenella decussata (Montagu).—Scarborough (Bean, rare, F. & H.); coast of Yorkshire (Jeff.).

Ostrea edulis Linné.—Widely, but sparsely distributed.

var. **parasitica** Turton.—Scarborough (Bean).

Pecten maximus (Linné).—Redcar, in deep water (D.F.); only three alive during many years (Bean); very rarely brought in alive by trawlers, valves trawled not uncommonly.

Pecten pusio (Linné).—Dogger Bank (L. & M.); Redcar (W.C.H.); Saltburn (M.L.T.); valves common, Sandsend (M.V.L.); valves occasionally on rocks in both bays, Scarborough.

Pecten varius (Linné).—Fairly common.

Pecten opercularis (Linné).—Common.

This species is brought into Scarborough harbour in large quantities, for bait and for food, from localities varying from a few miles out to considerable distances. The fishermen consider it a migratory "fish."

var. **lineata** daCosta.—Dogger Bank (L. & M.); off Scarborough.

Pecten tigerinus (Müller).—Off Staithes; Robin Hood's Bay, 27-30 fathoms (Brady); Scarborough (Sc. Mus.); in numbers in stomachs of plaice, off Scarborough (M.B.A.); off Withernsea (M.B.A.).

Pecten striatus (Müller).—Off Scarborough (Bean).

Pecten similis (Laskey).—Single valve, Dogger Bank (Parke).

Lima loscombi G. B. Sowerby.—Dogger Bank (L. & M.); rare at Scarborough (Bean).

Turtonia minuta (Fabricius).—Redcar (D.F.); common, alive,

Kettleness; valves, Sandsend (M.V.L.); alive in numbers near low water mark, Scarborough.

Astarte sulcata (daCosta).—Dogger Bank (Brady, Parke, L. & M.); off Redcar (D.F.); valves not uncommon on rocks at Scarborough, and young in shellsand; off Flamborough (Parke and M.B.A.).

var. **paucicostata** Jeff.—Dogger Bank (L. & M.); off Scarborough (Harman).

var. **scotica** Maton & Rackett.—Dogger Bank (Brady and Sc. Mus.).

var. **minor** Jeff.—Dogger Bank (L. & M.).

var. **fusca** Jeff.—Dogger Bank, 20-40 fathoms (Marshall).

var. **multicostata** Jeff.—Dogger Bank (L. & M.).

var. **incrassata** Brocc.—Dogger Bank (L. & M.); off Scarborough.

Astarte compressa (Montagu).—Throughout the off-shore area.

var. **striata** Leach.—Widely distributed.

Goodallia triangularis (Montagu).—Dogger Bank, one (Parke); Scarborough (Bean).

Cyprina islandica (Linné).—Common.

var. **crassior** Jeff.—Dogger Bank (L. & M.).

Loripes lacteus (Linné).—Scarborough (Bean).

Lucina borealis (Linné).—Dogger Bank (L. & M.); Redcar (D.F.); Saltburn (M.L.T.); rare, eight miles off Staithes, 25 fathoms (Brady); Scarborough (Bean); frequently dredged at Scarborough (Roberts).

Thyasira flexuosa (Montagu).—Dogger Bank, small form in mud, 45 fathoms (L. & M., Brady); Scarborough (Bean).

Thyasira croulinensis (Jeff.).—Dogger Bank (Marshall).

Montacuta substriata (Montagu).—Dogger Bank (Brady, L. & M.); off Robin Hood's Bay, 20 fathoms (Brady); Scarborough (Bean); on spines of echinoderm trawled fifteen miles off Scarborough.

var. **lævis** Jeff.—Dogger Bank, 35 fathoms (Marshall).

Montacuta bidentata (Montagu).—Dogger Bank (L. & M.); shellsand, Sandsend (M.V.L.); not rare in shellsand, Scarborough.

Tellimya ferruginosa (Montagu).—Dogger Bank (L. & M.); Scarborough (Bean); valves occasional, Scarborough and Filey; Bridlington Bay as food for plaice, and from Hornsea to Tees in deep water (M.B.A.).

Kellia suborbicularis (Montagu).—Generally common, living from half-tide downwards in mud and under stones, Scarborough and elsewhere, also in deserted *Saxicava* holes.

Lasæa rubra (Montagu).—Redcar (J.H.); Scarborough (Bean); in similar habitats to *Kellia* in North Bay, Scarborough.

Lepton nitidum Turton.—Scarborough (Bean).

var. **convexa** Alder.—Scarborough (Bean).

Syndosmya prismatica (Montagu).—Generally distributed.

Syndosmya nitida (Müller).—Dogger Bank (L. & M.); Bridlington Bay as a food for dabs (M.B.A.).

Syndosmya alba (Wood).—Common.

Syndosmya tenuis (Montagu).—Redcar (W.C.H.); rare, Scarborough (Bean); Tees mudflats, Eston (*Victoria History*).

Scrobicularia plana (daCosta).—Tees mouth (D.F. and M.L.T.); Redcar (W.C.H.); living in Scarborough harbour, very dirty and discoloured; Skeffbrig to Spurn (T.P.).

Tellina crassa (Gmelin).—Scarborough (Bean); occasionally brought into Scarborough harbour, by trawlers, alive.

Tellina donacina Linné.—Dogger Bank (M.B.A.); Scarborough (Bean).

Tellina pusilla Philippi.—Dogger Bank (L. & M.); off Scarborough, 30 fathoms (Brady); Scarborough (Bean).

Tellina tenuis daCosta.—Common.

Tellina fabula Gronovius.—Fairly common.

Macoma balthica (Linné).—Tees mouth, common (J.H.); Redcar (D.F.); a few, Sandsend (M.V.L.); common at Filey, large near the Brig (W.C.H.).

Probably most of the above records should fall under the var. *carnaria*.

var. **carnaria** Pennant.—Filey; Scarborough.

[**Macoma calcarea** (Chemnitz).—An imperfect valve in apparently semi-fossil condition, off Scarborough (Jeff.).]

Donax vittatus (daCosta).—Common, but somewhat local.

var. **nitida** Jeff.—Dogger Bank, 15 fathoms; fully half infested with peacrab (L. & M.).

Mactra stultorum Linné.—Common.

var. **cinerea** Montagu.—Dogger Bank (L. & M.); Filey, not uncommon.

Spisula solida (Linné).—Dogger Bank (L. & M. and Jeff.); Coatham sands (W.C.H.); young shells not uncommon in shellsand, Scarborough, and adults some distance out.

Spisula elliptica (Brown).—Dogger Bank (Brady, Parke, and L. & M.); Redcar (W.C.H.); South Bay, Scarborough.

Spisula subtruncata (daCosta).—Tees mouth (J.H.); Redcar (D.F.), very abundant (W.C.H.); Scarborough (Bean); offshore from Flamborough southwards (M.B.A.).

Lutraria elliptica Lamarck.—Tees mouth (D.F.); Redcar (W.C.H.); at Coatham, sometimes in numbers (W.C.H.); Saltburn

(M.L.T.); young specimens in South Bay, Scarborough, and at Filey; adults difficult to get though valves are common.

Lucinopsis undata (Pennant).—Dogger Bank (L. & M. and M.B.A.); at one time its numbers on Redcar beach almost rivalled those of *Dosinia lupina* (W.C.H.); Scarborough (Bean); Bridlington (Gyngell).

Dosinia exoleta (Linné).—Dogger Bank (L. & M.); off Redcar (D.F.); Redcar (W.C.H.); Saltburn (J.H.); dead specimens, Filey Brig.

Dosinia lupina (Linné).—Common as a rule.

Venus fasciata (daCosta).—Moderately common off-shore.

Venus casina Linné.—Dogger Bank (L. & M.); Scarborough (Bean); occasionally brought alive into Scarborough, and a few have been picked up in the harbour, thrown overboard from the trawlers.

Venus verrucosa Linné.—“Rarely at Scarborough” (Bean); Forbes & Hanley and Alder thought that “the specimens have been imported with ballast.” Mr. Harman, sen., has several valves from fishermen which are said to have been got between Scarborough and the Dogger.

Venus ovata Pennant.—Common.

Venus gallina Linné.—Common.

var. **laminosa** Montagu.—Dogger Bank, 20 fathoms (L. & M.).

var. **triangularis** Jeff.—Filey.

var. **gibba** Jeff.—Filey.

Tapes virgineus (Linné).—Dogger Bank (L. & M.); Redcar, rather rare (D.F. and W.C.H.); young specimens, Sandsend (M.V.L.); young, alive on Filey Brig; fine specimens trawled off Whitby.

Tapes pullastra (Montagu).—Locally common.

var. **perforans** Montagu.—Redcar, in every part of our rocks (D.F.); Scarborough; Filey.

Tapes decussatus (Linné).—Redcar, rather rare (D.F.); Scarborough (Bean).

Cardium aculeatum Linné.—In deep water, 40-60 fathoms, off Whitby (M.B.A.); Scarborough (Bean).

Cardium echinatum Linné.—Dogger Bank (L. & M.); Redcar (W.C.H.); valves, five miles from Robin Hood's Bay (Brady); obtained in numbers by Scarborough fishermen when trawling; young ones alive, Scarborough and Filey.

var. **expansa** Jeff.—Dogger Bank (L. & M.).

Cardium exiguum Gmelin.—Five miles from Robin Hood's Bay (Brady); shellsand, Scarborough; Scarborough (Bean).

Cardium fasciatum Montagu.—Dogger Bank (L. & M.); common in shellsand, Sandsend (M.V.L.); shellsand, Scarborough and Filey; alive, North Bay, Scarborough.

Cardium nodosum Turton.—Scarborough (Bean and Sc. Mus.).

Cardium edule Linné.—Dogger Bank (L. & M.); Tees mouth (D.F.); Redcar (J.H.); Saltburn, common (M.L.T.); Staithes (J.H.); Sandsend, not common (M.V.L.); alive, Scarborough and Filey, but not in numbers, most easily obtained near Scalby Mills; Skeffbrig to Spurn (T.P.).

Cardium norvegicum (Spengler).—Dogger Bank (L. & M.); Scarborough (Bean and Sc. Mus.); north of Scarborough, 20 fathoms (M.B.A.); occasionally brought in by trawlers.

Gari tellinella Lamarck.—Dogger Bank (L. & M., Parke); Scarborough (Bean and Sc. Mus.); Bridlington (W.C.H.).

Gari ferroensis (Chemnitz).—Dogger Bank (L. & M.); Redcar, in deep water, alive occasionally on sands (D.F. & W.C.H.); living brilliantly coloured specimens near Filey Brig; broken fragments frequent in South Bay, Scarborough.

Gari depressa Pennant.—Scarborough (Jeff.); rare, Scarborough (Bean and McAndrew).

Mya arenaria Linné.—Tees mouth (D.F. & W.C.H.); common at and near low water mark, Filey; Skeffbrig to Spurn (T.P.).

Mya truncata Linné.—Dogger Bank (Brady, King, L. & M.); Tees mouth (D.F.); Saltburn (J.H.); common, Sandsend (M.V.L.); alive in *Pholas* holes, Scarborough and Filey; off Holderness coast (M.B.A.).

var. **abbreviata** Jeff.—Dogger Bank (L. & M.).

Sphenia binghami Turton.—Scarborough (Bean); in shellsand, Scarborough.

Corbula gibba (Olivi).—Dogger Bank, living, 40 fathoms (Parke), dwarf form, 36 fathoms (L. & M.); Scarborough (Bean).

var. **rosea** Brown.—Scarborough (Bean).

Cultellus pellucidus (Pennant).—Dogger Bank, a few living, 45 fathoms (L. & M.); Redcar and Coatham (D.F.); occasionally common all the way from Filey Brig to Speeton.

Ensis ensis (Linné).—Common.

Ensis siliqua (Linné).—Dogger Bank (L. & M.); Redcar (J.H.); Coatham, common (D.F.); Saltburn (W.C.H.); Sandsend, common (M.V.L.); abundant, Scarborough and Filey, but good specimens can be had only from Filey Bay, where the fisherman obtains it in a somewhat unexpected manner. Armed with a long pricker with a spade-shaped end, he walks backwards through the shallow water, and noticing the presence of a razor shell, though it is out of sight, he bores tentatively with his pricker, and getting right through the animal, he gives a half-turn to his implement, which is too broad to slip through the narrower diameter of the shell, and thus brings up the impaled mollusc.

Saxicavella plicata (Montagu).—Off Scarborough, an imperfect valve (Jeff.).

Panopæa norvegica (Spengler).—Dogger Bank, sparingly distributed and rarely brought up with the dredge (L. & M.); off the coast of Yorkshire at about 30 fathoms (Jeff.); two at Redcar (D.F.); brought into Scarborough by fishermen (Bean). I have had only one complete specimen offered for many years though the older fishermen know it.

Saxicava rugosa (Linné).—Abundant; together with *Pholas* it is in such numbers that they must have a material effect on the denudation of the coast.

var. **pholadis** Linné.—Dogger Bank (L. & M.).

Saxicava arctica (Linné).—Dogger Bank (Parke, L. & M.); common on roots of *Laminaria digitata*, Sandsend (M.V.L.); Scarborough, not uncommon.

Barnea candida (Linné).—Tees mouth, common (M.L.T.); common, alive in both bays, Scarborough; in clay, Kilnsea Skerries (T.P.).

Zirphæa crispata (Linné).—Dogger Bank, valves, probably drifted (L. & M.); Redcar (D.F. & J.H.); Saltburn, common (M.L.T.); common, alive in both bays, Scarborough, and at Filey, but not so numerous as the preceding species. Near the Brig large specimens may be found. Both this and the preceding species select the softer rocks in which to bore, whilst *Saxicava* may be found in harder and more durable rocks.

Xylophaga dorsalis (Turton).—In wood washed up at Saltburn (D.F.); occasionally in both Scarborough bays in drifted timber (Bean, Jeff. and others).

Teredo norvegica Spengler.—Dredged in Tees mouth, 1889 (W. Y. Veitch).

Teredo megotara Hanley.—On floating timber, Scarborough (Jeff. and Bean).

Teredo bipinnata Turton.—Scarborough (Bean, and Sowerby's Ill. Index of British Shells).

(**Teredo fimbriata** Jeff.—Bean records *Ter. palmulata*, which is possibly this species).

Lyonsia norvegica (Chemnitz).—Dogger Bank (L. & M., Sc. Mus.); Scarborough (Bean).

Cochlodesma prætenue (Pulteney).—Dogger Bank (L. & M.); Redcar (W.C.H.); has been dredged at Scarborough (W.C.H.); Scarborough (Bean).

Thracia fragilis Pennant.—Scarborough, South Bay, young. Occasionally good living specimens may be had from Filey Brig.

var. **gracilis** Jeff.—Dogger Bank, 40 fathoms (L. & M.).

var. **villosiuscula** Macgillivray.—Scarborough (Bean, Sc. Mus.).

Thracia convexa (W. Wood).—Off Scarborough, young (Jeff.).

Cuspidaria cuspidata (Olivi).—Dogger Bank, in mud, 45 fathoms, seventy-five miles from Scarborough (L. & M.).

var. **curta** Jeff.—Dogger Bank, 35 fathoms (Marshall).

Dentalium entalis Linné.—Common in deep water.

var. **infundibulum** Jeff.—Dogger Bank (L. & M.).

Dentalium vulgare DaCosta.—Scarborough (Bean).

Patella vulgata Linné.—In immense numbers all along the coasts north and south of Scarborough. It is gathered largely for bait by fishermen, and is known locally as the “flither.” Fishermen distinguish two kinds of “flithers,” rejecting *P. depressa* as too hard and tough for bait.

var. **picta** Jeff.—Scarborough, common.

var. **intermedia** Knapp.—Scarborough.

var. **cœrulea** Linné.—Scarborough, common.

Patella depressa Pennant.—Tees mouth (D.F.); Saltburn, common (M.L.T.); Scarborough and Filey, common.

Patina pellucida (Linné).—Common.

var. **lævis** Pennant.—Redcar (W.C.H.); common, Scarborough and Filey.

Acmaea testudinalis (Müller).—Dogger Bank (L. & M.); Redcar (W.C.H.); Saltburn, fine (W.C.H.); very common, in great variety, Sandsend (M.V.L.); in suitable localities between tide marks, Scarborough to Flamborough. In 1875 Leckenby recorded it from the Dogger Bank, and stated that up to that time its most southerly record was Hartlepool. It is not in Bean's list, and is evidently extending southward with great rapidity. I have known it at Scarborough for twenty years and it is now known south of Bridlington.

Acmaea virginea (Müller).—In similar localities to *A. testudinalis* but more abundant. It prefers the pools and, unlike *A. testudinalis*, is rarely left dry.

var. **lactea** Jeff.—Scarborough (Bean).

Puncturella noachina (Linné).—Dogger Bank (Brady); 30 fathoms (L. & M.); Scarborough (Bean).

Emarginula fissura (Linné).—Dogger Bank (L. & M.); Redcar (D.F.); Saltburn, one (M.L.T.); very rare, dead on rocks, both bays, Scarborough.

Fissurella græca (Linné).—Redcar (Ferguson, fide *Victoria History*). I have been unable to verify this record, which I regard as a doubtful one.

Eumargarita helicina (Fabricius).—Redcar (D.F.); a few in shellsand, Sandsend (M.V.L.); at times common near low water mark,

Scarborough and Filey. It is most easily found crawling over *smooth* stones in shallow pools.

var. **fasciata** Jeff.—Filey (T.P.).

Gibbula magus (Linné).—"Two or three specimens have been found on the sands (Redcar?) but it is a very doubtful native" (D.F.); Scarborough, dead specimens, "possibly introduced" (Bean).

Gibbula tumida (Montagu).—Off Scarborough, very large (L. & M.); one in shellsand, Sandsend (M.V.L.); frequently to be had from trawl ropes of vessels in Scarborough harbour; dredged, Bridlington Bay (W.C.H.); offshore area to the Dogger (M.B.A.).

Gibbula cineraria (Linné).—Abundant.

var. **electissima** Bean.—Dogger Bank (L. & M.).

Calliostoma montagui (W. Wood).—Dogger Bank (L. & M.); must be fairly common in deep water near Scarborough.

Calliostoma zizyphinus (Linné).—Widely distributed.

var. **lyonsi** Leach.—Dogger Bank, many (Parke, L. & M.); Scarborough.

Calliostoma occidentale (Mighels).—Three fine living examples, 40 fathoms, eighty-five miles north-east by east of Scarborough (L. & M.); off Withernsea in 20 fathoms (M.B.A.).

var. **pura** Jeff.—Dogger Bank (Marshall).

Delphinoidea nitens (Philippi).—Shellsand, Scarborough.

Delphinoidea serpuloides (Montagu).—Scarborough (Bean).

Lacuna crassior (Montagu).—Dogger Bank (L. & M.); small form, common, Sandsend (M.V.L.); rare at extreme low water mark, Scarborough; frequent in trawl ropes; Holmpton (T.P.).

Lacuna divaricata (Fabricius).—Common on *Laminaria*.

Lacuna parva (daCosta).—A few, Sandsend (M.V.L.); Scarborough (Bean).

var. **conica** Jeff.—Scarborough (Bean).

Lacuna pallidula (daCosta).—Redcar (J.H.); Saltburn (W.C.H.); common, Sandsend (M.V.L.); abundant at extreme low water mark, Scarborough and Filey.

Littorina obtusata (Linné).—Common, except the banded form, which is rare.

var. **neritiformis** Brown.—Staithes (J.H.); Scarborough and Filey.

var. **fabalis** Turton.—Scarborough (Bean); Filey.

(This variety is a play upon the name of the great Scarborough conchologist, Bean. It was altered to *beanii* by Macgillivray, but has been retained in all recent lists).

Littorina neritoides (Linné).—A few young, Sandsend (M.V.L.); Scarborough (Bean). I have not been able to find this species nor has the Rev. W. C. Hey, who told me he sought carefully for it in

1907 in its recorded habitat on Filey Brig, but without success.

Littorina rudis (Maton).—Very common.

var. **saxatilis** Johnston. — Staithes (J.H.); Scarborough (W.C.H.).

var. **jugosa** Montagu.—Staithes (J.H.); Whitby (Prof. Cockerell).

var. **patula** Thorpe.—Scarborough (Marshall); not uncommon, South Bay, Scarborough.

var. **tenebrosa** Montagu.—Hayburn Wyke (D.).

Littorina littorea (Linné).—Dogger Bank, drifted (L. & M.); Redcar, very common (D.F.); Saltburn (M.L.T.); Staithes (J.H.); Sandsend, very common (M.V.L.); abundant along the coast, Scarborough and Filey, and gathered largely for sale. A bright red form occurs both north and south of Scarborough; Withernsea; Wall Creek to Spurn; Kilnsea Skerries (T.P.).

Rissoa parva (daCosta).—Redcar (W.C.H.); Saltburn (J.H.); very common, Sandsend (M.V.L.); the most abundant of our *Rissoas*. At certain times may be had in thousands from seaweed and stones in pools.

var. **interrupta** Adams.—Saltburn and Redcar (J.H.); more common than the type, Sandsend (M.V.L.); also at Scarborough and Filey in similar proportions.

var. **exilis** Jeff.—Very rare, Scarborough.

var. **semicostata** Marshall.—Frequently at Scarborough.

Rissoa inconspicua Alder.—Dogger Bank (Brady, Howse); Scarborough (Bean).

Rissoa guerini var. **costulata** Alder.—Scarborough (Bean).

Alvania punctura (Montagu).—Dogger Bank (L. & M.); Redcar (J.H.); fairly common in shellsand, Sandsend (M.V.L.); alive in both bays, Scarborough; and fairly common in shellsand, Scarborough, Filey and Bridlington.

Manzonina costata (J. Adams).—Two in shellsand, Sandsend (M.V.L.); several in shellsand, Scarborough; Scarborough (Bean).

Onoba striata (J. Adams).—Dogger Bank (L. & M.); Redcar (J.H.); extremely common in shellsand, Sandsend (M.V.L.); next to *parva*, our commonest *Rissoa*; it may be taken alive at low water mark rarely, and it is abundant in shellsand, Scarborough, Filey and Bridlington; Withernsea (T.P.).

var. **aculeus** Gould.—Very common in shellsand, Sandsend (M.V.L.); and also at Scarborough and Filey.

Hyalia vitrea (Montagu).—Scarborough (Bean); one in shellsand, Scarborough.

Setia obtusa (Cantraine).—Dogger Bank (Marshall); Scarborough (Bean).

Cingula semistriata (Montagu).—Redcar and Saltburn (J.H.); this handsome little shell is sometimes abundant at Scarborough, Filey and Bridlington.

Cingula trifasciata J. Adams.—Redcar, scarce (W.C.H.); rare in shellsand, Scarborough; Filey (T.P.).

Barleeia rubra (Montagu).—Redcar (J.H.); Scarborough (Bean).
var. **unifasciata** Montagu.—Scarborough (Bean).

Paludestrina stagnalis (Basterot).—Tees mouth (D.F.); in swarms (W.C.H.); Redcar (Sc. Mus.); one in shellsand, Sandsend (M.V.L.); Scarborough (Bean); abundant, Saltend and Spurn (T.P.).

Skenea planorbis (Fabricius).—Not common, in shellsand, Sandsend (M.V.L.); common in shellsand, Scarborough and Filey.

Homalogyra atomus (Philippi).—Scarborough (Jeff.).

Homalogyra rota (Forbes & Hanley).—Scarborough (Jeff.).

Truncatella truncata (Montagu).—Scarborough (Bean); Jeffreys thinks this is a mistake.

Capulus hungaricus (Linné).—Redcar (W.C.H.); near Saltburn (Mawson); very young, in shellsand, Sandsend (M.V.L.); I have had several young in shellsand, and it is occasionally brought in by trawlers.

Crepidula fornicata (Linné).—Rev. W. C. Hey records this in a Yorkshire list as occurring in the Humber. It is abundant in North Lincolnshire.

Trivia europæa (Montagu).—Dogger Bank, drifted (L. & M.); Redcar, alive (D.F., J.H.); Saltburn, common (M.L.T.); alive at White Nab, Scarborough (Harman); common, dead, at Scarborough, Filey and Bridlington.

Natica pallida Broderip & Sowerby.—Dogger Bank (Brady. Parke); not uncommon thirty miles from Scarborough (Marshall); not uncommon with *Scala trevelyana* (L. & M.); Scarborough (Bean); off Flamborough in deep water (Parke).

Natica sordida Philippi.—Dogger Bank, rare, dead (Parke).

Natica catena (daCosta).—Dogger Bank, exceedingly large (L. & M.); common, dead (Parke); often alive at Redcar and Tees mouth (W.C.H.); Saltburn (M.L.T.); occasionally alive on sands near Filey. The egg ribbons are common on the shore near Speeton. Throughout the offshore area (M.B.A.).

var. **leckenbyi** Marshall.—Dogger Bank in 10 fathoms (Marshall).

Natica alderi Forbes.—Dogger Bank (L. & M., Parke); common but small (Brady); Redcar (J.H.); at times fairly common at Scarborough, and abundant in trawl ropes; throughout the offshore area (M.B.A.).

var. **lactea** Jeff.—Dogger Bank (L. & M.).

var. **subovalis** Jeff.—Off Bridlington in deep water (Rich).

Natica montagui Forbes.—Dogger Bank (Brady); abundant and fine (L. & M.); rare (Parke); off Redcar (D.F.); frequently in trawl ropes.

var. **albula** Jeff.—Dogger Bank, 40 fathoms (L. & M.).

var. **conica** Jeff.—Dogger Bank, 40 fathoms (L. & M.).

Amauropsis islandicus (Gmelin).—Dogger Bank, exceedingly rare, forty miles north-east by east from Scarborough (L. & M.); one (Parke); Scarborough (Bean). It must be commoner than indicated above, as I have had a fair number from trawlers.

Lamellaria perspicua (Linné).—Scarborough (Bean).

var. **lata** Jeff.—Dogger Bank (L. & M.).

Velutina lævigata (Pennant).—Dogger Bank (Brady, L. & M.); off Robin Hood's Bay, 30 fathoms (Brady); common in shellsand, Sandsend (M.V.L.); living, Scarborough and Filey, but not common.

Velutella flexilis (Montagu).—Scarborough (Bean).

Bittium reticulatum (daCosta).—Dogger Bank (L. & M.); beach at Redcar (D.F.); off Scarborough (Gosse).

Cerithiopsis tubercularis (Montagu).—Scarborough (Bean).

Scala turtonis (Turton).—Dogger Bank, 30 fathoms (Marshall); living in shallow water (L. & M.); Redcar, from deep water (D.F.); Scarborough (Bean); brought in by trawlers rarely.

Scala clathrus (Linné).—Dogger Bank (L. & M., Rich); white form, several, 40 fathoms, dead (Parke).

Scala trevelyana (Leach in Johnston).—Dogger Bank (Brady); off Robin Hood's Bay, 30-35 fathoms (Brady); not uncommon in 40 fathoms thirty miles from Whitby (Brady); Redcar (W.C.H.); brought in by trawlers.

[**Scala grœnlandica** (Chemnitz).—Bridlington sands, "possibly not recent, but from the (Bridlington) Crag" (W.C.H.).]

Scala commutata (Monterosato).—I have two specimens of this species and Mr. Harman has two others. These were obtained amongst a number of other *Scala* from a fisherman on a trawler in Scarborough harbour and were probably obtained between Scarborough and the Dogger, but as the species was not differentiated till I saw it, no more precise locality can be given.

Cioniscus albidus G. Adams.—Scarborough (Jeff. and Bean); very rare in South Bay in shellsand.

Aclis ascaris (Turton).—Off Scarborough, 17 fathoms (Brady); Scarborough (Bean); very rare in shellsand, Scarborough.

Odostomia lukisi Jeffreys.—Dogger Bank (Jeff.).

Odostomia conoidea (Brocchi).—Dogger Bank (L. & M.).

Odostomia acuta Jeffreys.—Dogger Bank (Marshall); off Scarborough, 30-35 fathoms (Brady); Scarborough (Marshall); in shellsand, Scarborough, rare.

Odostomia unidentata Forbes & Hanley.—Dogger Bank (L. & M.); Redcar (D.F.); a few in shellsand, Sandsend (M.V.L.); shellsand, Scarborough, common.

Odostomia turrita Hanley.—Shellsand, Scarborough, common.

Odostomia plicata (Montagu).—Scarborough (Bean); shellsand, Scarborough, very rare.

Jordanella nivosa (Montagu).—Scarborough (Sowerby's Ill. Index); shellsand, Scarborough, very rare.

Jordanella truncatula (Jeffreys).—One in shellsand, Scarborough. An interesting record. Both this and the preceding species were identified by Mr. Tomlin.

Brachystomia albella (Lovén).—One in shellsand, Sandsend (M.V.L.).

Brachystomia rissoides (Hanley).—Scarborough (Bean); common in shellsand, Scarborough.

var. **dubia** Jeff.—Dogger Bank (L. & M.); shellsand, Scarborough.

Brachystomia ambigua (Maton & Rackett).—Scarborough (Bean); several from shellsand, Scarborough.

Ondina divisa (J. Adams).—Dogger Bank (L. & M.).

Ondina obliqua (Alder).—Scarborough (Bean).

Oda dolioliformis (Jeffreys).—Scarborough (Bean & Jeff.); shellsand, Scarborough, very rare.

Pyrgulina indistincta (Montagu).—Off Robin Hood's Bay, 30 fathoms (Brady); Scarborough (Bean); in shellsand, Scarborough, rare.

Pyrgulina interstincta (Montagu).—Dogger Bank (L. & M.); a few in shellsand, Sandsend (M.V.L.); not uncommon in shellsand, Scarborough.

Spiralinella spiralis (Montagu).—Dogger Bank (L. & M.); Robin Hood's Bay, 30 fathoms (Brady); Scarborough (Bean); our commonest *Odostomia*; in shellsand it can be had in numbers.

Miralda excavata (Philippi).—Scarborough (Bean).

Pyrgostelis interrupta (Totten).—Dogger Bank (L. & M., Jeff.); food for plaice, off Flamborough (M.B.A.).

Turbonilla lactea (Linné).—Shellsand, Scarborough, very rare.

Eulimella commutata Monterosato.—Dogger Bank (Brady, L. & M.); off Scarborough, 20-25 fathoms (Brady); one in shellsand, Sandsend (M.V.L.); shellsand, Scarborough, very rare.

Eulimella nitidissima (Montagu).—Scarborough (Bean & Jeff.).

Eulima polita (Linné).—Dogger Bank (L. & M.); Scarborough (Bean and Sc. Mus.).

Eulima incurva (Renier).—Dogger Bank (L. & M.); in greatest depths of North Sea (Jeff.).

(To be continued).

PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

391st Meeting, April 13th, 1910.

Held at the Manchester Museum.

Mr. E. Collier in the chair.

New Members Elected.

C. Theodore Cribb, The Vicarage, Shipley, Yorks.

Harry L. Stephenson, 73, Colwyn Road, Dewsbury Road, Leeds.

Herbert H. Booker, 153, Albert Road, Heeley, Sheffield.

W. T. Elliott, D.D.S., F.Z.S., 63, Temple Row, Birmingham.

Candidate Proposed for Membership.

F. Montague Dyke, B.Sc. (Lond.), Bimblefell, Springfield Road, Kingston-on-Thames.

Resignations.

Mrs. Gubbins.

Mrs. E. J. Climensen.

Paper Read.

“Notes on some rare Mollusca from the North Sea and Shetland—Faerø Channel,” by James Simpson.

Exhibits.

By Mr. J. Kidson Taylor: A beautiful series of *Chloræa*, including *C. hugeli* var. *polygramma*, *C. sirena* var. *subdryope*, and *C. dryope* var. *laticans*; *Corasia reginæ*, *C. psittacina* and *C. puella*; *Crystallopsis najas* and *C. purchasi*; also *Valvata piscinalis* var. *albina*, from Lough Erne.

By Mr. Ed. Collier: A fine set of rare land shells from the mountainous regions of Peru, including *Bulinulus lobbi*, *B. rubellus*, *B. vexillum*, *B. tigris*, *B. cretaceus*, and *Xenothauma baroni* from altitude 4,000 feet, Rio Yonam; *B. decussatus* and others from Cajabomba, altitude 8,000 feet; *Porphyrobaphe vicaria*, *B. scitulus* and *Helix higgensi*, from Cajamarca, altitude 11,000 feet.

By Mr. R. Cairns: A large number of the rarer *Cypræa*, including *C. xanthodon*, *C. physis*, *C. caurica* var. *cairniana*, *C. hoivini*, *C. zonata*, *C. walkeri*, *C. citrina*, *C. cribraria* var. *exmouthensis*, *C. bregeriana*, *C. becki*, *C. gaskoini*, *C. nebulosa*, and many others.

By Mr. G. C. Spence: *Acanthinula aculeata*, *Ena obscura*, *Vallonia costata*, *Vitrina pellucida* and a number of other species collected about Abergele, N. Wales, during last Easter week; also photographs of living *Helix undata*, and examples of the singularly shaped dart of this species dissected from specimens brought from Madeira by Mr. B. R. Lucas.

By Mr. C. H. Moore: *Vitrea alliaria*, *V. nitidula*, *V. crystallina* and *Euconulus fulvus* from Marple; *Helicella caperata* from Southport; *Hygromia hispida*, *Vitrea crystallina* and *V. radiatula* var. *viridescens-alba* from Stalybridge.

By Mr. W. Whitehead: *Limnæa pereger* covered by a dense growth of the alga *Batrachospermum moniliforme* from a pond in Range Road, Staley Brushes.

By Mr. R. Standen: *Schizoglossa novo-zealandica* from Toko, New Zealand; *Cypræa testudinaria* from Ouvea, Loyalty Islands; a number of rare shells from Japan, including *Voluta megaspira*, *Dentalium vernali*, *Scala pretiosa*, *Gnildfordia triumphans*, etc.; also a number of new additions to the Falkland Islands collection in the Manchester Museum, received from Mr. R. Vallentin, and some new species recently described by Messrs. Cooper and Preston.

392nd Meeting, May 11th, 1910.

Held at the Manchester Museum.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

"Manual of Conchology," part 80, by H. A. Pilsbry. "Mollusca of the South-western States, iii. : The Huachuca Mountains, Arizona," "A new *Sonorella* from the Rincon Mountains, Arizona," by H. A. Pilsbry and J. H. Ferriss. "Melaniidae of the Panuco River System, Mexico," by H. A. Pilsbry and A. A. Hinkley ; and the usual periodicals received in exchange.

New Member Elected.

Frederick Montague Dyke, B.Sc.

Candidate Proposed for Membership.

David Colwell, Heathcote, Lavender Vale, Wallington, Surrey.

Resignation.

Mrs. E. Letson Bryan.

Member Deceased.

Dr. G. W. Chaster.

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 they have sustained in the lamented death of Dr. G. W. Chaster, of Southport, and instruct the Secretary to convey to Miss Chaster and the other relatives their most sincere condolence." Mr. Edward Collier, Mr. R. Standen and other members, to whom Dr. Chaster was personally known, expressed warm appreciation of Dr. Chaster as an enthusiastic and painstaking naturalist and a genial companion and friend. It was intimated that an obituary notice would be read at a future meeting.

Paper Read.

"Curiously distorted *Anodonta cygnea*," by E. Arnold Wallis.

Exhibits.

By Mr. J. Kidson Taylor : A number of non-marine shells from various Irish localities ; *Amphipeplea glutinosa* from near Hull ; *Planorbis carinatus* from Poynton, Cheshire ; and a series of *Bithynia tentaculata*, showing marked difference in colour, from Poynton and Lough Erne—the latter being very deeply coloured.

By Mr. R. Cairns : Some very choice sets of *Cypræa annulata*, *C. margarita* and *C. annæ*, *Trivia brevissima*, *T. vitrea*, *T. grandis*, *T. globosa*, *T. paucilirata*, *T. turneri*, *T. rubinicolor*, *T. formosa*, and many others, in beautiful condition.

By Mr. J. W. Baldwin : A number of richly coloured *Anodonta cygnea* from various localities in the Bolton district.

By Mrs. Gill : *Rostellaria powisi* and a number of other species ; also a series of small *Trochus*, *Clanculus*, and *Phasianella*.

By Mr. C. H. Moore : Very large, thin, diaphanous *Limnæa pereger* from a warm water pond at Stalybridge, Cheshire.

By Mr. J. Wilfrid Jackson : A large series of Pleistocene non-marine mollusca from the cave-earth at Dog Holes, Warton Crag, Lancs. ; these were described and fully discussed in the "Lancashire Naturalist," Oct.-Dec., 1909 ; also *Gryphæa incurva* from the Boulder Clay near Blackpool (coll. R. Cairns).



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The Journal, which is supported by many prominent Naturalists of the district, deals with all branches of Natural History, and is rapidly increasing in circulation. Amongst the Conchological Notes and Papers which have already appeared are: "Notes on the Freshwater Mussels of Lancashire and Adjacent Counties"; "On the Mollusca from the 'Cave-Earth,' Dog-Holes, Warton Crag"; and others, which contain much valuable information of local and general interest.

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T H E
JOURNAL OF CONCHOLOGY.

VOL. 13.

OCTOBER, 1910.

No. 4.

NOTICE TO MEMBERS AND OTHERS.

THE Council of the Conchological Society wishes it to be clearly understood that, for the future, lost numbers of the *Journal* will not be replaced *gratis*, unless the loss be notified to the Hon. Secretary during the year in which such number or numbers were printed. This rule applies both to members' copies and to exchanges.

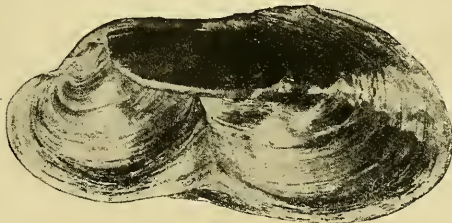
—♦♦♦—
CURIOSLY DISTORTED *ANODONTA CYGNÆA* (L.).

By E. ARNOLD WALLIS.

(Read before the Society, May 11th, 1910).

IN March, 1898, while the Valley Pond at Scarborough was being cleaned out, I found a remarkably distorted *Anodonta cygnæa*.

The pond is noted for the somewhat curious variety of this bivalve which occurs in it. The specimens are all very dark in colour and peculiarly heavy and tumid, and more or less distorted specimens have not infrequently been taken there. There are no weeds in the pond. The bottom is of soft fine mud with a great many stones among it.

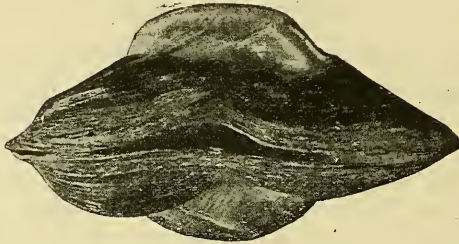


The specimen, photographs of which, taken by Mr. Wilfrid Jackson, are reproduced, was lying between two stones, but was not in any way

wedged between them. As will be seen in the photograph showing the shell from beneath the two valves are not symmetrical, though both show the same depression about the middle.

The two out-growing portions which start from the umbones are the most remarkable features. They, too, are unsymmetrical, the left hand one being more pronounced and itself very much distorted.

The colour is yellowish brown with streaks of dark green.



Unfortunately I did not preserve the animal, but I remember that it, too, was deformed, and there were parts of the body corresponding in shape and position to the outgrowing portions in the valves. My knowledge of shells is not sufficient for me to be able to form any opinion as to the cause of this curious malformation, but I think it may probably be due to an accident having happened to the animal in early life.

The photographs are life size.

Shell Drift at Ballinacurra, Limerick.—Since writing¹ the short note on *Carychium minimum*, I have further examined some of this drift, and append a list of the species found in it. Mr. R. Welch, of Belfast, and Mr. A. S. Kennard have also looked over some boxes of drift that I sent them, and have given me lists of what they have found, so that the following may be taken as a fairly representative list of the shells in the drift of the Ballinacurra Marshes near Limerick:—*Hyalinia cellaria*, *H. nitidula*, *H. pura*, *H. crystallina*, *H. fulva*, *Punctum pygmaeum*, *Pyramidula rotundata*, *Helix nemoralis*, *Hygromia rufescens*, *H. hispida*, *H. granulata*, *Vallonia pulchella*, *V. costata*, *V. excentrica*, *Pupa cylindracea*, *Vertigo antivertigo*, *V. pygmaea*, *V. edentula*, *Balea perversa*, *Clausilia bidentata*, *Cochlicopa lubrica*, *Succinea putris*, *S. elegans*, *Carychium minimum*, *Acme lineata*, *Limnaea palustris*, *L. truncatula*, *L. pereger*, *Planorbis marginatus*, *P. vortex*, *P. spirorbis*, *Ancylus fluviatilis*, *Bythinia tentaculata*, *Valvata piscinalis*, *Neritina fluviatilis*, *Paludestrina jenkinsi*.—HARRY FOGERTY (Read before the Society, June 8th, 1910).

¹ *J. of Conch.*, vol. 13, p. 71.

THE MARINE MOLLUSCA OF THE YORKSHIRE COAST
AND THE DOGGER BANK.

By J. A. HARGREAVES.

(Read before the Society, November 10th, 1909.)

(Concluded from page 94).

Eulima glabra (da Costa).—Rare at Scarborough (Bean).

Eulima bilineata (Alder).—Dogger Bank (Brady, L. & M.); Scarborough (Bean); several from shellsand, Scarborough.

Stilifer stylifer (Turton).—Filey (Miss Backhouse, *vide* Leckenby); on *Ech. saxatilis*, Scarborough (Bean).

Cæcum imperforatum (G. Adams).—Scarborough (Bean).

Cæcum glabrum (Montagu).—Scarborough (Bean).

Turritella communis Lamarck.—Dogger Bank (Brady); off Redcar (D.F., J.H.); Saltburn (M.L.T.); Scarborough (Bean); very rarely dead shells on rocks at Scarborough.

var. **nivea** Jeffreys.—Dogger Bank (L. & M.); occasionally at Redcar (W.C.H.).

var. **gracilis** Jeffreys.—Dogger Bank (L. & M.).

Trichotropis borealis Broderip & Sowerby.—Dogger Bank (L. and M., Jeff.); Scarborough (Bean); I have had a few from trawlers.

Aporrhais pes-pelecani (Linné).—Dogger Bank (L. & M.); one dead (Parke); Redcar, not common (W.C.H.); South Bay, dead. Filey fishermen regard this as a great rarity. It is known to them as the "Dogger Shell."

Buccinum undatum Linné.—Dogger Bank (Brady, L. & M.); rare, chiefly half-grown (Parke); Redcar, abundant (D.F., J.H.); Saltburn and Staithes (J.H.); Scarborough; Kilnsea (T.P.). At very low tides numbers of this species may be seen on the flat reefs in the South Bay; the specimens are generally thick and short. The species is used largely at Scarborough for bait in autumn and winter, but the specimens are not obtained locally but from the Norfolk coast, the fishermen stating that the shells are not so hard, and the "fish" better for bait.

var. **littoralis** King.—Dogger Bank (L. & M.).

var. **striata** Pennant.—Dogger Bank (L. & M.); occasionally from trawlers.

var. **pelagica** King.—Dogger Bank (L. & M.); not uncommon from trawlers, fine.

m. **acuminatum** Broderip.—Scarborough (Bean). Bean's own collection contains many acuminate forms.

m. **sinistrorsum** Jeff.—Bridlington (W.C.H.).

Liomesus dalei (J. Sowerby).—Dogger (Harman, King and others); Scarborough (Bean); Runswick Bay (J.M.).

Neptunea antiqua (Linné).—Dogger Bank (Brady); Redcar from deepish water (D.F., W.H.C.); common from trawlers.

var. **acuminata** Jeff.—Deep water outside Dogger (Jeff.).

var. **alba** Jeff.—Dogger Bank (L. & M.).

var. **ventricosa** Jeff.—Dogger Bank (L. & M.).

m. **cinctum** Jeff.—Dogger Bank (L. & M.).

Volutopsis norvegicus (Chemnitz).—Dogger Bank (L. & M., King, Bean); off Redcar (D.F.); coast of Yorkshire (Jeff.); two specimens recently found in Scarborough harbour; it is occasionally brought in by trawlers with *Pecten opercularis*.

Beringius turtoni (Bean).—Dogger Bank, exceedingly rare (L. & M.); off Redcar in deep water (D.F.); Scarborough (Bean); trawled in deep water by fishermen.

Tritonofusus islandicus (Chemnitz).—Off Redcar, one living and one dead shell (D.F. & W.C.H.); rare on Dogger Bank; an immature specimen from Scarborough harbour. Several Yorkshire records of this species are evidently errors for the much commoner *gracilis*.

Tritonofusus gracilis (Costa).—Dogger Bank (Brady, L. & M.); Saltburn (M.L.T.); Teesmouth (M.L.T.); frequently brought in by trawlers. In the autumn scores of specimens are brought into Scarborough with *Bucc. undatum* and thrown overboard. They are from further south.

var. **convoluta** Jeff.—Dogger Bank (Norman).

var. **belliana** Jordan.—Dogger Bank, 30 fathoms (Marshall).

A sinistral specimen from the Dogger Bank was exhibited by Mr. Tomlin, *J. of Conch.*, vol. x., p. 275.

Tritonofusus propinquus (Alder).—Dogger Bank (L. & M.); comparatively abundant and of large size, but smaller and narrower in the Silver Pits where the water is deeper (Marshall); coast of Yorkshire (Jeff.); occasionally in Scarborough harbour from trawlers. I have never obtained this species from the *Buccinum undatum* bags from further south.

Buccinofusus berniciensis (King).—Dogger Bank (L. & M.); coast of Yorkshire (Jeff.); very rare, I have had only one Yorkshire specimen; Scarborough (Bean).

var. **elegans** Jeff.—Dogger Bank, 30 fathoms (Marshall).

Ocenebra erinacea (Linné).—Redcar, dead shells, probably brought with ballast (D.F.); Scarborough (Bean); at times dead shells common in the harbour, but introduced. I have found young specimens in shell sand, but no adults; Flamborough (W.C.H.).

Trophon muricatus var. **barvicensis** Johnston.—Dogger Bank, very fine, nearly an inch in length (L. & M.); coast of Yorkshire (Jeff.); from trawlers.

Trophon clathratus var. **truncata** Ström.—Dogger Bank (L. & M.); Robin Hood's Bay 30-35 fathoms (Brady); Scarborough (Bean); from trawlers; Bridlington (W.C.H.).

var. **alba** Jeff.—Dogger Bank, 30 fathoms (Marshall).

Purpura lapillus (Linné).—Redcar, white and yellow vars., very common (D.F.); Saltburn, Staithes (J.H.); Huntcliff, a banded form (W.C.H.); very common, Sandsend; very abundant along the rocky shores north and south of Scarborough. Enormous examples have been taken from Bridlington harbour, whilst the opposite extreme is reached on the Scars at Kettleiness; eggs may be found during the greater part of the year, even in December. Withernsea, Hornsea (M.B.A.); The Den (T.P.).

var. **major** Jeffreys.—Bridlington.

var. **minor** Jeffreys.—Scarborough, Kettleiness.

var. **ovalis** Jordan.—Scarborough (Marshall).

m. **sinistrorsum**—One in Bean's collection from Scarborough.

Nassa reticulata (Linné).—Dogger Bank (L. & M.); Tees in deep water (M.B.A.); Redcar, dead (W.C.H.); Scarborough (Bean); Bridlington Bay (M.B.A.).

Nassa incrassata (Ström).—Dogger Bank (Brady, L. & M.); Teesmouth (D.F., J.H.); Redcar, very abundant (D.F., J.H.); Saltburn, Staithes (J.H.); very common, Sandsend (M.V.L.); common on rocks at Scarborough and Filey. I have taken a variety almost crimson, but it is very rare.

var. **minor** Jeff.—Dogger Bank (L. & M.); Scarborough and Filey.

var. **simulans** Jeffreys.—Rare from trawlers; Scarborough (Marshall).

Bela turricula (Montagu).—Dogger Bank (Brady); very fine L. & M.); rare (Parke); common in shellsand, Sandsend (M.V.L.); occasionally picked up on rocks at Scarborough. It is a common species in trawl ropes and nets; off Bridlington rather plentifully (W.C.H.); throughout the offshore area (M.B.A.).

var. **rosea** M. Sars.—Dogger Bank (L. & M.).

Bela trevelyana (Turton).—Moderately common off Robin Hood's Bay (Brady); generally diffused throughout the North Sea 50-60 fathoms (L. & M.); Scarborough (Bean); sometimes cast ashore, Scarborough, Whitby, and Filey (Marshall). I do not find this species nearly as common as the preceding one.

Bela rufa (Montagu).—Dogger Bank (L. & M.); Redcar (J.H.); common in shellsand, Sandsend (M.V.L.); Scarborough (Bean); shellsand, Scarborough.

Mangilia attenuata (Montagu).—Scarborough (Bean).

Mangilia costata (Donovan).—One in shellsand, Sandsend (M.V.L.); shellsand, Scarborough, rare; Scarborough (Bean).

Mangilia brachystoma (Philippi).—Dogger Bank (Marshall).

Mangilia nebula (Montagu).—Dogger Bank (L. & M.); Scarborough (Bean); shellsand, Scarborough.

var. **elongata** Jeff.—Dogger Bank (L. & M.).

var. **fusiformis** Marshall.—Dogger Bank (Marshall).

Mangilia anceps (Eichwald).—Off Scarborough (Jeff.); Scarborough (Bean); from trawlers, rare.

Clathurella linearis (Montagu).—Dogger Bank (L. & M.); common in shellsand, Sandsend (M.V.L.); shellsand, Scarborough, rare.

Clathurella purpurea (Montagu).—Scarborough (Bean).

Actæon tornatilis (Linné).—Dogger Bank (L. & M., Brady); Redcar, deepest water only, one alive (D.F., W.C.H.); fairly common in trawl ropes and nets, but small; young, very rare in shellsand, Scarborough.

var. **subulata** S. V. Wood.—Dogger Bank (L. & M.).

var. **tenella** Lovén.—Dogger Bank (L. & M.).

var. **bullæformis** Jeff.—Dogger Bank, 30 fathoms (Marshall).

Tornatina truncatula (Bruguère).—Redcar (W.C.H.); common in shellsand, Sandsend (M.V.L.); also at Scarborough and Filey; Scarborough (Bean).

Tornatina obtusa (Montagu).—One in shellsand, Sandsend (M.V.L.); one in shellsand, Scarborough, and at Bridlington; Scarborough (Bean); Bridlington Bay (M.B.A.); Humber (Jeff.).

Tornatina nitidula (Lovén).—Dogger Bank (L. & M.).

Tornatina umbilicata (Montagu).—Dogger Bank (Brady), 20-40 fathoms (L. & M.); Scarborough (Bean).

Diaphana hyalina (Turton).—Dogger Bank (L. & M.); one in shellsand, Sandsend (M.V.L.); occasionally in shellsand, Scarborough.

Bullinella cylindracea (Pennant).—Dogger Bank (Brady, L. & M.); Redcar (W.C.H.); Scarborough (Bean); occasionally from trawlers; several very young from shellsand, Scarborough; throughout offshore area (M.B.A.).

Haminea hydatis (Linné).—Scarborough (Bean). There appears to be some doubt about this record.

Roxania utriculus (Brocchi).—Dogger Bank (L. & M., Parke); Sc. Mus.; MacAndrew collection; Scarborough, rare (Bean).

Philine scabra (Müller).—Dogger Bank (Brady, L. & M.); Scarborough (Jeff. and Bean); not uncommon in shellsand, Scarborough; throughout the offshore area (M.B.A.).

Philine catena (Montagu).—Dogger Bank, 25-40 fathoms (L. & M.); shellsand, Sandsend (M.V.L.); Scarborough (Bean and Jeff.); the commonest species of this genus in shellsand, Scarborough.

Philine quadrata (S. V. Wood).—Dogger Bank (Mennell, Jeff., L. & M.); 45 fathoms (Brady); Scarborough, Whitby and Filey, occasionally cast ashore (Marshall).

Philine punctata (J. Adams).—Scarborough (Bean, Jeff.); shellsand, Scarborough. The shellsand obtained in front of the Grand Hotel and Spa is the most productive for *Philine* and *Rissoa*, whilst *Odostomia* is more plentiful nearer White Nab.

Philine aperta (Linné).—Dogger Bank, one living (Parke).

Limacina retroversa (Fleming).—Dogger (Bull); shellsand, Scarborough, rare (Rev. F. Woods).

Limacina balea (Möller).—Off Flamborough, 40 fathoms (Bull, fide *Victoria History*).

Aplysia punctata Cuvier.—Redcar (D.F.); Scarborough (Bean); living adult specimens may occasionally be taken in the South Bay, and I believe are fairly common on the Spital at Filey Brig.

Pleurobranchus plumula (Montagu).—Salt Scar, Redcar (D.F.); Scarborough (Bean).

Limapontia depressa Alder & Hancock.—On *Vaucheria*, in pools only reached by exceptional tides, Easington (T.P.).

Æolidia papillosa (Linné).—Sandsend (M.V.L.); Scarborough (J. Irving); Filey (T.P.); Redcar.

Æolidella glauca (Alder & Hancock).—South edge of the Coal Pit, 23 fathoms (M.B.A.).

Cuthona nana Alder & Hancock.—Several stations, East of Yorkshire (M.B.A.).

Tergipes despectus (Johnston).—Off Redcar (D.F.).

Embletonia pulchra (Alder & Hancock).—South Bay, Scarborough (J. Irving).

Galvina cingulata Alder & Hancock.—Inner Silver Pit (M.B.A.).

Galvina tricolor (Forbes).—Inner Silver Pit, and several other stations in deep water (M.B.A.).

Coryphella rufibranchialis (Johnston).—Dogger Bank (Brady); Scarborough (J. Irving); Redcar.

Coryphella lineata (Lovén).—Off Whitby, 34-36 fathoms (M.B.A.).

Facelina coronata Forbes & Goodsir.—Filey (T.P.); fairly common, Scarborough (J. Irving).

Facelina drummondi (Thompson).—Off Scarborough, 23 fathoms (M.B.A.).

Doto fragilis (Forbes).—Redcar, brought in by fishermen (D.F.).

Doto coronata (Gmelin).—Redcar, with previous species (D.F.); Staithes (A. T. Watson); Filey (T.P.).

Dendronotus frondosus (Ascanius).—Near Dogger Bank, 34 fathoms (Meyer); Redcar, West Scar (D.F.); off Flamborough; frequently brought in by trawlers; near Easington (T.P.).

Scyllæa pelagica Linné.—Two in pool in South Bay, Scarborough, Aug., 1910 (J. Irving).

Tritonia hombergi Cuvier.—Tees (M.B.A.); off Flamborough (M.B.A.); Bridlington Bay (M.B.A.).

Tritonia plebeia Johnston.—Redcar, in old shells on fishing lines (D.F.); wherever *Alcyonium digitatum* was abundant (M.B.A.).

Tritonia lineata Alder & Hancock.—Scarborough at low water mark (Bean, Alder & Hancock).

Archidoris tuberculata (Cuvier).—Saltburn (Baker Hudson); Sandsend, one (M.V.L.); Scarborough, both bays, common.

Cadlina obvelata (Müller).—Between tide marks, Scarborough (Bowerbank & J. Irving).

Jorunna johnstoni (Alder & Hancock).—Two fine specimens in *Halichondria*, Sandsend (M.V.L.); both bays, Scarborough; Redcar.

Polycera quadrilineata (Müller).—Common in *Delesseria*, Sandsend (M.V.L.); not uncommon, Scarborough (J. Irving); Redcar.

Acanthodoris pilosa (Müller).—Staithes (A. T. Watson); Saltburn (M.L.T.); very common where *Alcyonium gelatinosum* is at all abundant, and is widely distributed (M.B.A.); Scarborough; Redcar.

Lamellidoris aspera Alder & Hancock.—Very common, Sandsend, both white and yellow vars. (M.V.L.); Withernsea (T.P.); Redcar; Scarborough.

Lamellidoris bilamellata (Linné).—Saltburn (M.L.T.); “profusely covering a large rock,” Sandsend (M.V.L.); off Scarborough, 31 fathoms, fairly common (M.B.A.); Scarborough (J. Irving).

Lamellidoris depressa Alder & Hancock.—Yorkshire (Alder).

Goniodoris nodosa (Montagu).—Commonest nudibranch at Sandsend (M.V.L.); Redcar.

Goniodoris castanea Alder & Hancock.—Sole Pit, east of Withernsea, 47 fathoms (M.B.A.).

Ancula cristata (Alder).—Redcar, "common, east end of West Scar" (D.F.); Scarborough.

Otina otis (Turton).—Redcar, occasionally found on West Scar (D.F.); Scarborough (Bean).

Leuconia bidentata (Montagu).—Teessmouth (D.F.); Scarborough (Bean); rare in shellsand, Scarborough.

Alexia denticulata Montagu.—Middlesbrough (Dixon & Watson); Scarborough (Bean).

Sthenoteuthis pteropus (Steenstrup).—Redcar, 1907 (*Naturalist*, April, 1908); Gristhorpe.

Loligo forbesi Steenstrup.—Off Staithes (Veitch); Scarborough (Bean); brought into Scarborough harbour for sale for bait. It is caught in large numbers a few miles off; very rarely portions of the pen may be picked up on the shore.

Loligo media (Linné).—Scarborough (Bean).

Sepia officinalis Linné.—Scarborough (Bean); at long intervals considerable numbers of the bones are cast up on the shore at Scarborough.

Sepiolo scandica Steenstrup.—Scarborough (Bean). Occasionally alive at Scarborough and Filey. It is very aptly described in Jeffreys' *Brit. Conch.* as squatting like a frog. I have seen it discharge its ink, which mixed very slightly with the water as it rose to the surface in a kind of bubble. The discharge would be of no use for concealment.

Sepiolo atlantica d'Orbigny.—Coast to Dogger, sometimes as food for dabs and gray gurnard (M.B.A.).

Rossia macrosoma (delle Chiaje).—Off the Tees, 40-60 fathoms (M.B.A.).

Moschites cirrosa (Lamarck).—Living specimens occasionally to be had in the North Bay, Scarborough, and fresh specimens thrown up on the rocks.

Gwynia capsula (Jeffreys).—Four miles off Robin Hood's Bay, 30-35 fathoms (Brady).

ERRATUM:—Page 89, line 19, for "*Patina*" read "*Helcion*."

ADDITIONAL NOTES ON THE NON-MARINE MOLLUSCA
OF MORTEHOE.

By M. JANE LONGSTAFF, F.L.S.

(Read before the Society, January 12, 1910.)

THE mollusca here enumerated were collected between May 28th and June 1st, and between July 19th and September 23rd, 1909. Those which are new to Morteheo parish—as previously defined—are distinguished by an asterisk. Fresh localities for a few of the rarer species occurring either in this district or in the immediate neighbourhood are also recorded. The additions now made bring up the total for the parish to fifty-two species and forty varieties.

I must acknowledge my gratitude to Messrs. B. B. Woodward, J. W. Taylor and W. Denison Roebuck for their kindness in determining or confirming the names of species and varieties.

***Limax cinereo-niger** Wolf.—Borough Wood. Young specimen of the type form. Identified by W.D.R.

***Agriolimax lævis** (Müll.).—Pool Farm, under a stone at the edge of a ditch. Confirmed by W.D.R. [Two at the edge of a pond at Croyde].

***Milax gagates** (Drap.) var. **rava** Williams.—Twitchen, garden, numerous under stones in company with *M. sowerbii* (Fér.). Confirmed by W.D.R.

Vitrea radiatula (Alder).—Borough Wood, one living specimen among dead leaves; Woolacombe, one dead, very large. Though Mr. Tomlin states this species to be common on Lundy, I have so far found it scarce in the Morteheo district, and therefore think it well to record new localities for it.

Vitrea pura (Alder).—Borough Wood, four additional specimens taken here; Kitty Nest Cleeve, abundant on dead leaves.

***Euconulus fulvus** (Müll.).—Kitty Nest Cleeve, eleven examples on dead leaves; Borough Wood, one living specimen among dead leaves.

***Punctum pygmæum** (Drap.).—Kitty Nest Cleeve, eleven specimens among dead leaves. Confirmed by J.W.T.

***Arion ater** (Linné) var. **castanea** Dum. and Mort., sub-var. **livida** Colb.—Pool Farm, under a log. Confirmed by W.D.R.

***Pyramidula rotundata** (Müll.) var. **pyramidalis** Jeff.—Woolacombe, a single living specimen. Confirmed by W.D.R.

**Helicella caperata* (Montagu) var. *fulva* Moq. — Twitchen, garden wall. Only one specimen. Identified by W.D.R.

Acanthinula aculeata (Müll.).—Kitty Nest Cleeve. After hunting for this species in vain at Woolacombe, I found nine specimens in this wood near the house and two in Borough Wood.

**Helix nemoralis* Linné var. *minor* Moq.—Twitchen, garden. Confirmed by W.D.R.

**Vertigo pygmæa* (Drap.) var. *quadridentata* Stud.—Woolacombe. Two specimens adhering to stones in company with the type. Confirmed by W.D.R.

Balea perversa (Linné).—Borough Woods, a single specimen among moss and dead leaves.

**Clausilia bidentata* (Ström) var. *tumidula* Jeff.—Twitchen, garden. Identified by W.D.R. [Previously taken by Mr. Tomlin near the sea in the neighbourhood of Ilfracombe, and a single specimen is recorded by Messrs. Beeston and Wright from Rapparee Lane, Ilfracombe (*J. of Conch.*, vol. v., 1887, p. 183, and vol. xi., 1904, p. 77)].

**Succinea elegans* Risso var. *berilloni* Baudon.—Lee, pond, three fine specimens. [Two small dead specimens of the typical form were also found in a ditch at Braunton].

Carychium minimum Müll.—Kitty Nest Cleeve; Coney Park; Borough Wood. Abundant at the two former localities.

[*Limnæa pereger* (Müll.).—Trimstone, West Down, adjoining Morteheo parish. Numerous large specimens were taken in a pond in an old quarry, which Mr. J. W. Taylor considers approach the varieties **ovata* Drap. and **fontinalis* Studer, respectively. The pond was only fed by surface drainage, and no other mollusca appeared to be present.]

**Limnæa palustris* (Müll.).—Woolacombe. A single living specimen. Confirmed by J.W.T.

[**m. decollatum*. — Braunton. Three examples in a ditch. Confirmed by W.D.R.].

[*Planorbis albus* Müll.—Braunton. Confirmed by J.W.T.].

[*Sphærium corneum* (Linné).—Braunton. Messrs. Beeston and Wright found it common but small. I only met with two examples, one of which is a fair size, measuring 11 mm. in breadth and 8 mm. in length].

**Sphærium lacustre* (Müll.).—Gratton quarry. This pond has only been in existence about thirty years, and at first it was dried up in times of drought as it is only fed by surface drainage. There is

very little mud, the bottom being almost covered by broken pieces of Morte slate. Though some time was spent, only this species was taken, and but two specimens of it, one of which was alive and contained seventeen young shells. The only other locality where I have found the species is Damage, about one mile off, and there the shell is distinctly the variety **ryckholti** Norm., whereas here the shells are larger and flatter with less marked calculation. They measure 9.5 mm. in breadth and 8 mm. in length.

***Pisidium subtruncatum** Malm.—Lee. In a pond supplied by a stream which is joined higher up at Borough by two smaller streams previously mentioned. Only taken before at Saunton and Braunton.

Pisidium casertanum Poli.—Lee, pond. Three of the specimens are of remarkable size, one measuring 7.25 mm. in breadth.

***Pisidium pusillum** (Gmelin).—Lee, pond. I have not previously found this species in the district, but Messrs. Beeston and Wright state that it is common at Braunton (*J. of Conch.*, vol. xi., 1904, p. 80.).

The Dispersal of Shells by Insects.—Cases of dispersal have been recorded fairly frequently with freshwater shells, but records of observations are rare in the case of land mollusca. It is, therefore, of some interest to be able to report the abduction of a *Cyclostoma elegans*. While botanizing at the foot of Lord's Wood on the Great Doward Hill, a little below Symond's Yat, my wife called my attention to a huge bumble bee flying slowly and laboriously along a few feet above the ground, obviously impeded by something it was carrying. On being netted and examined, the bee proved to have one of its hind tarsi firmly wedged between the shell and operculum of a full grown *Cyclostoma elegans*. Several attempts to release the leg were unsuccessful, so I let the bee fly off again with its 'old man of the sea'. I do not imagine that the *Cyclostoma* would be carried far enough away to lead to any new result in colonization, but it shows in what unexpected ways shells may be transported.—J. R. LE B. TOMLIN (*Read before the Society*, June 8th, 1910).

On Ethalia nevillei Sowerby.—This species was described by Mr. Sowerby in the *Ann. and Mag. N.H.*, 1905, p. 186. A recent examination of the type in the British Museum and comparison with the type of ¹*Cyclostrema excavata* Carpenter established their identity. Mr. Edgar Smith considers that this species would be best placed in *Adeorbis*. I have two specimens of it from Singapore (coll. Archer).—J. R. LE B. TOMLIN (*Read before the Society*, Sept. 14, 1910).

Crepidula fornicata and Petricola pholadiformis in the Medway.—These two rather rare shells are found about six miles from Rochester and Sheerness. It is somewhat curious that the time of their discovery almost coincides with the laying-down of an oyster-bed in the same place eight years ago, but whether there is any connexion between the two circumstances is for others to decide. They are found in company with *Cyprina islandica* (this also seems rather a strange shell to find in an estuary), *Scrobicularia plana* and *Nassa reticulata*.—F. H. SIKES (*Read before the Society*, March 9th, 1910).

NOTES ON SOME RARE MOLLUSCA FROM THE NORTH SEA AND SHETLAND—FAEROE CHANNEL.

By JAMES SIMPSON.

(Read before the Society, April 13th, 1910).

EVER since the inauguration of the international scheme for the investigation of the North Sea, but more particularly since 1905, extensive trawlings and dredgings have been done by the Scottish Fishery Board steamer, "Goldseeker," in the North Sea and Shetland-Faeroe Channel.

The following notes have reference only to the work done in the years 1905-6-7, and to the rarer species and varieties, or those whose range is geographically or bathymetrically extended within the British area. Complete lists of all the mollusca collected will, in due course, be published by the bureau.

To my old friend, Mr. J. T. Marshall, and to Herr Friele my thanks are due for the verification of some of the more obscure species; and to Prof. Darcy W. Thompson, director of the investigations, for allowing me to work out the material.

The following is a list of the stations as given in the published list. The depths are those from which the dredgings were taken up.

STATIONS WITHIN THE BRITISH AREA.

Station.	N. Latitude	Longitude	Depth (in metres)	Station.	N. Latitude	Longitude	Depth (in metres)
4	59.26	1.20W.	108	34	58.17	1.03W.	97
6	60.35	0.29E.		38	58.34	c.47E.	137
6b	60.00	2.02E.	107	39b	57.59	0.57E.	140
7	61.06	2.01E.	134	41	57.03	0.26W.	98
7a	61.45	2.30E.	139	41c	56.35	0.10W.	89
9	61.30	2.04E.	361	44	56.20	1.49W.	41
10	61.35	0.47E.	204	49	59.00	4.00W.	49
11	61.38	0.41W.	286	50	59.21	5.00W.	125
12	61.02	1.10W.	93	53	59.36	7.00W.	1000
19b	60.26	4.02W.	270	54	59.10	7.00W.	182
21	59.46	2.21W.	93	55	58.44	7.00W.	108
21a	60.02	3.13W.	160	56	58.44	6.00W.	115
23	59.31	0.37E.	120	57	58.44	5.00W.	88
23a	59.55	1.32E.	115	58	58.44	4.00W.	105
24	58.55	0.04E.	133				

STATIONS BEYOND THE BRITISH AREA.

Station.	N. Latitude	Longitude	Depth (in metres)	Station.	N. Latitude	Longitude	Depth (in metres)
8	61.30	3.03E.	365	17	61.12	6.33W.	150
15b	61.39	4.45W.	240	18	60.57	5.47W.	355
16	62.00	6.12W.	130	19a	60.40	4.50W.	1078
16a	61.49	5.36W.	160				

Neomenia carinata Tull.—St. 54, four specimens brought up in the small trawl.

Lepidopleurus cancellatus Sowb.—St. 44, one; St. 57, one. Broad bay; common.

Hanleya hanleyi Bean.—St. 16, one; St. 16a, one.

Craspedochilus albus L.—St. 11, one; small.

Nucula tumidula Malm.—St. 53, five alive and several valves.

Nuculana lucida Lovén.—St. 9, several alive and dead.

Malletia obtusa M. Sars.—St. 9, one valve.

Limopsis aurita Brocchi.—St. 11, four alive and several valves.

Limopsis cristata Jeff.—St. 53, several alive and valves.

Limopsis minuta Phil.—St. 9, three; St. 19b, several.

Barbatia glacialis Gray.—St. 19b, valve; St. 53, valve. I consider both valves as semi-fossil.

Arca nodulosa Müll.—St. 11, one; 9 miles N.W. $\frac{1}{4}$ W. from St. 15b, 250 m., one; St. 16a, four; St. 17, several; St. 19b, one and several valves.

Arca obliqua Phil.—St. 11, valves; St. 19b, valves.

Batharca pectunculoides Scacchi.—St. 4, valves; St. 9, several; St. 10, four; St. 11, one; St. 12, two; St. 16, valves; St. 16a, several; St. 17, one valve; St. 18, several valves; St. 19, valves; St. 21, valves; St. 53, several; St. 56, two valves; St. 57, one; off Trumpan Head, 100 m., two.

Modiolaria discrepans Leach.—St. 16, three, small, with fragments of adults; St. 23a, several fry; St. 38, one baby and one valve; St. 41, one and two broken valves.

Pecten islandicus Müll.—St. 19b, several specimens and valves. This confirms my previous record of this species living within the British area. As on the former occasion, they belonged to a dwarf form which might be distinguished as var. *scotica*.

Pecten sulcatus Müll.—St. 9, three and two valves; St. 16a, one and several valves; St. 18a, two; St. 19b, several; St. 21a, valves.

Amussium hoskynsi Forbes.—St. 11, one valve; 9 miles N.W. $\frac{1}{4}$ W. from 15b, one and three valves; St. 18a, one; St. 19b, two and several valves.

Limea sarsi Lov.—St. 11, several, with many valves; St. 16a, valves common; St. 18a, two valves; St. 19b, several valves; St. 34, one valve.

Kelliella miliaris Phil.—St. 9, one; St. 10, several; $61^{\circ}20' N.$ $0^{\circ}55' W.$, two valves.

Leptaxinus incrassatus Jeff.—St. 10, one; St. 11, two and several valves; St. 16, two valves; St. 16a, four valves; St. 18a, two valves; St. 19b, one valve.

Syndosmya longicallus Scacchi.—St. 8, one; St. 9, one and several valves.

Tellina balaustina Linné.—10½ miles N.W. from St. 7, 167 m., eight valves; St. 7, one and one valve; St. 10, two small; 61°20' N., 0°55' W., one valve.

Venus fasciata var. **pallida** var. nov.—White, with no trace of colour. Fair Isle bank, 80 m., several; Broad Bay, 11 m., two.

Gari costulata Turton.—St. 4, valve; St. 12, two; St. 16a, one; St. 50, valve; St. 54, three; St. 55, several.

Lyonsia norvegica Chem.—St. 8, one small; between Sts. 10 and 11, 100 m., one; St. 16, four and several valves; St. 34, valve; St. 50, one juvenile; St. 56, one; off Trumpan Head, 100 m., one broken valve.

Thracia fragilis Penn. var. **gracilis** Jeff.—St. 10, one.

Lyonsiella abyssicola M. Sars.—St. 53, one.

Lyonsiella sp. ?—Fragments of another species of this genus at St. 54.

Poromya granulata Nyst. & W.—St. 11, one valve; St. 16a, two and several valves; St. 19b, one valve.

Cuspidaria abbreviata Fbs.—Off Trumpan Head, 100 m., one.

Cuspidaria costellata Desh.—St. 9, one; St. 10, two; St. 54, one valve; St. 56, one.

Cuspidaria cuspidata Olivi.—St. 10½ miles N. ¼ W. from 7, two and two valves; St. 10, one and one valve; St. 38, three.

Cuspidaria rostrata Speng.—St. 10, one and two valves.

Cuspidaria lamellosa M. Sars.—St. 9, several; St. 16a, several; St. 18, five; St. 53, three, two with the ribbing nearly obliterated.

Pulsellum lofotense M. Sars.—St. 8, one; St. 9, four.

Pulsellum lofotense var. **affine** M. Sars.—St. 10, several; St. 11, four; St. 16a, one.

Entalina quinquangularis Forbes.—St. 7, one; St. 9, several.

Cadulus subfusiformis M. Sars.—St. 9, several; St. 11, several; St. 16a, two.

Cadulus jeffreysi Monts.—St. 9, several; St. 10, four; St. 16a, one; St. 18a, two; St. 54, two.

Cadulus propinquus G. O. Sars.—St. 9, several.

Dentalium agile M. Sars.—St. 9, several.

Lepeta cæca Müller.—St. 10½ miles N. ¼ W. from 7, one fresh dead specimen.

Lepeta fulva Müller.—St. 4, several; St. 7, four; St. 11, common; St. 12, several; St. 16, common; St. 16a, several; St. 17, two; St. 19b, several; St. 21a, common; St. 55, several; St. 56, several; St. 57, four; Fair Isle bank, 80 m., several.

Lepeta fulva var. **albula** Jeff.—St. 11, several; St. 12, two; St. 16, common; St. 16a, one; St. 17, three; St. 54, one; St. 55, four.

Lepeta fulva var. **expansa** Jeff.—St. 56, two.

Moelleria costulata Müll.—St. 10 four; between Sts. 10 and 11, one broken; St. 11, five and several broken specimens; St. 16, one.

Eumargarita grœnlandica Chem.—St. 16, two; St. 17, several; St. 21, one; Fair Isle bank, one.

Solariella cincta Phil.—St. 11, one baby; St. 16a, four small; St. 17, several.

Solariella otto Phil.—St. 53, two dead but fresh, and one broken.

Calliostoma occidentale Migh.—St. 7, one small; St. 16, five; St. 16a, three small; St. 17, several small; St. 34, two; St. 53, one; Truman Head, one.

Danilia otaviana Cantr.—St. 19b, one, fresh dead.

Delphinoidea basistriata Jeff.—St. 11, one; 9 miles N.W. ¼ W. from St. 15b, one; St. 16, one; St. 16a, several; St. 17, several; St. 18a, two.

Delphinoidea lævigata Jeff.—9 miles N.W. ¼ W. from St. 15b, one dead and one broken.

Delphinoidea areolata G. O. Sars.—St. 16a, one.

Lacuna crassior Mont.—Fair Isle bank, common.

Alvania jeffreysi Waller.—St. 11, several; 9 miles N.W. ¼ W. from St. 15b, three; St. 16, two; St. 16a, several; St. 17, several; St. 18a, four; St. 21a, three.

Manzonia zetlandica Mont.—St. 11, three; St. 16, two; St. 17, one; St. 21, one; St. 21a, one.

Natica pallida B. & S.—St. 6b, one fine, and one half-grown; St. 9, one alive, and four dead; St. 38, several; St. 41, two.

Natica affinis Gmel.—St. 16, one; St. 16a, three small; St. 17, one small; St. 53, two small.

Natica clausa B. & S.—St. 16a, two small.

Amauropsis islandicus Gmel.—St. 4, one; St. 16, one; St. 17, three small; St. 41, one baby; St. 49, one small; Fair Isle bank, two small; off Ross Head (Caithness), 78 m., one baby.

Velutella flexilis Mont.—St. 16a, one dead.

Newtoniella metula Lovén.—St. 10, four; St. 11, four good, and four broken; St. 16, several; St. 16a, several; St. 17, several; St. 21a, two; St. 53, four.

Cerithiopsis costulata Möller.—St. 10, one; St. 11, five; 9 miles N.W. $\frac{1}{4}$ W. from St. 15b, one small and two broken; St. 17, five; St. 18a, three.

Læocochlis granosa S. V. Wood.—St. 16a, four.

Scala grœnlandica Chem.—St. 16, one small, dead and broken.

Eulima subumbilicata Jeff.—St. 53, two specimens which agree in most particulars with Dr. Jeffreys' description of this species in the Proc. Zool. Soc. 1884, p. 370, with the exception that they are transparent and glossy instead of "creamy white," and that the last whorl is nearer half the length instead of two-thirds. One is more slender than the other, and the outer lip does not project: with this exception, which may be an individual variation, they are identical.

This species is described from a single specimen brought up by the "Porcupine" in 1870, from Atlantic Station 27.

Eulima stenostoma Jeff.—St. 23, one; St. 23a, one; St. 38, one.

Aporrhais serresianus Mich.—St. 6, one; St. 24a, two; St. 34, four juveniles; St. 36, one adult and one baby; St. 38, four; St. 39b, one and three babies; St. 40, one juvenile; St. 41c, several young; St. 53, two juveniles.

Buccinum undatum L. var. **zetlandica** Forbes.—St. 6b, two and several young; St. 7, common; St. 7a, one; between Sts. 11 and 12, several young; St. 24, one large, two small; St. 34, one adult, several small; St. 38, three; St. 41, three small; 61° 20' N. 0° 55' W., one.

Buccinum humphreysianum Bennett.—St. 38, three small.

Liomesus dalei Sow.—St. 10, one dead and broken; St. 34, one; Fair Isle bank, one dead and damaged.

Neptunea despecta L.—St. 16a, one small.

Volutopsis norvegicus Chem.—31½ miles N. ½ W. from St. 6, common; 42 miles from St. 6, three; St. 23a, one half-grown and one baby; St. 38, two.

Beringius turtoni Bean.—31½ miles N. ½ W. from St. 6, four; 42 miles from St. 6, five; St. 9, two; St. 10, one; St. 12, one small; St. 23a, one small.

Tritonofusus islandicus Chem.—St. 38, three.

Tritonofusus gracilis Costa var. **glaber** Verk—St. 11, three small; St. 16, four juveniles; St. 16a, several small; St. 17, one broken specimen.

Tritonofusus propinquus var. **turrita** Sars.—St. 6b, five; 10½ miles N. ¼ W. from St. 7, one; St. 10, one; St. 38, several.

Tritonofusus fusiformis Brod.—St. 9, three; St. 16, one; St. 53, three.

Buccinofusus berniciensis King.—St. 6b, three small; 31½ miles N. ½ W. from St. 6, three; 42 miles from St. 6, one; St. 7, one small, and fragments; St. 7a, one; St. 9, three large, and one baby; St. 10, one baby; St. 12, one juvenile; St. 19b, one; St. 34, one juvenile; St. 38, one; St. 41, one; St. 53, three small; St. 54, one small, broken, and one baby specimen were brought up in the small trawl net. The baby was in its egg capsule. The fluid which surrounded it was of a pale transparent blue colour.

Columbella haliæti Jeff.—St. 7, one; St. 9, one; St. 11, several; St. 15b, five; St. 16, two; St. 19a, one; St. 53, several.

Admete couthouyi Jay.—St. 9, three; St. 19a, one.

Bela cancellata Migh. var. **declivis** Lovén.—St. 16, several.

Bela ovalis Friele.—St. 53, one.

Bela exarata Möller.—St. 16, common; St. 16a, three; St. 53, two; St. 56, one.

Bela cirrata Brug. (*mörchii* Malm).—St. 11, three good and three broken; St. 16, five; St. 17, three; St. 18a, one.

Typhlomangilia nivalis Lovén.—St. 10, two.

Spirotropis modiola C. & J.—St. 9, four adults and one baby; St. 16, one good and two broken; St. 53, two.

Thesbia nana Lovén.—St. 4, one small; St. 16, five; St. 16a, one; St. 17, several; St. 21, one; St. 21a, one.

Pleurotomella packardi Verr.—St. 53, one.

Volutomitra grœnlandica Beck.—St. 16, several; St. 16a, one; St. 17, two, and two broken.

Metzgeria alba Jeff.—St. 16a, several.

Actæon tornatilis L. var. *subulata* S. V. Wood.—Broad Bay, 11 m., one.

Actæon tornatilis var. *tenella* Lovén.—St. 12, ten ; St. 50, one.

Tornatina ovata Jeff.—St. 53, one.

Diaphana expansa Jeff.—St. 10, one ; St. 16a, one.

Diaphana quadrata Monts.—St. 41, one.

Scaphander lignarius L. var. *curta* Jeff.—St. 6, common ; 10½ miles N. ¼ W. from St. 7, several ; St. 7, common ; St. 7a, common ; St. 9, six and three white specimens ; St. 10, several ; between Sts. 11 and 12, 110 m., several ; St. 23, four ; St. 38, several ; St. 57, several.

Scaphander punctostriatus Migh.—St. 12, two.

Volvulella acuminata Brug.—St. 56, three.

Bullinella alba Brown.—St. 16, three ; St. 16a, six.

Bullinella alba var. *corticata* Beck.—St. 10, several.

Roxania utriculus Brocchi.—St. 6b, one ; St. 16, three, small ; St. 34, four, small ; St. 38, one ; St. 39b, three ; St. 41c, two ; St. 56, four ; St. 58, two, small.

Philine quadrata S. V. Wood.—St. 7a, one ; St. 34, one ; St. 38, three ; St. 41c, one ; St. 53, one ; St. 58, one.

Philine pruinosa Clark.—St. 61° 20 N., 0° 55' W., several.

Philine finmarchica M. Sars.—St. 16a, one.

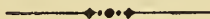
Macandrevia cranium Müller.—10½ miles N. ¼ W. from St. 7, three ; St. 7, several, small ; St. 10, two broken ; St. 11, several ; St. 12, two ; St. 15b, five ; St. 16, common ; St. 16a, very abundant ; St. 17, several ; St. 18a, several, small ; St. 19b, several.

Macandrevia cranium var. *oblonga* Jeff.—St. 16, two ; St. 16a, abundant. St. 16a is remarkable for the abundance of this species and variety. On one occasion the small trawl brought up such a quantity as to fill a large tub, 90 per cent. being alive.

Terebratulina septata Phil.—St. 19b, three.

Rhynchonella psittacea Chem.—St. 56, one semi-fossil under valve.

Atretia gnomon Jeff.—St. 56. One specimen brought up in the small trawl perfectly fresh and to all appearance had been alive when taken up.



OBSERVATIONS ON THE PAIRING OF *ARION ATER* (L.).

By LIONEL E. ADAMS, B.A.

(Read before the Society, March 9th, 1910).

VERY little seems to be known of the breeding habits of our slugs: we may judge by the lack of information contained in the text books. In Férussac's work¹ there are figures of the pairing of *Limax maximus* L. and *Arion ater* (L.), but all these are evidently drawn from memory and are wrong in detail; the descriptions, too, are vague and incomplete; these, however, are all that the student has to rely on, and even accurate figures of mere anatomical detail are quite inadequate to give an idea of the exact method of employment of the organs figured. I am glad, therefore, to have had the opportunity lately of an observation which may help to supply the deficiency.

In mid August, 1896, while searching for shells with Mr. C. E. Wright, of Kettering, one afternoon at Shepherdswell, near Dover, I noticed a couple of *A. ater* pairing in an open field among the short grass, but supposing at the time that the act must be common enough to be well known I made no notes. Subsequently I learnt that however common it may be, it does not seem to have been observed by British conchologists. Although I and many others have been on the look-out for the chance of an observation ever since, it was not until Sept. 1, 1909, that an opportunity presented itself while I was staying at Beeding in Sussex, and curiously enough Mr. C. Oldham wrote a few days afterwards to tell me that he had also witnessed a similar occurrence at Oxhey Woods near Watford on the afternoon of Sept. 4th, 1909.

Is it mere coincidence that the only three occurrences that have been noticed by myself and many others, who have been on the look-out for thirteen years, and who spend much time in the country, should be all late in August or early in September, or can it be that the "season" of this species is restricted to a very short period of the year? I used to think that the pairing took place at night, but extensive lantern search always failed to discover it in the lanes round Stafford where the species was exceedingly abundant. I used to notice that hundreds would be found abroad about dusk, but very few late at night, and this was the case on the occasion about to be described. The habits of this species are generally diurnal or crepuscular, not nocturnal.

On September 1, 1909, after a spell of nine days' dry weather, rain commenced steadily at 3 p.m., and the thirsty mollusks came

¹ "Histoire Naturelle, générale et particulière, des Mollusques Terrestres et Fluviales" (1819).

forth to enjoy it, swarming over the roads and hedges. At 3-30 p.m., I was returning from Henfield to Beeding, examining the snails along the low stone and turf wall, which bounded one side of the tarred high road, when I came upon a large colony of *A. ater*, extending for 150 yards along the wall and also on the road. I saw at once that many were intent on pairing, so I proceeded to make notes and sketches, and as I stayed till darkness rendered observation impossible and examined more than twenty couples, I was enabled to follow the performance in all stages. At dark I left the spot, but returned in half an hour to find that the slugs had nearly all disappeared.

The sequence of events was the same in all cases, varying only in the duration of time of the different stages. The procedure was as follows:—One slug would overtake another; the pursuer would begin to eat the slime from the caudal extremity of the other, which would then turn and reciprocate the act. Then would ensue a circular procession similar to that in the case of *L. maximus*, but at a much slower pace, and without any flapping of the mantle usual with that species. The processions that I timed lasted from ten minutes to an hour and a half. When the procession was completed, each would draw up alongside of the other, so that their genital orifices, from which the lower atria were slightly protruding, were opposed (Fig 1).

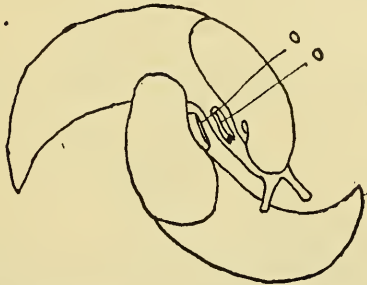


FIG. 1 (nat. size).—A couple drawing alongside each other at the completion of the circular procession. *o, o*, genital orifices.

The upper atria were then gradually evaginated through the mouth of the lower atria, which organs seem to act as constrictors or sphincters. The evaginated upper atria meet and adhere, ¹'sucker'

1 The inflated organs of a paired couple are joined by a neck of dead cream-coloured muscular tissue. The bulbs themselves are semitransparent bluish white. This neck of muscular tissue consists of the 'sucker,' the slightly evaginated spermatheca duct, and the epiphallus. These may be seen clearly if the organs of a paired couple be separated; a separated organ presents the appearance of fig. 3.

If the upper atrium as it lies in its natural position be slit open and turned inside out, a projected process, which resembles a schoolboy's 'sucker,' with a corrugated surface, will appear, also two holes, which may be squeezed so as to evert the two ducts communicating with spermatheca and epiphallus, fig. 4.

In the act of coupling, the 'suckers' fit together as fulcra and holdfasts, while the spermatheca of the one individual is projected into the spermatheca of the other.

I have called this process the 'sucker,' as that is apparently its function in keeping the everted organs compactly together during the act of coupling.

to 'sucker,' and become distended into spherical masses of 14 mm. diameter, the 'suckers' being apparently used as fulcra and hold-fasts, while the spermatophore and epiphallus of each is projected into the spermatheca of the other. They remain thus coupled from 15 minutes to half an hour (Fig. 2).

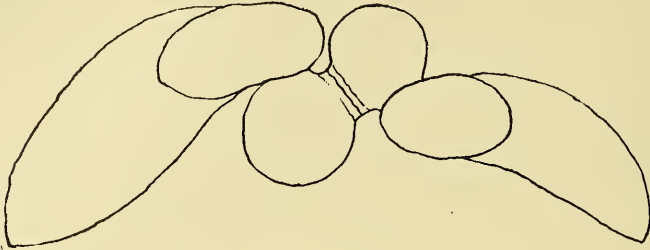


FIG. 2 (nat. size).—*A. ater* in cop. viewed from above.

I have been greatly helped in my dissections by the excellent figures in Mr. J. W. Taylor's "Monograph"; and it is due to the kindness of Mr. J. C. Melvill that I am enabled to reproduce the figure from Férussac's work.

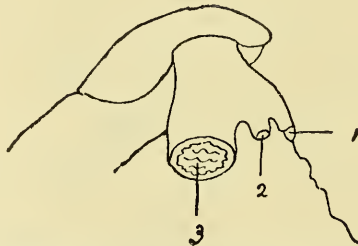


FIG. 3 (enlarged).—Evaginated upper atrium separated from another in the act of coupling; 1, epiphallus and spermatophore; 2, duct from spermatheca; 3, the 'sucker.'

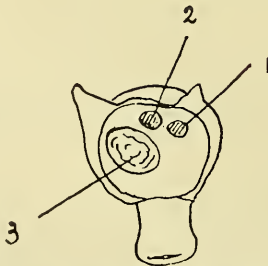


FIG. 4 (enlarged).—Showing upper atrium, dissected open, exposing—1, epiphallus; 2, entrance of duct from spermatheca; 3, the 'sucker' with corrugated surface.

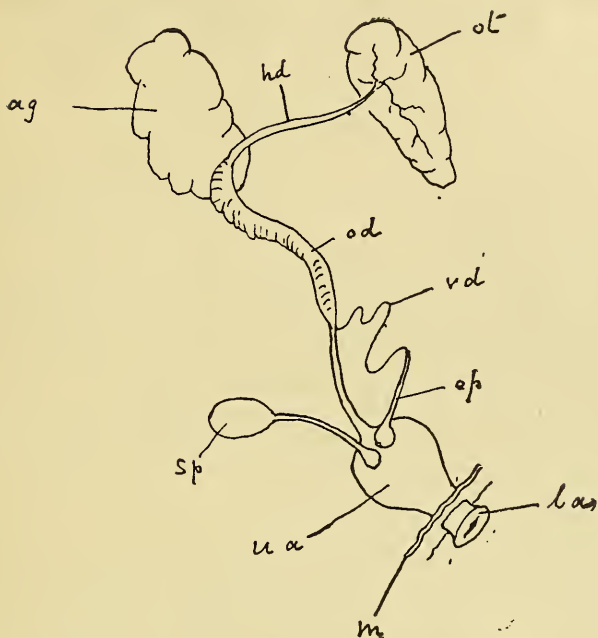


FIG. 5.—Showing genital system (enlarged).—*ag.* albumen gland; *hd.* hermaphrodite duct; *ot.* ovotestis; *od.* oviduct; *vd.* vas deferens; *ep.* epiphallus; *sp.* spermatheca; *ua.* upper atrium; *la.* lower atrium; *m.* edge of mantle.

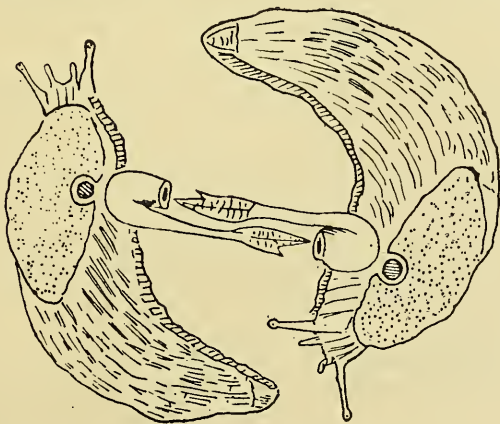


FIG. 6.—A tracing by Mr. J. C. Melvill from Férussac's work.

UPON CERTAIN SPECIES OF LAND MOLLUSCA LIVING IN
THE SOUTHERN LIMESTONE ALPS.

By MAXWELL SMITH.

(Read before the Society, March 9th, 1910).

DURING a stay at Cortina, last summer, I was enabled to observe a number of interesting facts in connection with the air-breathing mollusca of that region.

The town of Cortina is situated in the Ampezzo Valley at the base of Mount Tofana; a region of interest to botanists, conchologists, and especially geologists. While not a part of the original Dolomites, which were examined by Dolomieu, the geologist, it contains many exposed cliffs similar to this magnesian formation. Thus it has received the popular name of "Ampezzo Dolomites." To be exact the term Dolomite should be applied to the Fassa, Langkofel, Rosengarten, and Schlern Mountains, and not to the Cristallo, Antelao, and other peaks of the Ampezzo district.

The region is a diversified one. The land is, in many parts, especially the lower valleys, well wooded, and watered by numerous streams. By the town the Ampezzo Valley is broadest. This is at an elevation of 4,025 feet. The upper valleys, which are commonly plateau-like, are numerous. These are mostly around 5,000 feet. Above 7,500 feet no snails were found. This might be accounted for by the early time of collecting, before the winter snows had sufficiently melted on the mountain tops.

I was fortunate in arriving during a wet season. The rain was continuous for weeks in May and June, so this facilitated collecting in a region which under ordinary conditions is not so lucrative to the conchologist.

I do not consider the following list nearly complete, but merely a preliminary account of the particular situations and habitats of the species secured.

Euconulus fulvus Drap.—Taken under chips on a hillside at the base of rocks. They, presumably, also live in the grass.

Eulota fruticum Drap.—Two forms were taken in a station near the above. Canon Wiedemayr, who is conchologically well acquainted with the Tirol, has pronounced them:

var. **rosea**.

var. **roseofasciata**.

Vallonia pulchella Müll.—In clearings of the forests, around stumps of fallen pine trees. The pine woods do not appear objectionable to the species.

Helicigona arbustorum Linné.—From fields in many parts. It is found over most of Central Europe.

var. **rudis** Megerle.—Mount Faloria at 7,500 feet elevation. A single example, dead, was taken near the summit, in the bed of a sand-slip. It may live on some of the inaccessible crags near by. This thin variety recalls those found in the French Alps and Switzerland at high points.

Helicigona cingulata Stud.—On the road-side walls between Belluno, in Italy, and a point near 2,500 feet, towards Cortina. This species appears to reach its greatest development in the lower regions, on the south side of the Limestone Alps, which are naturally more sheltered and warm in winter. During November I took it alive near Riva, at the head of Lake Garda. It may also occur on the north side of these mountains, but I am not aware of its existence there.

Helicigona planospira Lamarck.—A characteristic species of the Eastern Alps, also extending south in Italy. I found it near the Austrian customhouse, on the Belluno road, at about 3,500 feet. Curiously it is replaced, at a lower elevation southward, by *H. cingulata*; and what is more remarkable another *Helicigona*, viz., *presli*, takes its place in numbers at higher elevations. Thus we may understand that in the region of the Ampezzo:—

H. cingulata inhabits the base of the Alps;

H. planospira principally around 3,500 feet;

H. presli from 4,000 to 6,000 feet.

The only one of the three that I found in company of another was *H. planospira*. It lives, under unusually favourable conditions, on the Mount Crepa cliffs with *H. presli*. Though the numbers are very limited, the individuals, being large and strong, constitute a healthy colony.

Helicigona presli Rossm.—Roughened specimens of this interesting species were taken on the aforementioned Mount Crepa, in the neighbourhood of Cortina. The elevation of the cliffs, where they were found, is nearly 5,000 feet above the sea. The locality, on the north, is an admirable one for snails. The walls are slanting and smooth, with numerous crevices, which in summer are a mass of creepers. These are replaced by ferns where small springs trickle out of the rocks. The composition of the latter is a mixture of lime and sandstone. The whole place is sheltered by pines. *H. presli* was also taken on the Schluderbach road at 5,500 feet. Dead were seen higher at 6,000 feet. Small examples were taken in the Ampezzo Valley at 4,000 feet.

Helix pomatia Linné.—Rather uncommon in the Ampezzo.

Helix nemoralis Linné.—From the lower and warmer situations near Cartina.

Sphyradium edentulum Drap.

Pupa secale Drap.—Both in the fields, as high as 4,500 feet.

Clausilia plicatula Drap.—Perhaps a variety. Found sparingly on the Mount Crepa cliffs with the following.

Clausilia stenzi Rossm.—A very distinct form of this species. Mount Crepa, on moist slabs of limestone.



PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

393rd Meeting, held at Manchester Museum, June 8th, 1910.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

“A Guide to the Natural History of the Isle of Wight,” by Frank Morey, F.L.S. “A List of the Generic Names of Dibranchiata Cephalopoda with their type species,” by W. E. Hoyle, D.Sc., etc. “Mollusca : Cephalopoda—Schultze, Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika,” by W. E. Hoyle, D.Sc., etc. (*presented by the respective authors*). “Catalogue of Cretaceous Bryozoa, vol. ii.,” “Memorials of Charles Darwin” (*presented by the Trustees of the British Museum*); and the usual periodicals received in exchange.

New Member Elected.

David Colwell, Heathcote, Lavender Vale, Wallington, Surrey.

Papers Read.

“The dispersal of shells by insects,” by J. R. le Brockton Tomlin, M.A.

“Shell drift at Ballinacurra, Limerick,” by Harry Fogerty.

Exhibits.

By Mr. E. Collier : A fine series of *Helix nemoralis* from Lisdoonvarna Spa, co. Clare, found climbing on thorn fences in great abundance, varying from 0000 yellow and red to 12345 very dark *coalita*; shells very large, variable, and glossy. Also from the golf links, Lahinch, but much smaller, badly weathered, and all one uniform colour.

By Rev. L. J. Shackelford : *Buccinofusus berniciensis* (King) brought in by a Fleetwood trawler—probably dredged on the Dogger Bank.

By Mr. J. Kidson Taylor : *Helicigona lapicida* monst. *scalariforme* from the Winnats, Castleton, and Miller’s Dale, Derbyshire; *Hygromia hispida* var. *alba* and *Eua obscura* from Raven’s Tor, Miller’s Dale.

By Mr. R. Cairns : A fine example of *Cypræa caput-draconis* Melv. from a reef at Easter Island; *Trivia pisum*; and *C. lurida* of a peculiar greenish tint, which he believed to be due to a growth of algæ over the dorsal surface of the shell during a resting stage, afterwards covered by another porcellanous layer.

By Mr. R. Standen : *Testacella haliotide*a from a garden at Didsbury.

By Mr. R. Harrison: *Limnæa stagnalis*, *L. peregra* and *L. palustris*; *Spherium corneum* and *Bithynia tentaculata* from pits at Reddish—also examples of the same species from Reddish Canal, taken from a point where the water is warmed by the engine water from adjacent cotton mills, and in consequence the *Bithynias*, especially, are particularly clean and free from the black incrustations so frequently seen on shells from the pits and canals around Manchester.

By Mr. T. H. Platt: *Helicigona arbustorum* and *Helix hortensis* from Miller's Dale.

By Mrs. Gill: *Cypræa aurantia*, *C. mus*, *C. scotti*, *C. stercoraria* and varieties, and other species.

By Mr. G. C. Spence: *Pomatias elegans* from wood at end of Promenade, Arnside, Westmorland; *Clausilia bidentata*, a curious variety from Malham; *H. cantiana* and *H. lapicida* from Wensley Dale; *H. arbustorum* and "love-darts," from Barnard Castle; *H. hortensis* from Greeta Bridge; living *H. pomatia*, collected by Mr. H. J. Stalley at Titsey Hill, Surrey, and a number of interesting photographs of the same.

By Mr. J. W. Jackson: *Acanthinula lamellata* var. *albida* from Kildale, Yorks., collected by Rev. J. Hawell; a remarkably fine example of *Ammonites excavatus* from the Coral Rag, Shotover, presented to the Manchester Museum by Prof. W. Boyd Dawkins.

394th Meeting, held at Manchester Museum, September 14th, 1910.

Mr. E. Collier in the chair.

Donations to Library announced and thanks voted:

"A Buried Valley at North Sea Landing, Flamborough." "Classified List of Organic Remains from the rocks of the East Riding of Yorkshire," "Recent Geological Work in the Humber District," "Bibliography, List of Papers referring to the Geology and Paleontology of East Yorkshire and North Lincolnshire, 1906-9," by T. Sheppard; "Monograph of the Land and Freshwater Mollusca of the British Isles," part 17, by John W. Taylor; "Manual of Conchology," part 81, by H. A. Pilsbry; "On some Land Shells collected by Dr. Hiram Bingham in Peru," "Summary of the Shells of the genus *Conus* from the Pacific Coast of America in the U.S. National Museum," by W. H. Dall; "Conchologische Mitteilungen aus dem Naturhistorischen Museum in Hamburg," by Dr. H. Strebél; "On the occurrence in England of *Valvata macrostoma* Steenbuch," by A. S. Kennard and A. W. Stelfox (*from the respective authors*); and the usual periodicals received in exchange.

Candidates Proposed for Membership.

Arthur Walton Rowe, M.S., M.B., M.A.C.S., F.G.S., Shottendane, Margate.
A. M. Oliver, 1, Fenham Terrace, Newcastle-on-Tyne.

Papers Read.

"*Succinea oblonga* in Merionethshire," by J. E. Cooper.

"*Paludestrina jenkinsi* in Merionethshire," by J. E. Cooper.

"*Helix nemoralis* with band formula 12045," by F. B. Jennings.

"On the dart of *Helix undata* Lowe," by G. C. Spence.

"A double-mouthed *Clausilia bidentata* near Warton, W. Lancashire," by J. W. Jackson, F.G.S.

"On *Ethalia nevilli* Sowerby," by J. R. le Brockton Tomlin, M.A.

Exhibits.

By Mr. J. E. Cooper: *Paludestrina jenkinsi* from Barmouth; *Agriolimax lævis* from Towyn; *Punctum pygmaeum*, *Zonitoides nitidus*, *Vallonia excentrica*, *Succinea oblonga* of a peculiar greenish colour, taken at an altitude of 500 ft., along with *S. putris*, near Aberdovey.

By Mr. J. W. Taylor: An interesting series of varietal forms, including *Helicigona arborum* var. *maynardi* Caziot, from the Alpes Maritimes; var. *depressa* from Heidelberg; var. *bifasciata* from Aysgarth; *Helix aspersa* var. *monozona* from S. Hants.; var. *minor* from near Cardiff; var. *insolita* from Trapani, Sicily; *H. costæ* Benoit, from Monte Pellegrino, Sicily; *H. mazulli* var. *fasciata* from Monte Pellegrino; *H. aspersa* var. *glabra* Calc., from Rand churchyard, S. Lincoln; *H. lapicida* var. *minor*, from La Preste; *H. ericetorum* var. *minima* from Wheatley, near Oxford; *Pupa triplicata* Studer, from Botzen, Tyrol; *H. virgata* var. *radiata*, from Freshwater, Isle of Wight; *Pupa marginata* var. *bigranata* Rossm., from Wood Eaton, Oxford; and a beautiful set of *H. hortensis*, collected by Mr. C. E. Wright near Northampton.

By Mr. G. C. Spence: Some very small *Helix aspersa* and *H. nemoralis* var. *albolabiata*, from Port St. Mary, Isle of Man; *Aeroloxus lacustris* and *Unio pictorum* from Congleton; *U. pictorum* var. *compressa* from Marple; and a number of species of *Urocoptidae* and *Placostylus*.

By Mr. G. H. Taylor: *Balca perversa* from Castleton, Derbyshire—a new record for that district.

By Mr. Fred Taylor: *Helix aspersa* var. *unicolor* from Torquay; var. *exalbida* from Wicken Fen; a remarkable series of this species from Southport, including var. *rufulo-zonata* and monst. *sinistrorsum*; *Clausilia bidentata* var. *albina* from Menai Bridge; *Limnaea palustris* var. *corva*, and var. *albida* from Southport.

By Mr. J. Kidson Taylor: A fine series of rare species and varieties of *Helicostyla*.

By Mr. R. Cairns: *Ena obscura* and *Pyramidula rotundata* var. *alba*, from Pickering; *Helicella caperata* var. *fulva* and var. *alba*, from Whitby; *Euconulus fulvus*, Clitheroe; *Pyramidula rotundata*, *Hygromia granulata*, *Clausilia laminata*, *Vertigo pygmaea*, *Vitrea cellaria*, *V. rogersi* and *V. nitidula*, from Gisburn; also a remarkably fine phragmacone (5½ inches long) of *Belemnites elongatus*, from the Upper Lias at Whitby, which he has presented to the Manchester Museum.

By Mr. J. Wilfrid Jackson: An exceedingly fine double-mouthed example of *Clausilia bidentata*, taken alive on a wall at Yealand Conyers, near Carnforth, Lancs.



Pyramidula rotundata var. **alba** at Meathop Fell, Westmorland.—I obtained two very fine specimens of the above variety under some stones on the left bank of the River Winster, near Meathop Fell, in September last; I also found a single example of the same variety in Eggerslack Wood, Grange. The species was accompanied at Meathop Fell by *Jamnia muscorum* var. *edentula* (abundant), *Vitrea pellucida*, *Helix aspersa* and *Vallonia costata* (abundant), all occurring under stones on the ground. Some little distance away *V. costata* occurred sparingly in company with numbers of *V. excentrica* under stones in a very wet place.—
J. WILFRID JACKSON (Read before the Society, February 9th, 1910).

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

Monograph of the Land and Freshwater Mollusca of the British Isles, part 17, pp. 225-304, with 6 plates, by JNO. W. TAYLOR (Taylor Bros., Leeds).

We heartily welcome another part of Mr. Taylor's great Monograph, giving a further instalment of the *Helicidae*. Mr. Taylor is now "in the thick" of the species which are still allotted to the old genus *Helix*, and which undoubtedly hold the rank of prime favourites with most British collectors, whether it be on account of their attractive appearance or their fascinating variability. It is not, therefore, surprising to find that the eighty pages of the present part only contain the conclusion of *Helix pomatia*, the complete monography of *H. aspersa*, and the beginning of *H. nemoralis*. Of the six plates which accompany, four are the distribution charts of *Punctum pygmaeum*, *Pyramidula rotundata*, *P. rupestris*, and *Helix pomatia*. The other two, also coloured, give us twelve beautiful figures of varieties and monstrosities of the last-named species, and are, we think, a most successful piece of work. To the records of reversed *H. pomatia* we may add a Kentish specimen received from a lady by the late Mr. Alfred Leicester, and with his wonted generosity added to our collection. We think it may be certainly assumed that Dr. Lukis's attempt to colonise this *Helix* in Guernsey failed, as assiduous collecting there from 1883 onwards has failed to discover even a dead shell. Under *H. aspersa* Mr. Taylor reproduces some beautiful photographs of cavities excavated by this species in the limestone, and of its feeding tracks.

The Irish Naturalist, vol. 18, nos. 1-12, Jan.-Dec., 1909; vol. 19, nos. 1-9, Jan.-Sept., 1910.

"Sligo Mollusca" (EDITORS). "*Pisidium personatum* Malm, an Addition to the Irish Fauna" (EDITORS).

"Additional Notes on the Land and Freshwater Mollusca of North-west Donegal," by A. W. STELFOX.

"Land-Shell Rain-Wash at Horn Head, Co. Donegal," by R. WELCH. "*Pisidium personatum* : a Correction," by R. WELCH.

"*Paludestrina confusa* Frauenfeld : an Addition to the Irish Fauna," by R. A. PHILLIPS.

"Additional Localities for the New Irish *Vitrina*," by A. W. STELFOX. "*Verrugo moulinsiana* in Queen's Co.," by R. A. PHILLIPS. "*Limnaea involuta* in Co. Cork," by R. A. PHILLIPS. "*Helix hortensis* in Co. Down," by R. WELCH. "The Nudibranch Genus *Lomanolus*" (EDITORS). "Locomotion and the Use of Slime Threads in Irish Marine Mollusca" (EDITORS).

"*Paludestrina confusa* in Kilkenny and Clare," by R. A. PHILLIPS. "*Helix nemoralis* in North-west Donegal" (EDITORS).

"Irish Fossil Molluscs" (EDITORS).

"*Carychium minimum* near Limerick," by H. FOGERTY.

"The Non-Marine Mollusca of Inishmore," by R. A. PHILLIPS.

"Notes on the Adaptability of certain Littoral Mollusca," by N. COLGAN.

"Land and Freshwater Mollusca [Rosapenna]," by A. W. STELFOX and R. WELCH.

The Annals of Scottish Natural History, nos. 68-75, Oct. 1908-July, 1910.

"Notes on Nudibranchiate Molluscs," by R. ELMHIRST.

The Naturalist, nos. 624-644, Jan., 1909-Sept., 1910.

"*Pisidium supinum* Schmidt (= *P. conicum* Baudon), etc., in Lincolnshire," by J. F. MUSLIAM. "Shells in British Barrows," by E. P. BLACKBURN. "Mollusca at Clapham," by W. DENISON ROEBUCK.

"*Vertigo alpestris* at Ingleton," by F. BOOTH.

"Thrush Stones and *Helix nemoralis* L.," by E. A. WOODRUFFE-PEACOCK. "*Paludestrina jenkinsi* in Airedale," by F. BOOTH.

"*Arion ater* L. as a Wart Curer," by S. L. PETTY.

"On the Geographical Distribution of Mollusca in South Lonsdale," by C. E. Y. KENDALL, J. D. DEAN, and W. M. RANKIN. "A New Lincolnshire Locality for *Paludestrina confusa*," by C. S. CARTER.

"Colonization of *Helicella virgata* at Hubbard's Hills, Louth," by C. S. CARTER. "*Arion ater* L. as a Wart Curer," by J. W. TAYLOR.

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"Snakestones [*Anmonites communis*]," by G. C. CRICK.

"Notes on two large *Anmonites* from the Holderness Drift," by C. THOMPSON.

The Lancashire Naturalist, vol. 2, nos. 13-24, April, 1909-March, 1910; vol. 3, nos. 25-30, April-September, 1910.

"Notes on the Freshwater Mussels of Lancashire and Adjacent Counties" by R. STANDEN [Illustrated].

"Conchological Notes [Southport and Fleetwood]," by J. A. HARGREAVES.

"The Zebra Mussel," by F. J. STUBBS.

"On the Mollusca from the 'Cave-Earth,' Dog Holes, Warton Crag," by J. WILFRID JACKSON [*Pyramidula ruderata*, etc., noted].

"*Pomatias elegans* Müller [near Warton]," by R. STANDEN.

Proceedings, etc., of the Hull Junior Field Naturalists' Society, vol. 1, part 1 (not dated).

"Some New Varieties of Mollusca for the East Riding," by A. J. MOORE. "More Specimens of *Melampus myosotis* found near Saltend Common," by A. J. MOORE.

Transactions and Proceedings and Report of the Royal Society of South Australia, vol. 33, Dec., 1909.

"Notes on South Australian Marine Mollusca, with Descriptions of New Species," parts x.-xii. [plates], by J. C. VERCO.

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. 61, parts i.-iii.; vol. 62, part i., Jan., 1909-March, 1910.

"Mollusca of the South-western States, iii., the Huachuca Mountains, Arizona," [3 plates], by H. A. PILSBRY and J. H. FERRISS. "A New *Sonorella* [*rinconensis*] from the Rincon Mountains, Arizona," by H. A. PILSBRY and J. H. FERRISS. "*Melaniidae* of the Panuco River System, Mexico" [2 plates], by H. A. PILSBRY and A. A. HINKLEY. "*Unionidae* of the Panuco River System, Mexico" [3 plates], by H. A. PILSBRY. "New Land Shells from Mexico," by H. A. PILSBRY.

"Variation of *Polygyra albolabris* in Michigan," by BRYANT WALKER. "*Modiolaria marmorata* and the Surface Film," by H. S. COLTON. "Mollusca of the South-western States," iv., the Chiricahua Mountains, Arizona" [14 plates], by H. A. PILSBRY and J. H. FERRISS. "A New Species of *Marinula* [*rhoadsi*] from Near the Head of the Gulf of California," by H. A. PILSBRY.

Proceedings of the Royal Society of Victoria, vol. 22 (n.s.), parts i.-ii., Sept., 1909, and April 1910.

"Description of a New Marine Shell of the Genus *Larina* (?)" by J. H. GATLIFF and C. J. GABRIEL [plate]. "Additions to the Catalogue of the Marine Shells of Victoria," by J. H. GATLIFF and C. J. GABRIEL.

Records of the Australian Museum, vol. 7, nos. 4, 5, Aug., 1909 and Feb., 1910.

"Lower Cretaceous Fossils from the Sources of the Barcoo, Ward, and Nive Rivers, South Central Queensland, part 2, Cephalopoda," by R. ETHERIDGE, jr. "Descriptions of New and Notes on other Australian Polyplacophora," by C. HEDLEY and A. F. BASSET HULL. "A Revised Census of the Terrestrial Mollusca of Tasmania," by W. F. PETERD and C. HEDLEY.

Journal de Conchyliologie, vol. 58, no. 1, June, 1910.

"Contributions à la Faune Fluviale de l'Extrême-Orient (Chine et Indo-Chine)," by A. BAVAY and PH. DAUTZENBERG. "Description d'une Espèce Nouvelle du Genre *Marginella* provenaux de l'Archipel du Cap Vert," by A. BAVAY. "Liste de Coquilles recueillies par le R. P. Aubin dans l'Île de Rua Sura (Archipel Sålomen) en 1909," by PH. DAUTZENBERG. "Faune Pliocénique de Karikal (Inde-Française)," by M. COSSMANN (third article).

La Feuille des Jeunes Naturalistes, nos. 459-479, Jan., 1909-Sept., 1910.

"Faune Malacologique du Marais de Coutainville (Manche)," by DR. ALLIX.

"Présence de *Helix pomatia* dans les Environs de Sainte-Cécile et *Helix melanostoma* à Sérignan," by M. MOURGUE.

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"Coquilles Fossiles des Calcaire Grossiers de Parnes, 1890-1910," by PEZANT. "Etude sur le Genre *Sphyradium* (Agassiz) Charpentier," by CT. CAZIOT.

“Une Variété Nouvelle de l'*Helix arbustorum* L. dans les Alpes-Maritimes,” by CAZIOT. “Coupe dans le Gravier, en Terrásse de +55, a Joinville-le-Pont (Seine),” by A. LAVILLE.

Butlletí de la Institució Catalana d'Historia Natural, nos. 1-6, Jan.-June, 1909.

“Moluschs Marins de Catalunya,” by LL. TOMÁS.

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“Ein Beitrag zur Erforschung der Europäischen Heliciden,” by C. R. BOETTGER. “Nachtrag zu ‘Die Fossilen Mollusken der Hydrobienschichten von Budenheim bei Mainz,’” by C. R. BOETTGER. “Einige Bemerkungen über Deutsche Süßwassermollusken und ihre Namen,” by J. THIELE. “Die Molluskenfauna des Nordsamländischen Küstengebeits in Lebensgenossenschaften,” by R. HILBERT. “*Helix personata* und *Helix obvia* Hart. im Taunus,” by D. KNIPPRATH.

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“Noch Einmal ‘Die Verwandtschaftsbeziehungen der *Helix* arten aus dem Tertiär Europas,” by O. BOETTGER. “Verzeichnis der postteriären Fauna der Böhmischen Weichtiere,” by BABOR and NOVÁK. “*Hydrobia stagnalis* Baster in Süßwasser,” by K. HASHAGEN. “Zur Nomenclatur der Chitonen,” by DR. THIELE. “Conchologische Miscellen aus Heidelberg,” by F. A. D. WILCKERS. “Diagnose Einer Neuen Archelix,” by DR. KOBELT.

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“The Cephalopoda Dibranchiata of the Coasts of Ireland,” by ANNE L. MASSY [3 plates], (*Fisheries, Ireland, Sci. Invest.*, 1907, i. [1909]).

“The Pteropoda and Heteropoda of the Coasts of Ireland,” by ANNE L. MASSY [1 plate], (*Fisheries, Ireland, Sci. Invest.*, 1907, ii. [1909]).

“Non-Marine Mollusca of Norfolk,” by A. MAYFIELD (*Trans. Norfolk and Norwich Nat. Soc.*, vol. 8, 1909, pp. 783-808).

“Report on a Collection of Shells from Peru, with a Summary of the Littoral Marine Mollusca of the Peruvian Zoological Province,” by W. H. DALL (*Procs. U.S. Nat. Mus.*, vol. 37, 1909, pp. 147-294, pl. 20-28).

“A Monograph of West American Pyramidellid Mollusks,” by W. H. DALL and P. BARTSCH (*Bulletin 68, U.S. Nat. Mus.*, 1909, pp. 1-258, pl. 1-30).

“A Catalogue of Recent Cephalopoda,” second supplement, 1897-1906,” by W. E. HOYLE (*Proc. Roy. Phys. Soc. Edin.*, vol. 17, no. 6, 1909, pp. 254-299).

“The Luminous Organs of some Cephalopoda from the Pacific Ocean,” by W. E. HOYLE (*Procs. Seventh Internat. Zool. Congress, Boston Meeting*, pp. 1-5, 1909).

“Revision der Unterfamilie der Orthalicinen,” by H. STREBEL (*Mitteil aus dem Nat. Museum*, xxvi, 1909, pp. 1-191, pl. 1-33).

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- 2.—Its object shall be the promotion of the science of Conchology, by the holding of Meetings for the reading and discussion of original papers, by the publication of proceedings, and by the formation of a Library and Collections illustrative of the science.
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J. W. BALDWIN.	JOHN RAY HARDY.

LEEDS BRANCH.

PRESIDENT, PROF. GARSTANG, M.A., D.Sc.
HON. SECRETARY - F. BOOTH

LONDON BRANCH.

PRESIDENT, REV. CANON J. W. HORSLEY, M.A.
HON. SECRETARY - J. E. COOPER.

LIST OF MEMBERS.

Corrected to Dec. 14th, 1910.

(With year of election; O = founder, or original member; L = Life Member; P = has filled the office of President; *post packets have been returned undelivered).

HONORARY MEMBERS.

(Limited to ten in number).

1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
 1889. Cossmann, Maurice, 95, Rue de Maubeuge, Paris.
 1897. Dall, Wm. Healey, A.M., D.Sc., Smithsonian Institution, Washington, D.C., U.S.A.
 1878. Kobelt, Dr. Wilhelm, Schwanheim, Frankfurt-am-Main.
 1905. Pelseneer, Prof. Paul, 53, Boulevard Léopold Grand, Ghent, Belgium.
 1906. Pilsbry, H. A., Academy of Natural Sciences, Philadelphia, Pa., U.S.A.
 1889. Sars, Prof. G. O., Universitet, Christiania, Norway.
 1889. Simroth, Dr. Heinrich Rudolph, Kregelstrasse 12, Leipzig-Gautsch.
 1905. Strebel, Dr. Hermann, Naturhistorisches Museum, Hamburg.
 O P Taylor, John W., North Grange, Horsforth, Leeds.

ORDINARY MEMBERS.

1903. Abbott, G., 83, Russell Street, Kettering.
 1906. Adams, F. E., St. Milburga's, Kingsland, Shrewsbury.
 1885. P Adams, Lionel Ernest, B.A., Oak Hill, Chart Road, Reigate, Surrey.
 1895. Arnold, Bernard, F.L.S., Milton Lodge, Gravesend.
 1908. Bacchus, A. D. R., National Provincial Bank of England, Exeter.
 1907. Baily, Joshua L., jr., Haverford, Pa., U.S.A.
 1907. Baker, Mrs. A. L., 167, Hoddle Street, Richmond, Melbourne, Australia.
 1908. Balch, F. N., 60, State Street (Rooms 504-507), Boston, Mass., U.S.A.
 1897. Baldwin, D. D., M.A., Hamakuapoko, Maui, Hawaiian Islands.
 1899. Baldwin, Joseph W., 61, Queen Street, Bromley Cross, near Bolton, Lancs.
 1907. Bartsch, Dr. Paul, Smithsonian Institution, Washington, D.C., U.S.A.
 1907. Bavay, A., 82, Rue Lauriston. xvi^e, Paris.
 1905. Becker, Dr. H., F.L.S., F.S.A., Grahamstown, Cape Colony.
 1901. Beeston, Harry, Sunnymead, South Street, Havant, Hants.
 1904. Bellini, Prof. Raffaello, R. Scuola Tecnica, Chivasso, Torino, Italy
 1904. Benn, C. A., M.A., F.G.S., Rodwell Hall, Trowbridge.
 1901. Bentley, R. H., 60, Rosebery Road, Muswell Hill, N.
 1897. Blackburn, Rev. Ed. Percy, Epworth Villa, New Road, Windsor.
 1899. Bladen, W. Wells, Stone, Staffordshire.
 1897. Blake, Wm. Charles, 2, Acacia Villas, Ross, Herefordshire.
 1895. Bles, Edward J., M.A., D.Sc., The Mill House, Ifley, Oxford.
 1897. Bliss, Joseph, Boar Bank Hall, Grange-over-Sands.
 1907. Bloomer, H. H., 35, Paradise Street, Birmingham.
 1899. Blundell, Mrs. Jessie M., Argyll House, Cirencester.
 1910. Booker, H. H., 153, Albert Road, Heeley, Sheffield.
 1904. Booth, Fred, 18, Queen's Road, Shipley, Yorks.

1884. Bostock, Edwin D., Holly House, Stone, Staffordshire.
 1906. Boulton, J. W., 50, Washington Street, Newland, Hull.
 1897. *Z* Boycott, Arthur Edwin, 7, The Square, Carshalton, Surrey.
 1908. Brainerd, Mrs. H. D., Captiva, Lee Co., Florida, U.S.A.
 1879. *Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill Street, Sydney, N.S.W.
 1909. Brindley, G. W., Milford, near Derby.
 1900. *Z* Broadbent, Dr. G. H., 8, Ardwick Green, Manchester.
 1899. Brooksbank, Hugh, M.B., College Road, Windermere.
 1905. Bromehead, C. N., Beverston Rectory, Tetbury.
 1897. *Z* Bullen, Rev. Robert Ashington, B.A., F.G.S., etc., Englemoor, Heathside Road, Woking, Surrey.
 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.
1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne.
 1906. Carpenter, Geoffrey D. H., B.A., c/o The Secretary to the Administration, Entebbe, Uganda.
 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.
 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.
 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.
 1886. Coates, Henry, F.R.S.E., Balure, Perth.
 1880. Collier, Edwd., Glen Esk, Whalley Range, Manchester.
 1898. *PZ* Collinge, Walter Ed., M.Sc., F.L.S., F.E.S., 55, Newhall St., Birmingham.
 1910. Colwell, David, Heathcote, Lavender Vale, Wallington, Surrey.
 1897. Cook, Rev. Thomas, Cliff College, Calver, near Sheffield.
 1901. Cooke, Rev. Alfred H., M.A., Aldenham School, Elstree, Herts.
 1892. Cooper, James Eddowes, Cadboro, 53, North Road, Highgate, N.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1910. Cribb, C. Theodore, The Vicarage, Shipley, Yorks.
 1899. Crowther, J. E., Portland Street, Elland, Yorks.
 1879. Cundall, Jas. W., 3, Orlando Road, Clapham Common, S.W.
1897. Dacie, John Charles, 30, Montserrat Road, Putney, S.W.
 1904. *Dagliesh, Gordon, 29, Larkfield Road, Richmond, Surrey.
 1899. Darnbrough, Frederick, 12, West End Terr., Yarm Rd., Stockton-on-Tees.
 1897. *Z* Dautzenberg, Ph., 213, Rue de l' Université, Paris.
 1909. Dawes, L., Hambledon, Hants.
 1898. Dean, J. Davy, 84, Dale Street, Lancaster.
 1909. Dickson, Robert Cecil, Dalhousie Villa, Carnoustie, N.B.
 1909. Diver, Cyril, Priory House, Dover College, Dover.
 1892. Dixon, James Bassett, Ribblesdale House, Preston, Lancs.
 1907. Dupont, Evenor, Hell-Bourg, Réunion.
 1910. Dyke, F. M., B.Sc. (Lond.), Bimblefell, Springfield Rd., Kingston-on-Thames.

1908. Edgar, H. F., 14, Woodside Park Gardens, North Finchley, N.
 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.
 1904. *L* Elliot, Sir Chas., K.C.M.G., Endcliffe Holt, Endcliffe Crescent, Sheffield.
 1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
 1910. Elliott, W. T., D.D.S., F.Z.S., 63, Temple Row, Birmingham.
 1901. *Ensor, A. R., 60, Lumley Road, Skegness.
 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., 581, Anlaby Road, Hull.
 1909. Fisher, Mrs., Higham, Bassenthwaite Lake, Cockermouth.
 1884. *L* Fitzgerald, Rev. H. Purefoy, F.L.S., Lidwells, Goudhurst, Kent.
 1898. Fitzsimons, J. B., M.D., The Cottage, Lympstone, S. Devon.
 1906. Fogerty, Harry, Chamber of Commerce, Limerick.
 1905. Foster, Miss Amy C. S., 45, Belsize Square, London, N.W.
 1905. Freeman, William, Hawkhurst, Milton Road, Oundle.
 1906. Freyberg, Cuthbert, 27, Hawker Street, Wellington, New Zealand.
 1892. Fulton, Hugh, River Side, Kew, near London.
1907. *L* Gabriel, Charles J., 293, Victoria Street, Abbotsford, Victoria, Australia.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., Meadow Bank, Accrington.
 1908. Gill, Mrs. A. E., Dinant Cottage, 1, Claude Road, Chorlton-cum-Hardy.
 1910. Gnosselius, Miss Hilda T., Silver Holme, Newby Bridge, Ulverston.
 1886. *L* Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1897. *P* Godwin-Austen, H. H., Lt.-Col., F.R.S., etc., Nore, Hascombe, Godalming.
 1906. Gomez, A. da Costa, 23, Clifton Place, Brooklyn, N.Y., U.S.A.
 1902. Gower, Harry D., 55, Benson Road, Croydon.
 1904. Gray, Arthur F., 509, Exchange Buildings, Boston, Mass., U.S.A.
 1905. Green, Wm. A., 4, Salisbury Terrace, Chichester Park, Belfast.
 1904. Grierson, P. H., Kilcarberry House, Clondalkin, Dublin.
 1906. *Grint, Miss Grace M., 33, Goring Road, Bowes Park, London, N.
 1907. Gripper, F. H., Springfield, Camden Park, Tunbridge Wells.
 1890. Gude, G. K., F.Z.S., 45, West Hill Road, Wandsworth, S.W.
 1886. Gwatkin, Rev. Prof. H. M., D.D., M.A., 8, Scrope Terrace, Cambridge.
 1907. Gwyer, C. D., 303, Putnam Avenue, Brooklyn, N.Y., U.S.A.
 1907. Gynnell, Walter, 13, Gladstone Road, Scarborough.
1909. Haas, Dr. Fritz, Senkenbergisches Museum, Victoria Allee, 7, Frankfurt-am-Main.
 1910. Haddon, Norman G., Levant Lodge, Earl's Croome, Worcs.
 1905. Hainsworth, Sam, 60, George Street, Saltaire.
 1906. *Hall, C. M., 33, Goring Road, Bowes Park, London, N.
 1895. Hann, Rev. Adam, 1, Park Terrace, Halifax.
 1895. Hardy, John Ray, The Museum, The University, Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough.
 1907. Harrington, Chas. P., Langlands, King's Avenue, Clapham Park, London, S.W.
 1909. Harrison, Richard, 28, Allen Street, Hulme, Manchester.

1904. Harrison, Russell C., 117, Tooting Bec Rd., Upper Tooting, S.W.
 1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorks.
 1887. Harvard, T. Mawson, 4, Queen's Leaze, Forest Hill, S.E.
 1907. Hawkins, H. L., University College, Reading.
 1903. Hawkins, John, J.P., 35, Avenue Road, Grantham.
 1887. Heathcote, Wm. Henry, F.L.S., 119a, Fishergate, Preston, Lancs.
 1907. Henderson, J. B., jr., 16th Street and Florida Avenue, Washington, D.C., U.S.A.
 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, Pike's Villa, Little Eaton, near Derby.
 1886.^Z Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1907. Hindley, R. T., Challis, 112, Southchurch Road, Southend-on-Sea.
 1906. Hirase, Y., Karasumaru, Kyoto, Japan.
 1891. Horsley, Rev. Canon J. W., St. Peter's Rectory, Walworth, S.E.
 1907. Horwood, A. R., Ivanhoe, Gwendolen Road, Leicester.
 1907. Howard, Vernon, Carlton Lodge, Eastgate, Louth.
 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., The National Museum of Wales, Cardiff.
 1895. Hudson, Rev. Hy. A., 445, Stretford Road, Manchester.
 1909. Huggins, Henry C., 13, Clarence Place, Gravesend.
 1905. Hutton, W. Harrison, 44, Dial Street, Leeds.
1901. Jackson, J. Wilfrid, F.G.S., The Museum, The University, Manchester.
 1891. Jenner, James Herbert Augustus, F.E.S., 209, School Hill, Lewes, Sussex.
 1904. Jennings, F. B., 152, Silver Street, Upper Edmonton, N.
 1906. Johnson, Chas. W., Boston Society of Natural History, Boston, Mass., U.S.A.
 1908. *Jolliffe, J. E. A., 8, Dorchester Road, Weymouth.
 1894. Jones, Kenneth Inrlstone, M.B., F.L.S., The Manor House, St. Stephen's, Canterbury.
 1901. Jukes Browne, A. J., F.G.S., Floriston, Cleveland Road, Torquay.
1907. Kendall, Rev. C. E. Y., 88, King Richard's Road, Leicester.
 1897.^Z Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902.^Z Kensett, Percy F., Broadmeadow, Coombe Lane, Wimbledon, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 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 Cronier, B.A., M.B., Winchester House, Swansea.
 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, Sidney, Manitoba, Canada.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1910. Levett, Rev. T. T., F.Z.S., Frenchgate, Richmond, Yorks.
 1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1909. Linton, Mrs., Ye Olde Mill House, Castle Hill, Northallerton.

1897. *L* Lodder, Miss Mary, 193, George Street, Launceston, Tasmania.
 1908. Longstaff, Mrs. G. B., Highlands, Putney Heath, S.W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
 1910. Lucas, F. R. Tindall, Lampton Lodge, Spring Grove, Isleworth.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire.
1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire.
 1903. McClelland, Hugh, Stretton, Balsall Street, Berkswell, Warwickshire.
 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., 11, Prince of Wales Road, Bournemouth.
 1906. Marshall, Arthur G., 66, Victoria Street, Westminster, 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.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880. *P* Melvill, James Cosmo, M.A., D.Sc., F.L.S., Meole Brace Hall, Shrewsbury.
 1909. Mercer, Jas. W., 611, Chorley Old Road, Bolton.
 1891. Middleton, Robert, Sheepscar Foundry, Leeds.
 1904. Milne, James N., Foylemore, St. Jude's Avenue, Belfast.
 1907. Milner, Miss Lucinda, Clevelands, Ellesmere Park, Eccles, Manchester.
 1909. Milton, J. W., Harrison House, Crosby.
 1906. Monterosato, Il Marchese di, 2, Via Gregorio, Ugdalena, Palermo, Sicily.
 1910. Moorcock, J., 91, Broadfield Road, Catford, S.E.
 1902. *L* Moore, Chas. H., 103, Mottram Road, Stalybridge.
 1908. Moore, Albert J., 9, Brook Street, Hull.
 1907. Morey, Frank, F.L.S., Wolverton, Carisbrooke Rd., Newport, Isle of Wight.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
 1906. Murdoch, R., Wanganui, New Zealand.
 1907. Musham, J. F., F.E.S., Haylands, Selby, Yorks.
1905. Napier, H. C., Headington Hill, Oxford.
 1903. Nash, P. B., Bruce Mines, Algona, Ont., Canada.
 1887. Newstead, A. H. L., B.A., 38, Green Street, Bethnal Green, 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, Berkhamsted.
 1903. Northey, Rev. A. E., M.A., Lisworney, Torquay.
 1901. Norton, Miss E. M., 20, Eastfield Road, Westbury-on-Trym, near Bristol.
1887. Oldham, Charles, Kelvin, Boxwell Road, Berkhamsted.
 1910. Oliver, A. M., 1, Fenham Terrace, Newcastle-on-Tyne.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, 18, Tudor Road, Sutton Coldfield.
 1905. *L* Owston, Alan, Yokohama, Japan.
1903. Pace, S., Milneholme, Hounslow.
 1900. Pannell, Chas., 13, East Street, Haslemere, Surrey.
 1904. Parritt, H. W., 8, Whitehall Park, Upper Holloway, 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.
 1908. Phillips, R. A., Ashburton, Cork.
 1906. Plant, James R., M.R.C.S., L.R.C.P., 107, Hinckley Road, Leicester.
 1904. Platt, Thos. H., Harpurhey Mill, Rochdale Road, Manchester.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1905. Poole, W. G., South Lawn, Godalming.
 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. *L* Pritchard, G. B., F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.
 1906. *L* Radley, Percy E., F.R.M.S., 30, Foxgrove Road, Beckenham, Kent.
 1896. Ragdale, John Rowland, The Béeshes, Whitefield, near Manchester.
 1899. Ramanan, Vedaraniam Venkata, M.A., F.Z.S., 12, Sami Pillai Street, Triplicane, Madras, S. India.
 1906. Keynell, Alexander, Caerleon, Whyteleafe Road, Caterham.
 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, S.W.
 1910. *L* Rowe, A. W., M.S., M.B., M.A.C.S., F.G.S., Shottendane, Margate.
 1908. Rumney, Thos., Watford Lodge, New Mills, near Stockport.
 1910. Saggi, M.K., M.R.A.S., etc., Common Room, Lincoln's Inn, W.C.
 1906. Salisbury, Albert E., Danetree, Clarence Street, Loughborough.
 1877. *P* Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
 1906. Schepmann, M. M., Bosch en Duin, Huister Heide, Utrecht, Holland.
 1895. *L* Schill, C. H., The Elms, Byrom Lane, Macclesfield.
 1886. Scott, Thomas, LL.D., F.L.S., 280, Victoria Road, Torry, Aberdeen.
 1893. Shackleford, 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.
 1910. Shaw, H. O. N., F.Z.S., Skreens Park, Roxwell, near Chelmsford.
 1904. Shaw, Rev. W. A., Peper Harow Rectory, Godalming.
 1906. Sheppard, T., F.G.S., Municipal Museum, Hull.
 1906. Shopland, Commander E. R., St. Benedict's, Carlton Road, Lowestoft.
 1910. Shrubsole, George, Ellesmere, Fields Park Road, Newport, Mon.
 1895. Sich, Alfred, F.E.S., Corney House, Chiswick, W.
 1906. Sikes, F. H., M.A., Woodstone, Rochester, Kent.

1905. Simpson, James, c/o G. Sim, Esq., A.L.S., 52, Castle Street, Aberdeen.
 1902. Smallman, Raleigh S., Wressle 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, c/o Farmer's Loan and Trust Co. (of New York), 15, Cockspur Street, London, S.W.
 1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, S.W.
 1900. Solly, E. H., 3, South Street, Deal, Kent.
 1886. Sowerby, Geo. Brettingham, F.L.S., River Side, Kew, near London.
 1907. Spence, G. C., 27, Pine Grove, Monton, Eccles, Lancs.
 1906. Stalley, Henry J., Thorntona, Oxted, Surrey.
 1886. Standen, Robert, The Museum, The University, Manchester.
 1903. Stelfox, A. W., Delamere, Chlorine Gardens, Belfast.
 1906. Step, Edward, F.L.S., Oakwood House, Ashstead, Surrey.
 1910. Stephenson, H. L., 73, Colwyn Road, Dewsbury Road, Leeds.
 1908. *L* Stobart, H. J. S., Belbroughton, Stourbridge.
 1896. Stonestret, Rev. W. T., B.D., F.R.S.L., c/o The New Church Book Depot, 18, Corporation Street, Manchester.
 1885. *L* Storey, J. A., B.A., Mafeking Villa, Locking Road, Weston-super-Mare.
 1897. Stracey, Bernard, M.B., Priory Lodge, 16, New Walk, Leicester.
 1890. Stubbs, Arthur Goodwin, The Meads Cottage, Hailey Lane, Hertford.
 1893. Stump, Edward Consterdine, Polefield, Blackley, Manchester.
 1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
 1888. *P* Sykes, Ernest Ruthven, B.A., F.L.S., 8, Belvedere, Weymouth.
1910. Tattersall, W. M., M.Sc., The Museum, The University, Manchester.
 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.
 1901. Taylor, Thos., Tainui Street, Greymouth, New Zealand.
 1903. Thaanum, D., 5, Church Street, Hilo, Hawaiian Islands.
 1908. Thomas, Rev. R. E., M.A., St. Martin's Clergy House, Salisbury.
 1907. *L* 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., 30, Caledonia Place, Clifton, Bristol.
1907. Upton, Charles, Homebush, Iustow, N. Devon.
1899. Vaughan, J. Williams, J.P., Pen-y-maes, Hay, *via* Hereford.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea.
 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.
 1909. Ward, J. S. M., B.A., The Whym, Gomshall, Surrey.

1902. *Z* Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1908. Weaver, G. H., 31, Devonshire Road, Palmer's Green, London, N.
 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.
 1886. Whitwell, Wm., F.L.S., Brookside, Darley Knowle, Warwickshire.
 1889. Williams, John M., 31, Grove Park, Liverpool.
 1906. Winkworth, John F., 290, Burdett Road, London, E.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1910. Woodcock, R., Fauvic, Jersey.
 1901. *Z* Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1898. Woods, Henry, M.A., F.G.S., 39, Barton Road, Cambridge.
 1886. *Z* Woodward, Bernard B., F.L.S., etc., 4, Longfield Rd., Ealing, W.
 1903. Worsdale, R., 102, Dudley Terrace, Dudley Road, Grantham.
 1906. Wragge, Clement L., F.R.G.S., etc., Perth, Western Australia.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.



***Helix nemoralis* with formula 12045.**—The form of *Helix nemoralis* in which the third band alone is missing seems to be generally regarded by conchologists as scarce, so it may be worth while recording the capture of a well-marked specimen with that band formula, 12045, this spring. It was taken from a fairly large colony in a hedge-bank at Chingford, Essex, early in May. Additional specimens have since been searched for without success.—F. B. JENNINGS (*Read before the Society*, Sept. 14, 1910).

***Paludestrina jenkinsi* in Merionethshire.**—Having a short time to wait one day at Barmouth Junction, I spent the interval fishing in the surrounding ditches. The result was *Planorbis spirorbis*, a few *Pisidia*, and one specimen of *Paludestrina jenkinsi*. The last-named appears to be a new record for this part of Wales. Fresh-water shells are strikingly few on this coast. *Planorbis spirorbis*, *Linnæa pereger* and *L. truncatula* are found sparingly; other species of *Planorbis* and *Linnæa* seem to be entirely absent.—J. E. COOPER (*Read before the Society*, Sept. 14, 1910).

***Pseudanodonta elongata* Hol. in the Thames.**—Mr. Fritz Haas has recorded (*Proc. Mal. Soc.*, June, 1910) the occurrence of *P. elongata* Hol. in the Thames. It seems remarkable that this shell should have escaped notice so long. So far as I can learn, the only valid external difference between *Pseudanodonta elongata* and small specimens of *Anodonta cygnæa* lies in the beak sculpture. In *Anodonta* this consists of a series of concentric ridges, while in *Pseudanodonta* it is irregularly nodulous. I have taken one living specimen of what I suppose to be *Pseudanodonta elongata* at Long Ditton, and several dead shells at Molesey. A few of these are sent for exhibition and criticism.—J. E. COOPER (*Read before the Society*, Nov. 9th, 1910).

 OBITUARY NOTICE.

 THE REVEREND ROBERT BOOG WATSON,
 LL.D., F.L.S., F.G.S., F.R.S.E.

 BY EDGAR A. SMITH, I.S.O., AND J. R. LE B. TOMLIN, M.A.

 WITH PORTRAIT.

 (Read before the Society, Nov. 9th, 1910.)

OUR science has suffered another great loss by the death of the Rev. R. Boog Watson, at Edinburgh, on June 13th, 1910, after a long period of ill-health, in the eighty-seventh year of his age. He had a severe illness early last year, from which, however, he rallied wonderfully, but his strength had failed for many months, and he passed away very peacefully.

Born on September 26th, 1823, he was educated at the Edinburgh Academy and at Lille, and took his B.A. at Edinburgh University. After a course of study at the New College, Edinburgh, he was licensed by the Free Presbytery in 1847, and in 1854, on the outbreak of the Crimean War, he went out as Chaplain to the 93rd Highlanders. Invalided home after a nearly fatal attack of dysentery, he recovered sufficiently to undertake garrison work at Dover in 1856. In this year he married Janet Cowan, daughter of the founder of the firm of Alexander Cowan & Sons, papermakers, and immediately afterwards went out to India, and acted as Chaplain to the Highland Brigade in the Mutiny.

Owing to a return of his illness he was again invalided home.

In 1864 he accepted an appointment to the Scots' Church in Madeira, and in the course of his ten years' tenure of that office was enabled to investigate the remarkably rich land mollusca fauna of the Madeiran group, in co-operation with Lowe and Wollaston, as well as the marine shells. On returning to Edinburgh, he devoted himself chiefly to his favourite sciences of geology and conchology; and in 1876, at the request of his friend, Sir Charles Wyville Thomson, he undertook to work out all the mollusca which had just been brought back by H.M.S. "Challenger"—with the exception of the Cephalopoda and Pteropoda.

In 1878, however, the failure of the City of Glasgow Bank compelled him to give up his well-earned leisure and to return to work; and he accepted the call of the Free Church congregation at Cardross, Dumbartonshire, where he remained till his retirement from active work in 1898.

Residence in a country district of course deprived him of easy access to books and collections, and he therefore returned all the

material he was working at to the "Challenger" office, but Sir C. Wyville Thomson's urgent representations induced him to resume his studies in part, though he limited his investigations to the¹Gasteropoda and Scaphopoda—about 1,300 recognisable species in all.

The results of his labours appeared in the fifteenth volume of the "Challenger" series in 1886, and as an illustration of the thoroughness of his methods it may be mentioned that he worked at the Museums of Paris, Berne, and Geneva, as well as at the British Museum, before the Natural History portion was moved to South Kensington.

In 1891 he was President of the Conchological Society, and in 1892 the University of Edinburgh conferred upon him the degree of LL.D.

Of the nature of Dr. Watson's work there is only one opinion. His descriptions, at times almost too detailed, are excellent, and he spared himself no trouble in their preparation. He was personally known for many years to one of the writers, who must bear witness to his pleasant and friendly amiability.

For nearly twenty years he spent part of the summer in Switzerland, especially in the Rhone Valley, and his favourite haunt was Bel Alp, where he did much climbing and botanising, and fraternised with such men as Bishop Ellicot, Edward Whymper and Prof. Tyndall.

He contributed the following three papers to the *Journal of Conchology* :—

Circe versus *Gouldia* (vol. 3, p. 299).

The Marine Mollusca of Madeira (vol. 6, p. 365).

The Relation of the Land and Freshwater Mollusca of the Madeiran Islands to Those Known Elsewhere (vol. 7, p. 1).

The following is believed to be a complete list of his other writings on conchology :—

A.—On the Great Drift Beds with Shells in the South of Arran.—
Trans. Roy. Soc. Edinburgh, 1864, xxiii., pp. 523-546.

B.—On the Marine Origin of the "Parallel Roads" of Glen Roy.—
Phil. Mag., 1865, xxx., pp. 452-3.

C.—Notes on the Boulder-Clay at Greenock and Port Glasgow.—
Proc. Roy. Soc. Edinburgh, 1866, v., pp. 258-261.

D.—Notes on Dredging at Madeira.—Brit. Assoc. Reports, 1871,
xli., p. 242.

E.—On some Marine Mollusca from Madeira, including a New
Genus (*Chascax*) of the *Muricidæ*; a New *Eulima* (*E. paivensis*);

¹ He used the term Gasteropoda as employed by Cuvier, it being equally correct as Gastropoda, which has found general acceptance.

- and the whole of the *Rissoæ* of the Group of Islands.—Proc. Zool. Soc., 1873, viii., pp. 517-548.
- F.—On the Generic Peculiarities of the Distinctively Madeiran *Achatina*.—Proc. Zool. Soc., 1875, pp. 677-680.
- G.—Notes on Lowe's ms. list of Webb's Type Shells from the Canaries (1829): and on the Annotations thereon of d'Orbigny (1839), and Lowe (1860).—Journ. Linn. Soc. (Zool.), 1876, pp. 516-524.
- H.—Note sur les Coquilles Terrestres Communes à Madère et à d'autres contrées, considérées au point de vue de la Distribution des Espèces.—Journ. de Conch., 1876, pp. 217-232.
- I.—Some Notes on the Madeiran Mollusk identified by the Rev. R. T. Lowe as *Achatina folliculus* Gron.—Proc. Zool. Soc., 1877, pp. 333-334.
- J.—Sur l'animal du *Ringicula auriculata*.—Journ. de Conch., 1878, pp. 312-313.
- K.—Mollusca of H.M.S. "Challenger" Expedition.—Parts i.-xx., 1878-1883.
 Journ. Linn. Soc. (Zool.), 1879, xiv., pp. 506-7, 508-529, 586-605, 692-716; xv. (1881), pp. 87-126, 217-230, 245-274, 388-412, 413-455, 457-475; xvi. (1883), pp. 247-254, 324-343, 358-372, 372-392, 594-611; xvii. (1884), pp. 26-40, 112-130, 284-293, 319-340, 341-346.
- These are practically reproduced in his "Challenger" Reports.
- L.—On the *Cerithiopsides* from the Eastern Side of the North Atlantic, with Three New Species from Madeira.—Journ. Linn. Soc., xix. (1885), pp. 89-95.
- M.—Report on the Scaphopoda and Gasteropoda collected by H.M.S. "Challenger," during the years 1873-76. In Report on the Scientific Results of the Voyage of H.M.S. "Challenger" during the years 1873-76. Zoology, vol. xv., pp. i.-v., 1-680, 691-756, pls. 1-50 (1886).
- N.—Notes on the Gastropoda in "Challenger" Narrative, vol. I., pp. 894-897.
- O.—Notes sur l'habitat de l'*Ovula carnea* Poiret.—Journ. de Conch., 1892, p. 208.
- P.—On the Marine Mollusca of Madeira; with Descriptions of Thirty-five New Species, and an Index-List of all the Known Sea-Dwelling Species of that Island.—Journ. Linn. Soc., 1897, xxvi., pp. 233-329.
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ON THE OCCURRENCE OF *UNIO SINUATUS* Lam.
IN THE BRITISH ISLES.

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, Nov. 9th, 1910).

FOR some considerable time past I have been accumulating material for a paper on the distribution of the Pearl Mussel (*Margaritana margaritifera* L.) in the British Isles, and in the course of my work I have seen and examined specimens from some thirty or more distinct localities in the United Kingdom, as well as from several places on the continent and North America. This has, naturally, necessitated access to several individual collections, the most important being that of Mr. R. Standen, who possesses perhaps the finest series in the country. In working through this latter collection, paying particular attention to the hinge-teeth, I was somewhat surprised to come across a single specimen labelled: "R. Clouden, Dumfries (1865), v. *sinuata* (Peace Collection)," which possesses well-developed lateral teeth, as well as very strong pseudocardinals. This specimen, Mr. Standen tells me, was presented to him by the late Mr. R. D. Darbishire, along with others from various localities, all of which formed part of the "Thos. Peace Collection," acquired some twenty years ago by Mr. Darbishire. The shell is in good preservation, hardly eroded at the umbones, and measures antero-posteriorly 112 mm., dorso-ventrally 62 mm., laterally 34 mm. The habitat, R. Clouden, or Cluden Water, a rivulet in South-west Dumfriesshire and a tributary of the R. Nith, is mentioned by Rimmer in his *Land and Freshwater Shells of the British Isles*, London, 1880, p. 16, as a locality for var. *sinuata* of the Pearl Mussel.

Although I examined carefully the hinges of scores of others, many of which have been recorded as var. *sinuata* Lam., I failed to discover any more which possess these lateral lamellæ. This feature, as is well known to most conchologists, is characteristic of the genus *Unio*, but is quite absent in *Margaritana*, to which genus the true pearl mussel belongs. It is, therefore, quite evident that there has been some want of observation in the past as to this point, collectors simply relying on the outward appearance of their shells, without examining the hinge, and have thus wrongly applied Lamarck's specific name *sinuata* to shells of *M. margaritifera* L., which possess an indented or sinuate lower margin. A new name will, therefore, be required for this form in place of the so-called var. *sinuata* (Auct.), which should be struck out of the Society's List in order to prevent further confusion. As far as I can ascertain, this indented form of *M.*

margaritifera appears to be known in France as the var. *elongata* Lam., and this name might very well be adopted in this country. The var. *arcuata* Barnes, met with in North America, also appears to be this form, but Lamarck's name has precedence over this.

It will be necessary now to carefully examine all previous records of the so-called var. *sinuata* to see if the shells possess lateral teeth or not. As mentioned previously, I have already examined a large number recorded as var. *sinuata*, and have noted the entire absence of lateral teeth therein. These, therefore, have no relation with the Lamarckian species, but belong to *Margaritana margaritifera* (L.).

The Dumfries specimen is undoubtedly *Unio sinuatus* Lam., and agrees in all its particulars with the descriptions and figures given by Rossmässler,¹ Moquin-Tandon,² and others. It is, however, the only specimen I have as yet seen from this locality, and I should be glad, therefore, to hear from other collectors who may have specimens from there in their collections. I should also be glad if anyone possessing British specimens of the Pearl Mussel would communicate with me and send a list of what localities are represented, in order to complete my paper on the species.

A good opportunity presents itself here to call attention to the paper I wrote, in conjunction with Mr. A. S. Kennard, on the occurrence of *Unio margaritifera* in the Pleistocene strata of the Thames.³ The shells referred to in this paper were dredged at Mortlake,⁴ and were recorded as the var. *sinuata* Lam., but owing to the incrustation of carbonate of lime, both inside and outside, the hinge-teeth were not properly examined. Dr. Fritz Haas, of Frankfurt, to whom one of the Thames shells was sent, has since kindly pointed out to us the fact that the Thames mussel possesses lateral teeth, and is, therefore, the *Unio sinuatus* Lam., and not *Margaritana margaritifera* (L.), as given in our paper.⁵ A careful examination of the specimens in our hands confirms this fact. The Thames specimens, therefore, being *Unio sinuatus* Lam. and not *Margaritana margaritifera* (L.), Dr. R. F. Scharff's statement in his *European Animals*,⁶ "that the Pearl Mussel is absent from the South-east of England—the area so characteristic of the Germanic species"—still holds good.

1 Iconographie, 1836, i., p. 22, pl. 13, f. 195; and 1854, iii., p. 38, pl. 70, f. 853, 853a.

2 Hist. Nat. Moll. de France, 1855, p. 567, pl. 48, f. 1-3.

3 *Journ. of Conch.*, vol. xii., p. 321.

4 Mr. Kennard tells me they have since been dredged at Barn Elms, E. Surrey.

5 See also his paper on "*Unio, Margaritana, etc.*," in the Thames Valley," *Proc. Malac. Soc.*, vol. ix., pt. ii., June, 1910, p. 106, in which this is discussed.

6 London, 1907, p. 72.

SOME REMARKS ON THE DETERMINATION OF
GENERA AND SPECIES.

(Presidential Address delivered at the Annual Meeting, Oct. 15, 1910).

BY LT.-COL. GODWIN-AUSTEN, F.R.S.

THE few remarks I have to make this evening are the outcome of some work I have been engaged upon during the last few months. Those who have worked much at the land mollusca know how difficult it is to deal with certain species when locating them in generic position. This is particularly the case with a type of shell more or less thin and delicate, of few whorls, these rapidly increasing in size, of subdued tint, and often shiny and polished. Such shells come from all parts of the world, and *Vitrina pellucida* may be taken as the type of the form. The earlier conchologists (and it is not so many years ago) placed all shells partaking in any degree of this shape in the genus *Vitrina*, and it is often done up to the present time. Even shells much more heliciform found their way into *Vitrina*—and at that period no deductions of any value on distribution or relationship were possible in this particular group of shells.

It was not long, however, before the great difference was noticed in the external form of the animals of true palæarctic *Vitrina* and the Asiatic and tropical species, and a large number became transferred to *Helicarion*, and other genera sprang into existence. *Helicarion* is, even up to the present day, the happy resting place of all sorts and kinds of land shells which happen to be thin and globose and with no definite shell characteristics.

Fortunately, although shell character is unsatisfactory, in the external structure of the animals and internal anatomy there are many very clearly discernible characters which make comparison much more easy, rendering generic and specific determination more satisfactory. Trusting it will not weary you, I will mention a few which can be observed.

First, the external. I will not occupy time by referring to all these, but refer to one which has been of help to me. On removing the animal from the shell, there is the visceral sac. From the mantle zone the wall of the branchial cavity, and the vicinity of the heart and kidney is often beautifully mottled or streaked; the patterns are most varied, in one or more colours, in round spots or streaks; and although they are not absolutely identical in every specimen, yet on

the whole it is a distribution of colour typical of the species. The spotting in some cases is continuous to the apex ; in other instances there is no spotting, but some particular uniform tint pervades the whole visceral sac. I was particularly struck by this when going over a large series of species of *Macrochlamys* from Sikhim, and quite recently another collection from South Africa. In *Succinea* I have noticed much variation of this kind in species from Europe and Asia, and have made careful drawings of the same.

Other characters are internal, and unfortunately require dissection, and every one knows amongst them every kind of modification is met with. I will only refer to one character which is not widely known, but is common to all the land mollusca in some shape or other. I refer to the spermatophore. It occupies an important place in the life of the animal ; it is only present at the highest stage of its existence, and therefore is of considerable importance in determining the relation of genera one to the other. I have found most interesting variation in the details of its form even in species of the same genus. As far as I have ascertained, there is a very large number of European species in which it has never been observed and described. This is undoubtedly due to the great difficulty of securing species at the right season. Mr. John W. Taylor, who has done such valuable work in the morphology of the land mollusca of our own country and the continent, gives in his Monograph a drawing of the spermatophore of *Helix aspersa*, modified after Moquin-Tandon, also of *Helix virgata* and of *Amalia sowerbyi*, the latter both in process of formation, and after transfer, when complete, into the spermatheca ; also another, after Moquin-Tandon, of *Arion ater* or *A. rufa*, and I would refer those wishing to know more concerning its functions, etc., to read Mr. Taylor's description. Mr. W. Moss has, I know, also photographed some. It may be noticed how the form differs even in these four examples ; still greater are the differences between those of the Asiatic and African species I have observed, particularly species of *Peltatus* from the latter country, hitherto placed in *Helicarion*. The spermatophores of this South African genus are most beautifully spined, and as these are constructed organs that are known to only a few, I have brought two here to-day in order that you may observe what really beautiful objects they are and the wonderful structure they present. Both these spermatophores are nearly perfect. They do not apparently keep this perfect form long, and are generally more or less broken up, emptied, and absorbed. I have been particularly fortunate in finding so many. They are hardly to be sought for—the labour of examining specimen after specimen would be so great—but they turn up from time to time in the process of dissection.

The details in form vary greatly in different species; as you may note, the spines of the two I have brought differ very greatly, and I could show half-a-dozen more. It can readily be understood what a valuable character this becomes in the identification of species of shells from Africa, Madagascar, the Mauritius, South Sea Islands, etc., indiscriminately placed in *Helicarion*. Still more, how valuable it is, combined with other characters, in placing genera in their true family position, for we may presume that the process that goes on during the period of formation of an organ of this kind is one far older in time than many modifications of the external form of the animal or of the shell that may be brought about.

In making these remarks I know full well only a few of our members can undertake investigation of these obscure characters, but all can aid those who do, in preserving the animals at a time when one is most likely to secure the spermatophore of the dozens of species we know now little or nothing about.



Vertigo substriata Jeffreys in Bucks.—On September 3rd, 1910, I found a few *V. substriata* at Burnham Beeches. This appears to be a new record for Bucks. On the same day Mr. F. M. Dyke took a single *V. pusilla*, thus confirming the previous record for Bucks.—a solitary specimen found at East Burnham a few years ago by Mr. Wallis Kew.—J. E. COOPER (*Read before the Society*, Nov. 9th, 1910).

Clausilia cravenensis Taylor var. **albina** nov.—In September last, one of my enthusiastic friends, Mr. T. H. Newlands, gave me some snails which he had collected from the limestone near Crosby Ravensworth, in Westmorland. I at once detected, among a number of the type, a pure white example of this species, the first I had either seen or heard of. *Clausilia cravenensis*, deservedly, now ranks as a species in the Census Lists published by Mr. J. W. Taylor in co-operation with this Society and its workers.—J. DAVY DEAN (*Read before the Society*, Nov. 9th, 1910).

Clausilia bidentata Ström var. **albina** Moq.—In May, 1908, I took near Burton-in-Kendal and in Westmorland, the rarely occurring albino of this species, not hitherto recorded for this district.—J. DAVY DEAN (*Read before the Society*, Nov. 9th, 1910).

LAND AND FRESHWATER MOLLUSCA OF ROSSSHIRE,
WITH SOME NEW COUNTY RECORDS.

By J. W. VAUGHAN.

(Read before the Society, Nov. 9, 1910).

WHILE spending three weeks this July at Strathpeffer, I devoted some of my spare time to slug and snail hunting in the hope of adding to the rather meagre county records. The geological formation is igneous rock, and a great part of the surface is covered with pine wood and peat. I found the land mollusca scarce and difficult to find. The freshwater forms were most abundant in a small loch called Kinellan, and in the Strathpeffer Curling Pond. The large fishing lochs, Luichart and Garve, seem to be barren of molluscan life, at least I found nothing in either of them. Slugs, especially *Arion circumscriptus* and *Agriolimax agrestis* were abundant in the garden of the Spa Hotel. The pearl fishery in the rivers Blackwater and Conon was once quite an important industry, and, when the water was low in the summer, provided several families with the means of livelihood. Now, I am told, only one or two pearl fishers remain. I found the *U. margaritifera* abundant in the Conon, and got eight or ten living shells in a very small distance. I have to thank Mr. W. D. Roebuck and Mr. F. Taylor for kindly verifying my specimens. The following is a list of the species I found, the new county records being marked with an asterisk *.

EAST ROSS.

***Arion subfuscus**.—Common round Strathpeffer.

***Arion hortensis**.—Scarce, Spa Hotel Garden.

Arion circumscriptus.—Common.

var. **neustriaca**.—With the type.

Agriolimax agrestis.—Abundant.

var. **pallida**.—Abundant with type.

var. **reticulata**.—Abundant with type.

***Hyalinia radiatula**.—One specimen under a log of wood, Garve.

Helix hortensis.—Two specimens: one, Spa Hotel garden, and one, Pontin.

***Limnæa pereger**.—Common round Strathpeffer.

***Limnæa truncatula**.—Scarce; Loch Kinellan and Curling Pond.

***Limnæa palustris**.—Scarce; Loch Kinellan.

***Ancylus fluviatilis**.—Peffer Stream, near Achterneed.

Planorbis contortus.—Abundant in Curling Pond; scarce Killenan Loch.

**Pisidium subtruncatum*.—Killenan Loch.

**Pisidium pulchellum*.—Killenan Loch.

Pisidium pusillum.—Killenan Loch.

Pisidium fontinale.—Curling Pond.

Pisidium milium.—Curling Pond.

**Unio margaritifer*.—Common in the Rivers Conon and Black-water.

**Paludestrina stagnalis*.—In great abundance on the mud at Dingwall, Cromarty Firth.

WEST ROSS.

**Paludestrina stagnalis*.—Abundant, but of small size, on the mud at the head of Loch Brome.



Succinea oblonga in Merionethshire.—At the edge of a small stream, some 500 feet above sea-level near Aberdovey, I took a few *Succinea oblonga* in June. They had thin pale green shells, very different in colour from those found at Braunton Burrows. It seemed to me remarkable to find *S. oblonga* so high up on the hills. Associated with them was a small form of *S. putris*; the latter occurred sparingly elsewhere, but a careful search in other similar localities failed to produce any more *S. oblonga*.—J. E. COOPER (Read before the Society, Sept. 14, 1910).

Ena montana Drap. in Buckinghamshire.—Buckingham may now be included in the short list of counties in which *Ena montana* is known to occur. On August 7th, 1910, I took many specimens associated with *E. obscura* and *Clausilia laminata*, on the trunks of beeches in a wood at Great Hampden.—CHAS. OLDHAM (Read before the Society, Nov. 9th, 1910).

Limax tenellus Müll. in Perth East.—As the distribution of *Limax tenellus* is still imperfectly known, it may be well to record the occurrence of the slug in East Perthshire. On October 6th, 1910, I found it in abundance, feeding on fungi in the birch forest of Pitlochry. Most of the examples noticed belonged to the var. *cincta*, but a few were referable to the var. *cerea*. Associated with the *L. tenellus* were *Arion ater*, *A. intermedius*, and *A. subfuscus* var. *succinea* and var. *fuliginea*.—CHAS. OLDHAM (Read before the Society, Nov. 9th, 1910).

Vitrea radiatula (Alder) in Dumbartonshire.—Amongst a few land shells collected by the late Dr. Boog Watson at Cardross, there is a specimen of the above species, as well as one of the var. *viridescens-alba* Jeff. The Recorder tells me that this is a new record for Dumbartonshire.—J. R. LE B. TOMLIN (Read before the Society, Dec. 14th, 1910).

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

395th (Annual) Meeting, October 15th, 1910.

Held in the Museum, Manchester.

Lieut.-Col. H. H. Godwin-Austen, F.R.S., President, in the chair.

Donations to the Library announced and special thanks voted :

“Obras Malacológicas, parte i., Estudios preliminares sobre la fauna Malacologica de las Islas Filipinas (plates 1 to 99),” by J. G. Hidalgo (presented by Mr. J. W. Taylor).

Mr. J. W. Taylor also presented to the Society a very handsome framed enlarged portrait of the late Mr. R. D. Darbishire, a gift which was much appreciated by the members present.

Appointment of Auditors.

Messrs. C. H. Moore and F. Taylor were again appointed Auditors.

Appointment of Scrutineers.

Mr. Platt and Mr. Spence were appointed Scrutineers.

New Members Elected.

Arthur Walton Rowe, M.S., M.B., M.A.C.S., F.G.S.

A. M. Oliver.

Candidate Proposed for Membership.

W. M. Tattersall, M.Sc., The Museum, The University, Manchester.

Reports and Balance Sheet.

The Annual Report of the Council (see p. 153), and the Treasurer's Report including Balance Sheet for 1909 and Interim Statement to Oct. 6, 1910 (see p. 154) were presented and adopted.

Reports of the Leeds and London Branches (see pp. 155-6) were presented and adopted.

The Librarian's Report was presented and adopted.

The Recorder's Report was presented and adopted.

Alteration in the Rules.

On behalf of the Council, Mr. J. W. Taylor moved—That Rule 8 of the Constitution be amended to read as follows, and that it be retrospective in operation:—

“The Presidency shall not be tenable for more than two years continuously, and the President is expected to give an address. On the conclusion of his term of office he shall become an ex officio Vice-President of the Society and ex officio Member of Council.”

That Rule 7 be altered to read:—

“Two elected Vice-Presidents” in place of “Four Vice-Presidents.”

This motion was carried unanimously.

Election of Officers and Council.

Dr. W. E. Hoyle, by virtue of the above alteration of rules, becoming an ex-officio Vice-President and ex-officio Member of the Council, requested that his name should be deleted from the ballot-paper. The Council therefore substituted the name of Mr. John Ray Hardy.

With this alteration the Scrutineers reported that the Officers and Council as nominated had been duly elected (see p. 130).

Election of Honorary Member.

On behalf of the Council, Mr. Edward Collier moved and Mr. R. Standen seconded :—

“That Mr. John W. Taylor be elected an Honorary Member of the Society in place of Dr. Rudolph Bergh deceased.”

The motion was carried with acclamation.

In acknowledging the honour of his election, Mr. Taylor took the opportunity to briefly review the genesis and progress of the Conchological Society and of the *Journal of Conchology*.

The Society was instituted about thirty-five years ago, the project being conceived by four enthusiastic conchologists, who constituted the Society at its inception. From this humble beginning has developed the powerful and prosperous Society to which we are all proud to belong. These four conchologists were Mr. Henry Crowther, F.R.M.S., Curator of the Leeds Museum, but unfortunately no longer a member of the Society; the late Mr. W. Nelson who, as the oldest and most experienced conchologist, was unanimously chosen as the first President; Mr. W. Denison Roebuck, F.L.S., who was chosen as first Secretary, and for many years ably filled that onerous and honourable position; and Mr. J. W. Taylor.

It was not only the first organization of its kind in this country, but the direct parent of the more recently-established Conchological Societies of London and elsewhere, which were definite offshoots from our Society and the outcome of its success.

The Society did not, however, spring up spontaneously, but resulted from the issue of the *Journal of Conchology*, which had been established by Mr. Taylor some two years previously—February, 1874—for the purpose of popularising and extending the influence of the study, and to bring into closer relationship and friendship the few and scattered conchologists of that period.

The *Journal* was edited by Mr. Taylor for twenty-one years, from the moment of its inception, and by its means a most powerful impulse was given to the study, which led to a great increase in the number of its votaries. At the end of that period the publication—having survived all its youthful perils and occupying an assured position in the scientific world—was handed over by Mr. Taylor to the care of the Society, which its influence had helped to establish, as he was desirous of devoting his available time solely to the preparation of the great Monograph, now in course of publication.

In conclusion, Mr. Taylor expressed his grateful acknowledgments for the unanimous and cordial way in which the motion had been received, and said what a great source of pleasure and satisfaction it was to him to receive this token of their kind appreciation of his long labours to promote the welfare of the Society and the progress of the study of Conchology.

President's Address.

Lieut.-Col. H. H. Godwin-Austen, F.R.S., then delivered an Address, entitled :—“Some Remarks on the Determination of Species.”

A vote of thanks to the retiring President for his Address was unanimously passed.

A vote of thanks was also accorded to the Manchester University Authorities for the use of the Museum buildings.

An invitation was received, through Mr. Masfield, to hold the next Annual Meeting at Hanley, Staffs.

Exhibits.

By Rev. Canon J. W. Horsley : *Hemiplecta javanica*, Java; *Ampullaria polita*, Java.

By Mr. Edward Collier : (a), series of *Helix nemoralis*, collected in May last at Lisdoonvarna Spa, Co. Clare, climbing high up in a thorn hedge. *Helix aspersa* and

H. hortensis—one specimen 00005—from Croyde Bay, North Devon. (b), set of shells from a rainwash in North-west Donegal, viz., *Vitrea crystallina*, *V. pura*, *Euconulus fulvus*, *Punctum pygmaeum*, *Sphyradium edentulum*, *Vallonia pulchella*, *Zua lubrica*, *Pupa anglica* and var. *alba*, *P. cylindracea* and var. *albina*, *P. muscorum* and var. *albina*, *Vertigo substriata*, *V. pygmaea*, *V. pusilla*, *V. angustior*, *Clausilia bidentata*, *Carychium minimum*, *Ovatella bidentata*, *Acicula lineata* and monst. *sinistrorsum*. (c), A fine series of West Indian *Urocoptidae* (*Cylindrellidae*). (d), Land shells from an old collection, bought in London from dealers named Humphrey and Mawe, one hundred years ago.

By Mr. J. Kidson Taylor: Band forms of *Helix nemoralis* and *H. hortensis*—a large proportion of the known forms, most effectively displayed on an entirely novel plan, being represented in the collection.

By Mr. John R. B. Masfield: Living *Limax tenellus* from Cheadle, Staffs., and series of *Physa* from Staffordshire canals.

By Mr. Thos. Edwards: A large series of *Buccinum undatum* m. *sinistrorsum*, m. *acuminatum*, m. *carinatum*, m. *subscalariforme*, and m. *bioperculatum*; var. *zelandica*, and var. *striata*; *B. humphreysianum*; and series of British *Ostomia*.

By Mr. J. Ray Hardy: A fine series of examples of the genus *Chama*, including *C. frondosa*, *C. lazarus*, *C. pacifica*, *C. arcinella*, *C. fibula*, *C. brassica*, *C. venosa* and others.

By Mr. A. Hartley: A pure white variety of *Acteon tornatilis* collected at Southport; and a specimen of *Helix aspersa* with "dart" fixed inside the shell and covered over with nacreous shell substance.

By Mr. W. M. Tattersall; *Calliostoma granulatum* dredged from 35 fathoms off the "Chicken Rock," Isle of Man. Also a beautiful series of rare marine shells dredged, mostly from great depths and alive, off the south and west coasts of Ireland, and including the following species:—*Pinna fragilis*, *Tritonofusus islandicus* of unusual size—185 mm. in length—57 fathoms off the Fastnet; a series of growth stages of *T. propinquus*, 82 fathoms off the Fastnet; *Neptunea despecta* and *Buccinofusus berniciensis*—series of young, adult and varieties, 320-372 fathoms off Tearaght; *Tritonofusus fenestratus* off Cleggan Head; *Liomesus dalei* 550 fathoms, off Clogher Head; *Buccinum humphreysianum* off Mine Head; *Cassidaria rugosa* off Kerry coast; *Clio pyramidata* and *C. cuspidata*, 250 fathoms; *Cavolinia inflexa* and *C. trispinosa*; *Aporrhais serresianus*, young, from 363 fathoms, adult from 454 fathoms; *Calliostoma suturale*, 363 fathoms; *Dentalium striolatum*, 600-660 fathoms; *Entalina quinquangularis*, 480 fathoms; *Palliolium vitreum* var. *abyssorum*, 363-700 fathoms; and *Cardium fasciatum* from Rosse's Point, Co. Sligo.

By Mr. J. E. Cooper: *Pseudanodonta elongata* Hol. from River Thames; and *Vertigo substriata* from Burnham Beeches, Bucks.

By Mr. G. C. Spence: A series of *Urocoptidae* from Cuba; *Helicella acuta* from Isle of Man; British *Clausilie*; photographs of pairing of *H. pomatia*; and living animals and "darts" of *Leptaxis undata* from Madeira.

By Mr. J. M. Williams: Dwarf forms of *Cypraea tigris*, *C. pantherina*, *C. arabica*, *C. ervones*, *C. carneola*, *C. onyx* var. *adusta*, *C. stercoraria*, *C. lurida*, *C. ventriculus*, *C. pulchra*, *C. vitellus*, *C. arabicula*, *C. tessellata*, *C. helvola*, *C. isabella*, *C. miliaris*, *C. turdus*, *C. spurca*, *C. caput-serpentis*, and *C. subviridis*; also unusually large specimens of *C. vitellus*, *C. onyx* var. *adusta*, *C. carneola*, *C. helvola* var. *argella*, and *C. pyrum*; *C. vitellus* recently dredged off the Fiji Islands; and *C. zonata* from Cape de Verde Islands.

By Mrs. A. E. Gill: Fine series of *Cypraea*, *Conus*, *Harpa*, *Rostellaria*, *Scalaria*, *Helix*, and *Cochlostyla*.

By Mr. Fred. Taylor: A beautiful set of *Limnæa palustris* var. *albida* from Southport: out of 1080 specimens examined, 25 were this rare albino form.

By Mr. J. Davy Dean: *Helicide* arranged in the form of a "genealogical tree" to illustrate Pilsbry's system of classification. A series of small mollusca from Lifu. Clausia of many British and Continental Clausiliæ; albino examples of *Clausilia cravenensis*, *C. laminata*, and *C. bidentata*; *Hyalinia lucida* from Grange-over-Sands; *H. helvetica* from Leicester; *H. cellaria* var. *compacta* from Halifax; *H. lucida*, *Pomatias elegans*, etc., from Belgian localities; and a double-mouthed *Clausilia bidentata* from Melling.

By Mr. Lionel E. Adams: *Macrochlamys pedina*, *Ariophanta levipes* and varieties, *A. bajadera*, specimens of *Onchidium*, etc., recently collected by him at Bombay.

By Mr. R. Woodcock: A fine series of colour varieties of *Pecten varius* and *P. opercularis*; *Lutraria oblonga*; *Psammobia vespertina*; *Pectunculus glycimcris*; some pretty varieties of *Donax politus*, with scarlet or blue umbones, all collected recently at various localities in Jersey.

By Rev. C. E. Y. Kendall: *Helix hortensis*, type, var. *coalita*, and var. *lilacina*, from Leicestershire; var. *coalita* and var. *incarnata*, Peterborough; var. *tenuis*, var. *subarenicola*, var. *lutea*, and var. *incarnata*, Northants; var. *lutea* and var. *albina*, Crowland; type and var. *olivacea* from Deeping, S. Lincolnshire—all obtained during the present year.

By Mr. C. H. Moore: Forty-four species of land and freshwater shells collected within a radius of four miles from Stalybridge.

By Mr. R. Cairns: A fine series of *Cypræa tigris* and its principal varieties; *Planorbis corneus* var. *albida* from Ashton-under-Lyne.

By Mr. J. W. Jackson: A series of Mollusca obtained from 'Cave-earth' at Dog Holes, Warton Crag, including examples of *Pyramidula ruderata*; also a large number of locality sets of *Margaritana margaritifera*, from his own and Mr. R. Standen's collections.

By Mr. R. Standen: A series of *Odontostomus* and *Macrodonates* from S. America. *Pedicularia albida*, *P. californica* in situ on *Gorgonia* and *Allopora*, *P. elegantissima*, *P. pacifica*, *P. sicula* in situ on corals, and *P. (Dentiora) rubida* from Samoa. *Aporrhais pes-pellicani* from numerous British and Mediterranean localities; *A. serresianus* from Sicily and West of Ireland coast; *A. occidentalis* from Labrador; *A. macandrea* from Shetland; *A. pes-graculi* and *A. pes-carbonis* from Sicily; and *A. senegalensis*; *Sphærium pallidum* from most of its known British and North American localities, including a set of the original specimens first taken in the neighbourhood of Manchester by the late Mr. R. D. Darbishire.

By Mr. J. W. Baldwin: Varieties of *Pecten opercularis* from Scottish localities: *Helix nemoralis* var. *tenuis*—weight $3\frac{1}{2}$ grains—from Isle of Man; a set of remarkably broad banded yellow 00300 *H. nemoralis*, Hope, Derbyshire; varieties of *H. hortensis* from Chatburn, Lancashire.

By the Manchester Museum: A number of special groups from the reserve collections, viz., (a), The "Neave Collection" of Rhodesian Mollusca containing examples of several new species. (b), The "Harmsworth-Jackson Collection" of Franz Josef Land Mollusca. (c), *Purpura lapillus* from a large number of British localities, illustrating local variation in form, size, and coloration. (d), British *Littorinidæ* and *Patelliidæ* from many localities, some interesting examples of the latter forming burrows in rock, and curious tracks on shale due to the browsing of the limpets on *Confervæ* (R. D. Darbishire Coll.). (e), *Ovula* and *Amphiperas*. (f), British and exotic *Limnæidæ*, including many large and beautiful specimens of

Limnæa stagnalis from Hungary (Hazay Coll.). (g), Marine Mollusca from Singapore (Archer Coll.). (h), Tasmanian Marine Mollusca (Miss M. Lodder Coll.). (i), The collections of *Ennea*, *Glandina*, *Streptaxis*, *Partula*, *Papuina*, *Chloræa*, *Amphidromus*, and Ceylon and Madeira Land Shells.

ANNUAL REPORT.

At the last Annual Meeting the membership, including the ten Honorary Members, stood at 330. During the year the deaths of seven members have been reported, and seven members have tendered their resignations. As a set-off against these losses, twenty-two new members have been elected, so that our membership now stands at 338—the largest in the history of the Society.

The deaths referred to are those of Prof. Dr. Rudolph Bergh, of Copenhagen, who was elected an honorary member of the Society in 1889; Dr. G. W. Chaster, of Southport, sometime President of the Society, and one who maintained an enthusiastic interest in its affairs, and was actively engaged in conchological research up to the time of his deeply lamented death in May last; and Messrs. A. Loydell, Kenneth McKean, T. B. Hall, W. J. O. Holmes, and Dr. Frew. When obtainable, obituary notices in reference to some of these have already appeared in the *Journal*.

During the year nine ordinary meetings have been held at the Manchester Museum, and a special joint meeting of the Leeds Branch and the Manchester Branch was held at Leeds University on July 2nd. This last-named meeting deserves more than a passing notice, as it marks a new departure, and was very much enjoyed by those who were privileged to take part in it. In the afternoon a meeting was held, presided over by Prof. Garstang, at which Mr. J. W. Taylor gave a deeply interesting address on the species *Helicigona arbustorum*, dealing with its malacological as well as conchological characteristics. The address was illustrated by a large number of specimens exemplifying the varieties and monstrosities of the species and also allied forms. During the evening an opportunity was afforded for a more informal interchange of observations on conchological matters and experiences in collecting. A similar meeting will be held in Manchester shortly.

Northern members also took part in a ramble to Gisburn, Yorks.

The *Journal of Conchology*—the thirteenth volume of which commenced in January—has been issued regularly each quarter; and some fifty papers and notes by members have thus been permanently recorded. Members are strongly urged to take still fuller advantage of the opportunity afforded to embody in such notes their observations, especially such as bear upon the life-history of mollusca. Whilst on the subject of the *Journal* the Council desires to emphasize a recent notice to the effect that lost back numbers can only be replaced *gratis*, either to members or those with whom we exchange, provided that the fact that numbers are missing be notified to the Secretary during the year of issue. Considerable financial loss has been recently entailed upon the Society through laxity in this respect.

At a recent meeting of the Council it was unanimously decided to nominate Mr. John W. Taylor—one of the two remaining founders of the Society—and author of the “*Monograph of the Land and Freshwater Mollusca of the British Isles*,” for the position of Honorary Member, vacant through the lamented death of Dr. Bergh. In ratifying this nomination by election, the Council feels that the Society will do honour to itself whilst conferring well deserved honour upon one who has done so much for the Society and for conchological research in general.

TREASURER'S REPORT.

Statement of Income and Expenditure

FOR THE YEAR 1909.

Receipts.	£ s. d.	Expenditure.	£ s. d.
Cash in hand ...	48 2 4	Library Cards	0 13 4
Subscriptions	75 10 0	Printing <i>Journal</i> for July, 1908	12 8 11½
Two Life Membership Fees	6 6 0	Do. do. Oct., 1908	13 2 0
Advertisements	4 2 6	Do. do. Jan., 1909	13 2 3½
Sale of Publications ...	17 2 6	Do. do. Apr., 1909	13 7 0
		Do. do. July, 1909	13 0 0
		Illustrations	7 19 0
		Reprints	6 10 0
		Stationery	3 11 9
		Taylor's Monograph, part xv.	0 5 3
		Curator's Expenses for 1908	1 0 0
		Secretary's Expenses to Dec.,	
		31st, 1908	2 1 8
		Recorder's Expenses, 1909...	0 6 2
		Editor's Expenses to Dec.,	
		1908	0 14 0
		Treasurer's Expenses, 1909	2 0 0
		London Meeting Expenses...	2 19 6
		Cash in hand	58 2 5
	<u>£151 3 4</u>		<u>£151 3 4</u>

Interim Statement of Income and Expenditure

TO OCTOBER 6TH, 1910.

Receipts.	£ s. d.	Expenditure.	£ s. d.
Cash in hand	58 2 5	Library Cards	0 2 0
Subscriptions	33 10 0	Cost of <i>Journal</i> for Oct., 1909	13 8 5
One Life Subscription Fee	3 3 0	Do. do. Jan., 1910	13 4 6
Sale of Publications ...	11 14 7	Do. do. Apr., 1910	12 16 6
Advertisements	1 2 11	Reprints	3 9 0
		Stationery	2 17 8
		Taylor's Monograph, part xvi.	0 5 3
		Illustrations	1 13 0
		Curator's Expenses ...	1 0 0
		Editor's Expenses, 1909 ...	0 13 10
		Secretary's Expenses, 1909	4 16 8
		Cash in hand	53 6 1
	<u>£107 12 11</u>		<u>£107 12 11</u>

The finances of the Society, as shown by the Interim Statement of Income and Expenditure for the present year, made up to October 6th, seem to be in a satisfactory condition. There is at the moment a cash balance in hand of £53 6s. 1d., with outstanding liabilities of about £32.

The subscriptions still to be paid amount to £36.

ANNUAL REPORT OF THE LEEDS BRANCH
FOR THE YEAR ENDING 30TH SEPTEMBER, 1910.

We have had 13 meetings during the year just ended, 7 in the field, for the purpose of investigating certain localities, with an average attendance of 6 members exclusive of visitors, of whom there have been 17. The rest of the meetings were held indoors, at which there was an average attendance of 11 members. The indoor meetings have been held:—one in the Institute of Science and Art, Leeds; two in the University, Leeds; and three in the Cartwright Hall, Bradford. Our field meetings were held at the following places:—2nd October, 1909, Leeds, for the Meanwood Valley; 9th April, 1910, South Milford; 16th May, 1910, Selby; 4th June, 1910, Malham; 9th July, 1910, Spurn; 13th August, 1910, Knaresboro'; 10th September, 1910, Gisburn.

The September meeting was the Fourth Annual Joint Ramble with the members from Manchester. I may say that these joint rambles have been of a most successful character, and have become an institution highly appreciated by all who have attended them. Early in January of this year suggestions were sent to our branch by the Hon. Secretary of the Society (Rev. Lewis J. Shackelford) intimating the idea of having two extra joint meetings during the year, one to be in Manchester, the other in Leeds, believing such meetings would be of great benefit to the members by the personal intercourse and exchange of ideas. Subsequent arrangements led to the first meeting being held on the 2nd of July of this year at the University in Leeds, where Dr. Garstang, M.A., D.Sc., presided over an excellent attendance of local and visiting members and also other invited friends.

The afternoon was given up to a combined display of *Helicigona arbustorum*, on which species Mr. J. W. Taylor, F.L.S., gave some very exhaustive remarks as to its characteristics and distribution. In the evening individual exhibits of a varied character were shewn and commented on by the exhibitors.

Judging by the remarks from several members at the close of the day, the meeting had been a most instructive and profitable one, and those privileged to be present had thoroughly enjoyed it.

Our indoor meetings, as in the past, have been devoted to the reading of papers and exhibition of specimens.

In regard to exhibits of British Land and Freshwater Species we have continued the list from *Hygromia rufescens* to *Helicigona arbustorum*.

Mr. J. W. Taylor has continued his excellent papers on the habits, morphology, and distribution of each species as they have been exhibited, and the members have shewn their appreciation by the continued good attendance at the winter meetings.

Two additional papers were given, both by Mr. J. F. Musham, F.E.S., one on a visit to Wigtownshire, N.B., in the spring of 1909, in which he gave details of species observed, and another paper on the effect he thought certain habitats had on the coloration of *Helix nemoralis*.

There was no addition to the Yorkshire list of mollusca during the year, but continued additions are being made to the many different drainage areas, the results of observations made during the summer rambles and by individual members.

The Branch continues to be officially represented at the meetings of the Yorkshire Naturalists' Union, and reports, when made, have appeared in the *Naturalist*.

The membership at the present time is 21, with one corresponding member.

F. BOOTH, *Hon. Sec.*

ANNUAL REPORT OF THE LONDON BRANCH.

Since the last Annual Meeting there have been six ordinary and six field meetings of this branch.

We desire once again to thank Canon Horsley for kindly placing a room at our disposal for the evening meetings. All these were well attended, and many interesting exhibits were made. No formal papers were read, but Mr. L. E. Adams gave some enjoyable "chats" on shells and shell-collecting. Other members contributed short notes on various subjects.

The following field meetings were held:—at Chigwell, on May 7th, when 26 species were collected, including a few new records for S. Essex; at Denham and Harefield on June 4th, when a large number of species was noted, though nothing not already recorded; at Leatherhead, on July 9th, where we took *Clausilia rolpheii*, *Pyramidula rotundata* var. *alba*, *Cochlicopa lubrica* var. *hyalina*; at Gravesend, on August 6th, when *Cacilioides acicula* was found alive in the soil at the edge of a gravel-pit; at Burnham Beeches, on September 3rd, when many interesting shells were taken, including *Acanth. lamellata*, *A. aculeata*, *Acicula lineata*, *Vertigo pusilla*, and *V. substriata* (the last a new record for Bucks); and at Crayford on October 1st, when the historic Pleistocene section in the old brick-yard was visited, and *Corbicula fluminalis*, *Pisidium astartoides*, etc., were collected.

We are glad to report a small increase in the membership of this branch.

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

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FURTHER REPORT ON THE ACCELERATION OF THE CENSUS IN 1910.

The effort commenced in 1909 to accelerate the completion of the Census of the distribution of British Land and Freshwater Mollusca, in which British conchologists so heartily co-operated, has been actively continued during the year now drawing to a close.

The circular drawn up and issued by Mr. W. Denison Roebuck, of Leeds, has been sent out in co-operation with the Official Recorder of the Society, and all specimens sent in have been authenticated by Mr. John W. Taylor as Referee.

The result of the year's working has been most satisfactory, and thanks are due to numerous British Conchologists for their ready and willing co-operation in the work.

So much was done during the previous year, when more than twelve hundred blanks in the distribution were filled up, that it was not to be expected that so large a number would be sent in this year.

Nevertheless, 542 blanks have been filled up for 90 vice-counties, averaging 5.9 species each, bringing up the total number of authentications to 10,395, or an average of 69.7 species for each area.

The amount of the work accomplished may be gauged by the fact that the 1,755 new authentications made during the two years amount to one-sixth of the total number registered during more than a quarter of a century's steady work.

Attention was drawn in the last report to the necessity of special attention being paid to Scotland, for which only 65 records had been made in 1909. It is, therefore, gratifying to report that this year no less than 313 fresh authentications have been made for 35 out of 41 vice-counties of Scotland, being an average of 9 species per area.

In this connection it may be mentioned that Mr. Fred Booth has this year investigated various northern counties of Scotland with a grant from the Royal Society's Grant Fund. The object of this investigation was the study of the northern limits of the terrestrial mollusca, and an incidental result was the filling up of numerous blanks in the Census.

There is much Scottish work still to be accomplished, and the Recorder appeals to all conchologists who have Scottish material, or who are disposed to make remote Scottish counties the scene of their holiday or other investigations, to communicate with him.

As to some counties, the Orkneys in particular, collections have been made in past seasons by various members, including many species which Mr. J. W. Taylor has not had the opportunity of seeing, and the Recorder would be pleased to have the opportunity of submitting them to him.

Lincoln North is now the most thoroughly investigated area in the kingdom,¹ with 117 species to its credit; while on the other hand the one of which least is known is the Irish county of Longford, with but 3. It would be a great service if some conchologist would make a special investigation of this county for the benefit of the Census.

In respect of the more closely investigated areas, there are still numerous cases in which common or readily-obtainable species are required for authentication, and in this connection it is curious that it is only this year that a complete Census has been obtained of any one species; *Agriolimax agrestis* having just been sent by Mr. J. Williams Vaughan from Carmarthenshire, to fill up the only remaining gap.

There are other species of general range, such as *Arion ater*, *Hyalinia cellaria*, *Pyramidula rotundata*, etc., for which the blanks in the Census are now reduced to one, two, or three.

In respect of the difficult genus *Pisidium* there is at present a considerable amount of confusion. Mr. B. B. Woodward is understood to be engaged on a critical study of the genus, and a large number of specimens have been seen by him as well as by the official referees, and identified by him somewhat differently, but so far he has not, to our knowledge, disclosed or published the bases or grounds upon which these determinations have been made. Until this is done it may be suggested that it will on the whole be wiser to follow the accepted nomenclature of the standard works on the subject, and so avoid further confusion.

In view of this it would be very useful to students if the Council of the Society would cause to be reproduced in the Journal of Conchology the original descriptions and figures of the various species, the figures being reduced to a common standard of size for ease of comparison.

The table of vice-counties of the British Isles is appended, showing the present state of the authentication-records, both the additions for 1909 and for 1910, and the totals to date. The vice-counties are arranged in the order in which they have been least investigated.

¹ This statement applies also to the detailed tabulation of species within the vice-county itself, in view of the early publication of a work upon the Mollusca of Lincolnshire.

No.	Name of Vice-County.	Additions in 1909.	Additions in 1910.	Total to date.	No.	Name of Vice-County.	Additions in 1909.	Additions in 1910.	Total to date.
133	Longford ...	—	1	3	18	Essex S. ...	9	1	60
102	Ebudes S. ...	—	2	17	131	King's Co. ...	1	1	61
112	Shetland Isles ...	—	—	19	76	Renfrew ...	2	2	61
103	Ebudes Mid. ...	—	1	30	2	Cornwall E. ...	32	—	61
108	Sutherland W. ...	—	1	32	120	Fermanagh ...	25	1	62
110	Hebrides ...	—	—	34	49	Carnarvon ...	11	—	62
109	Caitness ...	—	9	34	31	Hunts. ...	19	—	63
137	Mayo E. ...	—	1	35	1	Cornwall W. ...	2	1	63
134	Roscommon ...	—	—	35	127	Wexford ...	16	—	64
111	Orkney Isles ...	1	9	35	86	Stirling ...	1	14	64
99	Dumbarton ...	—	4	35	88	Perth Mid. ...	—	17	65
93	Aberdeen N. ...	—	28	35	136	Sligo ...	12	1	66
106	Ross E. ...	—	13	36	130	Queen's Co. ...	17	—	66
91	Kincardine ...	—	3	36	87	Perth S. ...	—	4	66
96	Easternness ...	—	10	37	71	Isle of Man ...	10	7	66
94	Banff ...	—	8	37	0	Channel Isles ...	20	—	66
97	Westernness ...	—	22	38	135	Leitrim ...	3	—	67
74	Wigtownshire ...	16	5	38	89	Perth N. ...	—	19	67
72	Dumfriesshire ...	2	14	40	117	Monaghan ...	—	4	68
51	Flint ...	3	—	40	47	Montgomery ...	—	—	68
132	Westmeath ...	3	1	41	45	Pembroke ...	2	—	68
77	Lanark ...	2	1	41	Average per County and Vice-County				69.7
104	Ebudes N. ...	—	17	42	113	Londonderry ...	20	1	70
101	Cantire ...	—	—	43	40	Shropshire ...	6	1	70
78	Peebles ...	—	8	44	126	Wicklow ...	3	—	70
118	Tyrone ...	12	1	45	85	Fife and Kinross ...	—	5	71
79	Selkirk ...	11	1	45	35	Monmouth ...	29	—	71
105	Ross W. ...	—	12	46	145	Waterford ...	2	—	72
92	Aberdeen S. ...	—	18	46	116	Armagh ...	4	8	72
107	Sutherland E. ...	—	1	49	65	York N.W. ...	—	—	73
98	Main Argyll ...	—	8	49	147	Cork S. ...	25	—	74
46	Cardigan ...	13	1	50	82	Haddington ...	—	5	74
140	Galway E. ...	11	1	52	52	Anglesey ...	1	—	74
75	Ayr ...	—	3	52	30	Bedford ...	—	2	74
50	Denbigh ...	1	1	52	148	Kerry ...	13	4	75
48	Merioneth ...	1	1	52	144	Tipperary S. ...	7	—	75
84	Linlithgow ...	—	5	53	7	Wilts. N. ...	5	1	75
81	Berwick ...	6	6	53	142	Limerick ...	13	—	76
90	Forfar ...	—	—	54	139	Galway W. ...	25	1	76
68	Cheviotland ...	15	10	54	128	Carlow ...	26	—	76
121	Cavan ...	4	1	55	55	Leicester and Rutland ...	—	—	79
43	Radnor ...	29	4	55	42	Brecon ...	44	3	79
95	Elgin ...	2	24	56	19	Essex N. ...	—	—	79
44	Carmarthen ...	2	2	57	14	Sussex E. ...	4	—	79
73	Kirkcudbright ...	—	8	58	10	Isle of Wight ...	20	—	79
143	Tipperary N. ...	4	1	60	115	Down ...	35	2	80
125	Kildare ...	15	—	60	4	Devon N. ...	18	2	80
100	Clyde Islands ...	—	1	60					
80	Roxburgh ...	18	—	60					

No.	Name of Vice-County.	Additions in 1909.	Additions in 1910.	Total to date.	No.	Name of Vice-County.	Additions in 1909.	Additions in 1910.	Total to date.
83	Edinburgh ..	4	5	80	24	Bucks ...	32	10	93
5	Somerset S. ...	38	1	81	6	Somerset N. ...	5	—	94
138	Mayo W. ...	13	7	82	39	Staffordshire ...	4	—	95
69	Westmorland with Lake Lancashire	4	3	82	37	Worcester ...	7	8	95
33	Gloucester E. ...	4	—	82	61	York S. E. ..	3	—	96
26	Suffolk W. ...	6	—	82	27	Norfolk E. ...	6	—	96
12	Hants. N. ...	5	11	82	23	Oxford ...	11	—	98
8	Wilts. S. ...	2	2	82	13	Sussex W. ...	1	5	98
36	Hereford ...	4	6	83	57	Derbyshire ...	—	—	99
119	Donegal ...	21	3	84	25	Staffolk E. ...	27	2	99
67	Northumberland S.	6	3	84	15	Kent E. ...	16	3	99
66	Durham ...	—	—	84	11	Hants. S. ...	4	1	99
29	Cambridge ...	24	—	84	59	Lancashire S. ...	6	—	100
41	Glamorgan ...	11	—	85	58	Cheshire ...	3	25	100
28	Norfolk W. ...	1	—	85	32	Northampton ...	7	9	100
114	Antrim ...	43	—	87	22	Berkshire ...	15	2	100
9	Dorset ...	2	18	87	20	Hertford ...	15	—	100
123	Meath ...	4	—	88	56	Nottingham ...	—	20	101
122	Louth ...	1	—	89	3	Devon S. ...	24	1	101
146	Cork N. ...	13	—	89	53	Lincoln S. ...	4	—	102
141	Clare ...	6	—	89	21	Middlesex ...	17	—	102
124	Dublin ...	22	—	89	62	York N.E. ...	—	—	107
129	Kilkenny ...	5	—	90	17	Surrey ...	12	1	113
70	Cumberland ...	22	11	91	64	York Mid W. ...	—	—	114
60	Lancashire W. ...	3	2	91	63	York S.W. ...	2	1	114
38	Warwick ...	5	—	91	54	Lincoln N. ...	2	7	117
16	Kent W. ...	9	—	91					
34	Gloucester W. ...	4	—	92					
Totals ...							1,213	542	10,395

In conclusion the time has now arrived—as indicated in last year's report—at which it would be a great convenience to workers to have the Census reprinted up to date, and if proofs were sent to workers it would probably be the means of many further blanks being filled up before it is finally printed off.

The work of authentication is still actively proceeding, and the active and systematic co-operation of all the members is desired.

396th Meeting, Nov. 9th, 1910.

Held at the Museum, Manchester.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

“On a new Labradorean Species of *Onchidiopsis*, a Genus of Mollusks new to Eastern North America ; with Remarks on its Relationships,” by F. N. Balch (*from the author*) ; and the usual periodicals received in exchange.

New Member Elected.

W. M. Tattersall, M.Sc.

Resignation.

W. Whitehead.

Member Deceased.

Rev. R. Boog Watson, LL.D., F.L.S., F.G.S., F.R.S.E.

In reference to the above the following resolution was passed :—"The Council and Members of the Conchological Society desire to place on record their sense of the great loss sustained in the lamented death of the Rev. Dr. R. Boog Watson, of Edinburgh, sometime President of the Society, and instruct the Secretary to convey to the relatives their most sincere condolence."

Great regret was expressed that owing to information of Dr. Boog Watson's death, which took place in June, not having been received until recently, the vote of condolence was so delayed.

An obituary notice, by E. A. Smith, I.S.O. and J. R. le Brockton Tomlin, M.A., was read, and will be published in the January number of the *Journal of Conchology*.

Papers Read.

"On the Occurrence of *Helix aspersa* L. var. *glabra* Calc. in Mid-Lincolnshire," by J. F. Musham, F.E.S.

"Protective Resemblance in British Marine Mollusca," by J. A. Hargreaves.

"The Dispersal of Shells by Insects," by H. J. Stalley.

"*Clausilia cravenensis* Taylor var. *albina* nov.," by J. Davy Dean.

"*Vertigo substriata* in Bucks.," by J. E. Cooper.

"*Pseudanodonta elongata* Hol. in the Thames," by J. E. Cooper.

"Land and Freshwater Mollusca of Ross-shire, with some New County Records," by J. Williams Vaughan.

"*Limax tenellus* in Perthshire East," by Chas. Oldham.

"*Ena montana* in Buckinghamshire," by Chas. Oldham.

"Obituary Notice: The Rev. R. Boog Watson, LL.D., F.L.S., F.G.S., F.R.S.E., etc.," by E. A. Smith, I.S.O. and J. R. le Brockton Tomlin, M.A.

"On the Occurrence of *Unio sinuatus* Lam. in the British Isles," by J. Wilfrid Jackson, F.G.S.

Exhibits.

By Mr. Chas. Oldham: *Ena montana* from Great Hampden, Bucks., to illustrate his paper.

By Mr. J. Kidson Taylor: Very fine examples of *Cypræa exusta*, *C. nigropunctata*, *C. reevei*, and many beautiful varieties of less common species.

By Mrs. Gill: Species of *Vitrina* from Tasmania, and a series of *Partula*, *Cyclostoma*, *Choanopoma*, and *Trochatella*.

By Mr. C. H. Moore: A number of land shells from Grange district.

By Mr. J. A. Hargreaves: *Acmea virginea* in situ amongst Nullipore, to illustrate his note.

By Mr. G. H. Taylor: *Pisidium nitidum*, *Sphaerium corneum*, and a stunted form of *Limnæa glabra* from Bowlee, near Manchester.

By Mr. J. E. Cooper: *Pseudanodonta elongata*, to illustrate his note.

By Mr. G. C. Spence: A number of fine *Urocoptide* and *Placostylus*.

By Mr. Fred. Taylor: Very large *Pisidium casertanum* Poli, approaching the variety *cineereum* Alder, from Filton Hill, near Oldham; *Physa fontinalis* and a form of *Physa* shewing some affinity with *P. heterostropha* or *P. gyrina*, from Barlaston, Staffs.; and a beautiful example of a large *Limax*, as yet unidentified, from Blandford, Dorset (coll. A. D. R. Bacchus).

By Mr. E. Collier: *Helix aspersa* and *H. hortensis*, from Dingle, Co. Kerry.

By Mr. J. Wilfrid Jackson: *Unio sinuatus* Lam., from River Clouden, Dumfries, River Danube, and fossil from River Thames, to illustrate his paper; also a "co-type" of *Pseudanodonta elongata* var. *nicarica* from Neckar, Heidelberg.

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THE
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OF
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OF GREAT BRITAIN AND IRELAND.*

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The Journal, which is supported by many prominent Naturalists of the district, deals with all branches of Natural History, and is rapidly increasing in circulation. Amongst the Conchological Notes and Papers which have already appeared are : "Notes on the Freshwater Mussels of Lancashire and Adjacent Counties" ; "On the Mollusca from the 'Cave-Earth,' Dog-Holes, Warton Crag" ; and others, which contain much valuable information of local and general interest.

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THE
JOURNAL OF CONCHOLOGY.

VOL. 13.

APRIL, 1911.

No. 6.

A DOUBLE-MOUTHED *CLAUSILIA BIDENTATA* NEAR
WARTON, WEST LANCASHIRE.

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, September 14th, 1910).

WHILST examining a mossy wall at Yealand Conyers, near Warton, one wet day a few weeks ago, I had the good fortune to discover a rather fine example of *Clausilia bidentata* which possesses an additional or second aperture.

The animal was busy climbing the wall in search of food at the time of its capture, and I noticed that its body protruded from the secondary mouth, which is situated about half-a-whorl distant from the original one, and faces to one side.



Whether the formation of this second aperture is due to some degeneration or obstruction of the clausium or not, is very difficult to decide. The new mouth is quite perfect and well formed, but only partially covers the hole pierced in the shell-wall, the jagged edge of which shows at one side (see figure).

Dual-mouthed examples of this species are not uncommon; one from Luton, Bedfordshire is figured by Mr. J. W. Taylor in his "Monograph of the Land and Freshwater Mollusca of the British Isles," vol. i. (1900), p. 119. Some further remarks on this phenomenon will also be found in the "Lancashire Naturalist," Nov., 1910, pp 275-276, and Dec., 1910, p. 307.

OBITUARY NOTICE.

PROFESSOR DR. OSCAR BOETTGER.

BY J. R. LE B. TOMLIN, M.A., F.E.S.

(Read before the Society, Jan. 11th, 1911).

WE HAVE to deplore the loss of another eminent conchologist—one who was well-known by correspondence to many of us. We owe the following details of his career to an able article by his friend Dr. W. Kobelt, published in the "Nachrichtsblatt der Deutschen Malak. Ges. 1910, Heft iv."

Oscar Boettger was born on March 31st, 1844, and was the son of a well-known professor of chemistry at Frankfurt-am-Main—Dr. Rudolf Boettger, the inventor of gun-cotton and safety matches. He was a born collector and at an early age began to study the fauna of his native place. While yet a schoolboy he came under the influence of the famous palæontologist Hermann von Mayer, and of Otto Volger, and it was probably due to the latter that Boettger, on leaving school, resolved to follow the mining profession, and in 1863 entered the School of Mining at Freiberg. Unfortunately an accident underground compelled him to give up mining engineering, and he decided to take up teaching. In 1866, therefore, he entered the University of Giessen, and soon after graduating there received the degree of Doctor of Philosophy at the University of Würzburg. In 1873 he received an appointment as Professor of Natural Science at his native town of Frankfurt. Henceforth his studies were pretty equally devoted to three subjects—the Reptilia, Fossil Mollusca, and Recent Mollusca, and he soon became a recognised authority on all three. Up to April, 1910, according to a list of his own compilation, his published papers amounted to 324. His forte lay in the working out of travellers' collections, and his infinite patience in the determination and revision of critical forms will be greatly missed.

He was an influential member of the directorate of the Neue Zoologische Gesellschaft, and from 1896 the editor of their official organ.

He had an altogether remarkable talent for rousing an interest in nature, though his methods were often far from conventional and by no means to the satisfaction of his superiors—especially in later life when he developed sundry eccentricities that laid him open to raillery. But he was to be seen at his best as a teacher on one of his regular weekly excursions round Frankfurt with his pupils, and any naturalist of the younger generation in Frankfurt is almost sure to have derived his first impulse from these rambles. There was, unfortunately, a

long break to his activity in this direction; for nearly nineteen years, from 1878 onwards, under the influence of a nervous disorder, he utterly refused to come outside his house and garden, and it was only in 1897 that his brother induced him to come out of doors one evening after nightfall, by the promise of a rare stamp which he had brought from America! They even visited a tavern together, and from that evening Boettger was cured.

During this voluntary imprisonment he accomplished the best of his systematic work, and was never at a loss for material owing to his world-wide correspondence. Great was the jubilation over his first re-appearance at the local Natural History Society—the “Beetlebox,” and he almost at once resumed his professorial work.

At the beginning of 1908 a marked failing in his powers was noticeable, but he fought bravely against disease and we find him, as late as the end of last summer, working hard to complete his Catalogue of Reptilia and Amphibia. He succumbed, however, to cancer on September 25th.

His collections and library pass to the Senckenberg Society, of which he was an original member.



The Dispersal of Shells by Insects.—I have been much interested in reading in the current number of the *Journal of Conchology* the extract, on page 108, from Mr. Tomlin's paper on “The Dispersal of Shells by Insects,” for an exactly similar incident occurred to myself when out with a small party of boys on June 11th, 1907, in a lane near Upper Beeding, in Sussex. In my case also it was a huge bumble-bee with one of its hind legs held firmly between the shell and the operculum of a fine specimen of *Cyclostoma elegans*, but the bee was only able to progress in a series of short flights, rising about two feet into the air, and then being dragged down again by the weight of the snail, reaching the ground in each case some four or five feet from its last resting place. This difficulty in progression may have been due to tiredness, for both bee and snail were smothered with dust, and had, I should say, come some distance along the dusty road and hedges. Our attention being attracted by the very loud “buzzing and bumbling” made by the bee in its vigorous efforts to get rid of its encumbrance, the creatures were caught, but in endeavouring to release the bee from its trap we only succeeded in snapping its leg, when, however, it flew off briskly with what sounded like a happy and relieved hum. The snail was retained, and next day was still holding the piece of leg firmly. I do not think I have seen the animal since. It is curious that two such similar incidents should have been observed in such widely separated parts of the country, and one wonders why the bees should “interfere with” the snails so as to get caught in this way. Were both incidents merely accidents, or were they attempts at egg-laying in the snail-shells? Do bees do such things? Mr. Tomlin tells me that certain beetles habitually breed in snail-shells. The incident is recorded in the 1907 Report of the Christ's Hospital Natural History Society.—H. J. STALLEY (*Read before the Society, Nov. 9th, 1910.*)

AN ENUMERATION OF THE
 ADDITIONS MADE TO THE GENUS *LATIRUS* Montfort,
 Since 1891, with Descriptions of Three New Species.

By JAMES COSMO MELVILL, M.A., D.Sc.

(Read before the Society, Dec. 14th, 1910).

TWENTY years ago I attempted an "Historical Account" with Catalogue¹ of the Fasciolaroid group separated under the collective name of *Latirus* Montfort, this now being inclusive of *Peristernia* Mörch, and *Leucozonia* Gray. Since that time, so far as I can ascertain, twenty-one species have been added to the genus as new, including the three being described at this opportunity, or else, as in case of *Latirofusus nigrofuscus* Tate, now referred to the genus, after being at first located elsewhere.

With regard to the 111 species enumerated and catalogued in the paper just alluded to, I see no reason why they should not all be maintained. Accordingly the sum total is now augmented considerably, not only by the twenty-one species commented on in this paper, but also by the admission of *Taron dubius* Hutton,² an anomalous Novo-Zealandic shell, with a latiroïd radula, which has lately been incorporated in the genus by Mr. H. Suter, under the name of *Latirus huttoni*. I should, however, conjecture that as the name *dubius* has only been once used, and that varietally³ in the genus, Hutton's appellation may be allowed to stand. *Latirus* (*Peristernia*) *fischerianus* Tap.-Can. likewise, considered in my first paper a *Coralliophila* or perhaps *Engina*, is now reinstated, and these swell the total of recognised species to 134 altogether.

It will be noticed, however, that *Metzgeria alba* (Jeffer.) is excluded. This is the *Latirus albus* Jeffreys in Wyville Thomson, "The Depths of the Sea," p. 64 (1873), and the Rev. A. M. Norman, F.R.S., when propounding the new generic name *Metzgeria* for it, remarks⁴ "The shell is not properly referable to *Latirus*, and Dunker and Metzger have established a genus (*Meyeria*) to receive it, but *Meyeria*, as well as *Meyerina* and *Meyerella* have all been previously employed and, therefore, the dedication of the genus to Metzger is suggested." It is an Arctic species, occurring in Norway and the Farøe Channel, and has been recorded as British. Although thus expunged from the genus, some authors consider it still a very near ally, and group it in the same family, considering that it bears the same relation to the

¹ Mem. and Proc. Manch. Lit. & Phil. Soc., ser. iv., vol. 4 (1891).

² Trans N.Z. Instit., xl., pp. 360 sqq.

³ *L. triserialis* Lam. var. *dubius* Petit, *J. de Conch.*, iv., p. 75, t. 2, f. 9, 10 (1853).

⁴ Norman in *Journ. of Conch.*, ii., pp. 56, 57 (1879).

typical *Latirus* that the Arctic *Admete* Kröyer does to *Cancellaria* Lam., whilst others relegate it to the neighbourhood of *Semifusus* Swainson, and *Ptychotractus* Stimpson, in the family Turbinellidæ.

Certain of the additional species are very conspicuous and handsome, notably *L. præstantior* Melv., with its elegant contour, ample dimensions, and warm Indian-red coloration. *L. maximus* Sowb. is also very noticeable, especially for size. *L. abnormis* and *singularis*, both of Sowerby, are bizarre and unusual in form, while *L. arabicus* Melv. is so like a *Fusus*, superficially, as, at first, to have been included in that genus. Others, e.g., *L. rudolphi* Braz. and *corallinus* Melv., rank amongst the smallest species of the genus; and of the three new species, *L. hesteræ* and *jeaniæ* are both select and brightly coloured species, while *photiformis*, as its name implies, bears a resemblance to a member of the beautiful genus *Phos*.

It is an enigma why so attractive an assemblage of shells has never, in the past, received the due attention it deserved. Both in sculpture, variety of form, size, colour, and other characteristics, they are nearly all of surpassing interest, and we trust that in the near future some student will be led to examine the recent species in connection and comparison with the many fossil forms now described, and so prepare the way for an exhaustive monograph of the whole group. The tertiary and post-tertiary species are particularly numerous and varied.

In my first account of the genus I endeavoured to preserve the genus *Peristernia* as separate from *Latirus*. The extremes may be distinct, but they naturally blend together with intermediates, and it is more convenient to treat all the species as coming under one generic headship. When the anatomy is more fully known perhaps some permanent alteration may be made; but the proposed grouping seems natural, and, in my humble opinion, the genus is as well fixed as, say, *Mitra*, or *Marginella*, or others with plaited columellæ.

1. *Latirus abnormis* Sowb.

Latirus abnormis Sowerby, *Journ. of Conch.*, vii., p. 369, 1894.

“ Marine Shells of S. Africa ” (Appendix),
pl. vi., f. 7.

Latirus imbricatus Sowb., “ Marine Investig.: South Africa,” p. 96,
pl. ii., f. 1, 1902.

Hab.: Natal.

As its name implies, a somewhat anomalous species, showing no columellar plication. It is of a fair size, the type measuring long.: 57, lat.: 23 mm. As just noted above, Mr. Edgar A. Smith has united with it, as synonymous, the *L. imbricatus* of the same author, also reported from South African seas (cf. Proc. Malac. Soc., v., p. 369).

2. *Latirus alboapicatus* Smith.

Latirus alboapicata E. A. Smith, *Journ. of Conch.*, vol. x., p. 250,
pl. iv., f. 5, 1902.

„ *alboapicatus* E. A. Smith, *Proc. Malac. Soc. London*, vol. v.,
p. 369, 1903.

The following is a free English translation of the author's Latin description:—Shell fusiform, rufescent, white towards the apex, and below the centre of the body whorl girt with a pale band; the spire is elongate, rather turreted, whorls $7\frac{1}{2}$, the two nuclear big, smooth and rounded, the third possessing about twelve longitudinal ribs, the remainder lightly concave above, sloping, below nodulously ribbed, spirally lirate; the body whorl is girt with about eight ribs, becoming evanescent towards the base; the mouth is oval, produced anteriorly into an oblique recurved canal, rufescent within. Columella with a thickened callus, and furnished with a small tubercle close to the lip.

Long.: 28; *diam.*: 12.

Hab.: Durban.

The author points out the contrast given in the large white apex compared with the rufous lower whorls of the species. The type, presumably unique, is said to be in the possession of Mr. Anderson. I have an unnamed shell in my collection which may possibly be a form of this, but I am not certain about it at present.

3. *Latirus andamanicus* Smith.

Latirus andamanicus E. A. Smith, *Ann. & Mag., N. Hist.*, ser. vi.,
vol. 14, p. 164, pl. iii., f. 9 (1894).

This is a fusiform species, whitish, covered with pale olive epidermis, eleven whorled, three being nuclear, white, smooth, polished, the remainder rather convex, upper whorls longitudinally ribbed, the ribs becoming more or less obsolete on the two lowest whorls, all succinct with three or four conspicuous lirations, with filiform spiral striæ intermingling. Aperture white, columella arcuate, having two obscure oblique plaits, canal nearly straight, narrow and elongate.

Long.: 50; *lat.*: diam. 12 mm.

Hab.: Two specimens¹ dredged by s.s. "Investigator," off Port Blair, Andaman Isles, in 112 fathoms.

Not seemingly dissimilar in some respects from *L. arabicus* Melv., but differing in the character of the spiral liræ, and the evanescence of the costæ on the penultimate and body whorls. The columella of *arabicus* is sometimes 3-4 plicate, though the plicæ are obscure.

¹ One of the specimens is in the British Museum (Nat. Hist.), the other in the Indian Museum, Calcutta (E. A. Smith).

4. **Latirus arabicus** Melvill.

Fusus arabicus J. C. Melvill, *Mem. Manch. Soc.*, vol. xlii., no. 4, p. 16, pl. i., f. 6 (1898).

Latirus arabicus J. C. Melvill, *Proc. Zool. Soc.*, Lond. 1901, vol. i., part 2, p. 418.

Shell attenuately lanceolate, slender, cinereous or cinnamon-brown, darker over the ribs, nine whorled, two being apical, smooth, brown, the remainder constricted suturally, ventricose, longitudinally thickly-ribbed, ribs of the two lowest whorls 8-10 in number, these being spirally crossed by revolving liræ or riblets, the interstices being granuloso-lirate, mouth ovate, canal straight, prolonged, lip within plicately striate, columella seven-plaited, plaits oblique, rather obscure.

Long.: 34; *diam.*: 10·50 mm.

Hab.: Maskat (Muscat), Persian Gulf, at entrance to the Gulf of Oman, 15 fathoms, sand and mud. Mekran Coast to Karachi (rare), F. W. Townsend.

At first deemed a *Fusus*, there can be no doubt now as to the proper location of this species. With *L. andamanicus* Smith, it stands somewhat alone in the genus, not far, perhaps, removed from *L. lauceola* Reeve ("Conch. Icon. Turbinella," vol. iv., f. 12, 1847), but with a 'facies' all its own.

5. **Latirus aurantiacus** Verco.

Latirus aurantiacus J. C. Verco, *Trans. Royal Soc.*, S. Australia, vol. xix., p. 89, pl. ii., f. 1 (1895).

The following is a condensed description of this interesting unique shell, which I only know by figure and description:—Shell very solid, rusty salmon coloured, whorls six, somewhat convex, roundly angled just below the middle, provided with 8-9 well marked nodules. Spiral liræ 8-10 in number, various in size, crossed by longitudinal scabrous distant incremental lines. Sutures marginate, body whorl with nine costæ, the spiral liræ here being almost equidistant, 16 in number, with occasional intermediate spiral threads. Umbilicus small, columella straight below, canal equalling $\frac{1}{3}$ of the whole aperture, slightly recurved. Outer lip acute, inner thin, glistening pearly white tinged with ferruginous, operculum ovate, acute, with anteriorly situated nucleus.

Long.: 46; *diam.*: 27 mm.

Hab.: Backstairs Passage, S. Australia, 18½ fathoms, dredged alive. One unique example in the author's (Dr. Joseph C. Verco) collection.

Allied, according to the author, to *L. concentricus* Reeve.

6. *Latirus burnupi* Smith.

Latirus burnupi E. A. Smith, *Ann. Natal Govt. Mus.*, vol. i., part 1, p. 34, pl. vii., f. 7 (June, 1906).

Shell whitish, fusiform; covered with a thin fuscous epidermis, spire acuminately coniform, whorls 8-9, sloping above, then concave, finally convex, provided with eight strong rounded ribs, attenuate above, the spiral liræ being thin and crowded, slightly granulate below the suture, the ribs of the last whorl disappearing below the centre, one lira below the periphery very conspicuous, the aperture rosy-purple, within lirate, canal hardly oblique, the columella adorned with a rose-purple callus, thrice plaited.

Long.: 28; *diam.*: 11.5 mm.

Hab.: Port Shepstone, Natal (Burnup).

The author adds that this species is near *L. fluvidus* A. Ad. and *L. marie* Crosse. Four specimens recorded, but I have not seen them.

7. *Latirus (Peristernia) corallinus* (Melv. & Standen).

Peristernia corallina J. C. Melvill & R. Standen, *Ann. & Mag., N.H.* ser. vii., vol. 12, p. 308, pl. xxii., f. 11 (1903).

Latirus (Peristernia) corallina (Melv. & Stand.), *Trans. Linn. Soc.*, London, vol. xiii., p. 109 (1909).

? *Nassaria mordica* Hedley, *Proc. Linn. Soc.*, N.S.W., vol. xxxiv., p. 462, pl. xlv., f. 100 (1909).

A small species, often more or less flesh-coloured, with much superficial resemblance to a *Coralliophila*; indeed, the assumption is that it probably inhabits corals. First noticed off Maskat (Muscat) in the Persian Gulf and entrance into the Gulf of Oman (F. W. Townsend), it has been found now to occur much further south, viz., during the Stanley-Gardiner expedition to the Seychelles, Cargados, &c. (1905), the exact locality being "Amirantes Isles, at 34 fathoms, amongst polyzoa and shell-rubble."

I have queried above the possible synonymy of *Nassaria mordica* Hedley, with this species. The description and most excellent figure seem to me precisely to tally; while, at the same time, a small element of doubt must continue to exist both in this and in every similar case, until the actual type specimens have been brought together for examination and due comparison. This last species was found at 5-10 fathoms, off the Hope Islands, N. Queensland, and also has been dredged by Mr. John Brazier, in 30 fathoms, off Darnley Island (C. Hedley).

I may add that *Latirus fischerianus* Tapp.-Canefri, *Journ. de Conch.*, vol. xxx., p. 33, pl. ii., f. 8, 9 (1882), comes nearest to *L. corallinus*. It is from New Caledonia, and differs mainly in being of more obese form, with the canal produced and slightly recurved. Mouth narrowly

oblong. Ribs stouter than in the fellow species. It likewise has the aspect of a *Coralliophila*. All the examples I have seen, however, are of uniform shape and size. The mouth is similarly coloured very pale carnation. In my former paper on the genus *Latirus*¹ (1891) this was relegated, but erroneously, to the genus *Engina*. My two specimens are both precisely similar, and, as already observed, are of the same alliance as *L. corallinus*. Indeed, it is possible intermediaries may some day be found to occur. A small shell hitherto considered a dwarf variety of *L. pulchellus* Reeve, may also, with certainty, be placed in the neighbourhood of this group.

8. *Latirus ernesti* Melvill.

Latirus ernesti J. C. Melvill, *Proc. Malac. Soc.*, Lond., vol. ix., p. 147, f. 1 (1910).



Senar, del.

Hab.: "Ad Antillarum insulas."

This little brightly coloured species, of which the type is unique in the collection of Mr. Ernest R. Sykes, at Weymouth, is allied to the much larger *L. turritus* Gmel., and *craticulatus* L. It also may be compared with *lautus* Reeve, this, however, being a much more obese species in contour. The colour is bright rufous-ochre, spirally lined, form attenuate-fusiform, solid in substance, whorls 6-7, spirally tornately-lirate, liræ white, unequal, increasing in number on each whorl, till the penultimate possesses six and the body whorl twelve. the interstices are microscopically delicately alveate-decussate, aperture ovate, outer lip thickened, columella twice-plaited, canal short. *Long.*: 12; *diam.*: 5 mm.

9. *Latirus funebris* Preston.

Latirus funebris H. B. Preston, *Journ. of Conch.*, vol. xii., p. 33, fig. (1907).

A small fusiform species, dark purplish brown in colour, with closely arranged longitudinal ribs, intersected by spiral grooves, outer lip serrate, columella twice plaited, canal abbreviate.

Long.: 15; *diam.*: 5 mm.

Hab.: West Indies.

The author rightly compares this shell, of which I have five examples from the collection of the late Sir R. W. Rawson, K.C.M.G., with a species I myself discovered in March, 1872, on the Florida Keys, where it occurred at Key West at low tide rarely and locally, amongst blocks of coral, often tenanted by Paguri, indeed it was difficult to get good specimens. This shell, named by me in MS. and afterwards (1878) described¹ by Mr. G. B. Sowerby as *L. cayohuesonicus*, is undoubtedly near *funnebris*, but I think absolutely distinct. As Mr. Preston well points out, the whorls are more ventricose, sutures impressed, surface cancellate.

10. **Latirus (Peristernia) hesteræ** sp. nov.



L. testa fusiformi, paullum attenuata, solidula, latè stramineo-ochracea, ad suturas et infra peripheriam ad basin ultimi anfractus castaneo brunnea, anfractibus 7-8, quorum apicales 1½ læves, nitidi, brunnei, cæteris apud suturas multum impressis, ventricosis, longitudinaliter crassicostatis, costis paucis, ultimum ad anfractum sex, spiraliter undique inæquiliratis, liris majoribus cum minoribus alternantibus, apertura ovata, intus pallidè straminea, labro paullum incrassato et effuso, margine columellari obscurissime triplicata, canali lato, prolongato, recurvirostri.

Long.: 24; *lat.*: 11 mm.

Hab.: ? but probably Mauritius.

An elegant, brightly coloured species, nearly allied to *L. melanorhynchus*, Tapp. Can., but differing in its much more attenuate contour, and enhanced sutural impression, the whorls on that account shewing greater ventricosity. The ribs are more numerous too, eight on the body whorl of *melanorhynchus*, which is almost black tipped at the base, while in *L. hesteræ* the coloration is a warm chestnut brown. It gives me much satisfaction to pay a small tribute to a near relation in thus adopting her Christian name for this species, my aunt, Mrs. Fenwick, wife of the late Col. Thomas Fenwick, R.E., resident several years in Mauritius, from whence she obtained for me the first collection of shells I ever possessed.

¹ *Proc. Zool. Soc.*, Lond., 1878, p. 796, pl. xlviii., f. 4.

I must tender Mr. G. B. Sowerby my thanks for having put before me the claims of this species to recognition. It is at present unique in my collection.

11. *Latirus* (*Peristernia*) *jeaniae* sp. nov.



L. testa ovata, abbreviata, pyramidato-fusiformi, solida, latissimè flavo-ochracea, anfractibus ad 8, quorum apicales duo albi, vitrei, perlèves, cæteris arcè longitudinaliter costulatis, et spiraliter liratulis, liris super costas albescentibus et sæpius incrassatis, nitidiusculis, apertura ovata, intus pallidè puniceo-suffusa, labro tenui, columella triplicata, plicis obscuris, canali lato, brevi.

Long. : 22 ; *Lat.* : 11 mm.

Hab. : Mauritius.

A most attractive, pretty species, allied to *L.* (*Peristernia*) *liratus* Pease and *gemmatus* Reeve ; from the former of these, which is the nearest akin, it differs in the complete absence of any darkly-shaded equidistant longitudinal bands, so conspicuous a feature in *liratus*, and from which it takes its name.¹ Seven examples of this species have been in my possession for many years, having been obtained in 1869 with others, from a new island, afterwards named Barkly Island, that came into being after a tropical cyclone near the harbour of Port Louis. The molluscan proceeds are wonderfully rich and varied, and they were well investigated by, among others, Sir Henry Barkly, the governor of the island at the time, Sir David Barclay, Bart., M. Robillard, and Mr. Nicholas Pike, formerly U.S. Consul for Mauritius, who has published in an interesting volume an account of the cyclonic disturbances of 10th, 11th and 12th March, 1868, with an account of the scientific exploration subsequently carried out by him² and others. I embrace the opportunity now given me with

¹ It will be necessary to change this name, now all the species are merged in *Latirus*, owing to there being a *L. lyratus* Reeve, 1847. I therefore propose the name *liratus* for the species named *Peristernia lirata* by Pease in 1858.

² *Subtropical Rambles*, by Nicholas Pike. London: Sampson Low, Marston & Searle, 1873. Chap. xxi., pp. 246-281, is devoted to an account of Barkly Island and its Natural History, including the Mollusca. It is there mentioned that "a peculiar characteristic of very many of the shells when first discovered was their brilliant colour, particularly those of shades of yellow. As many as 350 species have been found here, the Cones, Cypræas, Mitras, Pleurotomas and Tritons being very valuable. * * * It is a misnomer to call this an *island*, for there is not an inch of land on it, nothing but a pile of coral and shell débris raised in the centre, and sloping to the reefs on either side. On the east the surf is always rolling in, but on the west side it is still water." (l. c. p. 264).

unusual pleasure to name this shell after my aunt, Miss Jean Melvill, who has always evinced much affectionate appreciation of my conchological studies.

12. *Latirus maximus* Sowerby.

Latirus maximus G. B. Sowerby. The Conchologist, vol. ii., pp. 139-140, fig. (1893).

This fine addition to the genus, of which I have a large and imposing specimen 'ex auctore,' is described as fusiform-turbinate, solid and heavy, smooth, fuscous, or white filleted and banded with fuscous. Spire shortly turreted, obtuse, suture irregularly impressed, whorls obtuse-angled, provided with broad ribs; body whorl sub-quadrated, constricted below the middle, spirally sulcate towards the base, shortly caudate, aperture ovate, white, finely lirate, columella with white callus, lightly granulate, plaits inconspicuous.

Long.: 90; *diam.*: 50 mm.

Hab.: I. S. Thiago, Cape de Verde Isles (Eudel).

The above is a free translation of the author's Latin description. In my specimen there is not the slightest sign of columellar plication, the granulosity at the base of the columella is interesting and distinctive. The great ponderosity doubtless gives the shell its chief claim to be allied with the *Latiri*, otherwise it might be considered by some a *Fusus*, or even a *Siphonalia*.

13. *Latirus pagodæformis* Melvill.

Latirus (Peristernia) pagodæformis J. C. Melvill, Ann. and Mag. N. Hist., ser. vii., vol. 4, p. 89, pl. i., fig. 8 (1899).

An attenuate species, fusiform, fuscous-brown, often whitening on the rib-centres, below spirally fusco-zonate; ten whorled, the three nuclear are pale brown, smooth, vitreous, the remainder swollen, much impressed suturally, roundly-costate longitudinally, thickened, ten in number round the body whorl, uniformly spirally filostriate; the interstices closely squamulate; aperture ovate, within ashy-grey or palest violet; lip thin, simple, columella smooth, shining, obscurely obliquely four-plaited, canal long, slightly recurved, tinged with brown.

Long.: 28; *diam.*: 9.50 mm.

Hab.: Persian Gulf, Gulf of Oman, adhering to the telegraph cable at 20-25 fathoms, mud. Lat. 25° N., Long. 63° E. (F. W. Townsend).

The above is a translation of the original Latin description. It is not a species prone to vary; and has been received now from two or three contiguous dredgings.

14. *Latirus* (*Peristernia*) *photiformis* sp. nov.

Peristernia cremnochione J. C. Melvill, var. *photiformis* nov. Mem. and Proc. Manch. Soc., ser. iv., vol. 4, p. 43 (1891).



L. (P.) testa fusiformi, mediocri, solidula, castaneo-brunnea, anfractibus $8\frac{1}{2}$, *quorum apicales* $2\frac{1}{2}$, *albi, læves, cæteris sex apud suturas impressis atque incrassatis, undique et arcuè longitudinaliter rotundicostatis, costis crassis, spiraliter filoliratis, liris inæqualibus, magnis cum minoribus alternantibus, costis hic illic omnino albis, apertura ovata, labro subeffuso, columella carnea, paullum excavata, triplicata, plicis nequaquam conspicuis, canali brevi.*

Long.: 22 ; *diam.*: 10 mm.

Hab.: Mauritius.

I had some time ago come to the conclusion that this little shell was quite distinct from both *L. (Peristernia) cremnochione*, with which it was at first associated as "var. β *photiformis*," and also from *L. (Peristernia) canthariformis*, which I also described in the same paper. This last really seems a nearer ally, although quite distinct, being of a different build and form, and with longer, somewhat recurved, canal. The coloration is likewise different, and the shell larger in proportion than *photiformis*. *Peristernia nana* (Reeve), an ally, differs in greater ventricosity of whorl, and difference of sculpture. The name proposed for this new species, applied, as has already been observed, in 1891 varietally, may be conveniently now adopted specifically. It is bestowed in consideration of its superficial likeness to *Phos roseatus* Hinds.

15. *Latirus præstantior* Melv.

Latirus præstantior Melvill, Mem. and Proc. Manch. Soc., ser. iv., vol. 5, p. 92 (1892).

L. testa fusiformi, turrata, solida, rufo-fuscescente, anfractibus 10, *longitudinaliter fortiter angulatim crassicostatis, transversim undique regulariter filoliratis, ad suturas lævibus, duabus vel tribus liris in*

medio anfractuum omnium apud angulos costarum distinctioribus, canali producto, aperturae fauce intus fortiter costulata, albida, columella quadriplicata.

Long.: $2\frac{1}{2}$; *Lat.*: $\frac{7}{8}$ unc.

Hab.: Mauritius.



Shell rufous-brown or Indian-red in hue, elegantly fusiform, turreted, somewhat solid, possessed of ten whorls, all regularly ornamented with thick longitudinal ribs, crossed transversely (excepting at the sutures, where the shell is smooth) with equidistant filamentous liræ. The canal is produced, the mouth distinctly ribbed within, the columella four-plaited, white. There exists some little resemblance to *Fasciolaria filamentosa* Lamarck, in miniature, or, among the *Latiri*, to *L. gracilis* Reeve, and especially *L. concentricus*, also of Reeve, next which it must be placed. The specimen, at present the only one known, is recorded as coming from the Island of Mauritius, from whence also about a score of other species of the genus are derived, many among the most brightly coloured and select in design. It has never as yet been figured, and I am glad to be able to rectify this omission at the present opportunity. I do not think it can be mistaken for any other species. I consider it the finest *Latirus* I have been privileged to describe. The type is in my collection, being, as just observed, unique.

16. *Latirus pulleinei* Verco.

Latirus pulleinei Jos. C. Verco, Trans. Royal Soc., S. Australia, p. 90, pl. i., fig. 1, 1a, 1b (1895).

The following is an abbreviated description taken from the original.

A broad, eight-whorled shell, with elongate spire, regularly convex whorls, covered with uniform spiral liræ, 22 in number on the body whorl. Aperture obliquely oval, outer lip simple, thin, finely crenate, canal abbreviate, surface coloured with curved longitudinal rust-brown streaks on the summit of the ribs.

Long.: 51.5; *diam.*: max. 19.5 mm.

Hab.: Eyres' Sand Patch, West Australia, many dead (R. H. Pulleine and Jos. C. Verco). Larg's Bay, St. Vincent's Gulf, South Australia (D. J. Adcock). Also found sub-fossil in dredgings from Port Adelaide (Dr. Perks).

Comparison is made by Dr. Verco with *L. walkeri* mihi, also an Australian species, but there is not much in common between them. I have discovered three examples of *L. pulleinei* in my collection, obtained at the sale of Dr. J. C. Cox's collection in London in 1904: these, though not adult, and the largest only measuring long. 32 mm., are in good condition, and recognizable. The longitudinal ribs are seen conspicuously on the upper whorls, in two examples being tinged with red-brown, while the longitudinal coloration (as Dr. Verco has well pointed out) is continued on the body whorl, though the ribs have become obsolete and evanescent. On a label with these specimens is written, in Dr. Cox's handwriting, "Given me by Mr. Pulleine, said to be from South Australia," so I conjecture these are from Eyres' Sand Patch, as given above. One of them I have placed in the Brit. Mus. (Nat. History). It seems a very good addition to the genus, being one of the most fusoid of all in appearance. Since writing the above, I have obtained another example from Mr. Sowerby of very much the same dimensions.

17. *Latirus* (*Peristernia*) *rudolphi* Brazier.

Peristernia rudolphi J. Brazier, in A. U. Henn., Proc. Linn. Soc., N. S. Wales, vol. ix., p. 186, fig. (1894).

A very small and somewhat obscure species. The shell is rightly placed in this genus, in my opinion, though I cannot discern any columellar plication in any of my specimens, which I received direct from Mr. Arnold Umfreville Henn, who was, I believe, its discoverer in company with Mr. Brazier. The nuclear whorls are glossy, luteous, and bulbous, whorls intensely impressed, subangled, ribs few, stout and thick, speaking proportionately, spiral lirations also coarse and conspicuous. Mouth oval, canal abbreviate.

Long.: 7; *diam.*: 2 mm.

Hab.: S. Australia.

18. *Latirus singularis* Sowerby.

Latirus singularis G. B. Sowerby, *Journ. Malac.*, vol. x., p. 74, pl. v., fig. 10, 1903.

Shell elongate, fusiform, fuscous, solid; spire elongate-pyramidal; whorls six, spirally lirate, convex, longitudinally striato-laminate, the apical smooth, the next three longitudinally plicato-costate, the penultimate angular, suture most narrowly canaliculate; body whorl angular, prolonged, concave and attenuate below the middle to the base; widely rostrate at the base, with umbilicus nearly closed, aperture oblong, within pale yellowish, glabrous; lip acute, angled posteriorly, columella slightly arched, smooth, not plaited.

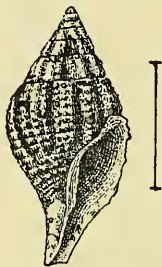
Long.: 70; *diam.*: 27 mm.

Hab. —?

The above is a condensed translation of the author's Latin description. I have never seen this species, and am inclined to agree with Mr. Sowerby, that it is possible it may belong to the genus *Hemifusus* rather than *Latirus*. At all events it is a form that deserves more study.

19. *Latirus* (*Peristernia*) *sowerbyi* Melvill.

Latirus (*Peristernia*) *sowerbyi* J. C. Melvill, Proc. Malac. Soc., Lond., vol. vii., p. 217, fig.



The following is taken from the original Latin description:—Shell moderate in size, fusiform, attenuate both apically and basally, solid, whorls seven, actual apex small, smooth, the remaining whorls slightly impressed at the sutures, the upper becoming rapidly attenuate, the body whorl much exceeds all the others, attenuated at the base, prolonged, adorned with thickened ribs, of a brown-black or chestnut colour, spirally thickly lirate, the liræ irregularly white-pustuled, especially towards the base, the aperture is white or violet, pyriform, canal produced, columella shining, and obscurely thrice plaited.

Long.: 19; *diam.*: 8 mm.

Hab.: Galapagos Isles (?).

I have seen four examples of this pyriform little species. The locality though probably correct, is not absolutely certain. Mr. Sowerby kindly presented me with a co-type, the actual type having been placed by him in the British Museum.

20. *Latirus spiceri* Ten. Woods.

Fusus spiceri Tenison Woods, Proc. Royal Soc., Tasmania, p. 137, 1876.

” ” ” ” Paetel Catalog, p. 55, 1887.

Latirofusus nigrofuscus Tate, Proc. Royal Soc., South Australia, vol. xiv., part ii., p. 258, pl. xi., fig. 3, 1891.

” ” J. C. Verco, *ib.*, p. 107, 1895.

Shell attenuate, straightly and narrowly fusiform, solid, cinnamon-brown or dark brown, whorls eight, two (?) being apical, the rest slightly impressed suturally, compact, shining, irregularly and rather incassately longitudinally ribbed, crossed spirally with thickened, coarse liræ, the interstices slightly squamulate, lowest whorl prolonged, ribs evanescent below the middle to the base, aperture narrowly oblong, outer lip thin, contracted suddenly towards the base, the canal being somewhat prolonged, columellar margin almost straight, obscurely and obliquely twice plicate.

Long.: 25; *diam.*: 10 mm.

Hab.: Dredged alive, St. Vincent's Gulf, South Australia (Matthews), (Verco), Spencer Gulf, 13 fathoms (Verco), shell sand, Aldinga Bay (Kimber), Encounter Bay (Adcock), Middleton, South Australia (specimen in coll. Rev. Lewis J. Shackleford, from which the above rough description was taken).

I am indebted for the sight of this shell to the Rev. Lewis Shackleford, and have no hesitation in pronouncing it a true *Latirus*, the columellar plicæ are distinct and oblique, and it belongs to the same section of the genus as *aureocinctus* Sow., and *angustus* Smith.

It seems to me that *Latirofusus* Cossmann, had best be retained for fossil species only. I have not seen a recent form really adapted to this genus.

21. *Latirus walkeri* Melvill.

Latirus walkeri J. C. Melvill, Proc. Malac. Soc., Lond., vol. i., p. 223, pl. xiv., fig. 9, 1895.

” Jos. C. Verco, Trans. Royal Soc., S. Australia, p. 91, 1895.

The following is a translation from the Latin description:—Shell pyramidato-fusiform, attenuate, rather solid, ash coloured, apex acnte, whorls seven to eight, longitudinally thickly ribbed, regularly and uniformly spirally very closely rugoso-striate, aperture oblong, canal produced at the base, recurved, columella hardly plaited. Inner lip distinct and continuous.

Long.: 25; *diam.*: 8 mm.

Hab.: Cossack, West Australia (J. J. Walker).

Of this I only possess one co-type in my own collection, but it is represented by the original type in the National collection, and I have

seen about eight or nine examples altogether, barely differing, except in size. The above measurement was taken from the largest obtained. I do not think it can be compared with *L. pulleinei* Verco, the shells are so abundantly distinct. Both were described within a very few months of each other.

* * * * *

It only remains for me to thank the Editor of Proc. Malac. Soc., Lond., for having kindly lent the process blocks, belonging to the Society, of *L. ernesti* and *sowerbyi*, for the purpose of reintroduction into this paper. I only wish it had been possible to illustrate all the species, but in every instance references have been given to the original figures.



Note on *Helix Pomatia*.—I have a couple of captive *Helix pomatia* which are kept in a wooden box. At the bottom is a sod on which, of course, the grass has by this time died off. On looking into the box a few days ago, I find that all the dead grass has been collected and formed into a heap in one corner under which the snails are now hibernating. (One has formed the usual epiphragm, the other has not). Query: What method is adopted in the collecting and transporting of the grass?—GEO. C. SPENCE (*Read before the Society*, Jan. 11th, 1911).

***Limnæa pereger* v. *lacustris* Leach living without shell.**—Whilst collecting specimens of this species in Derwentwater last summer, I was surprised to come across two specimens quite shell-less. They were crawling upon the stony bottom of the lake in about one foot of water.—W. GYNGELL (*Read before the Society*, Jan. 11th, 1911).

An Interesting Association of Species in Windermere.—In June, 1910, where the lake washes the shore of what is called the Colgarth estate, a mile or so north of Bowness, I found the following species on the shingle bed which forms the margin of the lake, and in some two or three feet of water, all within fifty yards length of the shore. *Limnæa pereger* var. *lacustris*, *L. palustris* (a short and decollate form), *Planorbis albus*, *Physa fontinalis*, *Ancylus fluviatilis* (fine specimens including type-colour and var. *albida*, the latter being quite common), and *Sphaerium corneum* v. *flavescens*. The *Planorbis* is generally regarded as inhabiting slow-running streams and stagnant water; I have, however, found it crawling on and under the stones of one of our swift-running Yorkshire moorland streams.—W. GYNGELL (*Read before the Society*, Jan. 11th, 1911).

***Helix aspersa* m. *sinistrorsum* at Scarborough.**—To the records of sinistral monstrosities I have pleasure in adding a full-grown and perfect example of the above, found by myself this autumn on the Castle Hill, Scarborough.—W. GYNGELL (*Read before the Society*, Jan. 11th, 1911).

ADDITIONS TO "BRITISH CONCHOLOGY."

BY J. T. MARSHALL.

PART VII.

[With the consent of the author, it is proposed to publish a Reprint of Part VII. of his work on "Additions to British Conchology," which was withdrawn from the pages of the *Journal* in 1902, and printed separately for private circulation.

In accordance with the previous parts, the nomenclature followed is that of Jeffreys' "British Conchology," except where altered on stated grounds.—ED.]

References to the previous parts are as follow :—

Additions to "British Conchology," Part I., *Journ. of Conch.*, 1893, vol. vii., no. 8; Part II., 1894, nos. 10, 11.

Alterations in "British Conchology," Part III., *Journ. of Conch.*, 1895, vol. viii., nos. 1, 2.

Additions to "British Conchology," Part IV., *Journ. of Conch.*, 1897, vol. viii., nos. 10, 11, 12; Part V., 1898, vol. ix., nos. 2, 3, 4; 1899, vol. ix., nos. 5, 6, 7, 8; 1900, vol. ix., nos. 9, 10, 11; Part VI., 1901, vol. 10, no. 4; 1902, vol. 10, nos. 6, 7.

Notes on the British Species of *Buccinum*, *Fusus*, etc., *Journ. of Malac.*, 1902, vol. ix., no. 2.

Additions to "British Conchology," Part VII., Conclusion and Supplement, printed for private circulation, 1903.

Marsenia perspicua L.—For the necessary change in this generic name see *Journ. of Conch.*, 1895, pp. 35-6.

In establishing itself for breeding purposes among compound ascidians, this species has the faculty, according to Giard, of assuming the different colours and appearance of the particular species of ascidian it may choose for a host, and Professor Herdman has related a very striking case in point in the *Conchologist* for 1893 (no. 6, vol. ii.). Gwyn Jeffreys and others have described and figured the shell of the female as the type. In the shell of the male, which is rare, and known as var. *tentaculata*, the spire is much smaller and flattened, and the aperture less curved at the outer margin.

var. **lata** Jeffr.—In this variety, the upper edge projecting over the aperture is much narrower than in the type, and the spire is similar to that of the male, minute and depressed. It is surprising that Jeffreys should have found this variety only "in deep water off Unst," as it has occurred to me in various places, and will, I think, be found generally diffused with the type, and in equally shallow water. At any rate the following localities may be depended upon—Sutherlandshire from haddocks (Baillie)! Jersey, Penzance, Torbay, Weymouth, Mayo, Sligo, Portrush, and Caldy Island. Jeffreys has described the animal of this variety in his Appendix,¹ from which

¹ Brit. Conch., vol. v., p. 216.

it would appear that the mantle is closely and minutely tessellated, instead of being covered with coarse tubercles; he says nothing as to sex. The shell is intermediate between the male and female forms. The former, when viewed with the mouth towards the observer, is the shape of a young *Haliotis* of the same size, whereas the var. *lata* is broader and more boat-shaped; while the shell of the female (or type) is still more boat-shaped or convex, and the overlapping part of the shell is much broader. Again, with the shells in the same positions, the whole interior of the spire is visible in the male, in the *lata* form it is only partially so, while in the female it is wholly concealed in the semi-tubular inner lip. The measurements are:—

Type form (female) length 0.65 in., breadth 0.450 (Jeffreys).

Lata form - „ 0.35 in., „ 0.275

Tentaculata form (male) „ 0.40 in., „ 0.275

Now, it would be desirable to have the sexes of this species confirmed, as it appears to me that the var. *lata* is more likely to be the male than Montagu's form *tentaculata*, for the following reasons:—

- (1) I find the var. *lata* nearly everywhere I find the type, instead of in the single and isolated locality given by Jeffreys.
- (2) I have rarely found a specimen of the var. *tentaculata*—three specimens from three different localities—though Jeffreys says that “both sexes are found together.”
- (3) The var. *lata* is uniform, and does not appear to possess a separate male and female form, analogous to the type, as it should do to be consistent.

It is important to observe that far from being a new variety from the Shetlands, the *lata* form was known to Sowerby, who figures it well in his “Index,” with the exception that the spire should be depressed instead of pointed. It was also known to Forbes and Hanley, who figure it as var. *tentaculata*, with the following significant observation: “Whether a still more depressed form, marked by Mr. Jeffreys as *Marsenia complanata* Leach, be distinct, is yet to be seen.”¹ Gwyn Jeffreys, again, meant to figure the var. *tentaculata*, as he inscribes on his plate the synonymous name *complanata*, but he actually figures the var. *lata*. I do not know of any good figure of the true *tentaculata* form.

Gwyn Jeffreys may have been himself mistaken in saying that Mr. Peach, “whose observations were continued regularly for ten years,” was mistaken in “supposing that his specimens belonged to the species called *tentaculata* by Forbes and Hanley; they are undoubtedly the typical form.”² But they may very possibly have

1 Brit. Moll., vol. iii., p. 359.

2 Brit. Conch., vol. iv., p. 238.

been the *lata* form. And when he further says "that the other form [*tentaculata*] is the male is manifest from the description of M. Bouchard and Dr. Johnston," the doubt in my mind is whether this "other form" was the *lata* or *tentaculata* one. And as he is wrong in his reference (p. 235) to the figure in "British Mollusca" as *L. tentaculata*, which is certainly not that, his reference to the figure of the animal would presumably be equally wrong, and that animal more likely to belong to the var. *lata*. There is clearly some confusion over these three forms, and unfortunately since I have given attention to the point I have not captured any living specimens.

Jeffreys' figures of the type and var. *lata* are perfect. Sowerby's type figure is unlike; it never has such a raised spire; but the body-whorl would well represent that of the var. *tentaculata* — flatter, narrower, and straighter at the outer edge. The figure of *Lamellaria latens* Müll. in Sars' work¹ also well represents our *lata* form, which I take to be the same species; the figures are identical; and should it prove to be not the male of *M. perspicua*, I should consider it a separate species under Müller's name.

Gwyn Jeffreys thinks that *M. prodita* Lov. "inhabits the coast of Shetland," as he "dredged off Unst, in 110 fathoms, a *Lamellaria* of an unusually large size, more than an inch long; but it was handled too roughly, and the shell broken to pieces."²

Velutina plicatilis Müll. — Bogony Point, Bute, 12-15f., one specimen (A. Brown); Loch Fyne, 25f., one specimen (Foster and MacAndrew); Brora, one specimen cast ashore in weed (Baillie)! Inverary, Loch Fyne, 15f.; Lamlash, 18f. A species singularly unattainable, but on one occasion Mr. Dawson obtained six specimens of this rare mollusc from a tuft of seaweed drifted ashore at Cruden, two of them being alive; and ten fine specimens, all living, were dredged off the Faroes in 1907 by the Scottish Fishery Board (Simpson)!

V. lævigata Penn.—The spire in this species, though usually twisted upwards, is occasionally sunk within the circumference of the shell. Two remarkable specimens from the Outer Hebrides are regularly oval, and have the outlines and spire of *Marsenia perspicua*.

var. **candida** Jeffr.—Sutherlandshire (Baillie)!

var. **tenuis** Jeffr.—Shetlands, 78f. (Jeffreys); Sutherlandshire, from haddocks (Baillie)! Moray Firth; Oban. This is much smaller than the type, and the sculptured ridges are variable. Some of these shells are as thin and membranous as *V. plicatilis*, and lose their shape after the animal is extracted.

¹ Moll. Reg. Arct. Norv., p. 150, pl. 12, f. 4 a-e.

² Brit. Conch., vol. v., p. 216.

Morvillia undata Brown has been dredged by the 'Triton' in the Shetland-Faroe Channel, 327-430f. A good figure of it will be found in Sars' work.

Capulus hungaricus L.—This occasionally attains a large size. I have one from Torbay 2½ in. by 2 in.; Jeffreys had another from Algiers exceeding 2 in. in length, and he noticed a larger specimen from the Bay of Naples in Dr. Tiberi's collection.

Trichotropis borealis Brod. and Sow.—This is rarely dredged in the perfect condition indicated by the published figures, living as it does on rough and stony ground, and the spire is nearly always longer than in those figures. Jeffreys' generic one is the best and most correct, but his dimensions are extreme.

var. **acuminata** Jeffr.—Oban, 25f., Aberdeenshire. This is well figured in "British Mollusca."

Cancellaria viridula Fabr. (*Tritonium viridulum* Fabr., Faun. Grœnl., p. 402) may be looked for on the British coasts, as it was dredged by the 'Lightning' 55 miles off the Butt of Lewis in 450f., by the 'Porcupine' 40 miles off the Shetlands in 345f., by the Scottish Fishery Board between the Orkneys and Faroes in 588f., and midway between the Shetlands and Norway in 197f. (Simpson)! It was also dredged by the 'Triton' in the Shetland-Faroe Channel in 500-550f., and by the 'Porcupine' on the Channel slope in 305-567f. An Arctic and Norwegian species, and fossil in the Red Crag and Bridlington deposits. It is the *C. couthouyi* of Jay and the *Admete viridula* of G. O. Sars,¹ whose figures of it are excellent, and the animal was described by Jeffreys in the 'Valorous' Report.² Canon Norman has introduced this shell as a British species from Station 65 of the 'Porcupine' Expedition of 1869,³ although in dealing with other species from that station he rules it out, and expressly so in his introductory remarks⁴ on the ground of the "temperature being below freezing-point."

Aporrhais pes-pelecani L.—Scilly Isles (J. K. Taylor, *Journ. of Conch.*, 1908, p. 169). Confirmation would be desirable. Mr. E. Marquand cites for this species "Herm beach, dead (Tomlin)," but I am doubtful if it has been found in any of the Channel Islands. There are none in the Jersey Museum, and a series of six specimens in the Guernsey Museum are from the English coast. Mr. Tomlin writes me that it was a much worn shell, not worth keeping; that he does not claim it as a native, and that it was probably a ballast shell.

1 Moll. Reg. Arct. Norv., p. 213, pl. 13, figs. 1 a b, 2.

2 Ann. Mag. Nat. Hist., 1877, p. 322 (printed 1876 in separate copy by error).

3 Op. cit., 1899, vol. iv., p. 137.

4 Op. cit., 1890, vol. v., p. 456.

I have in my mind one shop at least in Guernsey where numbers of *Aporrhais* may be seen ornamenting boxes and other fancy articles, which are imported.

A. serresianus Mich.—Dredged at many stations in the ‘Porcupine’ Expedition of 1869—S.W. Ireland, 113-18of.; W. of Ireland, 85-123of.; Little Minch, 45-5of.; off Lerwick, 10-66f.; and N. and E. Shetlands, 66-345f. (Jeffreys); Valentia, 112f. (Norman); from Faroe trawlers (Simpson)! and by the Scottish Fishery Board in the North Sea, 48-76f., and off the Butt of Lewis, 545f. (Simpson)! also Shetland-Faroe Channel, 516-57of. (‘Triton,’) and English Channel 358-69of. (‘Porcupine’). Mr. James Simpson has a specimen which was trawled to the N.E. of Aberdeen in 9of., and my collection contains another trawled E. of the Shetlands in 4of.¹ Most of the specimens from the ‘Porcupine’ Expedition were young, in which stage they are very delicate in texture, and bear no resemblance to the adult form. I think Gwyn Jeffreys’ record from the ‘Little Minch’ is almost certainly a mistake. Sowerby’s figure represents the following variety, and not this.

var. **macandreae** Jeffr.—Shetland-Faroe Channel 57of. (‘Triton’). Gwyn Jeffreys has redescribed the animal in the ‘Lightning’ Report.² In Britain this variety is confined to a very limited area of the Shetland seas.

Cerithium metula Lov.—Vidlin Voe, E. Shetlands, 2of. Flugga Light, N. Shetlands (Simpson)! The rows of nodules that ornament this species are not always uniform in size, the upper row occasionally being much less developed than the lower two. Authors do not seem to be agreed as to the type-form. Sars’ figure is perfect, and is described by him as half-an-inch in length, with 15 whorls; Forbes and Hanley’s are equally good, with one-third-of-an-inch and 12 whorls; while Jeffreys figures an elongated monstrosity, wholly unlike the type, and gives it eight-tenths-of-an-inch and 18-20 whorls. Actual typical specimens will be found to measure four-tenths-of-an-inch and possess 14-15 whorls.

C. reticulatum Da Cos.—This shell varies extremely in size, varicosity, and nodulosity, while the spiral riblets vary in number from three to four. Many named species and varieties have been originated from these peculiarities, some of which occur on our coasts. Gwyn Jeffreys writes that “our shell has never less than four rows” of nodules,³ and his figure exhibits that number; but his generic figure has three, while some of our largest specimens

¹ Since these pages were written my collection of British shells has passed into the hands of J. R. le B. Tomlin, Esq., M.A., of Stoneley, Reading, so that all references herein to my collection should obviously be attributed to Mr. Tomlin’s.

² Proc. Zool. Soc., June, 1885, p. 51.

³ Brit. Conch., vol. iv., p. 260.

have only three. Var. *jadertinum* Brus. is more peculiarly three-rowed. My largest types are five-eighths-of-an-inch in length, and the smallest one-eighth-of-an-inch; the latter resemble *C. pusillum* Jeffr., but have a different apex. The large type-form lives under stones and in seaweeds between tide-marks, while the smaller and more slender one is common in the coralline zone. An extreme form is cylindrical, and does not exceed one-third-of-a-line in width, while another has the outlines of *Cerithiopsis tubercularis*. The sea-shore at Falmouth consists largely of this species, and the finest specimens come from Helford River in Falmouth Bay, and Milford Haven. Jeffreys' figure has the spire too attenuated; that figure more nearly represents the form called by Continental writers var. *jadertinum* Brus., which is not uncommon on some of our coasts. Forbes and Hanley figure the type well, together with the next variety.

var. **simplex** Jeffr.—The peculiar ornamentation of this variety is not always well defined. The shell is smaller than the type, does not exceed ten whorls, and is limited to Guernsey and its islets.

var. **lactescens** Jeffr.—Weymouth (Damon) ! Guernsey, Scilly, Tenby, Killala Bay, and Bundoran. A rare variety.

Cerithium procerum Jeffr. has been dredged by the 'Lightning' 60 miles off the Butt of Lewis in 500 fathoms, and also by the 'Triton' between the Hebrides and Faroes.

C. tuberculatum L.—*C. vulgatum* Bruguière is in the same category as *Bulla striata* Bruguière, both species having been found in a rolled condition on different parts of the Jersey coast. Gwyn Jeffreys gives a good figure in his Supplementary Plates, of which Sowerby's is a copy, though these figures represent, not the type, but a specimen of the var. *alucastrum* Brocc.

Triforis perversa L.—This is nowhere common on our coasts in a living state. In South Devon it usually appears in rock-pools at very low water, and more rarely as a parasite on compound ascidians, with *Cerithiopsis tubercularis*

var. **palescens** Jeffr.—Scilly Islands (Burkill and J.T.M.); Channel Islands, Eddystone, and Torbay. Some of the Scilly specimens are pure white.

No British specimens attain the size of those from the Mediterranean, for which sole reason the latter is held by some writers to be the type shell, and a distinct species from the British one, *T. adversa* Mont. Guernsey produces our largest examples, half-an-inch in length, and Scilly the smallest, one-eighth-of-an-inch, while those from the Mediterranean range from one-tenth to a full inch in length. Immature shells are pyramidal and keeled at the base. A small and slender form from Scilly has a deeply-incised suture and a

square base. From the same district I have a monstrosity which has only two rows of tubercles ; these tubercles are larger than usual, and oblong ; the shell has 13 whorls, and does not look like a monstrous form, but it corresponds to the var. *darkii* of *Cerithiopsis tubercularis*. Another smaller specimen, but mature, has two rows of tubercles on all the whorls except the last, which has the usual three. Forbes and Hanley figure the prevalent British form, Jeffreys a medium one. The two extreme forms—var. *obesula* Bucq. and var. *attenuata* Monts.—are found in the Channel and Scilly Islands.

A fossil species of the Crag, *Laecochlis granosa* S. Wood, was dredged by the 'Porcupine' 40 miles N.W. of the Shetlands in 345f. (Jeffreys), and also on the Channel slopes in 257-539f.

Cerithiopsis tubercularis Mont.—There seems to be no doubt that this species is quasi-parasitic, though not invariably so. On the South Devon coast I find them living in the weeds of rock-pools at low water, but quite as commonly under stones, embedded mouth downwards in the integument of compound ascidians, and sticking out like spines, with an occasional *Triforis perversa* among them. Dr. Tiberi has recorded the same species living in the tunic of *Ascidia mentula* at Naples, in company with *Modiolaria marmorata*. The Rev. Prof. Gwatkin writes me in reference to the foregoing :—“It is particularly interesting to find that *C. tubercularis* is parasitic. So I had gathered from the peculiar wire-drawn teeth, the mounting of which is most difficult. The only parallels I know are the *Pedicularias* and *Sistrum spectrum*, which are both known to live on corals. But the radula of *S. spectrum* is quite different from that of any other of my *Sistrum*—a dozen or more The other species of *Cerithiopsis* are unknown to me, but it would be interesting to know whether they have similar teeth.”

Like the last species, *C. tubercularis* is extremely variable in size and shape. From the Scilly Islands they are particularly varied in form and sculpture. “Occasionally specimens have four rows of tubercles on the lower whorls ; and the apical or top whorls in fresh and perfect specimens, when examined under a microscope, are seen to be very finely and closely ribbed lengthwise.”¹ The latter character I have not been able to detect. Although the apical whorls are usually abruptly narrowed or pinched up above the spire, in a few cases they are regularly conical with the rest of the spire.

var. **albescens** Marsh., *Journ. of Conch.*, 1889, vol. vi., p. 56.—Jersey, Guernsey, Scilly, and Killala Bay. Some of the Scilly specimens are bicoloured, the last whorls only being white.

1 Jeffreys, Moll. 'Lightning' and 'Porcupine,' Proc. Zool. Soc., 1885, p. 59.

var. **acicula** Brus., *Journ. of Conch.*, 1893, vol. vii., p. 259.—Scilly Islands, 40f. : Achil Island. A very elegant form.

var. **nana** Jeffr.—Scilly Islands (Burkill and J.T.M.); Land's End, Falmouth, Eddystone, Torbay, Freshwater West, Aberdovey, Skegness, Killala Bay, Bundoran, Iona, and Loch Boisdale. Not *C. tubercularis* var. *nana* of Searles Wood, which is *C. concatenata*. This variety is characterised by its dwarf size and spindled shape, the last whorl being contracted and narrower than the preceding one, although spindle-shaped examples are found of all sizes. It is generally an eighth-of-an-inch long, but my smallest are only half that length, and the width is of every degree. This cannot be the male, as queried by Jeffreys, for though widely diffused it does not occur everywhere with the type, while in some instances it forms the majority; nor have I ever taken a living specimen with the type from seaweeds or ascidians; probably it has a distinct habitat. British examples embrace a form intermediate in size between this and the type, which is *C. minima* Brus., and, according to Weinkauff, *C. neglecta* C. B. Adams.

var. **clarkii** Jeffr.—Sark, Scilly, and Torbay. This variety is very rare. A similar form (*C. bilineata* Hörnes) is regarded by Continental writers as a distinct species, presumably because their specimens are found in colonies like other species, that they resemble one another, and are all of a definite shape—short, stout, and spindle-shaped, like a large var. *nana*, whereas British examples are variable in form, and are met with rarely and singly; I have not seen two alike. Jeffreys writes of this variety:—"I must still retain my own opinion that *C. clarkii*, alias *bilineata* or *coppola*, is merely a monstrous or irregular form of *C. tubercularis*. One of my specimens, which has only two rows of tubercles on the lower whorls, has three rows on two of the upper ones."¹ Gwyn Jeffreys appears to me to have erred in supposing that because var. *clarkii* and *C. bilineata* have two rows of tubercles, they must be identical. But the tubercles of the two forms are not quite the same, and I have previously mentioned an analogous form of *Triforis perversa*, Professor Sars has recorded another of *Cerithium metula*, and still another will be found in my notes on the next species. Probably this aberrant form will ultimately be met with throughout the genus, as I have a two-rowed specimen from the Algerian coast of *C. horrida* Jeffr., which is a treble-rowed species. An enlarged figure of var. *clarkii* will be found in "British Mollusca" (pl. ciii., fig. 6); but like Sowerby's figure, except that it has two rows of tubercles, it is otherwise unlike. The Rev. R. Boog Watson, writing

¹ Moll. 'Lightning' and 'Porcupine,' Proc. Zool. Soc., 1885, p. 59.

of this form, says that he owes "a sight of the Mediterranean shell to the Marquis di Monterosato," and that it "has an embryonic apex of $2\frac{1}{4}$ whorls, which are dull and roughish." This clearly marks it off from *C. tubercularis*, and though he does not give a figure he adds—"The figure in 'British Mollusca' leaves very much to be desired; it wants the apex, it presents a quite fictitious mouth and pillar, and fails to catch the general sculpture and the ornamentation of the base."¹ Neither Clark's original specimen, nor either of mine, possess the apex, nor have I seen a British specimen with that part perfect. A new and undescribed species of *Cerithiopsis* dredged by the 'Porcupine' on the Adventure Bank in 92f., by the 'Shearwater' in the same district in 1201., and off the Tripoli coast in 140f., resembles this and *C. bilineata* in every respect but that of the apical whorls, which are essentially different; I propose to name it *C. papillaris* on account of the form of the tubercles.

Among other forms of *C. tubercularis* is one in which the upper row of tubercles in each whorl is more or less aberrant, becoming thread-like towards the apex; and in another, which is more of a monstrosity, the last whorl has no tubercles, being ornamented with spiral ridges only. Of the four-rowed monstrosity mentioned by Jeffreys I have seen but one British example; it must be very rare; but I have three specimens from the Tripoli coast, and these have in addition an extra keel round the base. Another unnamed variety, from the Scillies and Torbay, has smaller and more crowded tubercles, with one of the whorls variced; and a remarkably graceful pyramidal form comes from the same districts. Jeffreys figures the type well; Sowerby's is too broad, the tubercles are wrongly continued to the base, and the characteristic apex is omitted.

C. barleei Jeffr.—12 to 40 fathoms, scarce everywhere except in the Scilly Islands. S.W. Ireland (R.I.A. cruise); Wexford coast, 40f. (Walpole); Guernsey, 20f.; Land's End; Eddystone, 30f.; off Berry Head, Torbay, and Babbacombe Bay, 12-15f.; Freshwater West; off Cork Harbour, 26f.; Lundy Island and the Irish Channel, 20-40f.; off Loch Ryan, 27f.; Ailsa Craig, 25f.; Iona, 20f. It has not hitherto been recorded from the Hebrides, where it appears to be very rare; I have only a single specimen from each of the three Hebridean localities I have given. Although personally I have not dredged largely among the Hebrides, I am very well acquainted with their molluscan fauna, having when a young collector received many a parcel of dredged material from Mr. Barlee, Mr. MacAndrew, Dr. Gwyn Jeffreys, and especially Admiral (then Captain Bedford), who was for some time on the survey of the Hebrides.

¹ Cerithiopsides from the N. Atlantic, Journ. Linn. Soc., 1885, vol. xix., p. 93.

When Gwyn Jeffreys described this species it was rare and imperfectly known, so that he was unable to give many particulars concerning it, while some of those he did give are not borne out by further research. The shape and colour particularly have to be qualified. Instead of being "an elongated pyramid with a broadish base," that applies to only about ten per cent. of the specimens; the great majority are cylindrical or tubular, similar to his figure, and exhibit no difference in outline from that of *C. tubercularis*, which he describes as "cylindro-pyramidal," and which applies quite as well to one species as the other. Sowerby's supplementary figure is from a pyramidal specimen, and would answer for Jeffreys' type in that respect, but it is coloured dark brown, while the author described his shell as "pale yellowish white." At the same time, it may be stated that there are specimens quite as dark as any *C. tubercularis*. The Rev. R. Boog Watson gives an excellent figure of the conical form,¹ presumably from Madeira, but no habitat is given and no colour mentioned.

Having examined many hundreds of specimens, I know of few species so closely allied as this and the last. It is impossible to separate them by the form alone, and any attempt to do so fails; two specimens perfectly alike may be placed side by side and taken for one species, when one would be found with a keeled and convex base, the other plain and slightly concave, and these seem, with the embryo, to be the only permanent and reliable characters between the two species. It is true the bulk of *C. barleei* are paler than *C. tubercularis*, but in this they only resemble the var. *albescens* of the latter. The apical whorls of this species are four, sometimes five in number, the upper two or three being smooth, and the next two striated longitudinally and more or less keeled. Gwyn Jeffreys' statement that it is "finely and closely striated in the direction of the spire" is ambiguous; if by this is meant spiral, it is incorrect. The circumbasal keel in the two species is occasionally beaded, thus making an incipient fourth row of nodules on the last whorl; but the circumcolumnar keel, which winds round the canal, is present only in adult *C. tubercularis*; immature specimens rarely possess it, and as this is the principal specific character, and the two forms when immature are both pyramidal in shape, they cannot in that stage be separated when they are both of the same colour, except by the embryo, which in *C. tubercularis* is smooth. The colour ranges from pure white through every shade of yellowish white and pale brown to dark brown; in some cases they are bicoloured. Some of the specimens from the Channel and Scilly Islands are of a rich ruby

¹ Cerithiopsides from the N. Atlantic, Journ. Linn. Soc., 1885, vol. xix., pl. 4.

brown, the ruby tint vanishing in dead specimens and leaving them of various shades of brown. Sowerby's figure in respect of colour just hits these specimens. I also have this dark-coloured form from several parts of the Mediterranean, under the name of *C. scalaris* Monts.

Although a more variable shell than even *C. tubercularis*, *C. barleei* seems to have no forms quite corresponding to the var. *nana* or var. *clarkii* of the former ; but there is a dwarf form not much larger than var. *nana*, and the var. *clarkii* is nearly represented by the var. *interrupta*, to be mentioned presently. Usually the rows of tubercles in both species are longitudinally straight, but in a few cases they are disposed diagonally, as in *C. diadema* Wats. A conical form from Scilly is white, with aberrant tubercles, and is strikingly like *Cerithium metula*.

var. **scalaris** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 259 (by error as *C. tubercularis* var. *scalaris*) belongs to this species and not to the last, as indicated by the absence of the keeled base. It is a very distinct form, and immature specimens especially are strikingly different from the same stage of the type. The whorls are flattened and turreted as in *Odostomia scalaris*, the embryonic ones are not so suddenly pinched up, and the rows of tubercles are more equalised. It is found only in the Scillies, where it must have a different habitat from the type, as all the specimens are more or less encrusted with a species of nullipore. There are several forms of this variety ; one is exceedingly slender and needle-shaped, which, with a similar form of the type, corresponds to *C. tubercularis* var. *acicula*. In these three attenuated forms the nodules are smaller and crowded together, and the shells are almost of the same width throughout.

var. **interrupta** Marsh., n. var.—Having but two rows of tubercles on the four upper whorls, and three rows as usual on the four lower. One specimen from Guernsey, and half-a-score from the Scillies.

Searles Wood, in his third volume of "Crag Mollusca" (p. 52), writing of *C. tubercularis*, says : "*C. barleei* I do not know." But in his Addendum (p. 181) he adds : "Jeffreys sent me his British recent specimens from which he formed two distinct species, *C. barleei* and *C. pulchella*. It does not appear to me that these shells present sufficient differences from *tubercularis* to entitle them to specific isolation, but they have their exact representatives among the Crag specimens. Under these circumstances I have still retained them under the specific name *tubercularis*. My var. *subulata* represents *C. barleei*, and my var. *nana*, *C. pulchella*." Subsequent authors have disregarded this identification of *C. barleei*, perhaps because Searles Wood himself repudiated the specific distinctness of the recent shell from the Crag one, or perhaps because his figure of var. *subulata* is

so unlike *C. barleei*, which is not subulate as compared with *C. tubercularis*. Contrasted with his own figure of the latter, that of var. *subulata* is only half the width, much more cylindrical, with a produced base, and small crowded tubercles, characters which do not apply to *C. barleei*.

(To be continued).

◆◆◆

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

397th Meeting, held at Manchester Museum, December 14th, 1910.

Mr. E. Collier in the chair.

Donations to the Library announced and thanks voted :

"The West American mollusks of the genus *Alaba*," by Paul Bartsch (*from the author*). "The Manchester Museum Report for the year 1909-10." "Manuel de Conchyliologie," by Dr. J. C. Chenu, 2 vols. (*presented by the Manchester Museum*); and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted :

By Mr. J. A. Hargreaves: *Acmea virginea* in situ amongst Nullipore, from Scarborough. Mrs. R. Boog Watson has presented to the Society a large photograph of her late husband, the Rev. R. Boog Watson, L.L.D., F.L.S., F.G.S., F.R.S.E., a gift very much valued by the members.

Candidates Proposed for Membership.

Keppel H. Barnard, B.A., Etwas, Farnham, Surrey.

Rev. F. H. Woods, Bainton Rectory, Driffield.

D. J. MacLeod, Hof Ter Meere, 13, Reigerstraat, Ghent, Belgium.

Papers Read.

"On the genus *Latirus*, with descriptions of new species," by J. Cosmo Melvill, M.A., D.Sc., F.L.S.

"Notes on the British distribution of *Testacella*," by Lionel E. Adams, B.A.

"*Vitrea radiatula* Alder, in Dumbartonshire," by J. R. le Brockton Tomlin, M.A., F.E.S.

Exhibits.

By Mr. J. Cosmo Melvill: A number of types or co-types of species of *Latirus* described during the last twenty years, to illustrate his paper.

By Mr. Chas. Oldham: A very large and perfect specimen of the large form of *Neptunea antiqua*, dredged in seventy fathoms on the "Witch Grounds," in the North Sea, east of the Moray Firth.

By Mrs. Gill: A number of very choice exotic *Helicidae*, including *Helix imperator*, *H. pyrostoma*, *H. cunninghami*, etc.

By Mr. G. C. Spence: A series of *Brachypodella*, *Eutrochatella*, and other exotic operculate land shells.

By Mr. J. Ray Hardy: Double-mouthed *Clausilia bidentata* from Lathkill Dale, Derbyshire, and a curious abnormality of *Cl. laminata* from Mansfield.

By Mr. Ed. Collier: Double-mouthed *Clausilia plicata* Drap., collected at Innsbruck, Tyrol; *Limnaea palustris* v. *albida*, from Southport, 1910, and the original specimen of this variety collected in 1876 at Blowick, near Southport, for comparison with the later specimens which are almost smooth, whereas the 1876 example is curiously malleated; *Limnaea stagnalis* v. *albida* from Folkestone; varieties of *Helix nemoralis* from Birdlip and Limerick, exhibiting curious band forms.

By Mr. J. Wilfrid Jackson: Some exceedingly fine specimens of *Margaritana margaritifera* from Glencar River, Co. Kerry, measuring six inches in length, also an abnormal form of this species from the river Strule, Co. Tyrone; series of fossil *Pisidia* from the chara and shell-marl deposit at Haweswater, Silverdale, including *Pisidium pusillum*, *P. obtusale*, *P. nitidum*, *P. gassiesianum*, and *P. steenbuchi*, the latter being an important discovery. (These specimens have been kindly authenticated by Mr. B. B. Woodward).

398th Meeting, held at Manchester Museum, January 11th, 1911.

Mr. James Cosmo Melvill in the chair.

The librarian reported that the usual periodicals had been received in exchange.

New Members Elected.

Keppel H. Barnard, B.A., Etwas, Farnham, Surrey.

Rev. F. H. Woods, B.D., Bainton Rectory, Driffield.

D. J. MacLeod, Hof Ter Meere, 13, Reigerstraat, Ghent, Belgium.

Candidate Proposed for Membership.

Griffith Humphreys, 1, Belsize Avenue, London, N.W.

Resignations.

S. Hainsworth. John Rhodes, F.E.S. Thomas Rumney.

Member Deceased.

J. A. Storey, B.A.

Papers Read.

"Obituary Notice—Prof. Dr. Oscar Boettger," by J. R. le B. Tomlin, M.A., F.E.S.

"An interesting association of species in Windermere," by W. Gyngell.

"*Helix aspersa* m. *sinistrorsum* at Scarborough," by W. Gyngell.

"*Limnaea pereger* var. *lacustris* Leach living without shell," by W. Gyngell.

"Note on *Helix pomatia*," by G. C. Spence.

Exhibits.

By Mr. J. C. Melvill: Specimens of a new *Latirus* of the group *Peristernia* from the island of Mauritius, which he proposed to describe under the name *Jeanie*.

By Mr. J. W. Baldwin: A fine series of species of *Partula*, shewing some variety in coloration, and all in excellent condition; also *Cochlicopa lubrica* from Bromley Cross, and its variety *hyalina* from the Winnats, Derbyshire.

By Mrs. J. Carphin: Specimens of *Pseudoglossula siostedti* d'Ailly, from Cameroons, West Africa.

By Mr. J. Kidson Taylor: *Macandrevia cranium* from Shetland, and a fine set of *Diplomorpha layardi* and *D. delatouri* from the New Hebrides.

SPECIAL EXHIBIT OF *Porphyrobaphe*: The chief exhibit of the evening was a fine collection of the Bulimoid group of mollusca now separated under the genera

or sub-genera *Porphyrobaphe* Shuttleworth, *Liguus* Montfort, *Corona* Albers, *Hemibulimus* v. Martens, and *Orthalicus* Beck (inclusive of *Metorthalicus* Pilsb.). In the classification of these groups, few in species, but mainly differing in the sculpture of their nepionic whorls, and the dentition of their radulæ, Pilsbry (Man. of Conch., 1899) and A. Strebel (Revision der Unterfamilie der Orthalicinæ, 1909) must be followed. The last mentioned work is, perhaps, the fuller in detail, and contains a larger number of individual delineations of forms of the various species. Besides the collections belonging to the Manchester Museum, the principal exhibits were from the collections of Mrs. Gill, Messrs. Edward Collier, R. Cairns, and J. C. Melvill, and, taken together, nearly all the described forms were shown, with the exception, perhaps, of the few newly introduced species of Dr. H. Strebel. Conspicuous among them was a full series of that most beautiful of all the species *Metorthalicus adamsonii* Gray, shewing variety in coloration, size, and depth of colour. The young of this species, with an egg of the same, was among the series. One specimen, which had been acquired at the sale of Mr. T. Lombe Taylor's collection in 1879 by Mr. J. C. Melvill, had attached to it an interesting label in the handwriting of Mr. Hugh Cuming, which may be considered worth transcription, and reads as follows:—"I have just received this most beautiful rare shell, two good ones, and one bad one. If you refer to Plate 26, fig. 165, of Reeve's Conch. Icon. you will see what a contrast there is betwixt the 10 guineas shell and the one I have the pleasure of sending to you. Mr. White paid Mr. Reeve 10 guineas for it. The other I shall put into my cabinet" (H.C. to T.L.T.). The date of this note is probably 1853. A New Granada and Columbian species, it was not found in any comparative frequency till comparatively recently, and held the position of one of the most sought after shells in existence, whose place has been now taken by *Met. laevis* Brod., an extraordinary species with remarkably swollen and pustulate lip, the body of the shell being warm chestnut colour with a single central transverse band. A specimen of this was exhibited by Mr. Melvill, from Chachapoyas, Andes of Peru. At the sale at Stevens' Auction Rooms of Mr. DaCosta's collection, in 1907, two examples of this occurred shewing variety, one being without the central band. These specimens, or at all events, one of them, were purchased for the National collection at South Kensington. Other rarities shown were *Tholus buckleyi* Higgins, from Ecuador, two of the original specimens discovered in 1871 by the late Mr. Buckley, and which were sold by him to Mr. Melvill the following year, with a third very similar example from Dr. Cox's collection. This species with its elongate form, thick corrugate substance, and pinkish-lilac interior, seems allied in some respects to *Placostylus* Beck from the New Caledonian region. Likewise various forms of *Metorthalicus yatesi* Pfr., *sublaevis* Dohrn, *vicarius* Fulton, *Povisianus* Pfr., *approximatus* Fulton, *atramentarius* Pfr., *Fraseri* Pfr. var. *brevispira* Pilsb., a remarkable form which at one time was called "*Victor* Pfr." but whether the true species is uncertain. Likewise attention was drawn to the rare *Porphyrobaphe Grevilli* Pfr. also collected in Ecuador by Mr. Buckley, *Hemibulimus iris* Pfr. = *Wallisianus* Mousson, and *H. dennisoni* Reeve. This last species described as an *Achatina* originally, is conspicuous for its truncate columella. The true "*Bulimus*" *dennisoni* also of Reeve, was shewn by Mr. Melvill. It is now included by Dr. Strebel (though not by Pilsbry) in the same genus *Hemibulimus*, but if this be the case, the specific name of one will have to be altered, even though it forms the type of the sub-genus *Myiorthalicus* Strebel. Taken altogether, the extreme beauty and fine condition of the species shewn rendered the opportunity one of the most successful for some time past, and proved the utility of co-operation being invited, and a special subject for the evening selected.

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THE
JOURNAL OF CONCHOLOGY.

VOL. 13.

JULY, 1911.

No. 7.

NOTE ON AN EARLY SPINOUS STAGE IN
CORBULA GIBBA (Olivi).

BY ANNE L. MASSY.

(Read before the Society, March 8, 1911).

It does not seem to have been previously noticed that very young examples of *Corbula gibba* have spines on the right valve at the anterior side of the beak. A specimen measuring .5 mm. in length and .75 mm. in breadth possesses three spines, graduated in size, the one furthest from the beak being the largest. At this stage the right valve scarcely exceeds the left in size. A specimen 1 mm. in length and 1.25 mm. in breadth has five spines in the same position. These young specimens were obtained during investigations carried out on board the fishery cruiser "Helga," of the Department of Agriculture and Technical Instruction for Ireland, and were dredged or taken in tow-nets attached to the trawl in the following hauls:— November, 1904, 3 miles N. $\frac{1}{4}$ E. of Black Head, Co. Clare, soundings 16 $\frac{1}{2}$ fathoms; May, 1905, 17 $\frac{1}{2}$ miles S.W. $\frac{1}{2}$ W. of Coningbeg Lightship, 40 fathoms; and February, 1906, 15 miles W.S.W. of Chicken Rock, Calf of Man, 35 fathoms. Mr. Farran, who has examined a series of these shells with me, is satisfied that they are undoubtedly the fry of *Corbula gibba*.

One of the above gatherings contained also a series of very young specimens without spines and more or less of the adult shape. The shells are much broader in proportion to the length in youth.

With the above observation may be compared Professor Petersen's¹ suggested identification of *Saxicava arctica* with *Saxicava rugosa* on the ground that in his experience all the specimens with longitudinal ribs furnished with spines are small, and that the spinous ribs appear to vanish with age.

¹ Det videnskabelige Udlytte af Kanonbaaden "Hauchs" Togter. Copenhagen, 1889-93, p. 93.

 ADDITIONS TO "BRITISH CONCHOLOGY."

 BY J. T. MARSHALL.

 PART VII. (*continued from page 190*).

C. barleei was originally dredged in Plymouth Sound by Mr. George Barlee, to whom it was dedicated by Gwyn Jeffreys, although Mr. Barlee had some difficulty at the time in persuading Searles Wood and Gwyn Jeffreys to recognise his species. At the time of his discovery, Mr. Barlee was systematically working out the Devon and Cornwall coasts with all the zeal of an enthusiast, but when he reached the Land's End he was persuaded to transfer his energies to the Hebrides and Shetlands, so that he stopped short of the Scilly Islands. Had he gone on to the latter district, I have no doubt he would have done justice to what I consider to be the most promising dredging field in the British Islands, and one which is full of possibilities. It is almost untouched ground, and will well repay the practical dredger. It is true Lord Vernon did some dredging from his yacht in Scilly waters one summer in the sixties, but he was disappointed in not obtaining what he wanted, "large shells," while the fine "rubbish" he threw away.

Mr. Barlee's conversion to conchology, at the mature age of forty-five, may be worth recording. It arose out of a visit to Paignton during a period of his life in which he had sustained a deeply-felt loss in an only child, a young boy, which seriously affected his health, and Paignton was one of the many places he visited in his search for forgetfulness. Walking on the beach one day, he noticed two ladies in front of him continually bobbing up and down picking up something, and on reaching them learnt that it was a lady and her daughter engaged in the congenial occupation of picking up shells, with which the beach was then plentifully strewn after a storm. He courteously assisted them, and was subsequently invited to pay them a visit, when he was shown their collections, became interested in learning the names of their shells, and finally took to collecting them for himself, until it aroused in him a zeal and enthusiasm such as he had never before experienced. Thereafter he was never so happy as when he was out collecting or dredging, which he pursued with the greatest avidity, only interrupted by repeated attacks of illness, which laid him prostrate in his cabin for a week at a time, and then going at it again night and day until another period of prostration came upon him; and although he never got over the loss of his boy, he found in conchology a never-failing solace. His fine collection, in the Oxford

University Museum, should be seen by all conchologists. It will either fill them with despair or urge them to greater emulation.

Unfortunately, Mr. Barlee had no literary side to his conchological character, or we should probably have had some interesting account of his researches. He only made a list of the dredging spots and of the rarer species he found at each, which he afterwards gave to Mr. Damon of Weymouth. I had the use of this list in my early days when I commenced dredging, and found it of much value.

C. concatenata Conti.—Scilly Islands (Burkill and J.T.M.); Channel Islands, Land's End, Battery Rocks at Penzance, living in rock-pools at low water; Eddystone, Torbay, Killala Bay, and Barra in the outer Hebrides, 12f., two specimens. The latter locality is a remarkable one. Fossil in the Red Crag (S. Wood) as *C. tubercularis* var. *nana*.

var. **lactea** Marsh., *Journ. of Conch.*, 1891, vol. vi., p. 346.—Scilly Islands (Burkill and J.T.M.). Gwyn Jeffreys gives (name only) a var. *alba* from Guernsey in the Annals for 1859. I have similar specimens thence, but regard them as bleached or water-worn. Of the Scilly examples there is no doubt.

A variety occurs at Guernsey, Scilly, and the west of Ireland, which has only four whorls besides the embryonic ones; these four whorls are of uniform width, and the length of the whole shell is one-tenth of an inch. Gwyn Jeffreys' description does not mention the embryonic whorls; they seem to be shed at a very early stage, for they are rarely present even in the young. However, the embryo consists of four smooth whorls, and scarcely differs in form from that of *C. tubercularis*. His figure is a good one of the type-form, which is a short cylinder; but many specimens are more regularly conical, like Sowerby's. And his dimensions are not only extreme, but disproportionate, being too broad for the length; the largest are 0.15 in. by 0.05. His original figures in the Annals are conical, like Sowerby's, and have eight whorls, six sculptured and two smooth embryonic ones, though here also he does not describe the latter, while he gives the number of whorls as seven. I have a specimen from Scilly exceeding two lines in length, but that is quite exceptional.

C. metaxæ Del. Ch.—Scilly Islands (Smart and others); St. Martin's Point and Fermain Bay, Guernsey, 12-22f.; Eddystone, 30f.

var. **angustissima** Forb., *Journ. of Conch.*, 1893, vol. vii., p. 259.—Scilly Islands and Plymouth Sound.

var. **alba** Marsh., loc. cit., p. 260.—Channel and Scilly Islands.

The more specimens there are examined of this very rare species, the greater will the extent of its variation be apparent. Gwyn Jeffreys' dimensions, which are right, indicate an obelisk rather than

a "cylinder." Mediterranean specimens, which are not so rare, mostly belong to the var. *angustissima*; these have 18 whorls, and are only 1-20th of an inch in the widest part. A fine example from Guernsey is $\frac{3}{8}$ in. long, and has 14 whorls besides the embryonic ones; these latter are 4-5, quite smooth, with the extreme tip turned down or inverted. Although Jeffreys gives the number of whorls as 14-15, his figure has 10 only; but Sowerby's has 14, and is also the better figure. Still better is Boog Watson's figure, with 13 whorls besides four embryonic ones.¹ These apical whorls are rarely present, the deep suture favouring their early dislocation.

C. costulata Möll.—Off the Shetlands, 111-155f. (Simpson)! the Minch 60-80f., and North Shetlands 345f. (Porcupine).

The apical whorls of this shell are not so suddenly narrowed as in the foregoing species, and they consist of two only, the first one being smooth, and the second one striated longitudinally and keeled. Jeffreys gives the length as four lines, but his figure indicates three, which is more correct, and the usual number of whorls is ten. Sowerby's figure (pl. xv., fig. 13) is not this, nor has it any resemblance; but his supplementary figure has been taken from a specimen of this shell, though badly. Some of the Norwegian and Arctic specimens are larger and broader throughout, with the ribs coarse and blunt instead of fine and sharp.

The Rev. R. Boog Watson considers that *C. costulata* seems "doubtfully entitled to rank as a *Cerithiopsis*."² The conchological characters of *Cerithium* and *Cerithiopsis* are so intermixed in some species that only an examination of the animal can rightly determine their allocation. Several undescribed species from the Porcupine Expedition are in this category.

I have a specimen of *C. horrida* Jeffr.³ which was dredged off the Eddystone in 30f., but as it is an imperfect example, without the apical whorls, I think it better to wait for a more perfect one before adding it formally to the British fauna, the embryonic whorls being such a necessary feature in determining the species of this genus. *C. horrida* resembles *C. metaxæ* in colour, in its obelisk-like shape, and in its sharp-pointed tubercles (not papillose, as erroneously figured by Jeffreys); but the whorls are not so convex, and it has only three instead of four spirals. It varies, however, in size and degree of sculpture quite as much as any of its congeners.

Purpura lapillus L.—Gwyn Jeffreys has written that "the shell of the male *P. lapillus* is longer, more slender, and has a

1 Cerithiopsides from N. Atlantic, Journ. Linn. Soc., 1885, vol. xix., pl. 4, figs. 10, 10a.

2 Challenger Gastropoda, p. 554.

3 Moll. Lightning and Porcupine, Proc. Zool. Soc., 1885, p. 60, pl. vi., figs. 9-9a.

finely tapering spire, with a plicated but not tubercular throat." ¹ I think this must be erroneous. I have met with colonies of long-spired and also of short-spired forms, sometimes mixed and sometimes isolated. There is a colony of the long-spired form now at Torquay which cannot all be males, and, moreover, their apertures are both plain and tuberculated, none of them plicated. I have looked over many groups of these molluscs, but have never been able to pick out the male from these outward characteristics. The tuberculations of the aperture are periodical marks of growth, and not of maturity.

var. **imbricata** Lam.—This is a scarce variety, and very local. Ordinary imbricated or fimbriated specimens are not uncommon, chiefly from quiet bays where there is no surf, or from rocks rather low down the littoral zone. (There is one colony of them at Fleetwood, and another at Cleethorpes.) The young also are frequently fimbriated. But in the true var. *imbricata* the sculpture is flounce-like and about $\frac{1}{8}$ in. deep; it is, moreover, one of the handsomest of British shells, its snowy-white appearance and deep flounces giving it more the appearance of a tropical species than a sober British one. Rarely the shell is fawn-coloured. There is a fine series in the MacAndrew collection at Cambridge, one of which is figured in *Journ. of Conch.*, 1895, vol. viii., pl. iv., fig. 10. It is also well figured in "British Mollusca" (pl. cii., fig. 2); but Searles Wood's figure of the Crag form (tab. iv., fig. 6g), as well as Sars' figure of the Norwegian form (tab. 23, fig. 15), are not this variety, but ordinary imbricated specimens. This variety has only once been dredged in any number, and that by Mr. MacAndrew in Rhoscollyn Bay, and he parted with his surplus specimens to a shell dealer, who made a "corner" in them and doled them out at famine prices. A client, having seen one of these, wrote for more on approval, and received a fine series of 20 at 7s. 6d., of which he was so enamoured that he could not part with them again, but kept the whole parcel for £7 10s.!

var. **ovalis** Jord., *Journ. of Conch.*, 1893, vol. vii., p. 260; and vol. viii., pl. 4, fig. 16.—Paignton in South Devon (Jordan and J.T.M.); Morthoe in North Devon (Cooke); Scarborough.

var. **major** Jeff.—Solent and Conway Rivers (Cooke); Laugharne sands (Williams-Vaughan)! Swanage. This is very large and coarsely ridged, and the aperture is without the usual tubercles or thickened margin; the animal appears to prefer using its materials to enlarging its abode than to ornamenting it. Figured in *Journ. of Conch.*, 1895, vol. viii., pl. 4, figs. 5 and 12.

var. **elongata** S. Wood, Crag Moll., vol. i., p. 36, tab. 4, fig.

6c.—Burnham in Somerset (Bell, Jordan, and others); Torbay. This must take the place of var. *gracilis* described by me in *Journ. of Conch.*, 1893, vol. vii., p. 260.

var. **minor** Jeff.—Moulin Huet, Guernsey. Jeffreys' locality for this variety is a cave in the Shetlands. He did not consider the Guernsey specimens identical, but having compared the two I find that they fairly agree; the only character in which they differ is in the Shetland examples having a larger aperture, but that is in consequence of their being immature and lacking the thickened outer lip with its usual tubercles. Otherwise, Guernsey and Shetland specimens in my collection are identical in shape, size, sculpture, and spire. Figured in *Journ. of Conch.*, 1895, vol. viii., pl. iv., fig. 11.

A very pretty form from Jersey is lavender-coloured, and deeply ridged; it forms a colony on the rocks of St. Clement's Bay, much lower down the littoral zone than usual. An interesting plate, illustrating many forms of this polymorphous species, will be found in the *Cambridge Natural History*, and reproduced in the *Journ. of Conch.* for July, 1895. Two reversed specimens have been recorded—one from Scarborough, in the Bean collection, and the other from North Wales, in the Norman collection. There is also a specimen in the MacAndrew collection in the Cambridge University Museum. Mr. John Leckenby, of Scarborough, on one occasion offered £10 for a reversed specimen, but without result, and at the suggestion of Gwyn Jeffreys started a small army of Scarborough women to collect the *Purpura* from the rocks at twopence a pint; but the Scarborough coast-line having in time become exhausted, and this Amazon corps declining foreign service, they were then disbanded, no results having followed their campaign save many bushels of useless dog-whelks and an expenditure of £10 or £12! This is only half the tale. Mr. Leckenby subsequently heard, through a traitor in the camp, that two of the women, having ascertained that his agent only scanned them over previous to throwing them into his back yard, obtained access to this heap, and presented the same *Purpura* over and over again for measurement and pay!

Canon Norman has placed *P. tetragona* J. Sow. (a monstrous form of *P. lapillus* from the Crag) in the *Muricide* as a variety of *M. erinaceus*,¹ in consequence of Searles Wood's son having found a similar but recent form on Felixstowe beach and wishing to transfer it to *Murex*, against the contention of Gwyn Jeffreys that it is a *Purpura*. But I think Jeffreys' contention the right one. Searles Wood's figures (four) clearly show the short and open canal of *Purpura*, only one of them (fig. 7b) having a superficial resemblance to a *Murex*.² The

¹ Ann. Mag. N. Hist., 1899, p. 147.

² *Purpura tetragona* S. Wood, Crag Moll., vol. i., p. 38, tab. iv., figs. 7 a-d.

canal is short and open in *Purpura*, long and closed in *Murex*; but the closing in of the canal is very gradual, and only complete in aged specimens; while the sculpture also is that of *Purpura*, and not *Murex*. (See Gwyn Jeffreys and Searles Wood, junr., in the Annals for 1883, pp. 66-7, 143, and 208).

Although *P. hæmastoma* L. has been figured by Gwyn Jeffreys in his Appendix, and by Sowerby in his "Index," its British origin is extremely doubtful. Judge Macculloch's discovery of three specimens at St. Peter's Port, Guernsey, is no doubt quite correct so far as it goes, but the same spot has been searched many times since without confirming its occurrence, and as many French vessels are constantly visiting that port, in all probability these specimens had a French origin. After more than one diligent search, I have been unable to trace these three specimens in the collection of Sir Edgar Macculloch, which came into the hands of the Guernsey Museum on his death in 1898. Among Sir Edgar's foreign shells, however, is a tablet containing six specimens of this shell, three dead and three live, but as he kept no record of localities, it is impossible to say which three, if any, are of Guernsey origin.

[My notes on the genera *Cassidaria*, *Buccinum*, *Buccinopsis*, *Triton*, and *Fusus* were published as a separate paper in the *Journal of Malacology* for 1902, vol. ix., no. 2. They are now revised and brought up-to-date for insertion in their proper order].

Cassidaria tyrrhena Chemn.—Since my account of this species was published¹ Mr. F. W. Wotton has received several very fine living specimens which were obtained by trawling off the south-west of Ireland in 50-60f., two of which he very generously presented to me. His largest specimen measured $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in., and contained the animal still showing signs of life. I have another fine specimen exceeding 3in. by 2in., dead but perfect, trawled in 50f. south of the Scilly Islands, in 1900. It has also been recorded "off the Kerry coast" (Tattersall). A fragment was dredged by the 'Porcupine' Expedition of 1870 on the Channel slope off the Scillies in 539f., and another fragment of *C. echinophora* by the 1869 expedition off Donegal Bay in 183f.

The Mediterranean form of *C. tyrrhena* is smaller and thinner than ours, and lives in shallower water. The Irish and Scillonian specimens belong to a larger and coarser deep-water form, which Monterosato calls var. *atlantica*.

Mr. E. A. Smith has conclusively shown² that *Morio* Montf. has the preferential claim for recognition over *Cassidaria*, if the coleop-

1 Journ. Conch., 1893, vol. vii., p. 260, and 1894, p. 380.

2 Journ. Malac., 1895, vol. iv., p. 11.

terists will only adopt some other name than the former for the beetles.

Buccinum undatum L.—Alderney, common on the shell-beach, and often large (Marquand); Guernsey, two small live specimens dredged (Tomlin).

This is a most instructive species, no other affording better evidence of the effects of environment. Any one interested in the variation of species will find the study of this one most fruitful and interesting, while a series from various localities and depths will impart a good object lesson in the variability of species. These variations and mutations are without end, and all graduate one into the other. The form, texture, size, sculpture, etc., appear to depend entirely on habitat, and an experienced collector can readily tell, from the appearance of the specimen, the nature of the sea-bottom and the probable depth from which it had been procured. The Rev. Prof. Gwatkin gives the radula of *Buccinum* a very bad character as a help to specific distinction; he writes me that "the radula varies so much in *Buccinum* that I consider it, for that family, worthless as a character, the individual variations being greater than the specific." Herr Friele, of Bergen, has also studied this subject exhaustively throughout various species of *Buccinum* and *Fusus*, and has arrived at practically the same conclusion.¹ He found that different species, and even different genera, so interchanged and resembled one another, as to be useless as a guide to the determination of species. He further corroborated and supplemented these views in his later work on the results of the Norwegian Arctic Expedition.

B. undatum is very scarce in the Channel Isles except at one part of Jersey facing the French coast, and I have never met with a specimen from the other islands; it is equally scarce in the Scillies. But, like *Littorina littorea*, *B. undatum* has of late years been coming into the Jersey shell-fish market in some quantities from the opposite ports of France, and the dead shells are to be found everywhere. These French specimens are small and immature, and of sub-littoral origin. Pure white specimens occur occasionally, but they are rare.

var. **flexuosa** Jeff.—Very variable in size and texture, sometimes attaining a length of $5\frac{1}{2}$ in. in the West Orkneys and off Wick, while a small thin form lives in the former district and in the Shetlands with the var. *zetlandica*, and has the same silky epidermis.

var. **littoralis** King.—The interior of this variety is sometimes orange-coloured, but more frequently purplish-brown.

var. **paupercula** Jeff.—Specimens from Southampton Water do not exceed an inch in length; many are smaller.

¹ Jahrb. Deutsch. Mal. Ges., 1879, vol. vi., p. 257.

var. **striata** Penn.—Off Cork Harbour (Wotton) ! off Aberdeen (Simpson) ! North Rona, 45f. ; Doggerbank, 30f.

var. **pelagica** King. — Aberdeenshire (Simpson) ! off Unst (Coulson) ; Shetlands (coll. MacAndrew). In this variety the last whorl is smaller and narrower proportionally, hardly projecting beyond the penultimate, and in British specimens the longitudinal ribs are evanescent or wholly wanting. My largest examples exceed $6\frac{1}{2}$ in. in length. It occurs in Norway, but of a smaller size and strongly ribbed.

var. **zetlandica** Jeff.—Gwyn Jeffreys has described this variety as “destitute of ribs,” whereas he figures it with rather prominent ones, and this has given rise to some doubts as to whether the var. *zetlandica* is ribbed or not, especially as he compares it with *B. humphreysianum*, which is ribless, while this is rendered more confusing by its living on the same fishing-grounds with a dwarf and thin form of var. *flexuosa*, which is ribbed, in the Orkneys and Shetlands. But the real truth is, that the presence or absence of ribs is not a criterion of this variety, its only permanent characters being that it is dwarfed and thin. It is almost as variable as the type, and really runs into many forms when collected from different parts of the Shetland seas. It is seldom without traces of longitudinal ribs, especially on the upper whorls, and there is considerable variation in the size, comparative length of spire, and degree of sculpture. To give an idea of its extreme variability, I may say that I have specimens of it corresponding not only to the ribbed type, but to the var. *striata*, the var. *flexuosa*, the var. *pelagica*, and the var. *acuminata*. In rare instances it is as finely striated as *B. humphreysianum*, while on the other hand I have examples which are as much ribbed as any typical shell. Nor is Gwyn Jeffreys’ white specimen at all singular ; I have a series of them.

Some large specimens of the *zetlandica-striata* form, which may be ascribed to either variety, have been trawled off Fair Isle, midway between the Orkneys and Shetlands. They are deceptive examples, and much resemble *B. finmarkianum*, from Upper Norway, etc., a species having several synonyms, but which perhaps is only an extreme form of *B. grænlandicum*. Another very pretty form from the East Shetlands, 60-90f., is white, very finely striated, extremely thin, with a cinereous, silky, deciduous epidermis, a form which also occurs at Vardö, Finmark, in 100-150f. ; this is *B. schneideri* Verk. The same form was also trawled off S.W. Ireland, in 55f., by the Rev. W. S. Green, and off the south and west of Ireland, in 90-180f., by the ‘Porcupine.’ *B. parvulum* Verk. is different from this, and is a white variety of *B. grænlandicum*, its specific identity being indicated by the size, contour, spire, embryo, and micro-sculpture. Jeffreys’ figure is much too large, and the spire too long for var.

zetlandica; that figure more correctly represents the thin deep-water form of var. *flexuosa* mentioned above; Sowerby's figure would do for var. *paupercula*, but not this; while the figure in "British Mollusca" (pl. cix., f. 4) is perfect, as most of them are in this well-illustrated work.

The Leckenby collection contained an adult specimen of the var. *paupercula*, little more than half an inch in length, one of a pair said by Mr. Robert Damon to have been dredged in Weymouth Bay, and which changed hands for 10/-. On the other hand, specimens from Thurso and Wick are very large, coarse, and solid, attaining 6in. by 3½ in.; this is the var. *incrassata* of King; but coarse and solid examples occur of every size.

Monstrosities are numerous, and many of them have received special names. Two splendid figures of Turton's *B. carinatum* will be found in Brown's "Recent Conchology," and "Science Gossip" for Apr., 1894, contains figures of the curious malformation called monst. *bioperculatum*. As to the monst. *trioperculatum* Jeff., that was the outcome of a too eager inquiry, accompanied by a liberal offer, made many years ago to the whelk-dealers for a specimen, and with the inevitable result—as nature could not produce one to order, a counterfeit was manufactured, and successfully palmed off to a dealer, but it did not travel any further. No genuine specimen of this "sport" has been recorded.

In dealing with the phenomena of sinistral shells, Gwyn Jeffreys says that the animal "may be compared to the case of a man having his heart on the right and his lungs on the left side of his body. The structure of a mollusc is, however, not so complicated, and the consequence of such a reversal in the position of its organs is probably not very important to its economy."¹ I do not know how Gwyn Jeffreys came to regard the lungs as being on one side only of the body, for as a matter of fact one lung is on the right and another on the left side, and in a sinistral case the right and left lungs would presumably be simply transposed. As to the consequence of a similar reversal of organs in the human subject, one instance has been placed on record of such a case, an account of which appeared in a Vienna paper in 1894, of which the following is a summary:— "A man, named Adolph Schlesinger, died in Vienna in November of that year, whose heart was on the right side, and almost all of whose internal organs—milt, liver, and intestines—were found to be opposite their usual place, but who never felt any inconvenience from this cause. Having some years previously accidentally learned of the unusual arrangement of his internal economy, he offered to sell his body to the British Museum [? Royal College of Surgeons] for

1 Brit. Conch., vol. i., Introduction, p. xxi.

the immediate payment of a good round sum, but the offer was declined. He died of consumption, aged twenty-seven, and Prof. Schrötter said that Schlesinger might have lived to any age had his lungs been sound, while his family strongly objected to the *post-mortem* examination desired by the medical faculty." Again, at an inquest held on an infant, at Battersea in London, in 1901, the coroner remarked that the *post-mortem* examination revealed that the child had its heart on the right side, a phenomenon so rare that it did not occur once in 10,000 cases. Modern medical works throw no light on these phenomena, but Pliny does say, in writing on the spleen:—"It is attached to the left side, opposite the liver, though sometimes this arrangement is found reversed; but that is a prodigy."¹

B. humphreysianum Benn.—S.W. Ireland, 8of. (R.I.A. cruise); the Minch off Loch Boisdale, 72f., a very young specimen (J.T.M.); between the Butt of Lewis and St. Kilda, 90-100f., and North Sea, 74f. (Simpson)! Some shells exhibited under this name at one of the Conchological Society's meetings, and alleged as coming from Jersey, either could not have been this species or they could not have come from Jersey.

var. **ventricosum** Kien. (*Journ. of Conch.*, 1893, vol. vii., p. 261).—South of Ireland (R.I.A. cruise)! Gwyn Jeffreys records in "British Conchology" a var. *lacteum*, but without locality; that locality should be "Shetlands." A pretty variety, also from the Shetlands, has a white zone below the suture of each whorl, as well as on the outer lip. This species can scarcely be mistaken for *B. undatum* var. *setlandica*; it has no palpable epidermis at any stage of growth, the aperture is reflected outwards, and the embryo is different. Sowerby's is the better figure, but the apical whorls are incorrect; they should be as Jeffreys'.

The *B. hydrophanum* of Hancock was dredged by the 'Triton' in the Shetland-Faroe Channel, and the same species with *B. mörchi* Friele by the 'Knight Errant' in the same district.

Buccinopsis dalei J. Sow.—Atlantic off Ireland, 345f. (R.I.A. cruise); west of St. Kilda, 100f. (Hoyle); Aberdeenshire, 40 miles off Rattray Head (Kelly)! Buchan Deeps, 70 miles east of Aberdeen; North Sea, 53f.; Fair Isle Bank, midway between the Orkneys and Shetlands; and off the Shetlands, 111f. (Simpson)! West of Ireland (Irish Fishery Board)!

There is considerable difference between the shells of the male and female of this species, the former being oblong and the latter oval. Sowerby's figure well illustrates the female form, and Jeffreys' *generic* figure the male, though the latter has the whorls too convex

and the operculum is wrongly shaped. Jeffreys' plate figure is much too broad, and it should not be spirally striated nor have such a broad glaze on the pillar.

Gwyn Jeffreys has recorded a *Buccinopsis striata*, which he vaguely assigned as "another interesting addition to the Shetland fauna."¹

Triton cutaceus L.—A very fine living specimen, dredged by me off St. Martin's Point, Guernsey, in 22f., in 1885, exceeds the dimensions given by Jeffreys. This is the only example that has been obtained alive in recent years. Unfortunately, the operculum of this particular specimen was lost through being placed on a table-cloth while extracting the animal, and then whisked away, with several other small rarities, before it was remembered. Although very rare in a living state, dead specimens picked up on the shell beaches now and again clearly indicate its continued presence among the Channel Islands. Four dead specimens, though very much worn, are in the Guernsey Museum from the Macculloch collection, and another dead specimen was picked up on the beach at Alderney by a casual visitor in 1902. Guernsey examples belong to a form named by Locard *T. danieli*, which is larger and broader than the Mediterranean one, with a thinner and paler epidermis.

T. nodiferus Lam.—No addition has been made to the "three living specimens" of this shell found off Guernsey in 1832. One of these recorded specimens is still in the collection of Dr. Lukis, now in the possession of his daughter. But since the death of the Doctor in 1865, this interesting little collection of Guernsey shells has been kept hidden away and doing no good to anybody, instead of being placed in the very excellent Museum established in that island. It may be that the "three living specimens" cited by Gwyn Jeffreys were survivals from a period when the species was perhaps less rare in the Channel Islands. I have never met with so much as a fragment of the shell, though I have thoroughly worked through the whole of the islands more or less since 1860.

Murex erinaceus L. — Linné's type-form, which is the var. *sculpta* of Jeffreys, has been dredged only occasionally off Guernsey, but in 1868 I discovered a numerous colony at Herm Island, during a very low tide, concealed under stones. Since then, though the species has always been plentiful at the same spot, they have reverted to the usual form common on our coasts. I cannot account for this curious circumstance. All specimens obtained from other parts of our coasts belong to the var. *tarentina* of Lamarck, which is the form figured and described (erroneously) in British works as the type. In the true type form, the spiral ridges are vaulted where they cross the

¹ Wyville-Thomson, "Depths of the Sea," p. 463, with fig. p. 364.

longitudinal ones, and their edges are foliaceous. In the var. *tarentina*, the longitudinal ridges are varicose and the spirals are rope-like or semi-tubular; the term *erinaceus* would not apply to this variety. Specimens living between tide-marks are about an inch in length, and this is represented by Jeffreys' generic figure, but dredged examples are larger, and sometimes attain the $2\frac{1}{4}$ inches assigned to the species by Jeffreys. A handsome form from Dublin Bay is elongated and narrow, with a deeper suture. The very young are scarcely distinguishable from the same stage of *Trophon muricatus*.

Some writers allocate this species, on account of differences in the radula and operculum, to a separate genus *Ocinebra*, and the next species, for other reasons, to the genera *Ocinebrina* or *Corallinia*, leaving *Murex* unrepresented in the British list.

M. aciculatus var. **badia** Jeff. — Herm Island, at low water.

var. **elongata** Monts. *Journ. of Conch.*, 1893, vol. vii., p. 261. — Occurs occasionally with the preceding.

I have a specimen of *M. brandaris* L., adult but dead, which was trawled 50 miles N.E. of Scarborough. It is not uncommon in the Mediterranean.

Donovania minima Mont. — Living under stones and among sea-weeds in rock-pools. L. 0·2 in., b. 0·75. Scilly Islands (Smart and others).

var. **palescens** Jeff. — Guernsey, Sark, and Herm; Scilly Islands. This variety is either milk-white, pale yellow, or bi-coloured.

A tablet of half-a-dozen specimens, containing the animals, is in the Millport Museum at Cumbrae, labelled in Dr. Robertson's handwriting, "Shore, Cumbrae." They undoubtedly belong to this species, but I have great doubts as to their origin, and think some mistake must have been made. No reliable record is obtainable north of Devon and Dorset. A variety from the Channel and Scilly Islands is destitute of longitudinal riblets on the last whorl, and more rarely on the penultimate also, while an attenuated variety comes from Guernsey. Jeffreys' and Sowerby's figures belong to a slender form, and the latter errs in having the edge of the aperture corrugated instead of plain; these corrugations should be much fewer, and placed inside the aperture, as in Jeffreys' figure. The generic name *Lachesis* being in prior use for the Reptilia, was superseded for *Donovania* by Bucquoy, Dautzenberg, and Dollfus.¹

Trophon muricatus Mont. — Bull Bay, N. Wales (Archer); Loch Fyne (T. Scott); Iona 2of., Loch Boisdale 3of.

var. **lactea** Jeff. — Scilly Isles 4of., Iona 2of.

¹ Moll. Mar. Roussillon, vol. i., p. 112.

The young differs from that of *Murex erinaceus*, which it much resembles, in being more slender, the mouth more contracted, and the canal longer.

T. barvicensis Johnst.—This and the last species vary considerably in their sculpture, both of spirals and longitudinals, and sometimes approximate to each other in that respect, but each retains its own family resemblance. Specimens from the Doggerbank and Aberdeenshire are nearly an inch in length. Jeffreys' figure is a good one, but exaggerated.

T. truncatus Ström.—Between tide-marks in Antrim (Jeffreys); Bull Bay, N. Wales (Archer). The limit of the distribution of this species on our coasts is problematical. The Rev. J. Smart obtained a dead and worn specimen at Scilly, and I have several young specimens from the same district. I have also found it as a sub-fossil in a raised beach on the Thatcher Rock, off Torquay. The record "Poole"¹ was an error of identification.

var. **alba** Jeff.—Doggerbank 30f., off Iona 20f., Aberdeenshire.

var. **scalaris** Jeff.—Soay Isles, Iona (Somerville)! the Minch off Barra 35f.

An Aberdeenshire specimen in my collection is an inch in length. A very pretty variety from Skye has a purple ground with white ribs. The shell is variable in convexity of whorls, comparative length to breadth, and especially in the number of ribs; an adult from Skye has 15 ribs, while its fellow has 20.

T. clathratus L., which differs from the preceding in size only—and is in fact the type of the species, our shell being only the southern variety—is equally variable. Glacial specimens of it, with its var. *gunneri* (analogous to our *T. truncatus* and var. *scalaris*) are occasionally obtained in the Hebrides, Orkneys, and Shetlands, and though some of them look remarkably fresh, I have never met with an undoubted recent specimen.

Sowerby's figures of *T. truncatus* and var. *scalaris* (not *scalariformis* as printed) are incorrect; the type has no spiral ribs as there indicated, and the variety represents a worn specimen of the type. Excellent figures of var. *gunneri* will be found in Sars' work,² and of var. *scalaris* in Searles Wood's.³

Fusus Brug.—Those interested in the nomenclature of this genus should read Mr. Edgar Smith's notes on the "Nomenclature of Certain Genera,"⁴ which have been elaborated and exhaustively worked

¹ Cooper, Journ. Conch., 1894, vol. vii., p. 435.

² Moll. Reg. Arct. Norv., tab. xv. figs. 11, 11a.

³ Crag Moll., vol. iii., tab. iii., figs. 18 a b (as var. *gunneri*).

⁴ Journ. Conch., 1901, vol. vi., p. 331.

out by Prof. W. H. Dall in another paper on the "Early History of the Generic Name *Fusus*."¹

Fusus antiquus L.—A "young and dead specimen" has been dredged by the Rev. J. Smart at Scilly; this is its furthest southern limit. The operculum is triangularly oval, dark horn-colour, very coarsely wrinkled, with a few faintly-impressed lines, and often a flexuous depression down the centre. Very rarely the shell is snow-white; I have two from deep water off the Shetlands, but these do not belong to the next variety.

var. **alba** Jeff.—Off Cork (Wotton)! off Aberdeen (Simpson)! the Irish Sea, and off Peterhead in 60f. All the specimens I have seen of this variety are very finely striated, and one from Peterhead is entirely devoid of sculpture except the lines of growth. It attains 6½ in. by 3 in., but one form of it from the Irish Sea, with the aperture expanded and reflected, is 6½ in. by 4 in. Some aged specimens of the latter have the outer lip formed of half-a-dozen separate layers added one over the other, making the edge a third-of-an-inch in thickness.

var. **ventricosa** Jeff.—Great Fisher Bank, off Aberdeenshire (Simpson)! Doggerbank, 30f. This varies in the length of the spire, but the last whorl is always tumid and greatly expanded, trumpet-shape, like *Limnea auricularia*. Some of my specimens have hardly any spire, and the largest, from the Doggerbank, are 7 in. by 4½ in. It is yellowish-white externally, with the inside of a deep orange colour, and occasionally the upper whorls are carinated, as in the var. *carinata*. One monstrous specimen from Aberdeenshire has all the whorls strongly carinated.

var. **gracilis** Jeff.—I know this from S.W. Ireland only. It is a very handsome shell, characterised by a long slender spire, a thin texture, and tumid whorls. Its dimensions are 6 in. by 2½ in.

var. **carinata** Turt.=var. *striata* Jeff.—One specimen from an Aberdeen trawler (Kelly)! Bantry Bay, Irish Sea and Bristol Channel. My finest are from S.W. Ireland, and measure 6½ in. by 3 in. Some specimens approximate to *F. despectus* L. in sculpture, but the two forms can always be readily separated. Gwyn Jeffreys admits that this is *F. carinatus* Turt., but gives no reason for substituting a varietal name of his own, which was clearly not required. Var. *carinata* is also a more suitable name, as all the forms of *F. antiquus* are striated.

F. despectus L., although a northern species, has been dredged by the 'Porcupine' in the Atlantic off Ireland, and by the 'Challenger'

1 Journ. Conch., 1906, vol. xi., pp. 289-297.

as far south as Portugal in 470f. (a young specimen). I have examples from shallow water in the Faroe Isles, where it seems, however, to be only partially established, and to be small and scarce. It is occasionally brought into Aberdeen by fishing-boats from Iceland and the Faroes (Simpson). As a general rule, and comparing large series with *F. antiquus*, *F. despectus* will be found to be appreciably longer in the spire and shorter in the body-whorl, in some instances very much so. The carinated sculpture is always present and conspicuous in *F. despectus*, and is a prominent feature of the shell; it is only now and again that a specimen with *less* prominent carinations approximates to one of *F. antiquus* var. *carinata* that is *more* than usually carinated. Prof. G. O. Sars and Mr. E. A. Smith consider the two forms distinct species, as to which I do not think there can be much doubt. Miss Elliott's examples of var. *carinata* in the National Collections are as characteristic as any that may be found, but these could never be mistaken for *F. despectus*; while Sars' figures are excellent representations of *F. despectus*, yet could not be mistaken for the most extreme examples of var. *carinata*. The Rev. Boog Watson writes with respect to *F. despectus*:—"The identity of this species with *F. antiquus* is very strongly supported, and is an opinion deserving the utmost respect. If it has not been followed here, the reason is that though my opportunities for comparison have been rather limited, I have an impression that the apex in the two species is different. On this point I had hoped for fuller information from Mr. Friele in his great work on the Mollusca of the Norwegian Northern Expedition."¹ But that work was not forthcoming at the time. It has subsequently been published, and Herr Friele has figured the apices of both *F. despectus* and *F. antiquus*, but his figures are not convincing. I have an uninterrupted series of all ages of both species, and I must confess to finding the evidence negative, notwithstanding that there is an unusual amount of individual variation in the apex of both species. The most that can be said is that the extremes of both forms nearly approximate; but they are not singular in that respect, nor would the mere presence or number of carinations in the var. *carinata*, however closely resembling those of *F. despectus*, of itself constitute that species. The extreme variability of these striations and carinations (hardly two specimens being alike) demonstrate their varietal character. *F. turtoni* has a correlative variety.

F. norvegicus Chemn.—Great Fisher Bank, and from Aberdeen trawlers (Simpson)! None of the figures or descriptions of this species indicate the presence of a large swollen excrescence on the upper part of the pillar, just at the entrance of the aperture, which occurs in about

1 'Challenger' Gastropoda, p. 199.

fifty per cent. of adult specimens. This excrescence if examined is found to wind itself inwardly round the pillar. Sowerby's figure shows an indication of this swelling, though it is usually more prominent. I cannot imagine its utility, nor why it is present in only half the specimens. Jeffreys' dimensions are extreme; the usual size is $4\frac{1}{4}$ in. by 2 in. A dwarf form from the Doggerbank does not exceed 3 in. by $1\frac{1}{2}$ in.

F. turtoni Bean.—Aberdeenshire coast, 70 miles from land, in 40f., and from trawlers (Simpson) ! Peterhead, 43f. ('Triton' Expedition) ! East Shetland fishing-banks, from trawlers. This species lives in muddy ground in deep water far from land, rare; more often procured by deep-sea fishermen than by the dredge. The colour is yellowish-white under the epidermis, and occasionally the inside is more or less tinged with purple; epidermis rather thin, deciduous, ranging from light-brown to olive-green, and frequently stained with ferruginous deposit. Round the periphery the spiral riblets are more prominent and irregular, and these sometimes develop into ridges or carinations (as in *F. antiquus* var. *carinata*), thus making the whorls more or less angular at that part. The operculum is large, elongated, and obliquely triangular (but varies greatly in length and width), dark horn-colour, highly glossy, closely wrinkled, with semi-circular striations, and having impressed lines (variable in number) radiating from the nucleus.

This species is subject to more extreme variation than is generally supposed, and I regard it as by far the most variable of the genus, while the differences between the male and female forms are more than usually apparent. My smallest adult specimen, from the Shetlands, is only 3 in. by $1\frac{1}{4}$ in., while the other extreme is represented by examples exceeding $5\frac{1}{4}$ in. by $2\frac{1}{2}$ in., and there is every intermediate gradation of length and breadth. The whorls also are of every degree of convexity, and the aperture is especially variable according to age, as after it has reached maturity the outer lip is added to and reflected, and the operculum altered to correspond. The shell of the male, correctly figured by Sowerby and Jeffreys, has a comparatively small body-whorl and an elongated spire, and rarely exceeds $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in. The young of this up to 2 in. in length present a very droll appearance, being all spire. An extreme example of this male form from the Shetlands, having the spire abnormally elongated, and now in the collection of Mr. James Simpson, of Aberdeen, has been named var. *attenuata*.¹ The shell of the female, well figured by Forbes and Hanley,² is larger and broader throughout, the spire is not nearly so attenuated, the last whorl is very much larger and swollen, and the shell attains $5\frac{1}{4}$ in. by $2\frac{1}{2}$ in. The young of both forms are easily dis-

1 Trans. Aberdeen W.M. Nat. Hist. Soc., 1893, p. 83 (with fig.).

2 Brit. Moll., vol. iii., p. 432; vol. iv., pl. cv., fig. 4; and pl. cvi., fig. 3 (the same shell reversed).

tinguished at all ages, and the adults have each the same number of whorls, $7\frac{1}{2}$.

Bean founded this species on a specimen found in a Scarborough fishing-boat, but I have not been able to refer to his original description and figure to see which of these two forms is the type. (Jeffreys' reference in "British Conchology" is wrong; instead of "Bean in Mag. N.Hist., viii.," it should be "Bean in Loudon's Journal, vol. vii., p.493, fig. 61.") Canon Norman says the slender (or male shell) is the "typical Doggerbank form,"¹ but both forms occur on the Doggerbank as well as in the Shetlands and off the Aberdeenshire coast. He also adds that it is "well figured by Forbes and Hanley," but a comparison of the latter's figures and measurements will demonstrate that their type is the large and broad female form.

Northern specimens are smaller than ours generally, rarely exceeding 4in. in length, and these exhibit a still further range of variation. Sars figures several; Friele has described one as *F. ossiani*; and Middendorff another as *F. schantarius*; while Canon Norman has also described two specimens from Norway, apparently immature, one as var. *brevispira* and the other as var. *tumida*.² Specimens, however, the exact counterparts of the two latter are also found in our seas, some of them much more tumid than his figure, while as regards the short-spired form, some of my British specimens have very little spire indeed, measuring only 4in. in length by $2\frac{1}{2}$ in. in width. That both slender and broad specimens also occur in Norway is evident from Sars' figures, as he gives the immature forms both of the male (t. 14, f. 3b) and female (t. 25, f. 10).

F. schantarius Midd.³ possesses no specific attribute apart from *F. turtoni*, and though Canon Norman "lays chief stress on the spiral grooving of the inside of the lip" (p. 354) that is merely the impress of the ordinary outer sculpture, which is occasionally observable (also with the purple interior) in the immature stage of *F. turtoni*, and more frequently in *F. islandicus*, a species similarly sculptured. Sars' figure 3 (pl. xiv.) clearly shows the connection between the two forms. *F. turtoni* also rejoices in several generic names. Prof. Dall has conferred on it that of *Beringius*, Herr Friele that of *Jumala*, and Canon Norman that of *Ukko*.

F. islandicus Chemn.—Off Milford Haven, the Bristol Channel as far as Lundy Island, and the Wexford and Waterford coasts, procured by trawling (Wotton) ! S.W. Ireland, 345f. (R.I.A. cruise); Porcupine Bank off the west of Ireland, 85f., and north of the

1 "A Month on the Trondhjem Fjord," Ann. Mag. Nat. Hist., vol. xii., p. 352.

2 Loc. cit., p. 352, pl. xvi., figs. 1, 2.

3 Loc. cit., p. 353, pl. xvi., fig. 3.

Hebrides, 185f. ('Porcupine'); off the Fastnet, 57f. (Tattersall); North Sea, 74f., Great Fisher Bank, and S. and S.E. Shetlands, procured from trawlers (Simpson) ! S. Ireland, a trawled specimen, and E. Orkneys, another trawled specimen (J.T.M.); Shetland-Faroe Channel, 64of. ('Triton'). The records given in the Linnean Society's Journal¹ as to *F. islandicus* being dredged by the 'Triton' off Peterhead were *lapsus penne* of mine for *F. gracilis*. The operculum of *F. islandicus* is obtusely triangular, dark horn-colour, large, solid, and closely and coarsely wrinkled in the line of growth. *F. islandicus* has a broad as well as a narrow variety. Some from the Shetlands are unusually slender, measuring 5-in. in length by $1\frac{1}{4}$ -in. only in the widest part; but rougher ground in the same seas yields a much more robust form, some of my specimens thence being fully 6in. by 2in. These forms will no doubt in time receive distinct varietal names. The normal dimensions of the type are 5in. by $1\frac{3}{4}$ in., though a specimen in Mr. F. W. Wotton's fine series of this handsome shell from the Irish Channel is $5\frac{3}{4}$ in. in length, and is unique in having the epidermis perfect throughout. Another specimen from the same seas, in the collection of Mr. Bartlet Span of Tenby, is just short of 6in. in length, but has lost the bulbous apex. In these large specimens the epidermis is usually more or less abraded. Mr. Bartlet Span found a specimen in Tenby harbour some years ago, which had most probably been cleaned out of a trawl-boat.

The peculiar bulbous apex, which is supposed to be a specific character of this species, is locally variable. Specimens from Greenland, Finmark, and the Shetlands have the spire gradually tapering to a blunt point, while those from S.W. Ireland, the Irish Channel, and adjacent coasts have the prominent bulbous apex depicted in Jeffreys' figure, which is much broader than the following whorls. The shell is more attenuated than either Jeffreys' or Sowerby's figures, especially the lower half, and has a much longer canal; Sowerby's figure should also have the suture oblique and the whorls less tumid. An actual specimen placed over these figures will show how very much they are drawn out of scale. Sars gives an excellent figure of the northern form (*minus* the bulbous apex) where, as in our seas, it is less rare than it used to be. Dr. Mörch many years ago brought about twenty specimens from Greenland when on a visit to England, and these sold at from twenty to sixty shillings each.

(To be continued).

¹ Zoology, 1883, vol. 17, pp. 95, 96, 97.

ON THE DART OF *HELIX UNDATA* Lowe.

By GEO. C. SPENCE.

(Read before the Society, Sept. 14th, 1910).

EARLY in 1910 Mr. B. R. Lucas paid a visit to Madeira and brought back a number of living *H. undata*. He was kind enough to distribute some of these and I became the possessor of a few examples which I dissected. I was at once struck with the peculiar form of the dart, which does not appear to have been previously figured and only very briefly described.


Pilsbry in the "Manual of Conchology," 2nd series, vol. ix., p. 292, mentions that the darts were unfortunately missing from the specimens he examined and refers to Mörch in "Journal de Conchyliologie," 1865, p. 390, who writes as follows: "J'ai vu un fragment du dard, qui est colossal, un peu tordu, avec une expansion latérale sur chaque côté."



Dart of *Helix undata* Lowe,
× 5.



Cross Section through Centre of Head
of Dart of *Helix undata* Lowe.

As will be seen from the micro-photo, kindly taken by Mr. J. Wilfrid Jackson, the rounded stem rises from an expanded base, the latter having a hemispherical depression, slightly crenulate round the edges, in its basal portion. The stem develops two lateral expansions, forming a strongly twisted sharp-pointed lanceolate head. The expansions bear narrow loop-like markings at right angles to the central stem. The twist on the whole dart is very pronounced and viewed lengthwise the dart has this appearance . Length 6 mm. The surface is vitreous in appearance and microscopically papillose.

Mr. Lucas informs me he found two fossil darts in the deposit of Caniçal, which appear to belong to the same species.

The specimen figured is now in the Manchester Museum (no. E.E. 2314).

NOTES ON THE BRITISH DISTRIBUTION OF
TESTACELLA.

By LIONEL E. ADAMS, B.A.

(Read before the Society, Dec. 14th, 1910).

ON reading the lists of British localities of the *Testacella*, so carefully compiled by Mr. Taylor in his "Monograph," one cannot help being struck by the fact that in almost every case the records are from gardens, or at any rate from cultivated ground, or from ground immediately adjoining such, and the question immediately arises as to what extent the three species are native to the soil.

I have been at some trouble to enquire into the particulars of those records where the nature of the habitat is not specified, with the result that in only one instance the collector specifies wild ground. This record is from Mr. J. R. le B. Tomlin, who replied to my enquiries as to his record for *T. haliotidea* at Hele Bay, Ilfracombe, as follows:—"The *Testacella* (of which we found some four living and a dead specimen) was, I should say, distinctly on wild ground. It occurred under stones in a little hollow on the cliff much overgrown with brambles." On the other hand, further enquiry elicits the fact that gardens surround this little bay, and the slugs might possibly have escaped from these gardens.

Concerning the following records from the "Monograph" I have failed to gather any information, but in almost every case they may refer to gardens or cultivated ground.

¹ "*T. haliotidea* Drap.

WILTS. S.—Frequent at Devizes, also Trowbridge (J. E. Vise, Wilts. Mag., ix., no. 27, p. 178, 1866).

BEDFORD.—Abundant in the south of the county, F. W. Phillips, May, 1890.

MONMOUTH.—Plentiful at Mathem [? Malthern] near Chepstow, April 26, 1892, E. J. Lowe.

The following, however, seem to refer to natural wild grounds.

"*T. scutulium* Sow.

SOMERSET N.—Leigh Woods, rare, T. G. Ponton, 1862 (Leipner's Bristol List, 1875).

SURREY—Headley Lane, under beech leaves near Box Hill, April, 1886 ! T. D. A. Cockerell."

¹ "Monograph of the Land and Freshwater Mollusca of the British Isles," J. W. Taylor, vol. ii., part 8, p. 9, et seq.

“*T. maugei* Fér.

WILTS. S.—Fields near Devizes, Mr. Cunnington (Woodward's Manual, 1875, p. 298).

GLAMORGAN.—Bridgend, under leaves, in a little wood, July 1885 !
C. G. Barrett.”

¹ Mr. A. S. Kennard has found *T. maugei* in a deposit of Holocene rainwash at Porlock.

The records for “Leigh Woods” and “fields near” Devizes are too ancient to allow of discovering to what extent the ground was wild, and I have also failed to gain any information about the “little wood” at Bridgend ; but these last three records seem to indicate wild, natural ground.

It will be noticed that most of these records refer to the neighbourhood of the Bristol Channel, one to Bedford, and one to Surrey.

The Bedford record does not seem to have been confirmed later, and possibly referred to gardens, as I never heard of *Testacelle* in the county when I used to explore it many years ago.

The locality of the Surrey record is well known to me, and must be considered as adjoining cultivated ground. In two old-established nursery gardens in the neighbourhood both *T. haliotidea* and *T. scutulum* are common. Indeed both these species are to be found in many gardens from Dorking to Nutfield, a distance of eleven miles, but hitherto not in uncultivated ground.

The doubtful records, then, are practically narrowed down to the neighbourhood of the Bristol Channel, and the following facts favour the probability of the genus being indigenous in this district.

- 1.—All the three species are mentioned in the records.
- 2.—Judging by the foreign distribution of *T. maugei*, the locality is one in which we might expect it.²
- 3.—The autochthonous character of *T. maugei* is confirmed by the occurrence of the Holocene shell; though it must not be forgotten that rainwash records are by no means always conclusive proofs of antiquity.

That the genus is indigenous in other parts of Britain also is possible ; but, I think, the evidence of these “garden” records is hardly convincing, and one cannot help wondering to what extent its British distribution is due to transportation in plant mould, either direct from continental nurseries, or from British nurseries which have been supplied from those on the Continent. It is easy to understand how these

¹ Monograph, vol. ii., Appendix, p. 263.

² See Map in Monograph, p. 26.

worm-eating slugs increase and flourish when once they have found a lodging in a richly manured nursery garden.

Now it would be very extraordinary if such creatures as the *Testacella*, if native to the soil, existed only in gardens ; and it might well be asked where they lived before the gardens were made. If it were suggested, in answer, that the gardens were built on spots where the slugs happened to be located, although (with the exception of three ambiguous records) no slugs were known to exist outside gardens, surely the likelihood of coincidence would be somewhat unduly strained.

It is quite true that these slugs are liable to escape notice from their subterranean and nocturnal habits, and also from their protective resemblance to small yellow pebbles when dug up covered with dirt ; that navvies breaking fresh ground are the least likely people to notice such things when dug up ; that gardens are particularly likely spots for close observation, and gardeners, perhaps even more than ordinary conchologists, pay close attention to slugs.

Yet these slugs may be frequently found on the surface in the daytime, crawling or feeding, and they frequently spend the day under stones, flowerpots, etc., where they may be easily found like other slugs ; and, considering the number of conchological observers who have worked over most parts of the British Isles during the last fifty years, would it not be very extraordinary if these peculiar slugs, generically unmistakable to the tyro, had not been observed if they existed in the wild and open country ?

Now, when we consult Mr. Taylor's maps of 'Distribution'—by which, of course, we understand natural and not artificial distribution—we find thirty-three comital areas coloured on the strength of purely 'garden' records, and we are tempted to wonder how far this correctly indicates the natural distribution.

Of course it would be exceedingly difficult, and indeed often quite impossible, to draw the line between records of localities where a species is undoubtedly indigenous and those where it has been possibly introduced ; but in the case of *Testacella* one would have expected a warning of the possibility of artificial distribution—an indirect warning, however, we have, viz., the detailed list of 'garden' records.

If these maps of distribution were intended to serve no further purpose than to satisfy one's mere curiosity as to the various localities where a given species might be found, these notes would have no significance, but as the maps are intended to indicate, so far as may be, the natural situations of species from which scientific deductions may be drawn, it behoves one to guard against any disturbing factor.

As an example of the unsatisfactory nature of 'garden records,' when a comital area has been coloured red on the strength of one, I will instance *Milax gagates* :—

¹ "NORTHAMPTON.—Mr. Beeby Thompson's garden, Northampton, June, 1896 (L. E. Adams, Journ. Northants. Soc., 1896, p. 60)."

This refers to a small colony which I once found under a plant in a town garden. Though the entire county has been worked very thoroughly by many conchologists, no other specimens have yet been found. I have never had any doubt as to their artificial introduction.

² "STAFFORD.—Grounds of Grammar School, Stafford, June, 1886 !
L. E. Adams."

This refers to two or three individuals that I found in the field close to a low wall separating it from a large vegetable garden. This county has also been very thoroughly worked, but no other captures have been made.

³ "CHESHIRE.—Var. *rava*, nursery gardens, Sale, Feb., 1895 ! and Ashton-on-Mersey, Oct., 1892, C. Oldham."

Mr. Oldham informs me that he regards these slugs as undoubtedly introduced.

In the Appendix in the same volume of the "Monograph," p. 282, there is the following record :—

⁴ "SURREY.—Betchworth, Nov., 1906 ! Lionel E. Adams."

This, of course, was received too late to be of service for the map of distribution, which is, perhaps, just as well, as it refers to a colony in an old kitchen garden—the only locality for the species known in the county.

No less than eleven out of the forty-nine comital areas are affected by 'garden records' alone, and perhaps some of those not specified as such may be so. It may be noticed that all the inland comital areas depend upon these records alone, and, as I have said, I have no doubt as to the artificial introduction of the species into Stafford and Northants, and have every reason to conclude the same with regard to Warwick and Middlesex.

It is a species that is comparatively easy to acclimatise, and I know of no geological reason why it should not occur naturally inland in Britain, as it does on the continent, but the fact of its doing so is not convincingly proved by the single 'garden records.'

1 Monograph, vol. ii., p. 147.

2 Ibid.

3 Ibid., p. 144.

4 Ibid., p. 282.

PROTECTIVE RESEMBLANCE IN BRITISH
MARINE MOLLUSCA.

BY J. A. HARGREAVES.

(Read before the Society, Nov. 9th, 1910).

THE question of protection, and particularly colour protection in the British marine mollusca, does not appear to have attracted much attention. In the volume on Molluscs and Brachiopods in the *Cambridge Natural History* several instances are given of nudibranchs which are protective or warning in colouring or in habitat, or by disagreeable taste; but among the shell-bearing mollusca only three British examples are given, viz., *Chiton*, *Littorina obtusata* on *Fucus vesiculosus* and *Helcion pellucidum* on *Laminaria*.

While admitting that *Littorina obtusata* may gain some advantage from its resemblance to the air-bladders of the *Fucus*, it must be but slight if pursued by animals of normal vision, as it is easily visible at a considerable distance; whilst it appears to me that *Helcion pellucidum* is rendered more conspicuous by the blue rays which are claimed as protective.

In this part of Yorkshire, however, we have a case of what I cannot but regard as colour protection, which is undeniably serviceable, the protection being so marked as to render the shell almost invisible even at close quarters. I refer to *Acmæa virginea* (Müller) which on our coast is common, but is most difficult to find unless its habitat is known.

Our rocks between tide-marks vary from an iron-stained sandstone to a bluish-black shale, and odd specimens of *Acmæa* may be found on rocks in pools drained by the tide but never left dry. If wanted in numbers, however, another method of search must be adopted.

We have at Scarborough a nullipore *Lithothamnion polymorphum* Aresch (kindly named for me by Professor Herdman, of Liverpool), which clothes many rocks with a pink coating, with which the "pink-rayed limpet" harmonises marvellously. Not only is this the case but the mollusc is MUCH more abundant on the nullipore than elsewhere; so much so that I could gather more specimens on an average square yard of the nullipore than on a hundred square yards of uncoated rock. Even for an experienced collector it is necessary to examine the nullipore minutely over and over again to obtain all the specimens exposed, so completely does the background agree with the shell colour.

Mr. Herbert King, M.Sc., the Borough Analyst of Scarborough, has been kind enough at my request to analyse both mollusc and nullipore, and he tells me the shell and its contents gave 49% of animal matter and 51% per cent. of organic; and the *Polythamnion* in two examples gave 60% and 57% or an average of 58.5% of mineral matter. He adds: "The metals present in the ash of each were similar, as one would expect, viz.: calcium, sodium, aluminium and a small trace of iron. A very minute quantity of what might be manganese was present, but with the small amount of material at disposal this could not be satisfactorily confirmed, even with borax bead nor as permanganate."

Presumably *Acmaea* feeds on the nullipore, hence its abundance on it. When an adult *Acmaea* is taken off the nullipore, it is found that the colour of the nullipore covered by the shell has disappeared, which I think makes it probable that *Acmaea*, like *Patella*, returns to exactly the same place after feeding.

I have written to three correspondents who have taken this species alive in different parts of the country, but except in the case of Prof. Herdman who tells me he knows it in similar situations, and remarks how very like it is to its background, I have not heard of others who have found it similarly placed. Possibly now that attention has been drawn to it, instances may be found elsewhere.

I may add that *Tonicella ruber* (Lowe) also occurs on this nullipore, on which it is almost invisible.

New County Records of *Pisidium*.—Merionethshire—*P. personatum* Malm, near Arthog; *P. obtusale* Pfr., Barmouth Junction. Montgomeryshire—*P. obtusale* Pfr., near Glandyfi Junction. Cardiganshire—*P. personatum* Malm, Lyffinant Valley; *P. subtruncatum* Malm, Glandyfi. Middlesex—*P. personatum* Malm, Hampstead. East Suffolk—*P. pulchellum* Jenyns, Southwold. I have to thank Mr. B. B. Woodward for kindly identifying *P. personatum*.—J. E. COOPER (*Read before the Society*, Feb. 11, 1911).

ON THE OCCURRENCE OF *HELIX ASPERSA* Müller
var. *GLABRA* Calcara IN MID-LINCOLNSHIRE.

By J. F. MUSHAM, F.E.S.

(Read before the Society, Nov. 9th, 1910.)

AT the meeting of this Society, held on Sept. 14th last, Mr. J. W. Taylor exhibited two specimens of *Helix aspersa*, which he found referable to the var. *glabra* of Calcara, and which were sent him by me.

They were found quite accidentally in the churchyard of Rand St. Oswald, ten miles north-east of Lincoln, by a friend who was spending the day angling in the beck which runs by the side of the churchyard.

In one corner of this churchyard was a large irregular heap of stones, the bulk of them cobbles, as the district is gravelly, overgrown more or less with ivy.

Turning the heap over, he found these specimens; most of them are dead shells, but those which were alive show the same characteristics, so their smoothness can scarcely be attributable entirely to their age, or due to their being partly buried in sand.

Several youngsters were left on the spot, showing, as far as my friend could judge, every likelihood of growing up like their parents. These, I had hoped, would keep the colony flourishing, but on writing some days ago, after an interval of six months, I received the disappointing news that the stone-heap had been cleared away and the adjacent ground levelled, and all trace of the shells removed; so we may consider it fortunate that this interesting aberration was recorded in time.

I have not been able to secure more specimens from any other part of the county, but in May last a box of *H. aspersa*, similar to these, was sent me from Bracebridge-by-Lincoln Fen. They consist of dead shells of a similar ground colour, but not so glabrous.



PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

399th Meeting, held at Manchester Museum, Feb. 11th, 1911.

This meeting, to which members of the Leeds Branch had been specially invited, took the place of the ordinary February Meeting.

Mr. E. Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange.

New Member Elected.

Griffith Humphreys, 1, Belsize Avenue, London, N.W.

Candidate Proposed for Membership.

Miss Margaret C. March, Healey Grove, Burnley, Lancs.

Papers Read.

"*Helix nemoralis* and *H. hortensis*: Their Colour and Band Variations and Distribution," by W. Gyngell.

"*Diloma nigerrimum* Gmel. on the Coast of Chile," by J. E. Cooper.

"New County Records for *Pisidium*," by J. E. Cooper

Mr. W. M. Tattersall, M.Sc. gave an interesting address, embodying the results of some original researches into the Life-History of *Littorina littorea*.

Exhibits.

By Mr. W. M. Tattersall: A large series of the British species of *Littorina*, showing extremes of variation in size and colour in different localities, to illustrate his address upon the Life-History of *Littorina littorea*.

By Mr. R. Cairns: A series of varieties of *Cypraea staphylea*; also *C. capudraconis*, *C. nigropunctata*, *C. citrina*, and many other rare species among the smaller forms.

By Mr. R. Standen: *Planorbis corneus* taken near Manchester; sets obtained from one pond during a number of consecutive years, showing a gradual change from typical horn colour, through straw colour to white, and on to normal form again.

By Mrs. Gill: A fine set of *Trigonia* from Australian localities; and a number of bivalves polished to show outer structure of shell.

By Mr. J. E. Cooper: *Diloma nigerrimum* Gmel. from Chile; *Pisidium pulchellum* from Southwold, *P. personatum* from Hampstead, Arthog, and Llyfnant Valley.

SPECIAL EXHIBIT.

The chief exhibit of the meeting was a large and comprehensive collection of British *Unionidae*, probably the finest series ever brought together in the British Isles. Besides the Manchester Museum collection (R. D. Darbishire coll.), large series were shown belonging to the Conchological Society (Oldham coll.), and from the private collections of Messrs. J. Wilfrid Jackson and R. Standen. Included with the latter were fine series illustrating the Life-History of *Anodonta cygnea*, from the glochidium to the adult.

Specimens of various locality sets of *Unio* and *Anodonta* were also exhibited by Messrs. T. H. Platt, J. Ray Hardy, F. Booth, G. C. Spence, F. Rhodes, J. Madison, W. D. Roebuck, and Mrs. Gill.

During the meeting, Miss Margaret C. March, who has been studying the British *Unionidae* at the Manchester University, gave a most interesting account of the variation in the shells of *Unio pictorum*, *U. tumidus* and *Anodonta cygnea*, which was listened to with great attention.

The points dealt with by Miss March are embodied in the following abstract:—

- a.—Effect of environment: i., Marls or clays tend to produce animals with thick bodies and shells. ii., Current action in lock basin produces anteriorly truncated forms, with a forward throw of the umbo. iii., Animals living in water with excess of lime and absence of humic acid have thin shells. iv., The loss of the wing during the growth of *Anodonta cygnea* can be shown to be due to wearing.
- b.—Variation in umbonal markings: i., The three types of umbonal marking in *Unio pictorum*, *U. tumidus*, and *Anodonta cygnea* grade into one another. *U. tumidus* appears to retain the least degenerate type, and therefore to be the most primitive. This is supported by the state of development of its teeth.
- c.—Relationship of British Freshwater *Unionidae*: The intermediate stages between the *Uniones* and *Anodonta*, can be filled in from American forms, giving a perfectly-graded series, from *U. tumidus* through *U. pictorum* to *A. cygnea*.

D.—Ornament of the *Unionidae* :—This is seen best in foreign forms, and can be classified into the following types : i., Confined to the umbonal region, *e.g.*, *U. tumidus*. ii., Occupying the whole valve in a more or less degenerate form, *e.g.*, *Quadrula lacrymosa* (Lea). iii., Occupying the whole valve and fairly regular, *Parreysia nyassaensis* (Lea). iv., Occurring after an unornamented area as irregular pustulations, *Quadrula pustulata* (Lea).

Relationships of the *Unionidae* :—The older theory connecting them with the *Trigoniidae* is supported by their teeth and ornament.

Mr. J. Wilfrid Jackson gave a few short remarks on the Pearl-mussel, *Margaritana margaritifera* (L.), a very large collection of which was exhibited, the main contributors being the Manchester Museum ; Dublin Museum ; Department of Agriculture of Ireland, Fisheries Branch (these two last collections lent to Mr. Jackson for the purpose of study) ; Messrs. R. Welch, R. Standen, J. Wilfrid Jackson, and the Rev. G. A. Frank Knight.

400th Meeting, held at Manchester Museum, March 8th, 1911.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

“New Species of Shells collected by Mr. John Macoun at Barkley Sound, Vancouver Island, British Columbia,” by W. H. Dall and Paul Bartsch. “Descriptions of New Mollusks of the Family *Vitrinellidae* from the West Coast of America,” and “The Recent and Fossil Mollusks of the Genus *Alabina* from the West Coast of America,” by P. Bartsch (*from the respective authors*) ; and the usual periodicals received in exchange.

New Member Elected.

Miss M. C. March, Healey Grove, Burnley, Lancs.

Resignations.

Mrs. L. A. Baker. Professor W. A. Herdman.

Papers Read.

“Note on an early Spinous Stage in *Corbula gibba*,” by Anne L. Massy.

“Conchological Notes from La Plata, Durban, and Bombay,” by Lionel E. Adams, B.A.

“Descriptions of new Colour Varieties of *Donax variegatus* Gmelin from the Channel Islands,” by R. Woodcock.

Exhibits.

By Mr. R. Woodcock : Specimens of *Donax variegatus*, type and varieties, to illustrate his paper.

By Mr. G. C. Spence : *Planispira liedtkei* and *P. obiensis* from Obi Island ; specimens of *Cerion* from Nassau, Bahamas, including an example of *Cerion glans* with double lip.

By Mr. C. H. Moore : Fine examples of *Melapium lineatum* var. *bulbiformis* from New Zealand.

By Mr. J. Wilfrid Jackson : Shells of *Unio tumidus* from river gravel on the banks of the Avon near Bath.

In the Special Exhibit of the Genus *Amphidromus*, a large number of species and varieties of the brilliantly coloured shells of this interesting group was shown by Messrs. J. Kidson Taylor, Edward Collier, J. R. Hardy, R. Standen, G. C. Spence, and Mrs. Gill ; also the fine series in the Manchester Museum collection. Mr. Collier made some remarks upon the distribution of the genus, and pointed out the chief characteristics of the more remarkable forms.

Mr. J. Wilfrid Jackson also exhibited several examples of the Oligocene fossil form, *Amphidromus ellipticus* (J. Sow.), from the Bembridge Limestone, Isle of Wight.

401st Meeting, held at Manchester Museum, April 12th, 1911.

Mr. E. Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange.

On behalf of Miss Chaster, of Southport, a handsomely-framed portrait of her brother (the late Dr. Chaster, sometime President of the Society) was presented and the Secretary was instructed to convey the warm thanks of the members to her for this highly valued gift.

Candidate Proposed for Membership.

Harry Allan, Junr., Silverstone, Cheadle Heath, Stockport.

Member Deceased.

Rev. A. E. Northey, M.A., Torquay.

Exhibits.

By Mr. A. W. Stelfox: *Unio tumidus*, *U. pictorum* (type, and a form approaching var. *curvirostris*) from canal at Weybridge, Surrey; *Vertigo pygmaea* and *V. substriata* from N.E. shore, Clare Island, 1909.

By Mr. R. Standen: Very large *Petricola pholadiformis* from Mablethorpe, Lincs., and a fine specimen of *Calliostoma occidentale* collected at Clee, Lincs., by Mr. Arthur Smith—this was found, along with other uncommon species, on the shore after a strong gale and heavy tide, when the tide-line débris was knee-deep. An interesting series of *Aporrhais pes-pellicani*, showing gradations in growth from the earliest nepionic whorls to adult stage, from Southport; and growth stages in *Strombus gigas*, to illustrate the striking difference between juvenile and fully-grown specimens. *Hemifusus tuba* Gmel., and var. *crassicanda* Phil., from China. Very fine and perfect *Meleagrina margaritifera* from Japan.

By Mr. R. Woodcock: Some pretty examples of *Modiolaria discors* found living in a sponge growing on *Pecten opercularis*; and *Cardium exiguum* from Jersey.

By Dr. Kenneth H. Jones: *Margaritana margaritifera* from Glengariff; *Limnea involuta* from Barley Lake, Glengariff, and *Limnea pereger* from an adjacent lough, some of which approach *L. involuta* very nearly in intortion of spire and general appearance.

By Rev. L. Shackleford: *Voluta pulchra*, *V. jamrachi*, *V. thatcheri*; varieties of *V. flavicans*; and a number of varietal forms of *V. hebrea*.

By Mr. J. Kidson Taylor: A fine series of *Cochlostyla*, including *C. electrica*, and many scarce varieties of *C. mirabilis*, *C. fischeri*, *C. fulgetrum*, *C. pictor* and *C. ventricosa*; *Amphidromus dautzenbergi*—the first co-type brought to this country, and the later described sinistral form of this rare species, from Muong-Kong, Tonkin.

By Mr. G. P. Richards: *Amphidromus interruptus* var. *infrapictus*, *A. maculiferus*, *Pachyotis melanostomus*, *Cypraea erosa* var. *straminea* and var. *chloricans* Melv., *C. poraria* var. *kanaiensis* Melv., and *C. caput-columbi* Kenyon.

By Mr. G. C. Spence: Specimens of *Dreissensia polymorpha* collected in the Lancaster canal during February, 1910 and 1911, to illustrate the remarkable difference in growth and amount of erosion of the shells during the twelve months' interval; also a fine copy of Captain Thomas Brown's "Conchology of Great Britain and Ireland," 1st edition, 1827.

By Mr. T. H. Platt: *Solen siliqua*, *Scaphander lignarius*, *Helicella virgata* and var. *leucozona* and var. *lutescens*, *H. acuta* and var. *bizona* and var. *grisea*, *H. caperata*, *Helix nemoralis*, *Cochlicopa lubrica*, *Jamnia cylindracea*, and *J. mus-*

corum, all from Aberffraw, Anglesea. Also *Hygromia rufescens*, type and var. *rubens* and var. *alba*, *Cochlicopa lubrica*, *Jaminiia cylindracea*, and *J. muscorum* from Red Wharf Bay, Anglesea.

By Mrs. Gill: A series of varieties of *Acaus hæmastomus* and *A. phoenix*, from Ceylon; and a specimen of *Hemifusus tuba* var. *crassicauda*.

In the special exhibit of the curious and interesting group of shells in the sub-family Odontostominae, peculiar to South America, a large proportion of the known species was exhibited from the collections of Mrs. Gill, Messrs. Ed. Collier, R. Cairns, B. R. Lucas, J. R. Hardy, T. H. Platt, R. Standen, and the Manchester Museum.

402nd Meeting, held at Manchester Museum, May 10th, 1911.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted:

"Studies in the Morphogenesis of certain *Pelecypoda*: (1), A Preliminary Note on Variation in *Unio pictorum*, *U. tumidus* and *Anodonta cygnea*," by Margaret C. March (*from the authoress*). "Outline Classification of the Animal Kingdom," 4th edition, by Prof. S. J. Hickson (*from the Keeper of the Manchester Museum*). "A List of the Land and Freshwater Mollusks of Ireland," by A. W. Stelfox. "The Recent and Fossil Mollusks of the Genus *Diastoma* from the West Coast of America"; "The West American Mollusks of the Genus *Eumeta*," both by P. Bartsch. "Notes on Non-Marine Mollusca from some Irish Lakes," by A. S. Kennard and B. B. Woodward. "On the Occurrence of *Pisidium supinum* in the Living State in England"; "On the Occurrence in the British Isles of Living Specimens of *Pisidium steenbuchii* Mörch and *P. liljeborgii* Clessin, with Notes on New Records of *Pisidia* for the Lake District, and Fresh Localities for *P. supinum* A. Schm.;" "Note on Further British Localities for *Pisidium steenbuchii* Mörch and *P. liljeborgii* Clessin—all by B. B. Woodward. "A Double-Mouthed *Clausilia bidentata* at Yealand Conyers near Carnforth, Lancs.;" "On *Unio distortus* Bean and *Alasmodon vetustus* Brown from the Upper Estuarine beds of Gristorpe, Yorks.—both by J. Wilfrid Jackson. "Manual of Conchology," part 82, by H. A. Pilsbry (*from the respective authors*). "A Catalogue of the Mollusca of Northumberland and Durham," by Joshua Alder. "Check-Lists of the Shells of North America," by Isaac Lea and others. "Catalogue of the Mollusca in the Collection of the Government Central Museum, Madras," by J. Mitchell (*presented by E. W. Swanton*). "Anatomy of British Species of *Psammobia*," by H. H. Bloomer. "Zur Gattung *Fasciolaria* Lam.," by Hermann Strebel. "Studies in the Morphogenesis of certain *Pelecypoda*: (2), The Ancestry of *Trigonia gibbosa*," by Margaret C. March (*from the respective authors*). "Révision des Mollusques Marins des Açores," by P. Dautzenberg. "Fauna, Flora, and Geology of the Clyde Area," by various authors. "Traité de Zoologie" (2 vols., 1884), by C. Claus. "Proceedings of the Malacological Society of London" (vols. i.-iii., 1893-1899). "The 'Valorous' Expedition (Molluscan Report)," by J. Gwyn Jeffreys. "A Report upon the Mollusca . . . Royal Irish Academy Cruises of 1885, 1886, and 1888," by G. W. Chaster. "On the Marine Testacea of the Piedmontese Coast," by J. G. Jeffreys (*presented by Miss Chaster, from the Library of the late Dr. G. W. Chaster*); and the usual periodicals received in exchange.

New Member Elected.

Harry Allan, jun., Silverstone, Cheadle Heath, Stockport.

Candidate Proposed for Membership.

George Curtis Leman, 44, Bloomsbury Square, London, W.C.

Exhibits.

By Mr. J. Wilfrid Jackson: A large specimen of *Unio pictorum* from the canal at Marple, Cheshire, exhibiting fine radial striations on the anterior half of the shell. The striae, which radiate from the umbo, are only slightly visible on the umbonal region, but become more and more apparent as the ventral margin is approached.

By Dr. K. Hurlstone Jones: *Pisidium casertanum* and *P. lilljeborgi* from Lough Mare, Glengariff, Co. Cork; *P. obtusale* from a small wayside pond near Lough Mare, Glengariff; *P. steenbuchi* from a roadside pool, Coomerkane Valley, Glengariff; and *P. hibernicum* from Lough Nagarriva, Co. Kerry, all taken during March and April last.

By Rev. Lewis J. Shackelford: *Voluta vesperilio* L., type, and vars. *serpentina* Lam., *pellis-serpentis* Lam. (specimens 110-118 mm. long), and *mitis* Lam., and a large number of intermediates, illustrating the extreme variability of the species; *V. zebra* Leach from Geelong, and its var. *lineata* Leach from Tasmania; *V. nivosa* Lam., and *Lyria (Euaeta) harpa* Barnes, west coast of Central America—an unusually fine specimen.

By Mr. G. C. Spence: *Achatina knorri* from Fernando Po; *Placostylus bavayi* *P. macfarlandi*, *P. alexander*, and many other species in exceptionally fine condition, including *P. clevis*—a magnificent specimen with the delicate green cuticle intact, a state in which this shell is seldom seen, the specimens usually met with in collections being rose-pink in colour, owing to loss of epidermis; in Tryon's Appendix to his Monograph on *Placostylus*, in the "Manual of Conchology," he describes and figures an almost identical example from the collection of Dr. J. C. Cox, which has retained the cuticle on all but the apical whorls, and this appears to be the first specimen of this rare form he had seen.

By Mr. R. Standen: An interesting series of *Cypræa mauritiana*, dredged alive off the coast of Mauritius, showing transitional growth-stages from specimens an inch in length to fully adult; also some well-marked *Nauiina inversicolor* from Mauritius.

By Mr. R. Cairns: A very fine series of Land Operculates, including *Cyclophorus kubaryi*, *C. rafflesi*, *C. leucostomus*, *C. aquila*, *C. borneensis*, *C. cochranæi*, *C. zollingeri*, *C. smithi*, *C. ibyatensis*, *C. turbo*, *C. perdis*, *C. cybeus*, *C. punctatus*, *Acroptychia equivoca*, *Leucöptychia leai* and *L. foliaceus*.

By Mrs. Gill: *Conus floridanus*, *C. orbigny*, *C. ammiralis*, *C. granulatus*, *C. cancellatus*, and other interesting species.

By Mr. Harry Allan: *Vitrea alliaria*, *Helix nemoralis* var. *rubella* 00300, and other forms; *Sphærium corneum*, *Physa hypnorum*, *Limnaea pereger*, and *Planorbis spirorbis*, from Cheadle Heath near Manchester; *Helix aspersa* and var. *zonata*, *H. nemoralis* var. *olivacea*, *Cochlicopa lubrica*, *Clausilia bidentata*, *Jamnia cylindracea*, *Helicella acuta*, *Vitrea cellaria*, *V. lucia*—of large size and brilliant coloration—from Great Orme's Head, Llandudno; series of *H. nemoralis* and *H. pisana* from various localities; *H. arbustorum* type, and var. *flavescens* from Derbyshire.

By Mr. C. H. Moore: A number of land shells collected in the neighbourhood of Dyserth and St. Asaph, Flintshire, during Easter week of this year.

In the Special Exhibit of *Veritina*, the fine series in the Manchester Museum, "Layard," and "R. D. Darbishire" collections were shown by Mr. R. Standen, who pointed out the various characteristics of the different sections into which the genus is divided, their habitats, and geographical distribution. Specimens were shown by other members, including a fine series of eighteen species received by Mr. Collier from the late Mr. Andrew Garrett, of Huahine, who had collected them in the South Sea Islands.

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VOL. 13.

OCTOBER, 1911.

No. 8.

ADDITIONS TO "BRITISH CONCHOLOGY."

BY J. T. MARSHALL.

PART VII. (*continued from page 209*).

F. gracilis DaCosta.—South Devon is the limit of this species, where it becomes rare. The Alderney record¹ was an error—a very pardonable one. I have seen Mr. Marquand's shell, and it proves to be a worn and broken specimen of *Buccinum undatum*, stained brown by age, worn smooth by rolling, and the broken aperture reconstructed with the leathery integument of another marine animal.

var. **convoluta** Jeff.—Scilly Islands (Smart and others); the Smalls Light (Span)! and various other places, but sparingly. Variable in length and slenderness. My largest are $3\frac{1}{2}$ -in. in length by 1-in. only in the widest part, and have a deeply-channelled suture. A dwarf form from the Shetlands is half this size, with a finer apex, the young of which have the same proportions and might easily be mistaken for *F. propinquus* var. *turrita*, but they are more coarsely sculptured. Some Scillonian specimens have a light yellow epidermis, with the sculpture less marked. This variety is well illustrated by Forbes and Hanley (pl. ciii., fig. 3), and by Captain Brown (pl. vi., figs. 7, 9).

var. **belliana** Jord. (*Journ. of Conch.*, 1890, vol. vi., p. 232).—Larger and broader. Off the Wexford and Waterford coasts, 20-30f. (Jordan and others); off Galley Head, S. Ireland (Wotton)! deep water off Montrose, Aberdeenshire, and Flugga Light, North Shetlands (Simpson)! Doggerbank, 30f.; Moray Frith, 24f. This is the form figured by Forbes and Hanley (though not the type) as "dredged from the Doggerbank at the depth of 50f."²

var. **coulsoni** Jord. (*Journ. of Conch.*, vol. vi., p. 232, 1890).—Smaller and narrower; the usual deep-water form. Shetlands, from

¹ Marquand, "Marine Shells of Guernsey," Trans. Guerns. Soc. Nat. Sci., 1901, p. 14 (separate copy).

² Brit. Moll., vol. iii., p. 418, pl. ciii., fig. 1.

trawlers (Jordan and others); the Smalls Lighthouse (Span)! off Peterhead, 60f.; West Orkneys, 45f.; off the Butt of Lewis, 90-100f.

var. **glabra** Verk.¹—New to Britain. Off the Shetlands, 155f. (Scottish Fishery Board)! This was first recorded from Finmark by Mr. T. A. Verkriizen. My specimens are small and thin, the epidermis very delicate, silky, and highly polished, resembling gold-beater's skin, and the spiral striæ slight or totally absent. I have three specimens trawled from deep water in the Shetlands, and their appearance suggests a habitat in deep and still water, on fine sand or mud. Canon Norman dredged a small form of it at Drontheim, which is figured in the "Annals" for Nov., 1893, and Mr. James Simpson has many specimens procured from the north side of the Shetland-Faroe Channel, 60-70f.! The original Finmark specimens, of which Sars' figure is a good representation, have an unusually short base and canal, somewhat similar to *F. curtus* Jeff., from North America and the Crag, but those characters are not uniform in this variety.

I do not know of any good typical figure of this common shell. Shetland specimens of *F. gracilis* (as in the last species and the next) are more slender than usual, and Gwyn Jeffreys figures this slender form as his type; Sowerby figures an immature shell, the base being angulated in consequence of the last whorl not being fully developed; while Forbes and Hanley describe as their type "the beautiful slender form that is most commonly preserved in cabinets," but their figures illustrate the vars. *belliana* and *convoluta*. Mr. Tomlin's collection contains a reversed example. Specimens of this and the next species are occasionally dredged which are denuded of the epidermis and apparently dead and water-worn, yet still containing the animal and operculum. As I have explained with regard to examples of *Trochus* in a similar condition, these have been swallowed by fish and voided again, the action of the gastric fluid having meanwhile destroyed the epidermis.

F. propinquus Ald.—Not Dublin Bay nor Cork, which localities belong to the next species (Jeffreys); Birkdale (Heathcote); Llandulas (Archer); St. Andrew's (M'Intosh); off Peterhead 60 f. (Triton)! West Orkneys 45 f.; and North Rona. In the Report of the 'Valorous' Expedition, Gwyn Jeffreys has mistakenly recorded this species from the Bay of Biscay 109-1380 f., by the 'Porcupine' Expedition of 1870, instead of from the West of Ireland, Stations 24 and 30, by the expedition of 1869; and Canon Norman has also mistakenly recorded it from N. of Hebrides, 189-530 f., 'Porcupine' 1869, instead of 'Lightning' Expedition, 1868.

¹ Sars, Moll. Reg. Arct. Norv., pp. 271-2, tab. 4, fig. 7 (as *Sipho glaber*, from Vadsö and the Lofotens).

var. **turrita** M. Sars.—North Sea 74 f.; off the Shetlands 111 f.; midway between the Shetlands and Norway 59-73 f.; and North-East Shetlands, several specimens from Aberdeen trawl-boats (Simpson)! Its dimensions are $1\frac{1}{4}$ -in. by $\frac{3}{8}$ -in., the apex is much more pointed than in the type, and it is very rare on our Shetland coasts. One of my specimens is almost smooth. Searles Wood figures a specimen from the Red Crag (pl. ii. fig. 15) as what he considers “an abnormal form of *F. propinquus*.” It is not very well executed, but fairly represents this variety. Various misconceptions have centred round the identity of this shell. The specimens ascribed to it by Mr. H. K. Jordan¹ are not of this variety, but small typical specimens. Some writers prefer to consider it a variety of *F. tortuosus*, G. O. Sars, and it is so described and figured by him, though from a poor specimen minus the apex.² The difference between Sars’ var. *turrita* and var. *attenuatus*³ is not apparent, certainly not in the figures, and I consider them the same thing; while Gwyn Jeffreys held that *F. tortuosus* G. O. Sars (non Reeve, which is *F. sabini* Gray) is another variety of *F. propinquus*.⁴ However that may be, from my own specimens I can easily graduate vars. *turrita* and *attenuatus* into typical *F. propinquus*, from which they do not differ in any particular except that of proportion. Sars was mistaken in quoting *F. attenuatus* Jeff. as a synonym of his var. *attenuatus*; they have nothing in common except the name. The latter, as well as *tortuosus* and *turrita*, are attenuated at each end, which gives them a cylindrical outline, whereas *F. attenuatus* Jeff. and *F. consimilis* Marsh. are attenuated in the spire only, but have a short and broad base, which imparts a conical outline in comparison with the others. The two latter are also much larger shells, with a glossy surface and compressed whorls. Canon Norman is also “inclined to add as a wider variety” *F. delicatus* Jeff.,⁵ but that again is quite distinct from *F. propinquus* or any of its varieties, all its affinities (except size) being with *F. sabini* Gray.

var. **lævis** Marsh. n. var.—This is a small delicate form, with a light, silky, polished epidermis, and the whorls partially or entirely without the usual spiral sculpture. It corresponds with *F. gracilis* var. *glabra*, but is still smoother than that variety, and comes from the same British locality.

As in the last three species, there is a broad as well as a slender variety, the result of depth and habitat. It flourishes best on the Doggerbank, where I have dredged it in comparative abundance and

1 Journ. Conch., 1890, vol. vi., p. 233.

2 Moll. Reg. Arct. Norv., p. 272, t. 25, fig. 11 (printed 10 in error).

3 Loc. cit., p. 273, t. 15, fig. 5.

4 Moll. Triton Exp., Proc. Zool. Soc., 1883, p. 395.

5 Ann. Mag. Nat. Hist., 1899, p. 142.

of large size, the largest attaining $2\frac{1}{4}$ -in. by 1-in.; but on the edge of the Doggerbank and in the Silver Pits, where the water is deeper, they become smaller and narrower, like the Shetland form, although the latter district produces large specimens also in places. Mr. Richard Howse¹ first noticed and figured the small deep-water form, but mistakenly under the name of *F. gracilis* var., which he described as "hispid, $1\frac{1}{4}$ -in. by $\frac{1}{2}$ -in., with seven whorls;" and if it merits a varietal name that of var. *howsei* would be appropriate. Some of my Shetland specimens do not exceed an inch in length by less than half that width. Searles Wood records and figures a reversed specimen found by Mr. A. Bell in the Red Crag (pl. 7, fig. 21).

This is another instance in which Forbes and Hanley, Jeffreys, and Sowerby are at variance as to the type-form, and unfortunately the author did not accompany his description with a figure. Gwyn Jeffreys' figure, description, and dimensions belong to the Shetland and deep-water form, while the other authors figure more southern examples as the type; and although Forbes and Hanley give the dimensions as $1\frac{1}{2}$ -in. by $\frac{1}{2}$ -in., their figured specimen is $2\frac{1}{2}$ -in. by 1 in. Captain Brown's figures are not this, but the next species.

F. jeffreysianus Fisch.—Bristol Channel (Wotton)! the Smalls Lighthouse (Span)! Milford Haven (Jordan); Tenby and Laugharne (Williams-Vaughan)! Brixham in S. Devon, from trawlers; and occasionally cast ashore in Torbay by storms. It has been dredged on the north coast of Spain (Locard, 'Travailleur' Exp.), and I have a young specimen dredged by the Porcupine off Cadiz in 386 f.

I incline to the opinion of Canon Norman, that this is "a large variety of *F. propinquus*." It is not only larger generally, but is much more solid and robust, and commences where the latter leaves off, viz., in the Bristol Channel, *F. propinquus* tending north, and *F. jeffreysianus* to the south. Its British range is from Exmouth in South Devon (Clark) to both sides of St. George's Channel as far as the Smalls Lighthouse off the Pembrokeshire coast, which is its northernmost limit, meeting here and mingling with *F. propinquus*, and so both partake somewhat of each other's characteristics. From a series of specimens from this district it is not difficult to graduate one form into the other, or to meet with examples that may be ascribed to either. Moreover, none of the characters ascribed to it by Jeffreys mark it off as a distinct species. The comparative length of the spire is too variable to make it a specific test, and as to that of the smooth epidermis, Gwyn Jeffreys would probably now qualify his description after admitting that *F. sabini*, *F. pygmaeus*, *F. propinquus*, and *Buccinum groenlandicum* are occasionally "finely and closely ciliated,

¹ "Notes on a Dredging Excursion off Dunbar," Ann. Mag. N. Hist., vol. xix., p. 161 pl. 10, fig. 5.

though the epidermis is usually smooth," for some *F. jeffreysianus* are certainly hispid even to the unaided eye. It is quite true that the young and fry "are as distinct from those of *F. propinquus* as the adult of each from the other," but neither is that a specific test. (It is curious, by the way, that in shape the young are the reverse to the adult shell, those of *F. jeffreysianus* being long and narrow, while those of *F. propinquus* are short and stumpy). The shell becomes larger and more solid as it proceeds south, and attains its greatest development in Torbay and at Exmouth, my largest thence being $2\frac{5}{8}$ -in. by $1\frac{1}{4}$ -in., while the smallest, from the south of Ireland and the Pembrokeshire coast, are $1\frac{5}{8}$ -in. by $\frac{3}{4}$ -in. All the published figures correctly represent the shell, the best perhaps being those of Captain Thomas Brown,¹ who was the first to figure it, though mistakenly as the last species. His description, however, is unreliable, and he says a specimen was "found at Seaton, Northumberland, by Walter Trevelyan, Esq., and is in the cabinet of Sir John Trevelyan, at Wallington;" but the figures are undoubtedly those of *F. jeffreysianus*, and of the South Devon form. Sir Walter may without doubt have picked up a specimen of *F. propinquus* at Seaton, but that cannot be the shell figured by Brown, and it is surprising to find Gwyn Jeffreys and others failing to recognise these figures. Sowerby figures the Irish form well.

F. berniciensis King.—Aberdeenshire (Simpson and others)! Channel slope 539 f. ('Porcupine'); Atlantic off Ireland 345 f. (R.I.A. cruise)! Shetland-Faroe Channel 570 f. ('Triton'). The finest come from the Doggerbank, and measure $4\frac{1}{4}$ -in. by $1\frac{7}{8}$ -in. Four prominent ridges (sometimes only three) encircle the periphery of each whorl. A specimen from the Doggerbank is peculiar in having the very different smooth and spiral embryo of *F. norvegicus*. Gwyn Jeffreys' figure is drawn out of scale; the spire is too slender and the last whorl too short and distended. Sowerby's figure has the same faults.

var. **elegans** Jeff.—East Shetlands 70 f. (Simpson and others)! North of Unst (Jordan); Doggerbank 30 f., North Rona 45 f., and East Shetlands 100 f. Also N. of Hebrides 530 f. ('Knight Errant'); Shetland-Faroe Channel 680 f. and 640 f. ('Triton'); between the Hebrides and Faroes 155-632 f. ('Porcupine'). L. 4-in., b. $1\frac{5}{8}$ -in. This lives with the type on the Shetland deep-sea fishing-grounds, whence Barlee and Jeffreys first procured it, and I have several specimens from the same locality. From the same region I have a fully adult specimen which is only half the usual size— $2\frac{1}{2}$ -in. by $1\frac{1}{8}$ -in. Another variety,² with more tumid whorls and shorter spire, has been

1 Illust. Rec. Shells, 2nd ed., 1845, p. 8, pl. vi., figs. 11, 12.

2 Var. *inflata*, Jeff., 'Valorous' Moll., Ann. Mag. N. Hist., 1877, p. 327.

dredged by the 'Porcupine' 50 miles west of the Shetlands in 203 f., and north of Scotland in 290 f. (Jeffreys), but which does not differ, except in texture, from var. *solida* G. O. Sars.¹ I have two specimens that may pass for either of these varieties, one from the Shetlands and the other from the Doggerbank. All three varieties gradually merge from the type, and are only the extreme forms common to all the *Fusus* family, and indeed to all univalves.

F. fenestratus Turt.—This has hitherto been considered a very rare species. It lives in deep water, far from the coast, and has never been taken in private dredging except in one instance, a young specimen from the Minch in 72 f. (J. T. M.); S. of Ireland 110 f. (E. A. Smith); S. W. Ireland 50 f. (R. I. A. cruise)! Channel slope 539 f., off Cape Clear 180 f., S. of Ireland 725 f., and W. of Ireland 90 f. ('Porcupine'); off the Butt of Lewis 530 f. ('Knight Errant'); Shetland-Faroe Channel 530 f. ('Triton'); off the Butt of Lewis 545 f., midway between the Shetlands and Norway 197 f., and off the Faroes 71 f. (Simpson)! It was also dredged by the 'Porcupine' off the coast of Portugal in 220 f. Since 1892 specimens have occasionally been dredged in the west and south of Ireland, in company with *Buccinopsis dalei*, by the Irish Fishery Board. Two or three specimens have also been trawled in recent years between the Pembroke-shire and Waterford coasts; one of these is $2\frac{1}{4}$ -in. in length, and has seven whorls besides the apical ones; but for many years previously the only specimens known had their source from old Mr. Humphreys, the dealer, of Dublin, who obtained altogether during his career eight specimens, one of which is in my collection. It has also been recorded from Saddell, Clyde, 47 f., in the Scottish Fishery Board Report for 1897, but in view of the various mistaken records which I have cited from those Reports (and there are others which I have not cited) the identity of the species requires confirmation. My young specimen from the Minch has only $3\frac{1}{2}$ whorls, but is interesting as showing the embryonic sculpture, which is usually worn down in the adult. The first whorl is quite smooth, the second has spirals only, and the third initiates the longitudinals and spirals which characterise the adult. Gwyn Jeffreys gives an excellent figure, but Sowerby's is not like.

A good many outlying members of this genus have been dredged between the Hebrides and Shetlands and the Faroes, as well as in the Atlantic, by the 'Lightning,' 'Knight Errant,' 'Triton,' and 'Porcupine' expeditions, including *F. delicatus* Jeff., *F. hirsutus* Jeff., *F. lachesis* Mörch, *F. sarsii* Jeff., *F. sabini* Gray, *F. concinnus* Jeff., *F. turgidulus* Jeff., *F. togatus* Mörch, *F. moebii* Dunk. and Metz., and

¹ Moll. Reg. Arct. Norv., p. 278, tab. 14, fig. 2.

F. ebur Mörch. But it should be noted as a significant fact that the discoverers and authors of these species did not attempt to claim for them a British origin.

Fusus turgidulus Jeff. was dredged by the 'Porcupine' 40 miles N.W. of the Shetlands in 345f.; also 60 miles N. of the Butt of Lewis in 155f. (Jeffreys).

F. ebur Mörch, a Crag fossil, was dredged by the 'Knight Errant' 60 miles off the Butt of Lewis in 515f. Gwyn Jeffreys makes this a synonym of *F. sabini* Gray,¹ while Herr Friele says he has examined the type, and maintains their distinctness.

Mohnia alba Friele was dredged by the 'Knight Errant' in the Shetland-Faroe Channel in 540f., and *M. mohui* Friele by the 'Triton' in the same locality in 640f.

To the foregoing may be added another species, closely allied to *F. attenuatus* Jeff.,² which was trawled in 1897 by an Aberdeen steam-trawler "on the north side of the Shetland-Faroe Channel, on a small bank 60 to 70 fathoms deep, with very deep water on either side," and which I propose to name **F. consimilis** n.sp. With two exceptions it agrees in every respect with Gwyn Jeffreys' description of *F. attenuatus*, so closely indeed as to suggest at first that those two exceptions may possibly be reconciled if more specimens come to hand; but one of them is fundamentally distinct. Gwyn Jeffreys writes that the spire of *F. attenuatus* tapers "to a very blunt and regular spiral point, which is not mammillar nor twisted," while my specimen has a twisted and bulbous apex wider than the following whorl and similar to that of *F. islandicus*, but not stiliform. He also describes the canal as "straight," while in my shell it is much curved. All the other characters given to *F. attenuatus* may be applied to this species—shape, size, measurements, sculpture, epidermis, colour, etc. This specimen came into the hands of Mr. James Simpson, who generously gave it to me. *F. attenuatus* Jeff. is a very rare species, only one living and two dead adult specimens having been dredged by the 'Valorous' in mid-Atlantic, and by the 'Porcupine' in the Atlantic off Ireland, while no figure of it has yet been published. The correct 'Porcupine' localities for *F. attenuatus* are S. W. Ireland off Cape Clear 1207 f., and N. W. Ireland off Rockall 1215-1380 f., and not those recorded in error by Gwyn Jeffreys.³

A specimen of *F. concinnus* Jeff.⁴ was found some few years ago on an Aberdeen trawl-boat by Mr. J. Simpson.⁵ It was an adult

1 Moll. 'Valorous' Exp., Proc. Roy. Soc., vol. xxv., p. 327.

2 Proc. Roy. Soc., vol. 18, p. 434, 1870, name only; and Ann. Mag. N. Hist., 1877 (misprinted 1876 in private copy), p. 326.

3 Moll. 'Valorous' Exp., Ann. Mag. N. Hist., 1877, p. 326.

4 Moll. 'Triton' Exp., Proc. Zool. Soc., 1883, p. 397, pl. xlv., figs. 8, 8a.

5 Trans. Aberdeen W.M. Nat. Hist. Soc., 1893, p. 84.

example, perfect, but dead. The species was described by the author from a single specimen dredged by the 'Triton,' in the Shetland-Faroe Channel in 608 f., but this specimen more probably came from the deep-sea fishing grounds 70 miles east of the Shetlands, as trawlers cannot work their trawl deeper than about 100 f., and rarely at that. On another occasion, from the same source, Mr. Simpson found a living but immature specimen of another *Fusus* different from any species that I know. It is about the size of *F. latericeus* Möll., but differs from that shell in being still more slender, with more compressed whorls, no longitudinal ribs, and a bulbous apex.¹ I am informed that of late years several species of the Echinodermata have been brought into Aberdeen from the same fishing grounds which had only been previously dredged in the Shetland-Faroe Channel, and I have myself described an *Adula*² from these fishing grounds, which if not well authenticated, might have been relegated to the Shetland-Faroe Channel. (In this connection, I may add that a more recent discovery of *A. simpsoni* in a Teredo-pierced piece of wood brings its habitat into complete harmony with that of *A. argenteus* Jeff., from frigid water in the Shetland-Faroe Channel).

The results of the exploration of the Shetland-Faroe Channel by various expeditions has, of course, brought the question of the limits of the British area for zoological purposes into urgent prominence, and it is to be hoped that the British Association will soon take it in hand and issue some authoritative rules on the subject, as they have done in the matter of the Rules of Priority and Nomenclature. This boundary or zone must in any case be an arbitrary one, and for that very reason individual opinion cannot be expected to carry much weight. It is also the more necessary, not only because some rather wild ideas appear to be entertained as to what constitutes a British species or what are the limits of the British seas, but more especially because steam-trawlers are rapidly taking the place of the old sailing craft, and are now working nearly all the year round up to Iceland and the Faroes, bringing back with them various genera of marine animals; while the change from sailing to steam trawlers is still more accelerated owing to the growing reluctance of fishermen to remain at sea more than from Monday to Saturday; they are all learning to appreciate their week-end on shore, and, once enjoyed, cannot be induced to sacrifice that privilege; so that while steam-trawlers are easily manned, and can run home when they like, there is a difficulty in shipping hands for the sailing craft, who have to come home when they can.

1 Trans. Aberdeen W.M. Nat. Hist. Soc., 1903, p. 84.

2 *Adula (Myrina) simpsoni* Marsh., Journ. Malac., 1900, vol. vii., p. 167, figs. 1-3.

Nassa reticulata L.—Some specimens from Jersey are intermediate between the type and var. *nitida*. A short-spined form (var. *curta* B. D. and D.) occurs on the South Devon coasts, and has corresponding forms in the next two species. The denticulations of the aperture are periodical marks of growth only, and not of maturity, a similar peculiarity obtaining in our other species of *Nassa* as well as in *Purpura lapillus*.

var. **minor** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 261.—Coll. Clark (Jeffreys), and Torbay. This has the proportions of *N. pygmæa*, while an immature typical specimen of the same size is more conical and stumpy, and clearly indicates its immaturity.

var. **nitida** Jeff.—Hunstanton (Mayfield)! Falmouth (Norman and J. T. M.); Southampton Water. This was described and figured in *British Conchology* as a distinct species, but met with no acceptance.

N. incrassata Ström.—Variable in size, sculpture, and length of spire. Dredged specimens are always much smaller than those living between tide-marks. An example from Scilly is pure white.

var. **major** Jeff.—Chapple Island, Bantry Bay (Span)! This variety is only a line longer than the type, but it bulks largely. L. 0·6in., b. 0·4.

var. **minor** Jeff.—Generally distributed, but mostly dredged. Scilly Isles, Land's End, Torbay, Scarborough, Bundoran, Achil Island, Dornoch Frith, Loch Boisdale, &c. Usually two lines in length, but some specimens from Torbay are still smaller.

var. **simulans** Jeff.—Occasionally with the type, though rare and solitary. Guernsey, Scilly Isles, Weymouth, Scarborough, Killalla Bay, Sound of Sleat, Barra. Typical specimens frequently have a varix on one of the topmost whorls.

N. pygmæa Lam.—Some of the forms of this species run remarkably close to *N. incrassata*. Usually the whorls are less tumid, the suture shallower, and the crossings of the cancellated sculpture produce granulations instead of tubercles, while the young are more polished and not so angular at the base. Very rarely the shell is minus the specific varicose rib, and in a few cases the sculpture is regularly reticulated, the longitudinals and spirals being equalised and forming square spaces. Gwyn Jeffreys' figure is a good outline, but it exhibits the sculpture coarser than *N. incrassata* instead of finer.

(To be continued).

VITRINA HIBERNICA Taylor AND JEFFREYS' VARIETIES
OF VITRINA PELLUCIDA Müller.

By LIONEL E. ADAMS, B.A.

(Read before the Society, September 13th, 1911).

IN the "Irish Naturalist" for August, 1907, appeared a most interesting account by Mr. J. W. Taylor of an addition to the Irish mollusca, viz., *Vitrina elongata* Drap. (since altered to *V. hibernica* Taylor), which had recently been discovered by Mr. P. H. Grierson in co. Louth.

It is just possible that conchologists will be interested in the confusion that there has been with regard to the British *Vitrina*, and its alleged varieties, one of which bears such a remarkable likeness to *V. hibernica* that one might almost imagine that Jeffreys had a specimen of the Irish form before him when he wrote the description of *V. elongata*.

Mr. Grierson very kindly sent me three living specimens, which I kept side by side with some *V. pellucida* for comparison. The difference between the two species is very marked, and Mr. Taylor's description and remarks on them are very accurate; however, I have noticed two further points of difference, which I believe to be constant.

- 1.—In *pellucida* the rim of the respiratory orifice is coloured with black pigment, especially above, and this coloration is the darkest occurring in the animal, while in *hibernica* the rim is colourless and is the lightest portion of the animal.
- 2.—The spatuliform lobe of the mantle, which extends over the nucleus of the shell in *hibernica*, is marked with the darkest coloration to be found on the animal, while the same region in *pellucida* is perfectly colourless.

When first I saw a shell of *hibernica* it immediately suggested the elusive form of *V. pellucida*, named by Jeffreys var. *depressiuscula*, a satisfactory example of which I have never seen. I quote here what Jeffreys says on the subject in his "British Conchology," vol. 1, p. 157:—

"Var. 1, *depressiuscula*.—Shell rather oval and flatter on both sides; *spire* scarcely raised above the level of the last whorl. *V. draparnaldi* and *V. depressa* Jeffr. in Linn. Trans. xvi., pp. 326, 327. Var. 1, neighbourhood of Swansea and Plymouth (J.G.J.). It approaches very near to *V. major* of the elder Férussac and *V. draparnaldi* of Cuvier, with which I at one time considered it to be identical."

Now, on examination of the Linnean Transactions referred to, we find under the name *V. draparnaldi* not only a very accurate description of the shell of *V. hibernica*, but also of the animal with the specific characteristic clearly set forth. It will be convenient to give the extract almost in full.

“VITRINA.

1. MULLERI [=pellucida Müll.].

Animal albo-cinereum. *Sustentaculum* perangustum crassum. *Pallii processus*, albus.

Testa orbiculata, utrinque convexa, hyalina, politissima, subvirescenti-alba.

Anfractus 3. *Apertura* subrotundo-lunata.

Long. 0'125. Diam. 0'175.

. . . . The shell differs from the following in the spire being more central and produced, and in the form of the aperture, which is slightly angular near the insertion of the columellar border. The size of the animal is also not so disproportionately large.

2. DRAPARNALDI.

Animal griseum, testum valdè superans. *Sustentaculum* permagnunum.

Testa depressior, spirâ parum exsertâ laterali, perlucida, subviridis. *Anfractus* 3. *Apertura* ampla, elliptico-lunata.

Long. 0'135. Diam. 0'25.

Vitrina pellucida Drap., *Hist. des Moll.*, p. 119, t. 8, f. 38 [fig. 38 is *V. diaphana*].

Plentifully towards the end of autumn at the roots of the *Rosa spinosissima* on the Swansea burrows.”

3. DEPRESSA.

Testa depressa, lentissime et irregulariter rugosa, albida. *Anfractus* 2, vix 3. *Apertura* lunata.

Long. 0'065. Diam. 0'145.

As yet I have found only two dead specimens from Britonsferry Wood near Swansea. In its general contour it more nearly resembles the true *Helices* than any of the preceding ones. . . . This description being so different from the preceding, it is difficult to see how Jeffreys managed to class both *draparnaldi* and *depressa* together as he did subsequently in his “British Conchology” under the name *depressiuscula*.

“4.—ELONGATA.

Animal elongatum, peramplum. *Tentacula* brevia, ferè conica.

Testa globosa, spirâ prominutâ, alba. *Anfractus* vix 2. *Apertura* ovato-lunata.

Long. 0'085. Diam. 0'15.

Vitrina elongata Drap., *Hist. des Moll.*, p. 102, t. 8, f. 40.

From Britonsferry Wood near Swansea; very rare. Except in the fewer volutions and less orbicular form (characters which do not alter with the growth of the shell), I should have been inclined to consider this as the young of *V. Müllereri*.

Draparnaud's representation of this shell is very incorrect and by no means agrees with his description."

In a Supplement¹ to the foregoing we find the following reference to both *V. draparnaldi* and *V. elongata* just mentioned:—

"*V. draparnaldi*, p. 326.

Helicolimax audebardi Férussac, Prodr., p. 21

In addition to the locality before mentioned, I have to add that I lately found a specimen on Mount Edgcombe near Plymouth. It is an intermediate species between the last and the *Helix diaphana* of Draparnaud.

V. elongata, p. 327, *lege Dillwynii*, Jeffreys.

This being a different species from the *V. elongata* of Draparnaud, I have ventured to dedicate it to my friend, L. W. Dillwyn Esq."

And, accordingly, it appears in his "British Conchology," vol. 1, p. 157, as follows:—

"Var. 2, *Dillwynii*.—Shell nearly globular, with the last whorl very convex. *Spire* more prominent.—*V. Dillwynii*, Jeffr., l.c. p. 506."

But notice the discrepancy of this with the former description: the former description said "less orbicular" than *V. mülleri*—now we find the exact opposite to be the special characteristic.

Gray, in his edition of Turton's Manual (1840) says (p. 121):—

"Mr. Jeffreys has described three British species of the genus, but Mr. Alder observes that 'Mr. Jeffreys having kindly favoured me with specimens of his *V. Draparnaudi*, I compared them carefully with specimens of *Helicolimax audebardi* Fér., collected on the Continent, and have come to the conclusion that they are not of that species. I am afraid that *V. Draparnaudi* can only be classed as a variety of *V. pellucida* (*Helicolimax pellucidus* Fér.). Mr. Jeffreys now considers his *V. diaphana* to be only a variety of the same.'

"Mr. Alder having communicated to me the specimens referred to above, after careful examination, I have come to the same conclusion; indeed, *V. Draparnaudi* appears to be hardly a variety;

¹ Linn. Trans., vol. xvi., p. 506.

"Dr. Turton appears to have inserted *Vitrina elongata* of Draparnaud on Mr. Jeffreys' authority. Mr. Alder observes that no such shell is now found in Dr. Turton's cabinet."

With regard to *depressiuscula*, I am not acquainted with the reasons which subsequently caused Jeffreys to relegate his *V. Draparnaldi* to varietal rank as *depressiuscula* under *V. pellucida*, but it seems probable that he did not know the *V. elongata* Drap., as his reference to *Hist. des Moll.*, p. 102, t. 8, f. 40, does not agree with Mr. Taylor's reference, which is p. 120, pl. viii.,¹ ff. 40, 42.

Again turning to Sowerby's "Illustrated Index" (first edition, 1859) pl. xxii., ff. 15, 16, we find in fig. 15 a rather exaggerated *V. pellucida*, but fig. 16 of *V. Draparnaldi* Jeffreys is an excellent representation of *V. hibernica*. The description is as follows:—

"16. *V. DRAPARNALDI* Jeffreys.—*V. oblonga*, *H. brevipes*?—Less globular than 15, R."²

Now, where did Sowerby obtain his specimen to figure? Not from a continental source, for in that case he would have obtained some other species, not the *V. Draparnaldi* of Jeffreys, instead of the *elongata* of Draparnaud. If, however, he obtained it from an English source, what is more likely than his borrowing his figured specimen from Jeffreys himself? If so, the presumption is that it came from Swansea or Plymouth.

CONCHOLOGICAL NOTES FROM LA PLATA, DURBAN, AND BOMBAY.

By LIONEL E. ADAMS, B.A.

(Read before the Society, March 8th, 1911).

ANOTHER voyage to the Plate has afforded me the opportunity for further investigation of that conchologically neglected region.

On this occasion I was located at Ensenada, the port of La Plata, which city is five miles distant from the shore of the great estuary. The whole of the district between La Plata and the shore is a plain of alluvial deposit of comparatively recent formation, formed by the combined Uruguay and Parana Rivers. This plain contains extensive deposits of marine shells in solid masses, from two to eight feet thick, a foot or two below the surface of the ground. The shells evidently lay in vast masses on the beach or sea-floor before they

¹ Printed vii. in error in "Irish Naturalist."

² R. = rare.

were covered by the mud and sand of the rivers. This holocene deposit is so extensive that it is regularly quarried, and forms the surface of the country roads and railway tracks wherever a surface has been attempted at all, and that is only here and there. As the country roads (like those in the United States) are merely tracks across the open country, and without any bed or metalling, they are often impossible for pedestrians after a heavy shower. In such case, one walks along the railway track, which in one place is the only road at any time.

The following is a list of all the species I could separate; they are all extant on the Argentine coast.

Voluta colocynthis Chem.

V. angulata Swains.

Bullia deformis King.

B. cochlidium Kiener.

Mactra sp. ? } These two species formed the principal part

Venus sp. ? } of the mass.

Solecurtus platensis.

Tagelus gibbus.

The famous Museum at La Plata is surprisingly weak in Argentine mollusca; its chief feature being, of course, the unique series of *Glyptodons*, which, by the courtesy of the Director, I was permitted to photograph.

From the Plate we proceeded to Durban, where I had absolutely no success with the land and freshwater species. The well-known rocks and beach on the south side of the harbour, however, provided an interesting haul of *Patella*, *Fissurella*, *Cerithia*, etc. Very numerous strewn along the beach were the beautiful *Carolina gibbosa* and *Creseis acicula*, mostly in perfect condition in spite of their extreme fragility.

From Durban we went to Bombay, where, from an exclusively conchological point of view, we arrived at the best time of the year to find land and freshwater species, viz., during the South West Monsoon, when the earth is moistened and pools form. On this occasion the earth was quite sufficiently moistened for my purpose, for during the night of our arrival thirteen inches of rain fell in eleven hours—a record that even Manchester might be proud of. I spent much time in the Natural History Museum, which is an ideal provincial museum, the exhibits being restricted to the fauna of the country, and arranged on British Museum lines. The collections are copiously labelled, and immaculate as regards dust and mould. I owe much to the Curator, Mr. Kinnear, and the Secretary of the Bombay Natural History Society, Mr. Millard, for the trouble they

took to procure me specimens and advise me how to procure others for myself. Acting on their advice, I took a trip up the Gauts to Igutpuri, where I spent a short but satisfactory time among the snails. It was only possible to hunt between the deluges which continued the whole time with intervals of sometimes half an hour. The most abundant species here was the sinistral *Nanina bajadera* Pfr., which swarmed along a wall close to the dak bungalow where I was staying. In the town of Bombay, along Malabar Hill, about a quarter of a mile from the sea, in Mr. Millard's garden, were found considerable numbers of one (if not two) species of *Onchidium*, which I regret being still unable to name. *Nanina luvipes* Müll. and *Macrochlamys pedina* were not uncommon in the same locality, and one species of *Ampullaria* was plentiful in a certain piece of water.

Snail-hunting in India has distinct drawbacks. In dry weather it is useless, and in wet weather it is sometimes impossible and always uncomfortable.

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HELIX NEMORALIS AND H. HORTENSIS: THEIR COLOUR
AND BAND VARIATIONS AND DISTRIBUTION—
SOME COMPARISONS.

By W. GYNGELL.

(Read before the Society, February 11th, 1911).

THE enormous number of recorded observations of these two closely allied species of British mollusca must cause anyone to hesitate before venturing to make any further contribution to the literature of the subject. As, however, the writer has had exceptional opportunities for observing these two *Helices* in a large number of localities, he hopes that the following notes may be of some interest.

Both species have been sought by the writer in hundreds of districts, scattered over twenty English counties, and in nearly all these counties both species have been found, from Cumberland and Durham in the north, through the Midland and Welsh border counties, to Somerset in the south-west, and to Norfolk in the south-east; the main result being that *Helix nemoralis* has been found in almost twice as many districts as the smaller species, the comparative abundance being as 52 is to 27. It thus appears that if anyone, dropped from the skies at random, anywhere in England, were to search at once for both species, his chances of finding *Helix nemoralis* would be double that of his turning up *Helix hortensis*.

But the distribution of the two species is by no means the same in northern and southern England, the larger mollusk prevailing in most southern districts, and the smaller one being much the more abundantly found in the north, excepting in the neighbourhood of the sea-shore. Here *Helix nemoralis* always reigns supreme. It has been found by the writer on almost every part of the coast that he has visited. Precipitous sea-cliffs, grassy slopes, and bare sand-hills seem to be equally favoured by this species, whilst *Helix hortensis* has been found to be almost invariably absent from such situations, though very frequently occurring in the road-side hedgebanks half-a-mile inland. The different haunts favoured by the two species are very noticeable on the Yorkshire coast. Here the larger one has a continuous range along the coast on cliffs of Calcareous Grit, Boulder Clay, and Chalk, or low-lying sand-hills washed by the spring tides, the species ranging down as low as grass or any herbage will grow. These exposed situations, however, are not favoured by *Helix hortensis*, though very exceptionally odd colonies may be found, as for example, on one side of the Castle Hill, Scarborough. But as this particular spot was formerly a "pleasure garden," the species is very likely to have been introduced. If, however, we leave the sea-cliffs and turn into any of the high-roads, we shall find the smaller species

almost everywhere, sometimes forming continuous colonies for miles, and being especially abundant where there is a good hedge-bank with a ditch at the bottom of it. At the same time, miles may be walked along this road side without seeing a solitary "black mouth."

Helix nemoralis likes an old chalk-pit or a dry railway-bank, and may be found on some of the barest hill-tops of the North Yorkshire moors; but it is unusual to find *Helix hortensis* in such places. But although *H. nemoralis* may be found in more exposed situations, it hibernates for a longer period than does *H. hortensis*, which I have seen out crawling near Scarborough on January 2. I have not observed *Helix nemoralis* abroad earlier than April 16, though I have seen the species paired on April 18.

Away from the coast the larger is much the commoner animal, roughly speaking, say south of the city of York, but northwards from there *Helix hortensis* is the more abundant.

The plan observed for the purpose of these notes has always been to collect, wherever possible, a hundred specimens hap-hazard without making any selection of colour or band-varieties. No district has been visited because any species or variety was known to be present in or absent from that district, the writer's object being to find out for himself the comparative abundance of the two species, and their common varieties in the country, taken as a whole, and thus be able to see at a glance by comparison the peculiarities of any local list. All observations have been made personally, and no notice whatever has been taken of specimens received from other collectors.

According to the writer's observations, the following figures represent the colour and band varieties which make up an average one thousand specimens taken at random in England. The rarer varieties *roseozonata* and *hyalozonata*, although found by the writer on rare occasions, could not be included in a one thousand list.

It will be seen that banded forms of *Helix nemoralis*, excepting 00300, are much more common on the coast than inland, whilst incidentally it is interesting to note, as showing how colour or band varieties may abound in or be absent from a district, that the above-mentioned variety 00300 is so rare within twenty miles of Scarborough, that in twenty years the writer has not found half twenty specimens in this district; yet this variety is common on the sand-hills at Redcar on the Yorkshire coast.

As compared with *Helix nemoralis*, *H. hortensis* in a given number of specimens shows much more limited variation in both colour and banding, as well as a greater preponderance of the type form *lutea* 12345. In the latter species also the band form 00300 is extremely rare in nearly all districts.

Helix nemoralis and Helix hortensis.

THE COMMON COLOUR AND BAND VARIATIONS SHOWN IN ONE THOUSAND SPECIMENS OF EACH SPECIES.

Helix nemoralis.														
var. <i>libellula</i> .			var. <i>rubella</i> .				var. <i>castanea</i> to var. <i>olivacea</i> .		var. <i>citriusonata</i> .					
5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300	bandless,	1 band, 00300	5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300, bandless.	INLAND	COAST	INLAND	5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300, bandless.	ONLY.	5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300, bandless.					
276	10	13	10	86	156	248	10	13	52	80	4	2	40	..
ENGLAND—														
472	12	3	...	64	30	342	2	5	56	12	2
ENGLAND—														
374	11	8	5	75	93	295	6	9	54	46	2	1	20	1
ENGLAND—														
Helix hortensis.														
var. <i>lutea</i> .			var. <i>castanea</i> to var. <i>olivacea</i> .				var. <i>arenicola</i> .		var. <i>albina</i> .	var. <i>incarnata</i> .				
5 bands, 4-3 bands, bandless.	4-3 bands, bandless.	319	5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300, bandless.	bandless.	10	5 bands, 4 bands, 3 bands, 2 bands, 1 band, 00300, bandless.	bandless.	2	bandless.	24				
618	10	319	4	13	10	5	2	1	20	1	24			

COLOUR VARIETIES OF *DONAX VARIEGATUS* (Gmelin)
FROM THE CHANNEL ISLANDS.

By R. WOODCOCK.

(Read before the Society, March 8th, 1911).

HAVING collected marine mollusca in the Channel Islands for several years, I have often noticed, when working the gravel banks at extreme tide limits, that as soon as the tide turns the pretty *Donax variegatus* has a curious habit of springing out of the gravel, which action close observation has shewn to be caused by the contraction, followed by a sudden expansion, of the somewhat large foot of these bivalves. On certain favoured gravels, more especially on the south coast of Jersey, it is quite possible to collect several of these *Donax* lying thus exposed on the surface of a bed which a few moments ago was bare of specimens; one has to gather them rapidly, as the tide runs in so swiftly at this time. Their curious acrobatic habits interesting me considerably, I determined to collect several in hopes of finding varieties. Careful examination of the catch showed three distinct colour variations in addition to the type.

The beautiful var. *tristis* of Bucquoy, Dautzenberg, and Dollfus, is a variety in which the umbones are of an exquisite purple tint, the interior of the shell, and certain parts of the mollusc itself partaking of this shade. These specimens when seen together with others stand out very distinctly indeed. This variety usually occurs in common with the typical *D. variegatus* and var. *aurea* in the Laminarian zone. I have found them in the proportion of fifteen to eighteen of var. *tristis* to a hundred of the type. They are rather scarce and seem to favour a more gritty gravel than var. *laeta*.

Localities:—Royal, St. Clement's, and St. Aubin's Bays, Jersey; Cobo and Rocquaine Bays, Guernsey. Mr. Tomlin informs me that it also occurs commonly at Herm Island.

Var. *laeta* Bucquoy, Dautzenberg, and Dollfus, occurs at the lowest range in the Laminarian zone; in fact, I have taken this form in the Channel Islands solely from gravels which only dry during the great tides of the spring and autumn equinox. They seem partial to a sandier gravel than the other forms. In this variety, the umbones are of a pretty pink tint, the interior of the valves being in most cases yellow near the umbones, with a creamy white band around the outer edge of the interior of the shell.

Localities:—Royal, St. Clement's, and St. Aubin's Bays, Jersey. I have never yet succeeded in finding this beautiful form in any of the other Channel Islands, but am, of course, not prepared to state that they are local to Jersey gravels only in these islands, but they

are in any case decidedly scarce, their proportion being some four specimens to a hundred of the type.

Since this was written, Mr. Tomlin has told me that he has two or three specimens from Herm.

There is a variation which I claim to be a new variety, and have ventured to name it var. *aurea* nov., as the umbones are of a distinct orange-yellow tint, the interior of the shell being in most cases of a slightly lighter orange tint, shading off to a light yellow, in a somewhat similar manner to the interior of *Tapes aureus*. This variety is to be found in company with typical *variegatus* and var. *tristis*. They seem to occur in the proportion of one var. *aurea* to four of the type, and are sometimes more plentiful in certain gravels.

Localities :—Royal, St. Aubin's, and St. Ouen's Bays, Jersey ; Cobo and Rocquaine Bays, Guernsey.

Typical specimens of *Donax variegatus* (Gmelin) show perfectly plain creamy-white umbones, which are most distinct when seen in contrast with the other varieties.

Localities :—To be taken in nearly all the lower shell gravels in the Channel Islands, more plentifully during the warmer months of the year.

I have been led to draw the attention of collectors to these beautiful colour variations of *Donax variegatus* as they seem to me to be genuine and constant varieties, and are not occasional freaks of colouring as seen in some shells. I have also had the advantage of examining some thousands of these specimens under natural conditions during years spent in collecting in these islands, and have come to the conclusion that they are fully as worthy of addition to the British list as, say, var. *roseolabiata* of *Helix nemoralis* or *Limnea palustris* ; var. *cerulea* of *Patella vulgata* ; var. *cinerea* of *Mactra stultorum*, and many others I could name which occur in the Society's Lists.

INDEX OF NOTES ON THE BRITISH NON-MARINE
MOLLUSCA IN VOLS. I.—XII.

BY THE REV. CANON J. W. HORSLEY, M.A.

(Read before the Society, June 14th, 1911).

[This is the first instalment of an Index which Canon Horsley has practically completed to the first twelve volumes of the *Journal*.—EDITOR.]

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A PREHISTORIC *CYPRÆA TIGRIS* L. IN HANTS.

BY J. R. LE B. TOMLIN, M.A., F.E.S.

(Read before the Society, June 14th, 1911).

THE Reading Corporation Museum has recently added to its collections some interesting relics of prehistoric man from pit dwellings at St. Mary Bourne, Hants. Amongst these is a specimen of surpassing interest to the conchologist, viz., the complete outer lip of a large *Cypræa*. Careful comparison with all our large Cowries leaves no shadow of doubt in my mind that this lip is part of a *C. tigris* L. The teeth are considerably worn down in a way to suggest that it has been used as a file; it is also alternatively supposed to have been a charm. The edge, where it is broken away from the shell, has been evenly ground down.

Monterosato, in his "Notizie intorno alle Conchiglie Mediterranee" (Palermo, 1872) calls attention to a small collection of shells found at Pompeii and now in the Naples Museum, which includes two exotic species: *Conus textile* L. and *Cypræa tigris* L. I noticed a similar collection recently in the museum at Pompeii which contained several exotic species, including quite a long series of *Cypræa pantherina* L. The latter cowry is, of course, common in the Red Sea; *C. tigris* is recorded from Aden (Shopland), but was not found by McAndrew in the Gulf of Suez.

Since the above was written, Mr. J. W. Jackson has kindly called my attention to a record¹ of *Cypræa moneta* L. from a sandy layer above the Tertiaries at Frankfurt-on-Main. The author of the article, Dr. W. Wenz, says that the specimen is superficially weathered, but otherwise in good preservation, and that extensive prehistoric settlements of different periods existed in the immediate neighbourhood.

I also find that *Cypræa tigris* has been recorded by M. Locard from Lyon, in a paper entitled: "Note sur une Faunule Malacologique Gallo-Romaine, trouvée en 1885 dans la nécropole de Trion, à Lyon."

This necropolis was unearthed on the southern flank of Mount Fourvières, and was considered to date back to the end of the first century.

Twenty-one determinable species occurred, all but three being Mediterranean marine forms—either edible, or forms of the family *Muricide* for dyeing purposes. Of the three exceptions, the most interesting is *Cypræa tigris*, and its presence is explained by M.

Locard as due to the part played in pagan times by this and other cowries in connection with the cult of Venus, as symbolic of the generative forces of nature. The other two exceptions are *Helix pomatia* L., and an elongate form of the same, called *H. pyrgia* by M. Bourguignat. M. Locard considers that—judging from these shells—*H. pomatia* has degenerated and that the ancient examples were larger and stronger than now-a-days.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND

403rd Meeting, held at Manchester Museum, June 14, 1911.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

“New Species of Shells from Bermuda,” by W. H. Dall and P. Bartsch.
 “New Mollusks of the Genus *Aclis* from the North Atlantic”; “The Recent and Fossil Mollusks of the Genus *Cerithiopsis* from the West Coast of America”;
 “The Recent and Fossil Mollusks of the Genus *Bittium* from the West Coast of America”—all by P. Bartsch (*from the authors*); and the usual periodicals received in exchange.

New Member Elected.

George Curtis Leman, 44, Bloomsbury Square, London, W.C.

Candidate Proposed for Membership.

Mrs. Susan A. Hitchon, Rhyddington, Oswaldtwistle, Lancashire.

Papers Read.

“A Prehistoric *Cypræa tigris* L., in Hants.,” by J. R. le Brockton Tomlin, M.A., F.E.S.

“*Paludestrina jenkinsi* Smith in Hampstead Bathing Pond,” by Griffith Humphreys.

“Index of the Notes on British Non-Marine Mollusca in the *Journal of Conchology*, vols. 1—12,” by the Rev. Canon J. W. Horsley, M.A.

“The Unnatural History of Snails,” by the Rev. Canon J. W. Horsley, M.A.

Exhibits.

By Mr. J. Kidson Taylor: *Amphidromus levis* var. *kisserensis*; *A. hamatus*; many varietal forms of *A. adamsi*; and very fine examples of *Calocochlea semperi* and *C. harfordi*.

By Mr. J. W. Baldwin: A fine series of *Helix mazzullii*, *H. desertorum*, *H. ligata*, and *H. lactea* var. *alba*.

By Mr. C. H. Moore: A banded form of *Limnaea pereger* from Poynton Towers near Stockport.

By Mr. J. R. le Brockton Tomlin: Live shells from Sicily, including *Helix sicana* Fér., *H. mazzullii* Jan; *Clausilia affinis* var. *tauroyemica* Monts.; *H.*

messanensis var. *lauromenica* Monts., *H. meda* Porro, *H. timei* Monts. ; *Cionella vescoi* Bgt. ; *Clausilia syracusana* Phil. ; *Pomatias diouysi* West. ; *Pupa rufestris* Phil. ; *Clausilia grohmanniana* Phil. ; and *H. muralis* Müll., from the Forum at Rome.

By Mr. G. C. Spence : A series of the larger species of *Cylindrella* (*Urocotidae*), with examples of the various groups cut sectionally to show internal characteristics.

In the Special Exhibit of the Genus *Gibbus*, Mr. Edward Collier showed a considerable number—twenty-nine species—which he got principally from the Barclay and Da Costa Collections. Included in them was a very fine series of *Gibbus lyonetianus*, one specimen of which, from the Da Costa Collection, was taken alive over one hundred years ago, and is the specimen figured in Wood's *Index Testaceologicus*. He also showed a specimen of *m. sinistrorsum* from the Barclay Collection, of which there are only five specimens known. His series of *Goniodonus pagoda* and *Plicadonus sulcata* and *newtoni* were also very fine and in good condition. Messrs. B. R. Lucas, J. W. Baldwin, and T. H. Platt also showed a number of specimens of the genus, including a remarkable double-mouthed *G. pagoda* in the latter's collection. Mr. R. Standen exhibited the Manchester Museum Collection of this genus, which includes a fine example of the sinistral variety of *G. lyonetianus*, formerly in the collection of the late Mr. Thos. Norris, and which was presented to the Museum by Mr. J. Ray Hardy. Only three other examples of this form appear to be on record, viz., one in the Paris Museum ; one in the Lyons Museum ; and another in the Lombe-Taylor Collection in the Calcutta Museum (*vide* M. Dautzenberg in *Journal de Conchyliologie*, vol. lviii., p. 39, 1909).

BIBLIOGRAPHY.

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

Monograph of the Land and Freshwater Mollusca of the British Isles, part 18 (pp. 305-368, and 5 plates), by JOHN W. TAYLOR (Taylor Bros., Leeds).

Another part of Mr. Taylor's *magnum opus* was published on June 17th, and he must have heaved a very big sigh of relief at leaving *Helix nemoralis* behind. Besides completing the monograph of that species, the present part deals with *Helix hortensis* and starts *H. pisana*. Two of the five plates give us really excellent coloured figures of fifteen different forms of *Helix aspersa*, great care being evidenced in the selection of characteristic specimens. The special students of *H. nemoralis* will find in Mr. Taylor's account a very complete compendium of everything bearing on the variation of their favourite species, and of the hosts of varietal names which have been put forward, especially by MM. Moquin-Tandon and Locard. We cannot give Mr. Taylor too much credit for the incidental illustrations which continue to be a feature of his work. We can testify to the excellence of Monterosato's photograph from recent personal experience ! A very full life-history of *Drilus flavescens* L. (see page 333 of this part) was published a few years ago in the Transactions of the London Entomological Society. We found the female of this beetle commonly last March and April in Sicily in the shells of quite a number of different *Helicida*.

A List of the Land and Freshwater Mollusks of Ireland (*Proc. Royal Irish Academy*, vol. xxix., section B, no. 3, with plate), by A. W. STELFOX.

This excellent and thoughtful work is undoubtedly the most interesting contribution that has been made for some time to our knowledge of the terrestrial mollusks of the United Kingdom. The last Irish list was published by Dr. Scharff in 1892, since when an immense amount of field work has been done, and Mr. Stelfox tells us that there are now few, if any, districts which have not been roughly surveyed. We would call special attention to the remarks under *Limnaea prætenuis* Bowell, with reference to the description of new species, and the lack of attention paid to possible effects of environment on the radula and genitalia of a mollusk. Mr. Stelfox has taken up a reasonable and quite intelligible standpoint with regard both to new species and to forms whose specific rank still hangs in the balance, and has given us a list which ought to prove an ideal basis—as well as an incentive—for future investigation. We are inclined to join issue with him over one point, and over one point only, viz., the inclusion of *Otina otis* Turton, which has such a purely marine habitat, whatever its affinities. Mr. Welch's photographic plate, illustrating morphological variation in various species of *Limnaea*, etc., is excellent.

The list is accompanied by a very complete bibliography, and by annotated lists of doubtful and introduced species. For the purpose of records, the system followed is that of Præger in his *Irish Topographical Botany*. The country is split into forty divisions, and the symbols representing them are printed in an order corresponding to their relative geographical position. We are quite of opinion that *Hygromia revelata* may yet turn up on the east coast of Ireland.

***Paludestrina jenkinsi* (Smith) in Hampstead Bathing Pond.**—*Paludestrina jenkinsi* (Smith) is now abundant at the upper (enclosed) end of the Hampstead Bathing Pond, where sea-gulls congregate in winter. May not the somewhat unexpected appearance of this brackish-water species in similar localities be ascribed to its distribution by these birds?—GRIFFITH HUMPHREYS (*Read before the Society*, June 14th, 1911).

BÜLOW COLLECTION of RECENT SHELLS.

MESSRS. SOWERBY & FULTON have now on Sale, in detail, the magnificent collection formed by Herr Carl Bülow, of Berlin.

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JANUARY, 1912.

No. 9.

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 1897. ^Z Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902. ^Z Kensett, Percy F., Broadmeadow, Coombe Lane, Wimbledon, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne,
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 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 Cronier, B.A., M.B., Winchester House, Swansea.
 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, Sidney, Manitoba, Canada.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1911. Leman, George C., Wynyard, 152, West Hill, Putney, S.W.
 1910. Levett, Rev. T. T., F.Z.S., Frenchgate, Richmond, Yorks.

1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1909. Linton, Mrs., Ye Olde Mill House, Castle Hill, Northallerton.
 1908. Longstaff, Mrs. G. B., Highlands, Putney Heath, S.W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
 1910. Lucas, F. R. Tindall, Tewin Vale, Welwyn.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire.
1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire.
 1905. Macindoe, Dr. A., D.P.H., Sidmouth, Devon.
 1911. MacLeod, D. J., Hof Ter Meere, 13, Reigerstraat, Ghent, Belgium.
 1884. Madison, James, Turves Green, West Heath Rd., Northfield, Birmingham.
 1911. March, Miss M. C., M.Sc., Healey Grove, Burnley, Lancs.
 1885. Marquand, Ernest D., A.L.S., 46, Kimbolton Road, Bedford.
 1906. Marshall, Arthur G., 66, Victoria Street, Westminster, S.W.
 1887. Marshall, J. T., c/o Editor of *Journal of Conchology*.
 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.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1903. McClelland, Hugh, Stretton, Balsall Street, Berkswell, Warwickshire.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1880.^P Melvill, James Cosmo, M.A., D.Sc., F.L.S., Meole Brace Hall, Shrewsbury.
 1909. Mercer, Jas. W., 611, Chorley Old Road, Bolton.
 1891. Middleton, Robert, Sheepscar Foundry, Leeds.
 1904. Milne, James N., Foylemore, St. Jude's Avenue, Belfast.
 1907. Milner, Miss Lucinda, Cleveland, Ellesmere Park, Eccles, Manchester.
 1909. Milton, J. W., Harrison House, Crosby.
 1906. Monterosato, Il Marchese di, 2, Via Gregorio Ugdalena, Palermo, Sicily.
 1910. Moorcock, J., 91, Broadfield Road, Catford, S.E.
 1902.^L Moore, Chas. H., 103, Mottram Road, Stalybridge.
 1908. Moore, Albert J., 9, Brook Street, Hull.
 1907. Morey, Frank, F.L.S., Wolverton, Carisbrooke Rd., 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., F.E.S., Haylands, Brook Street, Selby, Yorks.
1905. Napier, H. C., Headington Hill, Oxford.
 1911. Nash, Rev. E. H., M.A., Wetley Rocks Vicarage, Stoke-on-Trent.
 1903. Nash, P. B., Bruce Mines, Algona, Ont., Canada.
 1887. Newstead, A. H. L., B.A., 38, Green Street, Bethnal Green, 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, Berkhamsted.
 1901. Norton, Miss E. M., 20, Eastfield Road, Westbury-on-Trym, near Bristol.
1887. Oldham, Charles, Kelvin, Boxwell Road, Berkhamsted.
 1910. Oliver, A. M., West Jesmond Villa, Newcastle-on-Tyne.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, The Newlands, Boswell Road, Sutton Coldfield.
 1905.^L Owston, Alan, Yokohama, Japan.

1903. Pace, S., Milneholme, Hounslow.
 1900. Pannell, Chas., 13, East Street, Haslemere, Surrey.
 1904. Parritt, H. W., 8, Whitehall Park, Upper Holloway, 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.
 1908. Phillips, R. A., Ashburton, Cork.
 1906. Plant, James R., M.R.C.S., L.R.C.P., 107, Hinckley Road, Leicester
 1904. Platt, Thos. H., Harpurhey Mill, Rochdale Road, Manchester.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1905. Poole, W. G., South Lawn, Godalming.
 1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
 1903. Preston, Henry, F.G.S., Hawthornden Villa, Spitlegate, 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. *L* Pritchard, G. B., F.G.S., 38, Mantell Street, Moonee Ponds, Victoria.
 1906. *L* 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, Caerleon, Whyteleafe Road, Caterham.
 1905. Reynolds, Laurence R., 233, Aspinwall Avenue, Brookline, Mass., U.S.A.
 1905. Reynolds, W. G., 15, Alfoxton Avenue, West Green, London, N.
 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., 6, Richmond Terrace, 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, S.W.
 1910. *L* Rowe, A. W., M.S., M.B., M.A.C.S., F.G.S., Shottendane, Margate.
 1910. Saggi, M. K., M.R.A.S., etc., Common Room, Lincoln's Inn, W.C.
 1906. Salisbury, Albert E., Rose Cottage, Havelock Street, Loughborough.
 1877. *P* Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
 1906. Schepman, M. M., Bosch en Duin, Huister Heide, Utrecht, Holland.
 1895. *L* Schill, C. H., The Elms, Byrom Lane, Macclesfield.
 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., 12, Seymour Road, Crumpsall, Manchester.
 1906. Sharp, C. J., M.R.C.S., 2, Wellington Avenue, Liverpool.
 1910. *L* Shaw, H. O. N., F.Z.S., Skreens Park, Roxwell, near Chelmsford.
 1904. Shaw, Rev. W. A., Peper Harow Rectory, Godalming.
 1906. Sheppard, T., F.G.S., Municipal Museum, Hull.
 1906. Shopland, Commander E. R., St. Benedict's, Carlton Road, Lowestoft.
 1910. Shrubsole, George, Ellesmere, Fields Park Road, Newport, Mon.
 1895. Sich, Alfred, F.E.S., Corney House, Chiswick, W.
 1906. Sikes, F. H., M.A., Burnham Abbey, Bucks.

1905. Simpson, James, c/o G. Sim, Esq., A.L.S., 52, Castle Street, Aberdeen.
1902. Smallman, Raleigh S., Homeside, Devonshire Place, Eastbourne.
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. *Z* Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
1907. Smith, Maxwell, c/o Farmer's Loan and Trust Co. (of New York), 15, Cockspur Street, London, S.W.
1894. Smith, Wm. Chas, 7, Vanston Place, Walham Green, S.W.
1900. Solly, E. H., 3, South Street, Deal, Kent.
1886. Sowerby, Geo. Brettingham, F.L.S., River Side, Kew, near London.
1907. Spence, G. C., 27, Pine Grove, Monton, Eccles, Lancs.
1906. Stalley, Henry J., Thorntona, Oxted, Surrey.
1886. Standen, Robert, The Museum, The University, Manchester.
1911. Standish, C. M., Prospect House, Weldbank, Chorley.
1903. Stelfox, A. W., Delamere, Chlorine Gardens, Belfast.
1906. Step, Edward, F.L.S., Oakwood House, Ashstead, Surrey.
1910. Stephenson, H. L., 73, Colwyn Road, Dewsbury Road, Leeds.
1908. *Z* Stobart, H. J. S., Belbroughton, Stourbridge.
1896. Stonestreet, Rev. W. T., B.D., F.R.S.L., c/o The New Church Book Depot, 18, Corporation Street, Manchester.
1897. Stracey, Bernard, M.B., Priory Lodge, 16, New Walk, Leicester.
1890. Stubbs, Arthur Goodwin, The Meads Cottage, Hailey Lane, Hertford.
1893. Stump, Edward Consterdine, Polefield, Blackley, Manchester.
1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
1888. *P* Sykes, Ernest Ruthven, B.A., F.L.S., 8, Belvedere, Weymouth.
1910. Tattersall, W. M., D.Sc., The Museum, The University, Manchester.
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., Drawer S, Nanaimo, British Columbia.
1904. *Z* Taylor, Gerald Medland, Rossall School, Fleetwood.
1907. Taylor, J. Kidson, 45, South Avenue, Buxton.
1901. Taylor, Thos., Tainui Street, Greymouth, New Zealand.
1903. Thaunum, D., 5, Church Street, Hilo, Hawaiian Islands.
1908. Thomas, Rev. R. E., M.A., St. Martin's Clergy House, Salisbury.
1907. *Z* Thornton, H. G., Kingsthorpe Hall, Northampton.
1886. *Z* Tomlin, J. R. le Brockton, M.A., Stoneley, 42, Alexandra Road, Reading.
1906. Turton, Lt.-Col. W. H., D.S.O., R.E., 256, Southtown, Great Yarmouth.
1907. Upton, Charles, Homebush, Instow, N. Devon.
1899. Vaughan, J. Williams, J.P., Pen-y-maes, Hay, *via* Hereford.
1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea.
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.
1909. Ward, J. S. M., B.A., The Whym, Gomshall, Surrey.

1903. *Z* Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1908. Weaver, G. H., 31, Devonshire Road, Palmer's Green, London, N.
 1900. Webb, Walter F., 202, Westminster Road, Rochester, N.Y., U.S.A.
 1902. Weeks, Wm. H., jr., 528, 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.
 1886. Whitwell, Wm., F.L.S., Brookside, Darley Knowle, Warwickshire.
 1911. Williams, James M. M., Imperial House, Pontlottyn, Cardiff.
 1889. Williams, John M., 31, Grove Park, Liverpool.
 1906. Winkworth, John F., 290, Burdett Road, London, E.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1910. Woodcock, R., Fauvic, Jersey.
 1901. *Z* Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1911. Woods, Rev. F. H., B.D., Bainton Rectory, Driffield.
 1898. Woods, Henry, M.A., F.G.S., 39, Barton Road, Cambridge.
 1886. *Z* Woodward, Bernard B., F.L.S., etc., 4, Longfield Rd., Ealing, W.
 1903. Worsdale, R., 102, Dudley Terrace, Dudley Road, Grantham.
 1906. Wragge, Clement L., F.R.G.S., etc., Perth, Western Australia.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

Succinea elegans Risso new to the Orkneys.—Amongst a few common species of shells which I received recently from the Orkneys are examples of *Succinea elegans*. These have been verified by Mr. J. W. Taylor, and the Recorder tells me that it is a new record for vice-county III.—J. R. LE B. TOMLIN (*Read before the Society*, Nov. 8, 1911).

Vertigo angustior Jeff. in Hertfordshire.—In February, 1911, I noticed that in the earth cast up by moles in the low-lying pastures which border the large reservoir at Wilstone, near Tring, there were many bleached shells of mollusca. A section exposed by a ditch which traversed one of the meadows showed that the thin layer of alluvium overlying the chalk was crowded with shells. The associated species suggested that the construction of the reservoir about a hundred years ago had entirely altered the character of the place, transforming swampy ground into comparatively dry meadow land, and, incidentally, destroying the habitat of the mollusca. An hour's search in the mole-hills yielded two specimens of *Vertigo angustior*, many *V. pygmaea*, *V. antivertigo*, *Jamnia muscorum*, *Vallonia excentrica*, *Hygromia hispida*, *Succinea elegans* and *Cochlicopa lubrica*. In smaller numbers, but conspicuous owing to their larger size, were *Helix nemoralis* and *Helicigona arbustorum* var. *alpestris*, whilst *Succinea putris* and *Limnaea truncatula* were not uncommon. I found two specimens of *Cæcilioides acicula* and a few *Euconulus fulvus*, *Carychium minimum* and *Pisidium casertanum*. — CHAS. OLDHAM (*Read before the Society*, Sept. 13th, 1911).

BIOLOGY OF THE MOLLUSCA :

Based chiefly upon a study of one of our commonest species,
Helix aspersa.

Address delivered at the Annual Meeting, in the Town Hall, Hanley, Oct. 14th, 1911.

BY JOHN W. TAYLOR.

At the request of the Council of our Society I have consented to fill the vacancy at this Meeting caused by our valued President being unexpectedly prevented from preparing the Annual Address which it has been always customary for our Chairman to deliver, but the intimation of the wish of the Council did not allow me much time for preparation, so I decided to offer some notes which I had already partially prepared, bearing upon the "Biology of the Mollusca," and based chiefly upon a study of one of our commonest species, *Helix aspersa*.

Probably at no time in the history of the world have changes of the organic inhabitants of the more primitive regions of the earth proceeded with such abnormal rapidity as at the present day; changes which are almost entirely due to the enormous increase in the facilities for rapid locomotion, which bring within comparatively easy reach the most remote regions of the globe and subject the weak and simple forms of animal and vegetable life in the more primitive countries to the direct and immediate competition of the more advanced and dominant species.

Rapid changes are thus caused in the fauna and flora of a relatively weak region by the extirpation or expulsion of the native organisms, which are supplanted by more highly organized and dominant species, purposely or involuntarily introduced by the agency of man, and transformations are thus effected which, in the ordinary course of diffusion, would have taken thousands of years to accomplish, but which may now be consummated even during the short span of an individual life.

Not only have animals and plants been rapidly and entirely exterminated, but man himself is almost equally subject to these natural laws, and races of men have been or are in process of being destroyed and have disappeared or will shortly disappear from the face of the earth: and this destructive process will, with the continued improvements in quick and easy transport, become increasingly deadly, bringing the stronger and weaker races more quickly into close contact and competition, with fatal effects to the indigenous fauna and flora of the weaker regions of the globe, and this natural process is more or less in operation in every country.

In this connection I may quote the remark of the late Capt. Hutton, our great authority on New Zealand, who stated in conversation with

our valued Recorder, Mr. W. Denison Roebuck, that he had verified that on the advent in any district in New Zealand of European mollusks, especially of the field slug *Agriolimax agrestis*, the new arrivals completely and quickly oust the native species, which have now to be carefully searched for in the remoter parts of the bush; and he said that now-a-days half-a-dozen specimens would even in the best localities be an ample reward for a whole day's search, and this applies to other forms of life, and, I may add, in a lesser degree to most other countries, as even in the British Isles we possess many local and rare species representing the weaker and dying elements of our fauna, which are being gradually restricted in their range and slowly exterminated.

In commencing it may be remarked that the great sub-kingdom Mollusca is a group characterized by the possession of a soft unjointed body, covered with a moist skin, but destitute of any internal supporting skeleton, as in man, or even an external one, as in the crab or lobster, to give firmness and strength to the limbs; but this is compensated for by its power to withdraw its soft body within the strong calcareous shell, where it is secure from many enemies.

Helix aspersa, or the snail, as it is familiarly called, is a representative species, and though so lowly and despised a creature, has not only habits and peculiarities quite its own, but has also, contrary to the popular belief, a wonderful and complex organization, with organs physiologically and in some cases structurally quite similar to our own, and in certain points is more specialized or, as some would say, more advanced than man himself.

Our *H. aspersa* is a comparatively modern species, probably evolved since the deposition of the Miocene strata, as it is found in many of the Pleistocene beds of Europe, but was unknown fossilized in this country until discovered by Mr. Lewis Abbott in the Ightham fissure in Kent, having previously occurred only in superficial deposits, in primeval refuse heaps, or kitchen-middens, and in the ancient British barrows or tumuli.

It is now, however, one of the commonest of English snails, and is an exceptionally interesting species, as representing the highest stage of development which the *Helices* have attained in this or any other country.

It abounds in the south of England, becoming rarer and more local as we advance northward, its progress in that direction being hindered by the great Scottish rift (now utilized as the Caledonian Canal), which it has only succeeded in crossing at one or two points.

This species was probably evolved in West Central Europe, and has spread therefrom chiefly to the west and south, its north-eastern extension being probably hindered by the competition of its close

ally, the Roman snail *Helix pomatia*, which occupies Central and Eastern Europe. Its natural range at the present day is the West of Europe and the circum-Mediterranean region, as it is quite unknown in Northern, North-Central, and Eastern Europe, except in a few isolated gardens, where it has been artificially introduced.

Though naturally restricted to the areas described, this species, being one of the most highly organized and dominant *Helices* in the world, is a great colonizer, and has by human and other agencies been accidentally or purposely transported to almost every part of the more temperate regions of the world ; its superior adaptability and organization enabling it to maintain its foothold in new regions, and, like the white man, gradually to dispossess the more feeble species which had previously lived there.

Being relatively so highly endowed and dominant, we may look for some display of intelligence, and careful observation has demonstrated that our *H. aspersa* and other species share with man the love of home, for it will traverse broad dusty roads and climb rough walls to reach some favourite food, and when satisfied does not secrete itself near by, in any convenient crevice, but laboriously returns by the often toilsome and disagreeable path to reach its home before dawn.

It has also been observed in the course of its nocturnal wanderings to describe by its path the same double-loop or figure of 8 as the common limpet does in its intertidal forages, and which when first discovered created such great interest.

In connection with these more or less temporary retreats, I may allude to the more permanent ones which have been resorted to for centuries, and have by the constant attrition of the foot become quite deep and spacious. These retreats or galleries, which are mainly found in cliffs of carboniferous limestone with an east or north-east aspect, invariably take an upward direction, perpendicular to the bedding of the strata, and were formerly surmised to be the work of the Pholads or other marine-boring bivalves, but the characteristic ascending tendency of these helicidian cavities clearly distinguishes them from those of the marine-boring bivalves, which usually descend, with the entrance opening above.

The Uses to which this species was formerly put or even used for at the present day are far from being insignificant. In comparatively modern times this species with others was included in the *Materia Medica*, and was held in great esteem for a variety of ailments, while as a remedy for consumption and colds they are still in good repute in some parts of our own country, and they make an effective liniment for stains and bruises when melted down and mixed with ammonia.

As Food it has always been more or less in vogue, and although the snail was denounced in scripture as unclean and its use as food forbidden, yet the larger kinds have been held in esteem by many ancient peoples, even by the Chinese and Hebrews, for their nutritive and curative virtues; while the masses of shells found in the caves occupied by the primitive men of the Stone Age probably point to their indulgence in a similar taste.

Amongst the Romans the prevalence of snail-eating is attested not only by their establishment of snail-farms, whereon these creatures were fattened for the table, but by their use of a special implement, the "Cochleare," for their consumption, which, though a spoon at one end, had a spike at the other for the purpose of picking the animal from its shell.

In Denmark, during the middle ages, the snail was regarded as a privileged and dainty food, and its use restricted by law to the nobility, the common people not being allowed to partake of it.

Even at the present day, *H. aspersa* and other snails are used largely for food, especially in Latin countries and during Lent. In Paris alone, more than fifty tons are used daily, a proportion of which belong to the present species.

Though thus used as an article of food in all ages of mankind, yet the snail was an object of superstitious veneration. The Gauls and the Druids regarded the snail (and by this *H. aspersa* is probably more particularly intended) in an analogous way to that in which the Egyptian priests regarded the *Scarabeus*, or Sacred Beetle, that is, as a visible emblem of resurrection, a belief probably arising from its habits of hibernation and æstivation, which are apparent deaths; the tombs of the ancient Gauls often bear the sculptured figure of a shell, and this clearly shews that they regarded the snail as emblematic of a future life.

The Romans, too, shared these beliefs in the symbolism of the snail, the superstition probably arising from the finding of living snails within the vaults of their forefathers, a circumstance which led to a belief in some mysterious connection or sympathetic bond between the silent snail and the spirits of the dead. These beliefs led to their incorporation in Roman funeral ceremonies, snails being eaten at the funeral repasts or around the tombs of those persons whose memory they wished to honour. The masses of shells in the cemeteries of Pompeii attest this custom amongst these ancient peoples.

Having thus briefly glanced at some of the habits and uses of the snail, we will now consider the modifications of the shell and investigate the structure and functions of the various organs of the body.

The study of the variation of the animal and its shell is very important, for in these variations we see incipient species, and they are the visible tokens of the progress of evolution in the changes they are undergoing, unless they are atavistic and thus reflect some past stages in the history of the species. Many naturalists view the shell merely as an exquisitely formed and beautifully marked object; but to the thoughtful student each species bears an impress upon its shell which unmistakably denotes its habits and mode of life.

A region like the Channel Isles, markedly deficient in limestone, is exemplified by the shells of this species being small, thin, and transparent, and sometimes weighing not more than four grains, while from a suitable region shells are sometimes found weighing 120 grains or even more; and it is fully recognized that every well-marked district necessarily imparts to the shells and other forms of life permanently resident there a certain general character or facies, which will be in harmony with the geological, climatal, or other conditions to which they are exposed, and the more widely diverse in character the districts are, the more divergent are the shells found therein.

To facilitate the study of variation, it is found necessary to classify the various modifications to which the shell is subject, distinguishing by special names those of the most striking character, and in this way many beautiful forms have become known to science.

The INTERNAL structure of this snail is full of interest, and I will now briefly summarise the more salient features of its organization, and describe some of their physiological functions.

The Nervous system, upon which all sensibility and motion are dependent, is composed of several paired medullary masses, or ganglia, which are closely adherent to each other, and surround the throat, the cerebral ganglia, or brain, being formed by paired masses of nerve substance above the gullet, from which all voluntary muscles and sense organs are innervated.

The organs for the sense of Orientation and the perception of sounds or vibrations exist as a pair of sacs placed upon the pedal ganglia and surrounded by a network of nerves which connect with the brain. Within the sacs are large numbers of minute oval bodies which during life are in incessant motion or oscillation, due to the action of the cilia lining the sac, but in addition there are some long sensory hairs which are connected with and convey the impressions of sound or direction to the brain.

Snails are generally thought to be mute, and really are so, but under certain circumstances, as when crawling over a thin sheet of glass or other suitable vibratory substance, they can produce musical sounds analogous to those produced by drawing a moist finger along

the edge of a wine-glass. This sound resembles an Æolian harp, and being usually heard at dusk or during the night, and the source of the mysterious sounds being frequently unsuspected, has often caused feelings of superstitious dread amongst those ignorant of its origin.

The sense of Sight is possessed by almost all mollusks, but objective perception is probably not very keen or definite. The eyes are placed at the tips of the upper tentacles, and can be withdrawn for protection within the body by special muscles, but their protrusion is mainly due to blood pressure and the action of the annular tentacular muscles. They are of complex structure, but differ from the human eye in so far that the optic nerve does not pierce the retina, and therefore does not form a blind spot. The *Onchidium*, a kind of marine slug, has, however, the eyes upon its back, constructed on exactly the same plan as our own.

The sense of Smell is chiefly exercised by a special development at the tips of the tentacles of a large nerve which arises from a lobe of the brain and terminates in an external layer of olfactory epithelium: this position of the organ being probably an adaptation to and developed by terrestrial life as in the more primitive aquatic mollusks, this sense is located within or at the entrance to the breathing chamber.

The Alimentary or Nutritive system resembles our own in its general arrangements and in the functions of its organs, but differs in possessing only an upper jaw, which is of the type known as Odontognathous or toothed, and is placed at the entrance of the mouth; it is composed mainly of chitin, and serves chiefly to hold the food while the sharp teeth rasp off particles, but it is able to bite out the piece if the food be soft.

The teeth are exceedingly numerous, and arranged like a tessellated pavement in closely packed rows on the upper surface of the radular membrane or tongue on the floor of the mouth cavity. There are about 140 of these rows, with 100 or more teeth in each row, or about 14,000 teeth in all; but the identical teeth now seen would not be present during the whole life of the animal, as the membrane to which they are fixed is always growing forward, like a finger-nail, so that the teeth in front are constantly being worn away, while new ones are continually forming behind, which gradually come into use. Some species in this way are said to have twenty or more complete changes of teeth during the life-time of the animal.

Locomotion is due to the alternate contraction and relaxation of the foot-muscles, and these contractions can be seen as dark waves passing from one end of the animal to the other; I have invariably counted seven as clearly visible at one time in the present species.

The speed at which these animals travel is not great, but when in

active motion *H. aspersa* can travel one yard in twelve minutes, or at the rate of a mile in a little over a fortnight ; but at times its motions are much more deliberate, and may be no quicker than at the rate of a mile in nineteen weeks.

The speed is greatly influenced, however, by the nature of the ground over which the creature crawls, as before it can be traversed it must be smeared with mucus or slime, which is poured out by a large gland, opening in front of the animal, and forms the track upon which the mollusk crawls, reminding one of the patent said to have been taken out for an engine to run along the roads and lay down in front as it ran the lines upon which it travelled.

Judging from the weights this creature can carry without diminution of speed, it would appear to have a great reserve of strength, as it can travel along a horizontal surface bearing or drawing a weight fifty times its own, or ascend vertically carrying a weight nine times that of animal and shell combined, which is equivalent to a person, like myself, ascending a ladder with a burthen of nearly a ton, or on fairly level ground being able to carry a weight of about four tons.

Circulation of the Blood and Respiration are co-dependent and influenced by temperature, age and muscular movement. Respiration or breathing in this species averages about four inspirations per minute in summer, but oxidation is not confined to the lungs of the animal, as the skin and tissues are permeated by various substances or pigments, called Enterochlorophylls, which form combinations with and draw oxygen within the system.

The Heart, which is the source of circulatory activity, is not, like that of man, practically uniform in action at all temperatures, but fluctuates with and is dependent in its rapidity upon the degree of warmth to which the animal is exposed, and we may therefore expect what actually does take place—a very marked diurnal range in the rapidity of the heart's action.

On an ordinary summer's day, the heart will vary in the number of pulsations from thirty to sixty or more per minute. A young individual, whose heart is pulsating at about seventy times per minute, will rapidly increase that number to 110 or even more on being placed on the palm of the hand, and that number can be as quickly reduced to twenty or even ten per minute, by placing the creature in contact with a cold surface, until at a few degrees below freezing they are reduced to three or four per minute, and these of feeble character and small amplitude.

The heart is also very responsive to muscular movement, like our own. A snail, whose heart was pulsating sixty times per minute while at rest, immediately increased the rate to eighty when it prepared to emerge from its shell.

In its circuit of the body the blood is not strictly confined within arteries, veins, and capillaries, as in our own bodies, but has also large spaces or lacunæ interposed in the course of its circulation, and thus freely bathes the surface of many of the organs of the body.

The Reproductive System is of an hermaphrodite character, being composed of the union of the male and female organs in the same individual, but self-fertilization does not take place, as the reciprocal union in sexual congress of two individuals is essential for effective fertilization; this is secured by the exchange during coition of what are known as spermatophores, which are masses of spermatozoa cemented together in a special shape which is determined by the particular species to which they belong.

This system of organs is especially remarkable for a very curious accessory, the "Love-Dart." This peculiar weapon, which resembles a four-bladed dagger or stiletto, is developed in every full-grown specimen at pairing time, and is mutually used by the snails in their preliminary coquettings when exciting each other to sexual congress, and as the darts are usually lost in these conflicts, they are often found lying on the ground in places where snails abound.

In former times, and even by some recent authors, the darts were supposed to be forcibly ejected from the pouch and launched, like arrows, against their prospective partners, and illustrations have actually been published showing the darts in transit through the air.

" See to the fight the gentle warriors move,
And dart with harmless force the shafts of love."

The symbolical fancy of Cupid with his darts would thus appear to have some foundation in actual life, at least so far as the mollusca are concerned.

During these amorous preludes, the actions of the animals are very different from their behaviour at ordinary times, as they fondle, caress, and pat each other with their palpi, and exhibit every symptom of pleasure.

The ocular tentacles also at those times curve downwards, as though looking at each other, a peculiarity only noticed at those pairing times and probably due to the withdrawal of blood to other organs.

This love-making occupies a great deal of their time, as they have been observed engaged in this process for ten to fifteen hours at a stretch. The eggs are laid during the summer, usually about a week after pairing, and under ordinary conditions hatch in about three weeks or a month; they are about one-sixth of an inch in diameter, of an oval shape, with an elastic membranous covering, and are buried in the ground at the roots of grass, etc.; they vary in number but perhaps average about one hundred.

During the development of the embryo within the egg, the wonderful phenomenon, known as the "Rotation of the Embryo," takes place. This rotatory motion is due to the action of the ciliary hairs with which the body of the developing mollusk is clothed, and it is remarkable that this motion almost exactly corresponds with the motion of the earth around the sun, the embryo not only revolving on its own axis, but circling round and round the circumference of the egg, like the earth in its orbit round the sun, and with exactly similar motions. This rotation is continued until the embryo is sufficiently advanced to crawl upon and eat its way through the egg-shell, and has then a whorl and a half of its shell already formed.

They grow little during the first summer, but in the following spring they eat voraciously and grow rapidly, soon attaining their full growth, when their life cycle is repeated.

Having now placed before you a short summary of some of the peculiarities of structure and habit of a typical mollusk, I trust it has tended to show those who have not hitherto given the subject much attention that there is a great and almost untrodden field of work in studying the organization and habits of these creatures, whose structure is in so many respects so wonderful, and without whose help stratigraphical geology could not have progressed so greatly.

In conclusion, I cannot help expressing my regret at the enforced absence of our distinguished President, Rev. Canon Horsley, and I hope he may be able to be present and that we may be privileged to welcome an address from his lips at our next annual gathering.

Pisidium lilljeborgi Clessin in the Isle of Skye.—I came across very fine examples of this species last September in a small lake called Loch na Stairsach, behind Broadford, Isle of Skye, at an elevation of some 750 feet. Mr. B. B. Woodward has very kindly examined and verified the species. It was abundant in sandy gravel where a small stream, connecting with another loch, entered. This is an addition to the fauna of vice-county 104, Ebudes North.—J. R. I. E. B. TOMLIN (Read before the Society, Nov. 8th, 1911).

Association of *Ancylus fluviatilis* and *Velletia lacustris*.—In a slow-running stream at Leighton Buzzard, Bucks., I found in August last *Velletia lacustris* and *Ancylus fluviatilis* living together on water-lily leaves. The specimens of *Velletia* were numerous and small, those of *Ancylus* were few but of good size. The unusual association of the two species seemed to me worth recording.—J. E. COOPER (Read before the Society, Nov. 8th, 1911).

PSEUDANODONTA ROTHOMAGENSIS Loc. IN BRITAIN.

BY W. H. FOXALL AND H. OVERTON.

PLATE 2.

(Read before the Society, Sept. 13, 1911).

FOLLOWING upon the note on this species, forwarded on June 14th, 1911, we have now pleasure in being able to give a more detailed account.

Specimens of this species were first collected by Mr. Foxall in the River Teme, now a tributary of the Severn, during the August of 1905, but owing to their similarity with *Anodonta cygnea* they had escaped notice as a distinct species. On recently visiting the locality specimens were again obtained. The nodules on the umbones of these being so prominent at once led to the identification of the species.

In order to confirm this, a specimen was forwarded to Dr. F. Haas, Frankfurt, for examination, who identified it as being *Pseudanodonta rothomagensis* and similar to those found in the Seine, as described by Locard in 1890 in "Contributions à la Faune Malacologique Française," xiv., pp. 12 and 90, and figured in his book "Les Coquilles des Eaux Douces et Saumâtres de France," on p. 219.

Dr. Haas raises some interesting questions with reference to the distribution of *Pseudanodonta*, particularly with respect to the rivers and streams in which the species have been found. Since *Pseudanodonta elongata* is recorded from the Thames, and *Pseudanodonta rothomagensis* from the Seine, and now from the Teme, he asks whether the eastern streams possess the former and the western ones the latter, thus raising the question of original drainage and consequent stream basins. It will, therefore, be of much interest if *elongata* can be found in the Teme, and also *rothomagensis* in the Thames.

We are much indebted to Dr. Haas for so kindly identifying the specimen and raising the interesting point to which we have alluded.

Clausilia bidentata m. dextrorsum at Skipton.—I am glad to be able to report the occurrence of a dextral *Clausilia bidentata* in this district. A specimen was brought to me amongst a number of the normal form by Mr. T. H. Holmes, who found them, in April, 1910, on an old moss-covered wall bordering a copse on the Grassington Road, just beyond the inhabited part of Skipton.—C. THEODORE CRIBB (Read before the Society, Sept. 13th, 1911).

TESTACELLA IN STAFFORDSHIRE.

By JOHN R. B. MASEFIELD.

(Read before the Society, Sept. 13, 1911).

MR. Bryan, the Assistant-Curator at the Hanley Natural History Museum, who has probably studied the Staffordshire *Testacella* more than any other malacologist, has sent me the following notes, which may be of interest in connection with Mr. L. E. Adams's paper on the distribution of these slugs in the last number of the *Journal*:—

- “The only species of *Testacella* recorded as having occurred in Staffordshire is *T. haliotidea*. The species was first recorded as an addition to the Staffordshire mollusca in 1897, when two specimens were found by Mr. Nicklin, who dug them up in his garden, near Trentham, from a depth of about twenty inches below the surface of the soil. One was an adult slug, and the other immature, and they were found about twelve yards apart. No further specimens were recorded until 29th July, 1905, when I received a half-grown specimen, found in a forcing-frame in a garden at Dresden near Longton.
- “On 21st April, 1906, I obtained an adult specimen from the same garden, where a few days later I saw two young mutilated specimens.
- “About the middle of July, 1909, I turned up two more specimens in a garden at Shooter's Hills, near Longton, from underneath loose bricks and a log of wood. On 21st July in the same year, I obtained three more young slugs of this species; and on 11th May, 1910, two more adult specimens from underneath pieces of wood in the same locality.
- “All these specimens belonged without doubt to the species *T. haliotidea*, and I have not met with either *T. maugei* or *T. scutulium*, although I cannot see why these latter species should not have been introduced as well as *T. haliotidea*.
- “From the recorded habitats I have given, I think with Mr. L. E. Adams that the evidence is conclusive that the species has been artificially introduced into Staffordshire.”
-

ON THE OCCURRENCE OF *CLAUSILIA DUBIA* Drap.
IN KENT.

By H. OVERTON.

(Read before the Society. Sept. 13, 1911).

DURING the autumn of 1897, whilst collecting in the district of Dover, I discovered a flourishing colony of *Clausilia* on and near one of the walls of the castle, and on reaching home these specimens were put on one side as being merely fine examples of *C. bidentata* Ström. Since that time, specimens from many localities have passed through my hands, and I have also been afforded the opportunity of examining numerous series belonging to other collectors.

The specimens in question may be divided into two forms: one long and fairly stout in proportion to the length (average alt., 14.39 mm. : average diam., 3.27 mm.); and the other short and of the same diameter, giving the shell a more tumid appearance (average alt., 12.53 mm. : average diam., 3.27 mm.).

On comparing these latter with continental forms of *C. dubia* Drap., I fail to discover any difference whatever, and have no hesitation in stating them to be this species, whilst on comparing the other form with *C. cravenensis* Taylor from Westmorland, the shells appear to agree in every detail.

Since these shells were all collected from one spot, and it is a fact that a complete series can be formed linking up the two extremes, it must obviously follow that *C. cravenensis* Taylor is identical with *C. dubia* Drap. I may state that this opinion is also shared by Mr. A. S. Kennard, F.G.S., to whom I am indebted for some of the Continental forms with which my specimens were compared.

That the shells in question are *C. dubia* Drap. there is not the slightest doubt. The lamellæ are identical, and whilst in the Dover specimens the rugæ appear to have faint dots or ridges running parallel with the suture, giving the shell a similar appearance in texture to *C. bidentata* Ström, this feature can also be detected in *C. dubia* Drap.

It is worthy of note that many continental authors have considered *C. dubia* Drap. to be a British species and there can be no doubt that this view is correct.

PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

404th Meeting, held at Manchester Museum, Sept. 13th, 1911.

Mr. J. W. Taylor in the chair.

Additions to the Library announced and thanks voted :

“A New Species of *Unio* from the Yorkshire Estuarine Series ; with Notes on other Forms,” by J. Wilfrid Jackson. “The West American Mollusks of the Genus *Nodulus*,” by P. Bartsch. “Fauna of the Gatun Formation, Isthmus of Panama,” by A. P. Brown and H. A. Pilsbry. “A New *Echphora* of the Chesapeake Miocene”; “Manual of Conchology,” part 83, by H. A. Pilsbry (*from the respective authors*). “Noticias sobre algunos Moluscos de España”; “El Museo del Instituto Oceanográfico de Mónaco”; “Moluscos de la Guínea Española,” by J. González Hidalgo (per Mr. J. W. Taylor); and the usual periodicals received in exchange).

New Member Elected.

Mrs. Susan A. Hitchon, Rhyddington, Oswaldtwistle, Lancashire.

Papers Read.

“*Pseudanodonta rothomagensis* Loc. in Britain,” by W. H. Foxall and H. Overton.

“On the Occurrence of *Clausilia dubia* Drap. in Kent,” by H. Overton.

“*Clausilia bidentata* monst. *dextrorsum* at Skipton,” by C. Theodore Cribb.

“Notes of certain Terrestrial and Fluviatile Mollusca from Glengariff, County Cork,” by Staff-Surgeon K. H. Jones, M.B., F.G.S., R.N.

“Note on a Colour Mutation in *Hyalinia helvetica*,” by Chas. Oldham.

“*Vertigo angustior* in Hertfordshire,” by Chas. Oldham.

“*Vitrina hibernica* Taylor and Jeffreys’ Varieties of *Vitrina pellucida* Müll.,” by Lionel E. Adams, B.A.

“*Testacella* in Staffordshire,” by J. R. B. Masefield, M.A.

Exhibits.

By Mr. J. Davy Dean : *Helicella cespitum* from Mentone ; *Pupa* (*Torquilla*) *cinerea* from Mentone (one example being abnormally long) ; *Helicella itala* from Kendal Fell ; *Hygromia rufescens*, peculiarly distorted, from Warton Crag ; also *Pleurodonta strangulata* from Jamaica.

By Mr. C. T. Cribb : *Clausilia bidentata* and m. *dextrorsum* from Skipton, to illustrate his note.

By Mr. H. Overton : Specimens of supposed *Clausilia dubia* Drap. from Dover, and *Pseudanodonta rothomagensis* Loc. from River Teme, to illustrate his notes.

By Capt. W. J. Farrer : *Margaritana margaritifera* from Rivers Irt, Greta, and Derwent, Cumberland, including a curiously twisted specimen from the Irt.

By Mr. Chas. Oldham : A series of Herts. Mollusca, to illustrate his note.

By Mr. J. W. Baldwin : A fine series of marine shells from Southport, collected during July of the present year.

By Mr. C. H. Moore : A series of photographs of *Helix pisana* in situ in its natural habitat at Tenby.

By Rev. L. Shackelford : A fine specimen of *Conus papilionaceus* Hwass from the Gulf of Guinea, a species closely allied to and often confused with *C. prometheus* Brug. The specimen agrees well with the figure in the “Conchologia Iconica,” but is larger ; *Voluta piperata* Sow. var. *macgillivrayi* Cox, and *Voluta*

(*Mamillana*) *mamilla* Gray from Western Port, Victoria, Australia. This last is a fresh living specimen, about three-quarters grown. The great majority of examples hitherto taken have been dead shells obtained from the lobster pots and inhabited by a large hermit-crab, consequently the unique features of the apex have been lost. In the present specimen the apex is of a bright orange colour and very shiny, the sutures being represented by a very slightly indented and somewhat confused line. An article on this rare species by Dr. Ph. Dautzenberg, with a fine engraving of an adult specimen from the collection of the late C. E. Beddome, appeared in the *Journal de Conchyliologie*, vol. xlix., p. 10, 1901. Dr. Dautzenberg expresses the opinion that the unique character of the nucleus justifies the existence of the sub-genus *Mamillana* established by H. Crosse for this single species.

**405th (Annual) Meeting, held in the Town Hall, Hanley, Staffs.,
Oct. 14th, 1911.**

Mr. J. R. B. Masefield, M.A., in the chair.

The following members and others were amongst those present:—

Mr. and Mrs. Gill, Dr. Wheelton Hind, Dr. Brooksbank, Rev. L. J. Shackelford, Rev. E. H. Nash, Messrs. T. H. Platt, J. R. B. Masefield, R. Standen, E. D. Bostock, J. R. Hardy, John Hill, C. H. Moore, J. W. Baldwin, J. R. le B. Tomlin, J. Kidson Taylor, John W. Taylor, G. H. Taylor, E. Collier, W. T. Elliott, W. Wells Bladen, J. T. Stobbs, A. Tonkinson, B. Bryan, C. Gale, W. D. Roebuck, J. W. Cooper, J. M. Williams, J. W. Jackson, H. Emmett, J. F. Musham, F. Barker, J. S. Gowshall, and J. Williams Vaughan.

Appointment of Auditors.

Messrs. J. W. Baldwin and C. H. Moore were appointed Auditors.

Appointment of Scrutineers.

Messrs. R. Standen and T. H. Platt were appointed Scrutineers.

Candidates Proposed for Membership.

Rev. E. H. Nash, M.A., Wetley Rocks Vicarage, Stoke-on-Trent.
James Moore More Williams, Imperial House, Pontlottyn, Cardiff.

Owing to the shortness of the time at the disposal of the meeting, the various reports, having previously been presented at the Council Meeting, were taken as read.

Election of Officers and Council.

The Scrutineers reported that the Officers and Council for the ensuing year, 1911-12, had been elected as nominated by the Council (see p. 256).

Presidential Address.

In view of the unavoidable absence of the President, Mr. J. W. Taylor had very kindly consented to step into the gap, and gave an address, illustrated by lantern slides, on "The Biology of the Mollusca as exemplified by a study of *Helix aspersa*."

A vote of thanks to Mr. Taylor was passed unanimously.

Exhibits.

By Mr. J. M. Williams: Series of foreign marine shells to show diversity of colour and pattern, including some splendid varieties of *Cypræa tigris* L., *C. rashleighana* Melv., *C. aurantium* Mart., *C. tessellata* Sw., *Turbo pethoiatus* L., *Phasianella australis* Gmel., a very dark *Cypræa mappa* L. from New Caledonia, and some fine examples of *Harpa*.

By Dr. Brooksbank : An extraordinary living specimen of *Limnaea*, from Lake Windermere, resembling a large *Trochus* in shape, apparently an abnormal *L. stagnalis*.

By Mr. F. H. Sikes : A number of less common varieties of *Helicidae*, including an enormous *H. aspersa* from Russia ; *H. nemoralis* var. *tonnensis*, Sandb., from Germany ; *H. setzeui* from Jericho ; *H. lapicida* var. *albina* Mke., from Switzerland ; *H. virgata* var. *dilatata* Sikes, from Kent ; and *H. arborum* var. *undulata* Sikes, from Friesland.

By Mr. J. R. B. Masefield : A complete collection of Staffordshire mollusca, among which were a particularly fine lot of *Unionidae*, extremely large *Limnaea globosa*, from a locality at Cheddle now destroyed, and fine *Sphaerium ovale* from Froghall Canal ; also various land and freshwater species from many localities, including two reversed *Helix pomatia* (France), and Scotch *Unio margaritifera* with pearls.

By Mr. H. Emmett : A large collection of land and freshwater shells from British localities.

By Mrs. Gill : A splendid series of *Scalaria pretiosa* Lam., *Spondylus princeps*, *Solarium quadricreps* Hinds, a good many forms of *Cardium*, *Terebra* and *Mitra*, *Bulna cruentata* Atl., and others.

By the Hantley Museum : Collections of British land and freshwater shells, and *Achatinella* : exotic bivalves, including species of *Perna*, *Malleus*, etc. ; five small tanks containing many living examples of *Limnaea stagnalis*, *Paludetrina jenkinsi* and others.

By Mr. J. R. le B. Tomlin : Some giant specimens of *Purpura lapillus* L., from Swanage ; very fine *Pisidium lilljeborgi* Clessin, from Loch na-Stairsach, Isle of Skye, about 750 feet above sea-level ; *Trachycystis scolopendra* M. and P., from Equeca, Natal ; and a number of rare *Pleurotomidae*, including *Pleurotoma gannonsi* Rve., *P. kieneri* Doumet, *P. undatiruga* Biv., *P. circinata* Dall, *P. gilchristi* Sow., *P. albina* Lam., *Drillia multiseriata* Smith, *D. multicostellata* Smith, *D. consanguinea* Smith, *Clavus becki* Rve., *C. exasperatus* Rve., *C. quadriliratus* Smith, *C. inclinatus* Sow., *Mangilia corallina* Watson, *Glyphostoma aubryanum* Herv., *G. tigroidellum* Herv., *G. jousseaumei* Herv., and *G. tribulationis* Hedley.

By Mr. W. Wells Bladen : An example of *Dreissensia polymorpha* Pallas, with pearl attached to interior of shell.

By Mr. A. Tonkinson : A small collection of land and freshwater shells, and some Carboniferous fossils.

By Mr. Gale : Staffordshire land and freshwater shells, including some fine examples of *Anodonta cygnea*, *Vivipara vivipara*, and *Planorbis corneus*.

By Mr. W. D. Roebuck : A very fine pair of *Paryphanta busbyi* Gray ; a number of *Cyprina annulus* L., from the Bazaar at Cawnpore, where they passed as current coin at the rate of 132 = one penny ; a cowry necklace from an Egyptian tomb of the XIXth Dynasty, guaranteed by the officials of the Egyptian Museum of Antiquities.

By Dr. Wheelton Hind, M.D., F.R.C.S., F.G.S. : A very complete exhibit of British Carboniferous Cephalopods, from all horizons.

By Mr. J. T. Stobbs, F.G.S. : Fossil mollusca from the coal measures, chiefly of North Staffordshire, including various species of *Carbonicola*, *Anthracomya*, and *Lingula*.

By Dr. Hind and Mr. Stobbs : A chart of fossil shells found in connection with the seams of coal and ironstone of North Staffordshire.

By Mr. H. Hills : Album of water-colour drawings of exotic shells.

By Mr. E. D. Bostock : Several drawers of land and freshwater shells, including large series of *Helicella virgata*, *Helix hortensis*, *H. pisana*, *H. arbustorum*, and two enormous specimens of *Ancylus fluviatilis* var. *capuloides* from Stafford.

By Mr. C. H. Moore : Series of *Helix aspersa* from various localities.

By Rev. E. H. Nash : A large number of exotic shells from the collection of the late Frederick Layard (a cousin of the late E. L. Layard), including a fine series of *Acavus superbus* Pfr., *Harpa imperialis*, Gm., *Melongenella corona* Gm., and a number of Cowries from the Island of Maré, Loyalty Isles—*C. exusta* Sow., *C. arabicula* Lam., *C. edentula* Sow., a remarkably small *C. cervinetta* Kien., and a splendid *C. mappa* var. *nigricans*.

By Mr. J. W. Baldwin : A small collection of marine shells from the shore at Southport, including *Actæon tornatilis* L., *Scalavia turtonis* Turton, and well-coloured *S. communis* Lam. ; also a number of exotic shells, among which were *Cypræa umbilicata* Sow., and several species of *Conus* and *Fasciolaria*.

By Mr. Kidson Taylor : A very beautiful collection of the genus *Amphidromus*, all the specimens being noticeable for their fine and perfect coloration ; we particularly noticed *A. webbi* Fulton, *A. dautzenbergi* Fulton, *A. sowerbyi* Fulton, *A. kalaensis* Fulton, *A. perakensis* Fulton, *A. floresianus* Fulton, *A. glaucolarynx* Dohrn, *A. enganoensis* Fulton, *A. cambojiensis* Reeve, and *A. niasensis* Fulton.

By Mr. B. Bryan (Assistant-Curator of Hanley Museum) : Series of Staffordshire land and freshwater shells, including some finely marked *Helix aspersa*, some curiously deformed *Limnea stagnalis* from Leigh, and *Physa heterostropha* from Sideway and Wood Green—both Staffordshire localities.

By Rev. Lewis J. Shackelford : A series of *Voluta*, including *Voluta virescens* Sol. ; *V. hebreæ* Lin., and vars. ; *V. nivosa* Lam. ; *V. imperialis* Lam. ; *V. junonia* Chem. ; *V. exoptanda* Sow. ; *V. undulata* Lam. ; *V. turneri* var. *daroni* ; *V. pacifica* Sol. and v. *elongata* Swains. ; *V. africana* Rve. ; *V. fusiformis* Swains. ; *V. fulgetrum* Sow. ; *V. papillosa* Swains. ; *V. roadknightæ* McCoy ; *V. mamilla* Gray ; *V. ponsonbyi* E. A. Smith ; *V. verconis* Tate ; *Patella kermadecensis* Pils. ; *Cypræa spurca* var. *acicularis* Gmel. ; *Stenoradsia conspicua* ; and a very fine example of *Mitra hamillei* Petit, from the Cape Verdes.

By Mr. E. Collier : *Helix nemoralis* from the west of Ireland, including a fine series from Valencia Island, and some very large ones from Inishmurray Island, off the coast of Sligo ; many species of *Cochlostyla*, showing great variation in colour and marking, including *Chloræa cærulea* Millf., *Corasia virgo* Brod., *Crystallopsis tricolor* Pfr., *Calocochlea pulcherrima* Sow., *C. festiva* Don., *C. depressa* Semper, *Anixa magistra* Pfr., *Helicostyla mirabilis* Fér., *H. fenestrata* Sow., *H. fuliginata* Mts., *H. unica* Pfr., *Cochlodryas polychroa* Sow., *C. florida* Sow., *Pachysphæra spherica* Sow., *P. balteata* Sow., and many others. Some of these were collected by the late Hugh Cuming, and several were received direct from the late von Möllendorff from Manila.

By Mr. R. Standen : (a), A fine series of non-marine shells, cut to show internal structure, prepared by himself for the Manchester Museum Collection, including examples of *Helix*, *Papuina*, *Helicostyla*, *Sagda*, *Gibbus*, *Porphyrobaphe*, *Cæliaxis*, *Cylindrella*, *Cerion*, *Macrodonates*, *Auris*, *Columna*, *Limnæa*, *Auricula*, *Pirena*, *Lanistes*, *Physa*, *Megaspira*, *Eucalodium*, *Clausilia* (showing *clausium* in situ), *Telescopium*, *Stenogyra*, *Amphidromus*, etc. (b), Very fine specimens of *Cypræa testudinaria*, from Ceylon and Loyalty Islands ; series of varieties of *Cypræa pantherina*, *C. mauritiana*, and *C. arabica*, from many localities. (c),

Aporrhais pespelicani, from Southport, showing growth stages from embryo to adult; also from Palermo and Corsica, showing extraordinary development of spines; and a fine set of *A. serrestianus*, from Valentia, Spain, exhibiting much variation in number of spines.

By Mr. J. Wilfrid Jackson: (a), A large series of Capt. T. Brown's "type specimens" from the "Pendleside group" of the Hebden Bridge area, including "*Goniatites*" *smithi*, *G. splendidus*, *G. undulatus*, *G. intermedius*, *G. jugosus*, *G. kenyonii*, *G. parvus*, *G. minutissimus*, *G. paradoxicus*, *G. proteus*, *G. subsulcatus*, *Orthoceras aciculare*, *O. brownii*, and "*Belemnites*" *gibsonii*, several of which are synonyms of well-known forms. (b), *Pleuromutilus pulcher*, from the Lower Coal Measures of Stalybridge (horizon: over first coal). (c), *Glyphioceras aff. reticulato*, from the Lower Coal Measures of Bacup (horizon: Upper Foot Mine).

ANNUAL REPORT.

At the last Annual Meeting the membership of the Society, including the ten Honorary Members, stood at 338. Since that time six members have resigned, and the deaths of four others have been notified, whilst eleven new members have been elected, so that the membership now stands at 339—a gain of one on the previous highest record. The deaths, deeply lamented by the Society, are those of Messrs. Dixon, Rhodes, Storey, and the Rev. A. E. Northey.

Eight ordinary meetings have been held, and a joint meeting with the members of the Leeds Conchological Branch was held in Manchester, and took the place of the February meeting. The special features of the joint meeting were the exhibition of an exceedingly extensive series of the British *Unionidae*, and addresses by Dr. Tattersall, director of the Manchester Museum, and Miss M. C. March, M.Sc. Dr. Tattersall's address embodied some interesting evolutionary conclusions, at which he has arrived from original research into the life-history of *Littorina littorea*, publication of which is promised shortly. Miss March gave the results of an extensive study of Variation, as exemplified in the British *Unionidae*. An abstract of her address has appeared in the *Journal of Conchology*.

At six of the meetings there have been special exhibits of the following genera:—*Porphyrobaphe*, British *Unionidae*, *Amphidromus*, *Odontostomus*, *Neritina*, and *Gibbus*.

Northern members have also taken part in two rambles—one to Ingleton, the other to Ilkley.

The *Journal of Conchology* has been issued quarterly. In the April number the concluding portions of the seventh part of a series of valuable articles on "Additions to British Conchology" (Marine), by Mr. J. T. Marshall, were commenced.

Some forty-four Papers and Notes have been read before the Society, and passed for publication, subject to the Editor's discretion. Amongst these is a paper on New Species of *Latirus*, by Dr. J. C. Melvill, M.A., D.Sc., which brings his monograph on the genus down to the present time. The first portion was published in the Memoirs and Proceedings of the Manchester Literary and Philosophical Society, 1891.

The Council has under consideration the publication of a new Census of the British Land and Freshwater Mollusca, and the more careful definition of the boundaries of the vice-county areas. In view of this, members are requested to furnish the Recorder with any fresh records they may make as speedily as possible. During the year the Recorder's work has been comparatively light, few

records coming to hand. The largest number has, however, come from South Wales, where Mr. Williams Vaughan, J.P., established a considerable number. The comparative scarcity of records for the whole of the country may be partly accounted for by reason of the very large number of returns made in 1909 and 1910, and partly through the phenomenal dryness of the past summer, which has rendered collecting difficult. Writing of a visit paid to Lincolnshire only last week, Mr. Roebuck says that he found that only the rivers and the largest drains have any water in them; the smaller and medium ones are entirely dried up.

The members of the Society heard with deep concern and sympathy of the accident that had befallen Mr. Fred Taylor, our Recorder, by which he has been laid aside for many weeks. It is a matter of great regret to the Council that one consequence of this mishap and the consequent pressure of business entailed is that Mr. Fred Taylor is unable to allow himself to be again nominated for the Recordership. It is with much satisfaction and confidence, however, that the nomination of Mr. W. Denison Roebuck, F.L.S., for the office is put forward. Mr. Roebuck is one of the two remaining founders of the Society still in membership, and is, moreover, admirably qualified by many years' work in the same direction in connection with Mr. J. W. Taylor's "Monograph of the British Land and Freshwater Mollusca."

TREASURER'S REPORT.

Statement of Income and Expenditure

FOR THE YEAR 1910.

The Statement of Income and Expenditure for the year 1910 reads as follows:—

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
Cash in hand ...	58	2	5	Library Cards... ..	0	2	0
Subscriptions	37	0	0	Cost of <i>Journal</i> for Oct., 1909	13	8	5
One Life Subscription Fee ...	3	3	0	Cost of <i>Journal</i> for Jan., 1910	13	4	6
Sale of Publications	14	1	10	Cost of <i>Journal</i> for Apr., 1910	12	16	6
Advertisements	2	6	5	Reprints	3	9	0
Darbishire Portrait Fund ...	3	8	0	Stationery	2	17	8
				Taylor's Monograph, part 16	0	5	3
				Illustrations	1	13	0
				Curator's Expenses	1	0	0
				Editor's Expenses, 1909-10 ...	1	6	4
				Secretary's Expenses, 1909-10	8	18	7
				Recorder's Expenses, 1909-10	0	4	8
				Cash in hand	58	15	9
	<u>£118</u>	<u>1</u>	<u>8</u>		<u>£118</u>	<u>1</u>	<u>8</u>

From this it will be noticed that there was a balance in hand of £58 15s. 9d.

The finances of the Society, as shown by the Interim Statement of Income and Expenditure for the present year, made up to Oct. 13th, seem to be in a satisfactory condition. There is at the moment a cash balance in hand of £6 12s. 8d., with outstanding liabilities of about £18.

The subscriptions still to be paid amount to £30.

Interim Statement of Income and Expenditure

TO OCTOBER 13TH, 1911.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
Cash in hand ...	58	15	9	Cost of <i>Journal</i> for July, 1910	12	5	7
One Life Subscription Fee ..	3	3	0	Cost of <i>Journal</i> for Oct., 1910	14	4	6
Subscriptions	27	15	0	Cost of <i>Journal</i> for Jan., 1911	14	0	5
				Cost of <i>Journal</i> for Apr., 1911	12	0	10
				Cost of <i>Journal</i> for July, 1911	12	1	6
				Illustrations	5	0	6
				Reprints	4	17	0
				Stationery	1	9	6
				Taylor's Monograph, pts. 17, 18	0	10	6
				Secretary's Expenses...	6	10	9
				Cash in hand ...	6	12	8
	<u>£89</u>	<u>13</u>	<u>9</u>		<u>£89</u>	<u>13</u>	<u>9</u>

ANNUAL REPORT OF THE LEEDS BRANCH

FOR THE YEAR ENDING 30TH SEPT., 1911.

The number of meetings held during the last twelve months has been twelve, six of which have been held in the field, and at the following places:—Selby in April; Harewood Park in May; Scarborough in June; Ledstone in July; Ingleton in August; and Ilkley in September.

The last meeting held in the field (the September one) was the fifth Annual Joint Meeting with the members of the Manchester Centre, and, like the preceding ones, was a great success.

The six indoor meetings were held, as usual, alternately in the University, Leeds, and the Cartwright Hall, Bradford, with the exception of the February meeting, which was held in the University, Manchester, by the invitation of members of the Manchester Centre.

The indoor meetings have been continued on similar lines to other years—exhibition of specimens and reading of papers. There is a prescribed exhibit for every meeting, consisting of one species from the British land and freshwater shells, upon which species Mr. J. W. Taylor gives a general survey, dealing with the morphology, habits, and general distribution. Mr. Taylor's remarks are always of great interest to the members, who turn up in full numbers to the winter meetings. Other exhibits of general interest are shown at the meetings, in addition to the exhibit appointed by the syllabus.

Additions continue to be made to the many drainage areas in Yorkshire, the result of observations made during the summer rambles or by the efforts of individual members. The meetings of the Yorkshire Naturalists' Union are officially attended, and reports when made have appeared in the "Naturalist." The membership at the present time is twenty-three, with two corresponding members.

Prof. W. Garstang, M.A., D.Sc., of the University, Leeds, is our President.

F. BOOTH, *Hon. Sec.*

ANNUAL REPORT OF THE LONDON BRANCH.

Since our last annual report twelve meetings of this branch have been held. Six of these were field meetings. The localities visited were Rickmansworth, Chesham, Purley, Arbrook Common, Kew Gardens, and Leatherhead. The exceptionally dry weather made collecting difficult, but we succeeded in finding *Vertigo substriata*, *V. pygmaea*, *Clausilia rolfhii*, and *Aecea tridens*.

The attendance at some of the meetings was disappointingly small, although the membership of the branch remains much as it was last year.

Canon Horsley once again very kindly provided a room for the winter meetings. We deeply regret that the Canon is leaving London; he will be much missed by the members of our branch.

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

406th Meeting, held at Manchester Museum, Nov. 8, 1911.

Mr. J. W. Taylor in the chair.

Additions to the Library announced and thanks voted:

"The American Species of *Sphyradium*, with an Enquiry as to their Generic Relationships," by G. Dallas Hanna. "New Marine Mollusks from Bermuda," by P. Bartsch. "New Species of *Valvata* and *Spharium* from West Runton," by A. S. Kennard. "On some Freshwater Mollusca from the Pliocene Deposits of East Anglia," by A. S. Kennard and B. B. Woodward (*from the respective authors*). "Additions to 'British Conchology,'" by J. T. Marshall (*from Mr. J. R. le Brockton Tomlin*). "Catalogo de los Moluscos Testáceos de las Islas Filipinas Joló y Marianas," by J. G. Hidalgo. "Monografia de las Especies Vivientes del Genero *Cypraea*," by J. G. Hidalgo. "Sulle Forme del Gruppo della *Campylaea cingulata* Studer," by Carlo Pollonera. "Liste des Mollusques récoltés par M. H. Mansuy en Indo-Chine et au Yunnan et Description d'Espèces Nouvelles," by Ph. Dautzenberg and H. Fischer. "Liste des Mollusques récoltés par M. le Capitain de Frigate 'Blaise' au Tonkin et Description d'Espèces Nouvelles," by Ph. Dautzenberg and H. Fischer (*presented by Mr. John W. Taylor*); and the usual periodicals received in exchange.

Donations to the Cabinet.

A large number of Voucher Specimens which had been sent to the Recorder for Census purposes.

New Members Elected.

Rev. E. H. Nash, M.A., Wetley Rocks Vicarage, Stoke-on-Trent.

James Moore More Williams, Imperial House, Pontlottyn, Cardiff.

Candidates Proposed for Membership.

C. M. Standish, Prospect House, Weldbank, Chorley.

Edmund Ridsdale Brown, 235, Brunswick Street, Manchester.

Samuel Wood Geiser, Assistant in Biology, Upper Iowa University, Fayette, Iowa, U.S.A.

Member Deceased.

Miss Mary Lodder.

Papers Read.

"The Track of *Limax flavus* Linné," by Lionel E. Adams, B.A.

"Association of *Ancylus fluviatilis* and *Velletia lacustris*," by J. E. Cooper.

"*Pisidium liljeborgi* Clessin in the Island of Skye," by J. R. le B. Tomlin, M.A., F.E.S.

"*Succinea elegans* Risso, new to the Orkneys," by J. R. le B. Tomlin, M.A., F.E.S.

Exhibits.

By Mr. J. Kidson Taylor: *Cypræa lynx* var. *michaelis* Melv.; *C. stolidus* var. *moniontha* Melv.; *C. poraria* var. *kauaiensis* Melv., and var. *vibex* Kenyon; *C. listeri* Gray; *C. nebulosa* Kien.; *C. citrina* Gray; *C. helvola* var. *mascarena* Melv.; *C. xanthodon* Gray; *C. physis* Brocchi; and very pale forms of *C. diluculum* Rve., and *C. rashleighana* Melv.

By Mr. J. Ray Hardy: A remarkable form of *Helicigona arbustorum*—approximating in colour to the var. *castanea* of *Helix nemoralis*—collected early in the present month in Prestwich Clough near Manchester; it is interesting to find this species still existing so near the city, as the larger *Helices* have practically been killed off for a considerable distance round by the increase in thrushes and the poisoning of the herbage by smoky rain. He also showed a fine series of *Helicelva virgata* of large size and great variety of marking, taken at Cleveleys near Blackpool, at the end of September last; the species has considerably extended its range along the coast between Blackpool and Fleetwood, since it was first observed near Rossall about thirty years ago, and the specimens are now fully treble the size they were then, and show far greater variation.

By Mr. Edward Collier: *Planorbis vortex*, *P. contortus*, *Helicella cartusiana*, and *Valvata macrostoma* Steenb.—which has recently been added to the British fauna—from Malling Marsh; *P. umbilicatus*, *Segmentina nitida*, and *Bythinia leachi* from Pevensey Level.

By Mrs. A. Gill: A series of *Tapes*, and other exotic bivalves.

By Mr. J. W. Taylor: A number of portraits of past and present continental conchologists.

By Mr. Fred. Taylor: A set of *Clausilia bidentata* from Ilkley, all perfectly cleaned; and *Hyalinia lucida* from Oldham Park Conservatory.

By Mr. G. C. Spence: A large number of species of *Urocoptis*, including nepionic tips of species of *Anoma*, which are seldom seen in collections, owing to the apical whorls being cast off as the shell grows; an egg of *Anoma* sp., and many beautifully prepared sections of the shells of various groups of the family.

By Mr. Harry Allan: *Pyramidula rotundata*, *Hygromia granulata*, *Azeca tridens*, and var. *crystallina* from Ilkley, Yorks.; also an interesting series of *Clausilia bidentata* var. *cravenensis* from Ilkley and Carl, showing difference in form from each locality.

By Mr. C. H. Moore: A collection of shells from Sulina, Roumania, including very fine examples of *Limnaea stagnalis*, *L. fereger*, *L. palustris*, *Bythinia tentaculata*, *Neritina fluviatilis*, *Planorbis corneus*, *P. complanatus*, *Helix pomatia*, etc.; also a specimen of *Saxicava rugosa* in situ in rock, from Tenby.

By Mr. R. Standen: A series of British oysters from Whitstable, shewing growth stages from the "spat" up to very old individuals of uncertain age, recently presented to the Manchester Museum.

By Mr. J. F. Musham: A series of *Margaritana margaritifera* from Kirriemuir, N. B., remarkably thin and light in weight, though apparently full grown.

By Mr. J. Wilfrid Jackson: Large examples of *Nautilus pompilius* (diameter $8\frac{1}{2}$ ins.); *Conus prometheus* (length 7 ins.); and *Melo æthiopica* (length $11\frac{1}{2}$ ins.), from the shell collections at the Salford Borough Museum. In connection with the last species, Mr. G. C. Spence reported having recently seen and examined an example measuring over 16 inches in length in the Museum at Accrington, Lancs.

PROPOSED REPRINTING OF VOL. I. OF THE
JOURNAL OF CONCHOLOGY.

FOR some years past a notice has appeared on the third page of the cover of the *Journal* with reference to the proposed reprinting of Vol. I., which has for a long time been rare and difficult to procure even second-hand.

The issue of the "*Quarterly Journal of Conchology*,"—as it was then called—was due, as everyone knows, to the enterprise of Mr. J. W. Taylor. The first volume covered the years 1874 to 1878, and consists of 416 pages, with 4 plates, and 2 woodcuts in the text.

Amongst the contributors to this volume, we find such names as Bland, Garrett, Brazier, Angas, Gwyn Jeffreys, Mariatt, Petherd, Sowerby, Smith, and Stearns. It contains descriptions of 48 new species of shells, many (unfortunately) unfigured.

I have often received enquiries from members as to the possibility of something being done, and, at the instance of several who were present at the last Annual Meeting, I applied to our Publishers for an estimate. This is now to hand:—For 100 copies (text, figures, and plates), £87 10s. : for 250 copies, £98.

Working on the basis of the smaller amount, it would require 84 subscriptions at a guinea (the price suggested on the cover of the *Journal*) to cover the outlay. If a sufficient number of subscriptions is obtained to justify printing, the Council proposes to issue the volume to advance subscribers at a guinea; the price subsequent to publication to be increased to 25s.

The covers of the various numbers will *not* be reprinted, as this would add considerably to the expense.—EDITOR.

BIBLIOGRAPHY.

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

"**The American Species of Sphyradium, with an Enquiry as to their Generic Relationships,**" by G. DALLAS HANNA (of the U.S. Bureau of Fisheries, Washington, D.C.)—from Proc. U.S. Nat. Mus., vol. 41, pp. 371-6.

This six-page pamphlet is of particular interest to British malacologists, on account of the vicissitudes undergone by our little *Sphyradium edentulum* Drap. as regards classification. On the other side of the Atlantic a species was described as *Pupa simplex* by Gould in 1840. Subsequently this was identified with *S. edentulum*, and the names are usually considered synonymous at the present day. Mr. Hanna, however, thinks it possible that the two are distinct, judging from figures of the genitalia of *S. edentulum* in Lehmann's "Leb. Schnecken und Muscheln in Pommern." These were published in 1873, and are not good, and Mr. Hanna complains of the lack of modern methods of dissection in connexion with this species. Lehmann describes the jaw of this snail as consisting of a single piece, and the radula as but slightly different from that of a *Vertigo*. Since this pamphlet was written, Dall has reinvestigated the jaw and radula in fresh material, and confirms the correctness of Sterki's statement that the jaw is composed of numerous separate plates (about sixteen). This inaccuracy of Lehmann's seems to discount considerably the value of his figures of the genitalia.

NOTICE TO MEMBERS.—Alteration of Rule.

AT the next meeting, to be held on Wednesday, Jan. 10th, 1912, at 7 p.m., in the Manchester Museum, Mr. J. W. Taylor will move:—

"That Rule 8 shall be altered to read: The Presidency shall be tenable for one year only, and the President shall give an address."

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NOTES OF CERTAIN TERRESTRIAL AND FLUVIATILE
MOLLUSCA FROM GLENGARIFF, CO. CORK.

BY STAFF-SURGEON K. H. JONES, M.B., F.Z.S., R.N.

(Read before the Society, Sept. 13, 1911).

THE specimens referred to in the following notes were collected by the writer in the vicinity of Glengariff, Bantry Bay, at the end of March and the beginning of April, 1911.

The terrestrial species are not of particular interest, but some of the fluviatile, and especially those belonging to the genus *Pisidium*, require to be carefully considered if only on account of their geographical distribution. It is perhaps doubtful whether *Pisidium hibernicum* and *Limnæa involuta* have previously been collected so early in the year.

Under the head of each species mention is made of the peculiarities of its habitat, if any, and of the position of the same in relation to Glengariff.

For the identification of the species of *Pisidium*, Mr. B. B. Woodward is responsible. The terrestrial species were submitted to Mr. A. W. Stelfox, of Belfast.

The following species were met with :—

***Hyalinia nitidula*.**

***H. pura*.**

***H. radiatula* and var. *viridescenti-alba*.**

***H. crystallina*.**

***Zonitoides excavatus* and var. *vitrina*.**

***Pyramidula rotundata*.**

***Cochlicopa lubrica*.**

All the above species were found abundantly in the woods immediately behind the Eccles Hotel.

Helix aspersa of course was plentiful and nearly always very thin in the shell.

H. nemoralis was not found at all commonly, and the specimens which were seen resembled the last-named species in the extreme tenuity of their shells.

Limnæa involuta was obtained at Barley Lake, about four miles from Glengariff and 1,000 feet above sea-level.

The molluscs were plentiful but difficult to see; all were resting on stones at the water's edge, individually they were small, and only one full grown specimen was taken.

L. prætenuis was obtained in its original habitat—Lough Nagarriva—but, unlike the preceding species, was found on weeds instead of on stones.

L. involuta could only be collected slowly and carefully by hand, but *L. prætenuis* required to be removed with the scoop.

The specimens were almost all immature, and extremely inclined to be localised, even in the small area of this tiny mountain lough.

They were not very numerous.

L. pereger.—A variety of this species was taken at Lough More, on the road between Glengariff and Bantry, at an elevation of about 600 feet.

This variety is probably one of the intermediate forms, which there can be little doubt exist between the type and the very aberrant *L. involuta*. The shells are characterized by their great fragility, their deep sutures, and the very well marked striations in the lines of growth.

Mr. A. W. Stelfox considers this variety of *L. pereger* to be identical with one obtained by him at Graheen's Lough, Achill Island, West Mayo, in April, 1909, which is figured in his List of the Land and Freshwater Mollusks of Ireland (Proceedings of the Royal Irish Academy, vol. xxix., section B., no. 3).

Acicula lineata.—One specimen only was obtained of this species. It was found under the moss on the stone wall of a bridge over the Glengariff River, beyond the village.

Ancylus fluviatilis.—This species is very common about Glengariff; the shells are always fragile, and usually somewhat small.

In Barley Lake specimens of the var. *alba* are found in considerable numbers.

Unio margaritifer.—The pearl mussel was only actually taken from one locality—the little Owenacahina Stream, which runs from Barley Lake down to the Glengariff River.

U. margaritifer is also to be found in the Coomerkane River, and in the lower reaches of the Glengariff River.

The little stream mentioned above is only three or four feet wide, and perhaps two or two-and-a-half feet deep, and in it the molluscs are only to be found in the two hundred yards or so nearest to the Glengariff River, where the rivulet runs through almost flat meadows.

There are no *Unios* in the Glengariff River itself at this point, although in the stream they are exceedingly abundant.

The neighbouring Irish capture these mussels by inserting a thin-pointed stick between the open valves, on which the mollusc at once closes them, and is then easily withdrawn from the bed of the stream, clinging tightly to the stick.

The specimens here obtained are rather small and of an elegant shape, with somewhat thin shells. Pearls are said to be rare in shells from this locality, which may account for the abundance of the mussels.

Pisidium hibernicum.—A few small specimens were found in Lough Nagarriva, where they appeared to be climbing on weeds.

P. pusillum.—This species was taken in considerable numbers at the Loughs of Avaul, on the road to Castletown, and about four miles from Glengariff. It also occurred sparingly in Coomerkane Lough, a partially-drained lake at the head of the valley of the same name.

P. nitidum.—This species was only obtained in Little Lough Avaul, the nearer of the two small lakes to Glengariff. It was not plentiful.

P. obtusale.—A very oval form of this species was sparingly taken from a small peaty pool on the road to Lough More.

P. steenbuchi.—This species was found very abundantly in a small wayside pool in the Coomerkane Valley. This pool was not more than six feet square, and besides the *Pisidia*, contained a quantity of *Algae* and innumerable tadpoles.

P. lilljeborgi.—This species was found very abundantly at Lough More.

P. casertanum.—This species occurred with the last at Lough More, but was not nearly so common there.

All the above species were found in the sub-division of West Cork, except *Limnæa prætenuis* and *Pisidium hibernicum*, which were taken in South Kerry.

Pisidium obtusale, *P. lilljeborgi*, and *P. steenbuchi* have not previously been noted in West Cork. *P. lilljeborgi* has previously only been taken in the north-west of Ireland; and *P. steenbuchi* not nearer than Co. Clare.

 OBITUARY NOTICE.

 ROBERT CAIRNS.

 BY WILLIAM MOSS.

 PLATE 3.

A MIGHTY hunter has been removed from our midst. By the death of Robert Cairns, conchology has lost one of its most loyal and earnest students, and a gap has been made in the membership of this Society which it will take long to fill. Readers of the *Journal of Conchology* have long been familiar with his name in the list of members exhibiting interesting rarities at the monthly meetings of the Society. To those of us who met him at these meetings, and who had the privilege of his friendship and intimate association, he was indeed a most delightful companion. At these meetings in Manchester, beginning with the days when they were held in the offices of the late Mr. R. D. Darbishire, or later at the Manchester Museum, his presence was always felt to be an encouragement and an inspiration. If it were not invidious to give names, one would like to mention a few of the old brigade, to whom these meetings were a joy amid the rough and tumble of the business life of the day. Amongst those who have "crossed the bar" are the late R. D. Darbishire and Thomas Rogers. Then one remembers others who have left the district—J. C. Melvill, Charles Oldham, and Dr. Hoyle. Amongst those still in the district, and who were often the companions of his rambles, are R. Standen, E. Collier, J. R. Hardy, Fred. Taylor, J. W. Jackson, G. H. Taylor, J. D. Dean, B. R. Lucas, the writer, and many others too numerous to mention. This close personal association tended to make more interesting the scientific studies in which we were all so deeply engaged. The rambles of the Society were supplemented by many other excursions. Space will not allow of the relation of more than a single incident in the happy hunting grounds, illustrating a find of more than ordinary interest in which he was associated. For many years—in the late eighties and the early nineties—it was the privilege and pleasure of the writer and his family to spend the summer holiday with Mr. Cairns and his family at Peel in the Isle of Man.

The land and freshwater shells were a never-ending source of interest, and we collected most, if not all, the species known to the island. In one valley, at Whitestrand Bay, Peel, from descriptions of the usual habitat of *Acme lineata*, given us by Mr. Standen, we were both convinced that this shell ought to be found. We had a

great harvest of other species, but although we worked very hard, our efforts to record *Acme lineata* were all in vain. One day we had a visit from our mutual friend, Mr. Fred. Taylor, of Oldham, who was then staying in Douglas. "Come with us to Whitestrand Bay," we said; "we are sure *Acme lineata* is in the valley, but we cannot find it." We went to the valley, and immediately got to work. In about ten minutes or less Mr. Fred. Taylor called out "*Acme*!" In less than another ten minutes, both Mr. Cairns and the writer had found specimens; and that is the story of the record of *Acme lineata* for the Isle of Man.

Undoubtedly Mr. Cairns was at his best in the field. A *Vertigo* had no more chance of escaping his eye than one of the larger *Helicidae*. On land or in water it was all the same. In our early field work, we once discovered in a pond near home a large colony of white *Planorbis corneus*, and the exchanges we were able to effect by means of these very fine specimens of their kind introduced us to a large circle of conchologists, with many of whom he kept in touch for most of his life. But the find did more than this—it introduced us to a then budding conchologist, Fred. Taylor, of Oldham, whom we found hunting for white *Planorbis* in what we considered to be, except to ourselves, an unknown preserve. This was the beginning of a friendship, close and continuous, between Mr. F. Taylor, Mr. Cairns, and the writer, which never faltered, and the faithful visits of this old friend during the last months of Mr. Cairns' illness greatly helped to soothe and comfort him, and were looked forward to with the keenest anticipation. It is only fair to mention that during this time the loss by Mr. Taylor of one of his own children had clouded his own home.

Apart from field work, Mr. Cairns conducted a very extensive exchange, and by this and other means accumulated a very large collection of foreign shells, mostly land and freshwater, in addition to British species, but including a few marine species, more especially *Cypræa*, in which group he ultimately specialized very extensively, forming a large and fine collection.

In his early days he was somewhat of a botanist, and he also collected birds' eggs. When the writer made his acquaintance, probably geology had the strongest attraction for him. There were at that time in the neighbourhood of Ashton-under-Lyne numerous collieries in active work, and the shale heaps at these collieries and in the neighbouring area of Oldham were a never-ending attraction, and large collections of fossils were made from the coal measures. On the banks of the River Tame, more especially on the Cheshire side near the Dukinfield railway station, most interesting strata were exposed,

and access being comparatively easy, Mr. Cairns spent a great deal of time in investigating the geological character and contents of these beds. Mr. Standen, in "Some Reminiscences of the late Mr. Cairns," in the *Lancashire Naturalist*, Jan., 1912, referring to this portion of his work, says:—"Mr. Cairns also collected extensively from the celebrated 'Marine Band' in the Middle Coal Measures exposed on the banks of the River Tame at Dukinfield, one of the many forms of mollusca from this horizon being named in his honour, viz., *Aviculopecten cairnsii* Bolton."

Another hunting-ground which very frequently attracted Mr. Cairns was in and about Castleton in Derbyshire. The Winnats, Sparrow-pit, and many other localities were worked very successfully, both for fossil and recent shells.

Although, with the exception of his collection of *Cypræa*, Mr. Cairns did not collect many marine shells, no account of his conchological work would do him justice which did not refer to the great interest he took in obtaining and dealing with the large collection of marine shells which, through the instrumentality of the Rev. James and Mrs. Hadfield, was collected in Lifu, Uvea, and other islands of the Loyalty group. The collection also included many interesting species of land and a few freshwater shells. A permanent collection of these shells was placed in the Manchester Museum, and named "The Hadfield Collection." The late Mr. R. D. Darbishire took a very great interest in this large and interesting consignment, which forms the subject of three lengthy articles in the *Journal of Conchology*, under the title of "Notes on a Collection of Shells from Lifu and Uvea, Loyalty Islands, formed by the Rev. James and Mrs. Hadfield, with List of Species," by James Cosmo Melville, M.A., and Robert Standen; part i., vol. viii., 1895-6, pp. 84-132, pls. ii. and iii.; part ii., vol. viii., 1896, pp. 273-315, and pp. 379-81, pls. ix.-xi.; part iii., vol. viii., 1897, pp. 396-421. These articles were published later as Museum Handbooks under the title of "Catalogue of the Hadfield Collection of Shells." In connection with the early history of this collection, Mr. Joseph H. Hardy was most actively associated with Mr. Cairns in the investigation of the first arrivals.

One of the earliest, if not the first Natural History Society with which Mr. Cairns was connected, was the Scientific Students' Association of Manchester, and many happy rambles one can remember under the auspices of this once popular society.

For a great many years he had been a member of the Conchological Society of Great Britain and Ireland; the Malacological Society of London; and the Manchester Microscopical Society.

In addition to the fossil species already mentioned, the following recent forms were also named after him:—*Haminea cairnsiana* Melvill and Standen; *Ennea cairnsii* Melvill and Ponsonby; *Cyprea caurica* var. *cairnsiana* Melvill and Standen.

In connection with his geological field work, he was for many years intimately associated with the late Mr. George Wild, of Bardsley, and the late Mr. James Radcliffe, of Ashton-under-Lyne, who were both keen geologists, and who formed with Mr. J. H. Grundy and the writer a little band of workers whose frequent meetings will never be forgotten.

Mr. Cairns was born in Hawick in 1854, and came to Lancashire about 1875 as assistant to Mr. Abraham Park, J.P., at Albion Schools, Ashton-under-Lyne. He took the Head Mastership of the Hurst British School in or about 1877, which appointment he held to the time of his death. From the time of his taking up the latter appointment, the writer has had the uninterrupted pleasure of the companionship of one of the best types of the Lancashire field naturalist the county has ever produced, even if we may be called upon to acknowledge that Scotland was the land of his birth.

This paper might be indefinitely enlarged with personal sketches of our old friend, but probably enough has been said to keep his memory green in the hearts and minds of hosts of friends who will read these pages. It is sad to think that at such a comparatively early age he has been taken away from us, and our sympathies must go out freely to his wife and to the two sons and two daughters he leaves behind him to mourn his loss.

[NOTE.—By the kind permission of the Editor of the "Lancashire Naturalist," we are able to reproduce in this number an excellent portrait of Mr. Cairns.—ED.]

A Note of the Occurrence of *Pisidium lilljeborgi*, Clessin, in the Island of Arran.—In Loch Urie, a small mountain lake, situated about 1,300 feet above Lamlash, in the Island of Arran, numerous specimens of *Pisidium lilljeborgi* were taken in September, 1911. Many of the specimens were of unusually large size. *P. lilljeborgi* is associated with *P. caseitanum* and *P. pusillum* in this loch. The specimens were identified by Mr. B. B. Woodward.—K. H. JONES (*Read before the Society*, Dec. 13th, 1911).

ADDITIONS TO "BRITISH CONCHOLOGY."

By J. T. MARSHALL.

PART VII. (*continued from page 231*).

Columbella haliaëti Jeff.—S.W. Ireland (R.I.A. cruise); off the Butt of Lewis, 545f., and between the Shetlands and Norway, 73-155f. (Simpson)! Shetland-Faroe Channel, 516f. and 57of. ('Triton'); English Channel slope 69of. ('Porcupine'); off the Butt of Lewis, 53of. ('Knight Errant'), associated with *C. costulata* Cant., which was for a time considered identical with *C. haliaëti*, but now regarded as the *Buccinum acuticostatum* of Philippi, a Calabrian pliocene fossil. In regard to the legitimacy of the specific name, see Marshall: "Alterations in Brit. Conch.," *Journ. of Conch.*, 1895, vol. viii., pp. 38-9.

var. **albula** Jeff.—Unst (Jeffreys); E. Shetlands, 4of.; S.W. Ireland, 75of. (R.I.A. cruise)! At some of the Porcupine dredging stations in the Atlantic off Ireland all the specimens were of this variety.

This is a most variable shell as regards size, number and strength of ribs, angularity of whorls, and proportions of length to breadth. Some specimens have fewer and stronger ribs, with the tops of the whorls shouldered, exactly resembling in these respects the relations of var. *nitida* to *Nassa reticulata*; while in others the armature of the aperture consists of tubercles instead of short ridges or corrugations. Jeffreys' generic figure is the type; his plate-figure is too narrow. For further particulars of this species see *Journ. of Conch.*, 1895, vol. viii., pp. 38-39.

The discovery of *C. haliaëti* came as a last hope at the end of a very unsuccessful Shetland cruise. For weeks Gwyn Jeffreys' yacht the Osprey (whence the name of the species is derived) had been unable to go out, and as the season was nearing its end he induced his captain to go out and bring him in something as a farewell. The captain returned at the end of the week with a few things *on a clean plate*, among which were the *Columbellæ*. Gwyn Jeffreys had to be satisfied with them for that season, but the following year the same ground was again visited and more specimens secured.

A specimen of *Columbella rustica* L. has been picked up by Mr. Tomlin on the Tenby beach, that noted haunt of foreign shells, and also several examples of *Conus mediterraneus* Brug., while only last winter three specimens of *Trochus conulus* L. were picked up on three different days on the same beach.

Pleurotomidæ Lovén.—The nomenclature of this extensive family has got into a thoroughly chaotic state, and badly wants mending or ending. So many fancy genera and sub-genera, of no scientific value whatever, have now been introduced into it, that authors are puzzled where to assign new species, and no sooner is a group or section defined than a new species arises to upset it, a feature which is strikingly apparent throughout the Challenger Reports. Nearly every successive writer seems to agree only in one thing, and that is to ignore his predecessors and adopt a fresh system for himself. Only one of two courses (both extremes) seems open to the naturalist, as distinguished from the "literary" conchologist, and that is to make a distinct genus of nearly every species, as is done by some writers, or in despair to lump them together under one or two genera, as is adopted by others. The Rev. R. Boog Watson thinks that the "sculpture and form of the apex may probably serve as the safest basis of classification in the whole group,"¹ while Dr. Gwyn Jeffreys more plainly says that "there ought to be at least one distinctive and fixed character, and no transitional or intermediate forms."² The pretty way in which this family has been tinkered is strikingly shown in the Challenger Reports by Boog Watson, who says, for instance, in describing his *Pleurotoma macra*—"I have put this and the two following species under *Mangelia*, not because they at all agree in sculpture with that group, for they do not, but because the apex agrees better with the apex of *Mangelia* than it does with that known to me in any other of these very perplexing and badly-defined groups. I do not believe that this and many other species can remain where I have put them, but as the entire family is in process of disintegration, they may fare with the rest."³

In the face of such evidence as this, naturalists who are indifferent to "systems," or the wrangles over nomenclature, may pursue the even tenor of their way, trusting to the inevitable reaction that always follows extremes. Object-lessons are not wanting to show where these extremes inevitably lead when pursued "to the bitter end!" The whole difficulty in this and other genera has arisen from a few writers having abandoned or failed to grasp the fair meaning and limits of a "species" or "genus," and no improvement can be expected while these terms mean one thing to one man and another thing to another. Notwithstanding the fact that the British Association Rules on Nomenclature have been promulgated for so many years, the confusion tends to become worse and worse, and unanimity is further off than ever.

1 Challenger Gastropoda, p. 360.

2 New and Peculiar Moll., Ann. Mag. N. Hist., 1877, p. 331.

3 Challenger Gastropoda, p. 345.

As to the priority craze, that has now proceeded so far as to land scientific nomenclature into a veritable morass, and it will require some authoritative pronouncement to bring matters back to their proper proportions. The question then arises, who is that authority to be? Das Tierreich is a painstaking and really good work so far as it has gone, but, like everything else German, it is too German, and not calculated to meet with such general acceptance (even if one could see the end of it) as the more impartial plan of the International Zoological Congress. If the latter is carried out on common-sense and consistent lines, avoiding anything like mere scientific pedantry, it would go far to reconcile all conflicting interests for the sake of scientific harmony and peace, which, after all, is what 99 out of every 100 scientists require.

To return to the Pleurotomidæ, *Clathurella* or *Defrancia* is one of the best-defined groups of this family, and yet that is not without its transitional forms, one of which, for instance, described by Boog Watson first as *Pleurotoma perparva*, and subsequently as *Clathurella* (?) *perparva*, "is classed under the *Clathurella* only provisionally, in consequence of the departure of the embryonic whorls from the typical sculpture."¹ *Defrancia* has been superseded by some authors for *Clathurella* on the ground of its being preoccupied for the Polyzoa, and there appears to be no doubt that, according to the strict law of priority, *Clathurella* holds the field. Its bibliography is a little obscured, but the Rev. R. Boog Watson puts it shortly in this way—"Millet's earlier name (1826) of *Defrancia*, which has been largely adopted, is preoccupied by Bronn (1825) for a genus of Polyzoa, which had indeed been previously named *Pelagia* by Lamoureux (1821), but that name having been preoccupied by Péron (1809) for a genus of the Acalephæ, the *Defrancia* of Bronn must come into use [for the Polyzoa]. The *Defrancia* of Millet must, therefore, unfortunately be dropped [for the Mollusca], and Carpenter's name *Clathurella* adopted."²

The embryo of *Clathurella* is conical, tumid, and exquisitely reticulated transversely. The embryos of *Rissoa jeffreysi* and *Ovula patula* are somewhat similarly sculptured. A very large number of new species of the *Pleurotomidæ* (nearly 100) were procured in the Porcupine Expedition, and are still undescribed, a few of which were also dredged in the Challenger and other expeditions. Mr. Sykes has described about eight of these,³ but the great bulk, consisting of dead, imperfect, or embryonic specimens, has been left unnoticed, though the latter especially are easily and distinctly separable, exhibiting as

1 Challenger Gastropoda, p. 361, pl. xxii., fig. 8.

2 Challenger Gastropoda, p. 348.

3 Moll. Porcupine Exp., Supp. Notes, Part III., Proc. Malac. Soc., 1906, vol. vii.

they do the greatest diversity, and it would have been helpful and interesting to future systematists if some of these forms could have been made available. Embryonic and imperfect examples obviously should not be described as new species, but where they exhibit marked characteristics they should not be ignored.

Clathurella anceps Eichw.—Scilly Islands (Smart and others); Aberdeenshire (Simpson and J.T.M.); Eddystone, Loch Fyne, and the Minch off Barra.

Var. **soluta** Marsh. n. var.—Shell more slender throughout, spire proportionally longer, whorls spindled, suture deeper and more oblique. Aberdeenshire, Scilly Islands 4of., Loch Fyne 3of., West Orkneys 45f.

There are two sizes of this shell, as in all other British species of *Clathurella*, one of which does not exceed three lines in length, while the other, the typical one, is 6-10ths of an inch by $\frac{1}{4}$ in. The finest come from Loch Fyne and Aberdeenshire. An immature specimen, which had received some damage, has been repaired and finished to maturity, but the added portion has been coloured pink. Sowerby's figure, as well as Forbes and Hanley's (two), are excellent; in Jeffreys' the proportions are wrong, the spire being too short and the last whorl too large and inflated; the sculpture moreover is too coarse. *C. anceps*, having been published by Eichwald in 1830, takes precedence of *C. teres* published by Forbes in 1844. Gwyn Jeffreys maintains their distinctness, but *C. anceps* is such a very characteristic shell that there should be no room for doubt either as to the description or the figures of its author.

C. gracilis Mont.—Scilly Islands (Smart and others). A monstrosity from Guernsey is without a canal.

C. leufroyi Mich. — Alderney (Marquand)! Scilly Islands (Burkill and J.T.M.); Port Erin, Isle of Man (Heathcote)! Jersey and Herm, Freshwater West, Mayo and Sligo, Lamlash 15f., Dornoch Firth, Pentland Firth 3of., the Minch off Barra 4of.

Var. **carosula** Jeff.—Scilly Islands 4of. (dwarf), W. Orkneys 45f. Almost as variable in size as the type.

This species varies extremely in size, in proportions of the spire and body-whorl, and in length and breadth. There are two principal sizes, according to habitat; one is a third to half an inch in length, thick and solid, and this lives at low-water mark under stones in the south of England, west of Ireland, &c.; the other is nearly an inch long and proportionally broad, thinner in texture, and always dredged; the latter is the Hebridean, Mediterranean, and Crag form, though I have both these forms from the Mediterranean, notwithstanding

Monterosato's note, "the British form is different."¹ The large one is well figured by Sowerby and by Forbes and Hanley; Brown describes the small one as *Fusus boothii*, and his figure can mean anything; while Jeffreys describes the Hebridean form, but figures the minor or southern one, and incorrectly depicts the aperture as furrowed or grooved; it should be plain. The small form resembles, especially in the sculpture, some specimens of *C. linearis* var. *intermedia*, and it also includes another form known as var. *concinna* Scacc., in which the spirals are much fewer and wider apart; but in all the variations of *C. leufroyi* the spire is shorter, the whorls more tumid and rapidly enlarging, than in *C. linearis*, the longitudinal ribs are usually more curved, and it never has the aperture denticulated. A specimen from Barra has only half the usual number of ribs, and a dwarf from Scilly, with a more slender spire, does not exceed a quarter of an inch. Although Gwyn Jeffreys says that *C. linearis* is "very much smaller than *C. leufroyi*," specimens will be met with quite the reverse of this.

C. linearis Mont.—Under stones, as well as in weeds of rock-pools, at very low water on our Southern and Irish coasts. The sculpture of this species is muricated or prickly, and the shell is coloured more or less with purple streaks and stains, the topmost whorls being usually purple, but sometimes yellowish; ground colour flesh-pink or yellowish-brown. The lip is furrowed inside with a dozen ridges, the bottom one being strong and prominent, and the upper one developing at maturity into a still more prominent tubercle. L. 0·35in., b. 0·15.

Var. **intermedia** F. and H.—Yellowish-white to yellowish-brown, with rounded ribs and spiral brown lines, apex never purple. L. 0·4in., b. 0·17. Dredged in the coralline zone nearly everywhere.

Var. **pallida** F. and H. = var. *æqualis* Jeff.—Smaller, thinner, finely and more equably sculptured, colourless or with the spiral lines pale brown. L. 0·30in., b. 0·1. Dredged on fine sandy ground, not common. This is considered a northern variety, but is also found south, and in comparative plenty at the Scilly Islands. It is usually more oblong than the type, in consequence of the last whorl being little wider than the penultimate; but it has as many gradations in shape and sculpture as the type form. Occasionally the longitudinal ribs are obsolete, especially on the body-whorl, and spirals are the rule. This variety has some of the features of *C. gibbera* Jeff., but the embryonic whorls are essentially different.

Var. **alba** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 262.—Guernsey, Scilly, Land's End, Aberdeenshire, Loch Boisdale 30f. This is

represented in all the varieties, though rare except at Scilly, where it is mostly represented in the next variety.

Var. **minor** Marsh., n. var.—Much smaller and proportionally more slender. Occurs in the Scilly Islands, the Land's End, and the West of Ireland, from the coralline zone. It has the dimensions and outlines of *Donovania minima*, and must not be mistaken for a dwarf of the type, which is more generally diffused.

C. linearis and vars. *intermedia* and *pallida* were all three figured and sufficiently described by Forbes and Hanley,¹ and the two latter varieties should not have been arbitrarily put aside and merged into a var. *æqualis* by Gwyn Jeffreys, who gave no explanation for this course. Forbes and Hanley indicated the three forms as "the purple-tipped (*scabra*), the blunt-ribbed (*intermedia*), and the colourless (*pallida*)," but they were not so happy as usual in depicting these three forms; the figures are certainly good, but the differences are not sufficiently defined; their fig. 1 should be more scabrous, and their fig. 3 more oblong. Nor do any other of the published figures improve on these, except Sars' fig. 2 (t. 23), which well represents the var. *intermedia*. The three forms are connected together by every degree of sculpture, both of spirals and longitudinals. The differences between the type form and var. *pallida* are very great, as much as in any two species; but the var. *intermedia* is less easily differentiated, as the sculpture sometimes partakes of two forms, and can be assigned to one or the other. Forbes and Hanley's description of a purple apex for the type and a yellow one for the var. *intermedia* is not tenable; although the latter is always yellowish, so are the former occasionally. The largest come from Aberdeenshire and the Orkneys. A very pretty form with nodulous sculpture comes from Scilly, Iona, the Minch, and the Shetlands, and its analogue in the var. *pallida*, from the Scilly Islands, is beautifully granulated; while a pure white delicate form of the latter comes from West Orkneys 45f. Specimens are sometimes met with in which the sculpture is evenly reticulated, and these may be mistaken for *C. reticulata*; others resemble *C. leufroyi* in the thick and rounded ribs, but the intersections of the sculpture are not granular as in the latter species, while the earlier whorls differ from those of *C. leufroyi* in being more slender, with a sharper tip, and the first two regular whorls reticulated. There is some misconception as to the dimensions of *C. linearis*. Forbes and Hanley say that the largest are $5\frac{1}{2}$ lines by $2\frac{1}{2}$, a size I have never seen approached. Sowerby gives two figures, one (fig. 13) to represent the type, and the other (fig. 12) to represent var. *pallida*, but he makes the latter twice the size of the type; and Gwyn Jeffreys

1 Brit. Moll., vol. iii., pp. 471-2, pl. cxiv. figs. 1-3.

also makes this variety the larger of the two; but the difference between them is the reverse of this. I have given the extreme sizes.

C. reticulata Brocc.—Alderney (Marquand)! Scilly Islands (Burkill and J.T.M.); Freshwater West (Span and J.T.M.); Penzance; Achil Island; Clyde mouth, 18f.; Iona, 20f.; Skye; Gairloch; Loch Boisdale, 30f.; Pentland Frith, 35f.

Var. **asperrima** F. and H.= var. *formosa* Jeff.—Lamlash, 18f. (Somerville)! Scilly Islands, 40f.; Loch Boisdale, 30f. This is larger than the type—six lines by three—and the apical whorls are sometimes brown, which contrasts with the snowy whiteness of the shell. It was well figured and described by Forbes and Hanley, but erroneously as a white variety of *C. purpurea*, and cited as *Fusus asperrimus* Brown; but that citation, according to Gwyn Jeffreys, was wrong. However that may be, Jeffreys was clearly not entitled to substitute another name without justification. *C. reticulata* was unknown to Forbes and Hanley as a British species.

This is a widely-diffused but scarce species. I have it from only a few localities, no two specimens of which agree with each other, the shell differing both in shape and sculpture, the latter especially varying between the two extremes of fine and coarse. Some specimens from the Clyde are short and oval, others from Pentland Frith are oblong and very finely sculptured, while the Scilly form is small and slender. The latter district also produces a dwarf variety only $\frac{1}{8}$ in. in length. I have white typical specimens from Guernsey, Scilly, and the Hebrides; this must not be confused with the white variety *asperrima*.

None of the British forms come near the large Mediterranean one, which has usually been considered the type shell, though according to Monterosato¹ the latter is *C. cordieri* Payr., the characters of the embryo being specifically different. Some difficulty will be experienced in determining the extreme forms of this and the last two species, owing to the variability and correlation of their sculpture to each other. Than all the forms of *C. linearis* this is more turreted, and the last whorl more elongated and compressed. The young may be known from its congeners by its deeper suture and the tops of the whorls being angulated. Worn specimens are frequently mistaken for *C. purpurea* var. *lavie*, but in this the sculpture is invariably coarser, and the suture more sharply and squarely excavated. Jeffreys' figure is a correct representation of the British type, but that of the var. *asperrima* is exaggerated.

C. purpurea Mont.—Under stones and in crevices at low water of spring tides in South Devon; usually dredged elsewhere. Fresh-

¹ Nuo. Riv. Conch. Med., p. 44.

water West (Span)! Achil Island, Bundoran, and Killala; a single specimen from the Long Forties, off Aberdeenshire (Dawson)!

Var. **minor** Monts. = var. *philberti* Jeff. non Michaud = *C. bicolor* Risso.—Scilly Islands (Burkill and J.T.M.); Sutherlandshire, from haddocks (Baillie)! Achil Island, Killala Bay, North Rona, 24f. I have a white specimen from Scilly. This is a dwarf form of the type, and not Michaud's species. When found imperfect the two shells are not easily separable, the differences being mainly embryonic; but in *C. bicolor* Risso (1826) = *C. philberti* Mich. (1829) the shell is more oblong, and the embryonic whorls are $1\frac{1}{2}$, coarse, and blunt; in *C. purpurea* and var. *minor* they are $3\frac{1}{2}$, conical, and sharp. The var. *minor* is figured by Forbes and Hanley as presumably *C. philberti* Mich.,¹ but the apex shows that it is the minor form of *C. purpurea*. It is unfortunate that the immature forms of the mollusca have not been more studied. As I have pointed out in various instances in the course of these papers, the embryonic whorls are often a sure guide, sometimes, indeed, the sole criterion of determination, and in almost all instances they are worthy of investigation. The Rev. R. Boog Watson has already pointed out that "young shells are always peculiarly instructive, though lamentably despised even in the best Museums."²

Var. **laviæ** Phil. = var. *oblonga* Jeff.—Not altogether confined to the Channel Islands; I can add the Scilly Isles (Burkill and J.T.M.); Lundy Island (coll. MacAndrew); Freshwater West (Tomlin); Jersey, Penzance, and Bundoran. The sculpture varies in this variety, but it is usually finer than in the type. My Jersey specimens are twice the usual size, and similar to those from the adjacent coast of France. Var. *oblonga* Jeff. is not separable from var. *laviæ* Phil., and Philippi's name was long prior to Jeffreys'. *C. bicolor* Risso is similar in size, sculpture, and contour, but the apex is specifically different.

Clathurella formosa Jeff.—May be considered a British species, having been dredged by the 'Porcupine' on the slopes of the English Channel, and off the Shetlands in 345f.; also by the Scottish Fishery Board about 50 miles off the Butt of Lewis in 545f., a single specimen only, and recorded as *Pleurotomella packardi* (Verrill).³ It was also dredged by the 'Triton' between the Hebrides and Faroes in 570f.⁴

I have not seen the specimen cited above from the Butt of Lewis, but there has been a lamentable confusion about this species on the part of Gwyn Jeffreys, whose description differs from his figures, and

1 Brit. Moll., vol. iv., pl. cxiii., fig. 4.

2 Challenger Gastropoda, p. 246.

3 Simpson: Notes on Rare Moll., Journ. Conch., 1910, vol. 13, p. 114.

4 Jeffreys: Moll. 'Triton' Exp., Proc. Zool. Soc., 1882, p. 397, pl. 44, figs. 99a, 99b.

whose collection of 'Porcupine' shells is said to "contain at least four species grouped under the name of *formosa*;" and this has been further complicated by Boog Watson (or his artist) in his description and figures, which also do not tally.¹ I have previously endeavoured to clear this up so far as I could with the material at hand,² but the position of this species has been left in an eminently unsatisfactory state.

Dr. Kobelt in his recent work cites *C. formosa* Jeff. as a variety of *Pleurotomella packardi* Verrill,³ as to which I cannot express any opinion, not having seen Professor Verrill's shell.

Pleurotoma nana Lov.—Aberdeenshire, West Orkneys 45f., E. Shetlands 20-40f., between the Orkneys and Shetlands 51-85f., and Flugga, North Shetlands (Simpson)! Shetland specimens are spindled, smaller, and narrower than those further north. Jeffreys figures the Shetland form, but gives the dimensions of the Norwegian one. The latter is well figured by Sars.

P. striolata Phil.—Freshwater West (Cooper)! Jersey, Babba-combe Bay, Achil Island, Killala Bay. The Mediterranean form differs from the British one in being only half the size, with coarser spiral striæ.

P. attenuata Mont.—Alderney (Marquand); Scilly Islands, one specimen (Smart); Aberdovey, Harlech, and Tenby. L. 0·5in., b. 0·150. The interior is occasionally coloured brown. Although Gwyn Jeffreys says this "differs from *P. striolata* in being more slender," he gives it the same dimensions, which are incorrect. There is a great similarity between the two species, and the extreme forms of each closely resemble one another, but when fresh the interstitial striæ of *P. striolata* will always distinguish it. *P. tenuicosta* Brugnone is a variety of this having visible spiral sculpture; but Brugnone's shell is a Ficarizzi fossil, and has not been recorded as recent.

P. costata Don.—Whorls 7-8, the four lowermost having the specific sculpture, and the uppermost being similar to those of *P. striolata*. L. 0·25in., b. 0·1.

Var. **coarctata** Forb. (*Journ. of Conch.*, 1893, vol. vii., p. 262).—Whorls 8-9; l. 0·4in., b. 0·15. In this variety the whorls are not only individually longer, but there is an additional one, and the colouring is of a linear character, somewhat similar to that of *P. attenuata*. It is supposed to be northern and the type southern, but there are a few exceptions in each case; I have dredged this at Guernsey and Scilly, and there is an intermediate form occasionally met with, in which the characters of both are combined.

1 Challenger Gastropoda, p. 350.

2 Sykes: Moll. 'Porcupine' Exp., Proc. Malac. Soc., 1906, vol. vii., pp. 179-180.

3 Icon. Europ. Meeresconch., vol. iii., p. 282.

The specimen ascribed by Canon Grainger to this species, from the Belfast deposit, is not this but *P. brachystoma*; I have seen the shell. A very small and slender variety comes from Achil Island. *P. costata* has a closer affinity to *P. striolata* than to *P. attenuata*, and Gwyn Jeffreys must have been thinking of the former when he wrote that "the spiral striæ are closer and finer" than in *P. attenuata*, for in this species the spiral striæ can always be seen with a lens, while *P. attenuata* is apparently smooth, and requires a microscope to detect the spiral sculpture. His description errs in other respects, while the dimensions, as well as his figure, appertain to the var. *coarctata*. Nearly all the published figures are most unsatisfactory. Forbes and Hanley give three (pl. cxiv. A), of which their fig. 3 is a slender form of the type called by old writers var. *metcalfei*, their fig. 4 is not applicable to any form of our shell, being too large and broad, while their fig. 5 is a good delineation of var. *coarctata*, but by an oversight of the artist no dimensions are attached. Sowerby also gives three (pl. xix.), of which figure 21 is not this species at all, but *P. bertrandi* Payr., a Mediterranean species; fig. 22 is a back view of a narrow form, and the dimensions should be reduced one-half; though fig. 23 is a good one of var. *coarctata*, and leaves nothing to be desired. Captain Brown's figures, though poorly executed, give the best idea of the typical form.¹ His *Fusus pyramidatus*, on the other hand, is the intermediate form of this species, and not a variety of *P. nebula* as cited by Forbes and Hanley, Brown's dimensions of "three-eighths inch by one inch" being an obvious error for $\frac{3}{8}$ in. by $\frac{1}{8}$ in.²

P. rugulosa Phil.—Birterbuy Bay (Walpole); Scilly Islands, two immature specimens; St. Ives and Hayle in Cornwall; Achil Island. Very few examples of this species have been found on our coasts, and these are usually rolled or water-worn out of all resemblance to the rugulose Mediterranean specimens. Those from Ireland differ in no respect from the Scilly and Land's End examples; but it is an extremely variable shell, and there are numerous foreign named varieties of it.

P. brachystoma Phil.—Scilly Islands 40f., Fowey 16f., Babba-combe Bay and Teignmouth, fine; Milford Haven, Southport, Connemara, Arran 25f., Sound of Sleat 40f. Fossil in the Belfast deposit (Grainger)!

Var. **alba** Marsh. n. var.—Shell white. Dredged off the Mull of Cantire in 27f. In shape and sculpture *P. brachystoma* comes very close to some of the dwarf forms of *P. nebula*, but the apical whorls differ materially.

1 Brown's Ill. Rec. Conch., p. 6, pl. v., figs. 45, 46.

2 Loc. cit., figs. 19, 20.

P. nebula Mont.—Loch Inver 25f., Sound of Sleat 45f., Aberdeenshire.

Var. **abbreviata** Jeff.—Torbay, Teignmouth, and Aberdovey. L. 0·3in., b. 0·125.

Var. **elongata** Jeff.—Sanda Island 18f. (Knight)! off Rattray Head, Aberdeenshire (Simpson)! Loch Boisdale 30f. There is also another slender or elongated form having the length, colour, and sculpture of the type.

Var. **fusiformis** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 262.—Doggerbank 40f., the Minch 30f., also dredged in the Shetlands by the 'Porcupine' Expedition of 1869. In this variety, which is also elongated, the last whorl is considerably more than half the shell; in the var. *elongata* the spire is the larger half. The Doggerbank specimens have the ribs nearly obliterated.

Gwyn Jeffreys has not correctly described the sculpture of *P. nebula*. The spiral striæ are usually unequal in size, especially on the last whorl, every third spiral being more prominent than the intervening two, and the third whorl has five rows of reticulated striæ. Specimens from Scilly have the coloration and finer sculpture pertaining to the var. *elongata*. Sowerby's is the best typical figure; Jeffreys' is a more slender form.

P. lævigata Phil.—Scilly, a single specimen (Smart)!

Var. **minor** Jeff.—Tenby (Span)! Portstewart, Antrim (Knight)! Shellness, Connemara, Achil Island, Killala Bay, and Bundoran. L. 0·04in., b. 0·01.

The record of this species for Loch Fyne¹ is almost certainly a mistake. And in this connection I may remark that the record for *Cardium papillosum*, also from Loch Fyne, published in the same Report (p. 116) is an error; I have seen the shell, and it is a young specimen of *C. edule*. In the same category, from another of these Reports, must be placed *Cardium islandicum*, from Campbelltown Loch (perhaps a mistake for *Cyprina islandica*, or for the young of *C. echinatum*, which it resembles); *Pleurotoma carinata*, *Donovania minima*, &c., all from the Clyde.

The only known habitat for *P. lævigata* was Guernsey, where it is now either extinct or dying out. Belgrave Bay in that island has undergone a great change since Mr. Gallienne collected them there more than forty years ago, and owing to a custom of allowing rubbish and ballast to be discharged, molluscan life generally has dwindled to very meagre proportions in that bay, *P. lævigata* being now almost if not quite exterminated. During many visits to the island and numerous searches, I could only find an occasional dead specimen,

¹ Scott: Ann. Rep. Scott. Fish. Bd. 1897, part iii., p. 118.

while other collectors have been even less successful. At Mr. Gallienne's death I noticed in his collection a box containing many specimens. Its old neighbour, however, *P. rufa* var. *lactea*, still lives in the bay, as I have frequently found it there.

During a recent visit which I paid to Guernsey, a final search among the miscellaneous stores in the Guernsey Museum brought to light the above-mentioned identical box with the specimens still in it, which enabled a fine series to be mounted and placed in the Museum collection.

An intermediate form lives in gravelly sand at low-water mark in Torbay, also at Jersey, Guernsey, Caldy Island, and Connemara. It is four lines in length and proportionally as broad as the type, with a shorter spire, longer body-whorl, and the typical sutural rim. It is a small type-shell rather than a large varietal one, and lives with the type in Guernsey and with the variety in Jersey. A monstrosity of this form from Jersey has a varicose rib on the last whorl, and the animal has thence started on a fresh growth and developed a body-whorl equal in size to the type. Jeffreys gives a good figure, and so does Sowerby, but that of the latter is the var. *minor*.

Forbes and Hanley described and figured the small form of this as *P. nebula* var. *laevigata*,¹ and Canon Norman has bestowed on the large form the name of *P. nebula* var. *vittata*;² but the latter is quite superfluous, *P. laevigata* being as distinct as any other member of the genus. It is true Philippi described the minor form as the type, the major one being unknown to him, and Gwyn Jeffreys' freedom to transpose the two forms may be open to argument (it would perhaps have simplified matters had he named the Guernsey form var. *major*); but as a matter of fact *P. laevigata* and var. *minor* differ only in size, the "strap-like rim" of Gwyn Jeffreys, or the "fillet passing round the summit of each whorl" of Canon Norman, being common to all three forms I am treating of, though not present in all specimens. This character is consequent on the top of each whorl being welded on the periphery of the preceding one, which is so striking a feature in the common Mediterranean species *Euthria cornea* L., though there again it is not present in all specimens. Another character in which *P. laevigata* differs from *P. nebula* is in the aperture, which is longer and narrower, not inflected, and with a straighter canal, well exemplified in the figures of each given by Forbes and Hanley and by Sowerby. From a description left by Gwyn Jeffreys in his MS. notes, the animal of the var. *minor* does not differ from that of the type.³

1 Brit. Moll., vol. iii., pp. 467-80; and vol. iv., pl. cxiv., fig. 8.

2 Ann. Mag. N. Hist., 1899, vol. iv., p. 135.

3 Moll. 'Porcupine' Exp., Proc. Malac. Soc., 1906, p. 189.

P. nivalis Lov.—S.W. Ireland 214f. (R.I.A. cruise)! off the Shetlands 111f. (Simpson)! N.N.W. of Unst, 90-120f. (Jeffreys). Canon Norman cites “ ‘Porcupine,’ 1869, N. of Hebrides, 170f.,” but explains in a footnote that “Jeffreys does not give the Station, and that depth is not recorded from any Station.” The Station was IX. of the ‘Lightning’ cruise, and the depth 170f.; it is not marked on the chart accompanying the Report, but is situated close to Station X. of that cruise, and is extremely interesting as being situated on a bank of a very limited area, with a bottom temperature of 41.7 degrees, in the midst of the deep and icy waters of the Shetland-Faroe Channel.

P. carinata Biv.—Fifty miles off the Butt of Lewis, 189f. (‘Lightning’ Exp.); 40 miles off Valentia, 110f., and Atlantic off Scilly, 690f. (‘Porcupine’ Exp.); off the Butt of Lewis 545f., and also midway between the Shetlands and Norway 197f. (Simpson)! Canon Norman cites “ ‘Porcupine,’ 1869, N. of Hebrides; probably Station 85, 190f., as the depth given by Jeffreys (189f.) is not given for any Station;” but the exact locality and depth and expedition are the first I have named. This is the *P. modiola* of Crist. and Jan.

P. rufa Mont.—Extremely variable as to the number and flexuosity of the ribs. The topmost whorl is quite smooth and glossy; the second and third are evenly reticulated, in consequence of the spiral lines being equal in size and space to the longitudinal. It is rather common in the Channel Islands.

Var. **lactea** Jeff.—St. Fergus, Aberdeen, a dead specimen from the shore (Simpson)! Jersey and Herm; Iona, 15f., a dwarf form; Frith of Lorne, 75f. The vars. *angusta* and *cranchii* are also occasionally white, and there are also pale brown, light yellow, and bicolored forms—all from the Channel Islands.

Var. **semicostata** Jeff.—Freshwater West (Span)! Alderney (Marquand)! Sutton-on-Sea, Lincolnshire.

Var. **ulideana** Thomps.—Guernsey, Sutton-on-Sea, Dublin Bay, Iona. This variety is often broader than the type.

Var. **cranchii** Brown.—Channel Islands.

Var. **angusta** Jeff.—Channel Islands; Belfast Lough.

Var. **prælonga** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 262.—Freshwater West (Span)! Guernsey, 20f., rare; Alderney (Marquand)!

Var. **ecostata** Marsh., op. cit., p. 263.—Lynn Deep, 40f.

P. rufa has many resemblances to *P. pyramidalis* Ström; not only the typical form, but all its varieties have representatives in the latter species. *P. pyramidalis* is one of our Crag and post-tertiary fossils, and as recent it was dredged by the ‘Lightning’ 50 miles off the Butt of Lewis in 189f.

(To be continued).

CYPRÆA PANTHERINA (Solander MS.), Dillwyn,
IN SAXON GRAVES.

By J. WILFRID JACKSON, F.G.S.

(Read before the Society, January 10th, 1912).

WITH reference to Mr. Tomlin's recent note on the finding of a *Cypræa tigris* in prehistoric pit-dwellings at St. Mary Bourne, Hants. (ante p. 251), it may be of interest to call attention to the fact of Cowries having been met with in Saxon graves in this country.

In Faussett's "Inventorium Sepulchrale," (1856), several records are given of the finding of Cowries associated with various other objects in Saxon women's graves, excavated on Kingston Down (pp. 68 and 92), and Sibertswold Down (p. 133) in Kent. In each case the shell is referred to as *Concha veneris*, but the species is not defined. Another specimen of evidently the same form appears to have been met with in a grave near Wingham, Kent (see "Archæologia," vol. 30, p. 551).

In a footnote to one of the Kingston Down specimens (p. 68), the editor (Mr. Charles Roach Smith) states:—"This is one of the large Indian Cowries, classed by Linnæus under the generic name of *Cypræa*. They were brought from the east by the Romans, and together with other kinds of Indian shells, are not infrequently found with Roman remains. The more beautiful kinds of sea-shells have, doubtless from remote antiquity, been often used as personal ornaments, and as amulets, and hoarded as objects of curiosity. In Africa, the small Cowries are at the present day used as a medium of traffic. Douglas, who has engraved this very shell, classes it with the *Ithyphallica* of the ancients, and refers to the use of shells by the Romans, and by the lower class in the neighbourhood of Naples at the present day as amulets and charms. These customs are well known; but they do not seem to explain the presence of the Indian shell in the Saxon grave, which may probably be more simply and naturally accounted for by viewing it as an ornament, either personal or domestic."

The two examples from the Kingston Down graves are in the "Mayer Collection" at the Liverpool Public Museum, and whilst on a visit there recently, I examined the specimens, and found them to be referable to the well-known Red Sea form, *Cypræa pantherina* (Sol.), Dill.

This species I find has also been recorded (under the name *Cypræa vinosa* Gmelin) by Dr. Ph. Dautzenberg (*Journ. de Conchyliologie*, vol. liv., 1906, p. 260, text-figs. 1 and 2) from the Franco-Merovingian Necropolis of Nesles-lez-Verlincingthun (Canton de Samer). Dr. Dautzenberg also refers in the same paper to a record by M. l'Abbé Henri Debout of the presence of this shell (erroneously referred to *C. arabica*) in a sepulchre at Tardinghen, and from Dr. Tiberi's Memoir on the shells met with in the excavations at Pompeii (*Le Conchiglie Pompeiane*, Napoli, 1879), we learn that many examples of this species were found, and that the shell in question was an amulet which the women carried in order to prevent sterility. The ladies attached as much value to this beautiful exotic shell as to *Cypræa pirus* and *C. lurida* from the Gulf of Naples, which were utilised in the same manner by the women of the lower class.

Dr. Dautzenberg further states that, if the tomb from which comes the shell figured by him is that of a woman, we should be justified in assuming that the tradition which was current at Pompeii survived up to the Middle Ages.

As mentioned previously, the examples recorded by Faussett were found in Saxon women's graves. This significant fact would point to the same persistence of ideas.

[NOTE.—*Cypræa pantherina* is still found from time to time in some numbers in the more recent excavations at Pompeii.—ED.].

Additions to the Mollusca of South Devon and the Record of a New Locality for Uncommon Species in North Devon.—During a short visit to Chagford in May, 1911, I met with the type of *Vitrea radiatula* Alder as well as the var. *viridula* Menke. A specimen of the former was also taken at Post Bridge. This appears to be a new record for South Devon. Other forms of interest found at the same time were:—*Zonitoides nitidus* Müll., and *Helix hortensis* Müll. var. *coalita* Moq., both at Chagford. Since *Helicigona arbustorum* L. and *Hygromia fusca* Mont., are both somewhat rare in North Devon, the record of a new locality for them may be of some interest. In September, 1910, I found both species on the banks of the Exe, near Bampton. The latter was alive, but the former had been broken by some animal, probably a thrush.—M. JANE LONGSTAFF (*Read before the Society*, Jan. 10th, 1912).

NOTES ON THE NON-MARINE MOLLUSCA OF MORTEHOE.

No. 3.

By M. JANE LONGSTAFF, F.L.S.

(Read before the Society, January 10th, 1912).

THE forms now added to the list of mollusca found in Morteheo Parish here recorded were observed by myself during the summers of 1910 and 1911, and by Mr. Hugh Watson in 1903 and 1910. The identification of all has been confirmed by Mr. F. Taylor, Mr. J. W. Taylor, or Mr. W. Denison Roebuck. The number of species previously noted was fifty-two, of varieties forty. This is now increased to fifty-eight species, and sixty-six varieties. One of the most noteworthy finds is that of *Vitrea rogersi* Woodward at Braunton, just outside the limits of the parish as previously defined. Mr. Hugh Watson sent a large series of *Helicella virgata* DaCosta which he had collected at Woolacombe to Mr. W. D. Roebuck who observed that he had never seen a set "that so nearly approached the Tenby forms."

**Vitrea pellucida* Müll. var. *depressiuscula* Jeff.—Woolacombe. Not uncommon in 1903 (H.W.).

*[*Vitrea rogersi* Woodward. Braunton. Four specimens taken on a wall by a stream in Sept., 1910. This species does not appear to have been previously recorded from North Devon. It has been confirmed by Mr. B. B. Woodward, Mr. Kennard, and Mr. F. Taylor].

Vitrea radiatula Alder.—Church Close, four specimens. Near Bennett's Mouth, one.

**Vitrea nitidula* Drap. var. *subnitens* Bourg.—Woolacombe in 1910 (H.W.).

**Zonitoides nitidus* Müll.—Near Bennett's Mouth. Two examples were found by my niece, Miss Constance Turpin, in May, 1911, on marshy ground. Though previously taken at Braunton and Croyde, its occurrence in this parish has not been noted before.

**Arion ater* L. var. *succinea* Müll.—Near Bennett's Mouth. A single specimen.

*sub-var. *plumbeo-pallescens* Roeb.—Twitchen. One specimen found under a stone in the garden. It was very pale grey, almost white, with a yellow fringe. Confirmed by Mr. W. D. Roebuck.

**Pyramidula rotundata* Müll. var. *alba* Moq.—Woolacombe Down. Only three specimens were met with, under mossy stones in a Pickwell sandstone quarry. They were in company with the typical form, which was much more numerous.

***Helicella virgata** DaCosta var. **subalbida** Poiret.—Woolacombe. Confirmed by Mr. J. W. Taylor.

*var. **leucozona** Taylor.—Woolacombe. Confined to a small area, where it is not uncommon, 1910 (H.W.).

*var. **ochroleuca** Moq.-Tand.—Woolacombe, rather rare in 1910 (H.W.).

*var. **nigrescens** Grat.—Woolacombe, rather uncommon in 1910 (H.W.).

*var. **coalita** Stubbs.—Woolacombe, rare, 1910 (H.W.)

***Helicella caperata** Montagu var. **major** Jeff.—Woolacombe, rare, accompanying the type, 1903 (H.W.).

*var. **subscalaris** Jeff.—Woolacombe. Of all colours. Uncommon, 1903 (H.W.).

*var. **obliterata** Pic.—Woolacombe (H.W.).

monstr. **sinistrorsum** Woolacombe. Recorded by Mr. E. Collier in *Journ. of Conch.*, vol. xi., p. 124.

***Hygromia hispida** L. var. **albida** Jeff.—Woolacombe (H.W.).

***Vallonia excentrica** Sterki.—Woolacombe, 1903 (H.W.).

***Helix aspersa** Müll. var. **albofasciata** Jeff.—Twitchen. Some of the specimens were sent to Mr. J. W. Taylor, who said they were not very characteristic, and that one was nearly allied to var. *flammea* Picard, sub-var. *undulata* Moq.-Tand. The var. *albofasciata* was also taken by Mr. Hugh Watson at Woolacombe.

*var. **conoidea** Picard.—Woolacombe (H.W.).

Helix nemoralis L.—Besides the vars. *rubella* Moq. and *libellula* Risso previously mentioned, there have also been taken—

*var. **bimarginata** Picard.—Twitchen. Confirmed by Mr. J. W. Taylor.

*var. **roseolabiata** Kobelt.—Twitchen. Confirmed by Mr. J. W. Taylor.

***Helix hortensis** Müll. var. **albina** Moq.-Tand.—Woolacombe. Confirmed by Mr. J. W. Taylor.

*var. **tenuis** + **lutea** Picard.—Twitchen. Confirmed by Mr. J. W. Taylor.

*var. **tenuis** + **castanea** Taylor.—Twitchen. Identified by Mr. J. W. Taylor.

***Jaminea cylindracea** DaCosta var. **albina** Moq.-Tand.—Woolacombe golf links. Uncommon with typical form, 1903 (H.W.).

*var. **gracilis** Issel.—Twitchen. [Braunton]. Identified by Mr. J. W. Taylor.

*var. **anconostoma** Lowe.—Twitchen. Identified by Mr. J. W. Taylor.

***Jaminea muscorum** L. var. **edentula** Cless.—Woolacombe, 1903 (H.W.).

*var. **albina** Menke.—Woolacombe, 1903 (H.W.).

***Phytia myosotis** Drap. var. **ringens** Turton.—Woolacombe sands, dead, 1903 (H.W.). Not in "Victoria History" for North Devon; a single specimen, however, was taken by Mr. J. R. le B. Tomlin on Lundy (*Journ. of Conch.*, vol. xii., p. 122).

***Ovatella bidentata** Montagu var. **alba** Turton.—Woolacombe sands, dead, 1903 (H.W.). This species is recorded in the "Victoria History," but no locality is given.

Ancylus fluviatilis Müll. var. **albida** Jeff.—Woolacombe. Recorded by Mr. E. Collier in *Journ. of Conch.*, vol. xi., p. 124. The Rev. C. Chichester has also taken this variety between Twitchen and Woolacombe.

***Acicula lineata** Drap.—Near Bennett's Mouth. One specimen was found alive by Miss C. Turpin in rotten wood in the stream. This appears to be a new record for North Devon, as it is not in the "Victoria History" nor the Census.

Pisidium amnicum (Müll.) near Hale, Westmorland.—I recently came across a box containing a number of shells, which I collected in April, 1907, from a ditch near Hale Moss, Burton-in-Kendal, Westmorland, and amongst the various species is *Pisidium amnicum*, which does not appear to have been previously recorded for that neighbourhood. Associated with it were *Valvata piscinalis*, *Bithynia tentaculata*, *Planorbis umbilicatus*, *Limnaea pereger*, *L. palustris*, *Helix nemoralis*, *Hygromia rufescens*, and *H. hispida* (small form, probably not referable to this species, but to *H. sericea* Drap.).—J. WILFRID JACKSON, Jan., 1912.

Scalariform Helix aspersa Müller.—There is a very fine example of the above monstrosity from Folkestone, ex collection Wigglesworth, in the collection of the Accrington Museum. This specimen is not recorded in Taylor's Monograph.—G. C. SPENCE.

NOTE ON A COLOUR MUTATION IN
HYALINIA HELVETICA Blum.

BY CHARLES OLDHAM.

(Read before the Society, September 13th, 1911).

AMONG some examples of *Hyalinia helvetica* that I collected at Berkhamsted in March, 1910, was an adult which exhibited a very unusual type of coloration. The shell was normally coloured, but the animal was milk-white. It should not perhaps, strictly speaking, be called an albino, but rather an instance of what Dr. H. Simroth in describing an analogous condition in *Vivipara vivipara* ("Zoologischer Anzeiger," 1886. pp. 403-5) has termed "rothalbinismus," for the whole of the body with the exception of the foot-sole and the tentacles was sparsely and minutely freckled with red. The flecks were barely perceptible on the head and neck, rather more apparent on the tail and the sides of the foot, whilst at the edge of the mantle and around the pulmonary orifice, where in a normally coloured animal there is a black collar, they were so numerous as to be almost confluent. The eyes showed under a strong lens as faint reddish specks. It may be that these minute red flecks are a normal constituent in the coloration of *H. helvetica*, and that they are quite obscured by the darker pigment in a typically coloured animal. In typical *V. vivipara* the red spots are apparent, and in the aberrant animals described by Dr. Simroth they persisted, although all other pigment was suppressed. It is perhaps something more than coincidence that certain birds which have red in their plumage retain the red when other pigment is absent; white grey parrots usually have red tails, and white bullfinches red breasts.

BIBLIOGRAPHY.

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

Manual of Conchology: Structural and Systematic. Second series.—*Pulmonata*, vol. xx. (parts 79 and 80), by H. A. PILSBRY, D.Sc.

The first half of this volume, viz., parts 77 and 78, has already been noticed on page 74 of the current volume of the *Journal*. The two parts here reviewed constitute a monograph of the genus *Partula*, which was constituted a family—*Partulidae*—by Pilsbry, in 1900. The species, which total 111, are grouped geo-

graphically, and of these the Society Islands claim 44, the New Hebrides and Santa Cruz groups 17 species. The following sub-genera are established:—*Marquesana* for the six Marquesas species (type *ganymedes* Pfr.); *Leptopartula* for *arguta* Pse. and *turgida* Pse.); *Partula* s.str. for a large number of species of which *otahaitana* Brug. is the most familiar; *Samoana* for six Samoan species (type *canalis* Mousson); *Thakombana* for *lirata* Mousson, the only *Partula* with raised spiral sculpture; *Melanesica* for a large number of uniformly coloured species without bands (type *turneri* Pfr.); *Palaopartula* for the Pelew species (type *thetis* Semper); *Carolinella* for the Caroline shells (type *guamensis* Pfr.); and *Marianella* for the Marianne species (type *gibba* Fér.). Dr. Pilsbry has had the advantage of the Hartmann Collection, now in the Carnegie Museum at Pittsburgh, for reference. In the course of a very interesting introduction, he points out that *Partulas* are only found on the high isles of the Southern and Western Pacific, never on atolls, from which fact he infers that the present groups of islands are remnants of a former continent. It is, therefore, probable that the ancestors of this group lie buried in this submerged continent beneath the South Pacific Ocean. Several Eocene and Oligocene forms have been referred to *Partula* by their describers, but Pilsbry says that such references are purely fanciful, and that the absence of characteristic apical sculpture (in well preserved examples) differentiates such forms from the *Partulidæ*. *Partula americana* Heilprin, from the Oligocene of Florida, is in reality a *Hyperaulax* (*Bulimulidæ*), and the European Eocene forms are inseparable from *Buliminus* or *Eua*. Only some five new species are described, and the Monograph concludes with a list of species erroneously described as *Partula*, and in reality referable to *Diplomorpha*, *Strophocheilus* and other genera.

Jaminia secale (Drap.) near **Penrith, Cumberland**.—In the course of re-arranging the British land and freshwater shells at the Salford Borough Museum, Buile Hill, Pendleton, I came across three examples of the above species, mounted in a round glass-topped box, and labelled as coming from Penrith. The collections are very old, and were formerly displayed at Peel Park, where they were for many years under the supervision of the then Curator, the late Major John Plant. Doubtless the above specimens represent examples sent to Major Plant for the Museum by one of the earlier conchologists—such as Thomas Gough or Thomas Glover, both of whom collected extensively in this district. The discovery of these specimens is, therefore, of some interest, as constituting a new record for Cumberland, as well as increasing somewhat the northern range of this species. Doubtless diligent search amongst the limestone rocks in close proximity to the town of Penrith will bring to light other examples of the species.—J. WILFRID JACKSON.

PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

407th Meeting, held in the Manchester Museum, Dec. 13th, 1911.

Mr. E. Collier in the chair.

The Librarian reported that the usual exchanges had been received.

The Chairman announced that a large and valuable collection of conchological works from the library of the late Rev. Dr. Boog Watson had been presented to the Society by his widow, Mrs. Boog Watson, and that the following letter of thanks had been forwarded to her for her exceedingly generous gift:—

November 22nd, 1911.

MRS. R. BOOG WATSON.

Dear Madam—

The President and Council of the Conchological Society of Great Britain and Ireland desire to tender to you their warmest thanks for the generous and very valuable gift of books from your late husband's library.

Not only do they greatly appreciate the gift as a most serviceable addition to the Library of the Conchological Society, but also as a much valued memorial of one who did so much for conchological science, and who was so distinguished and honoured a member of the Society.

It is especially gratifying that amongst the books are copies of Dr. Boog Watson's own works—works which testify to the painstaking thoroughness with which he conducted his researches, and which must be an example and an inspiration to future scientific enquirers.

We are, Dear Madam,

Yours faithfully,

Signed on behalf of the Society,

J. W. HORSLEY, *President.*

J. WILFRID JACKSON, *Librarian.*

LEWIS J. SHACKLEFORD, *Secretary.*

The following reply has been received:—

11, Strathearn Place,

Edinburgh, Nov. 28th, 1911.

Dear Sirs—

I, my daughter, Miss Boog Watson, and the family, thank the President and Council of the Conchological Society of Great Britain and Ireland for their kind acknowledgment of the books from Dr. Boog Watson's Library.

They are all much gratified to know that the books, which he so much valued, have found a resting-place where they are appreciated and where they will be useful.

We are sure that my husband would have been much pleased with this arrangement.

I am,

Very truly yours,

JANET WATSON.

It was further announced that, owing to the value and rarity of many of these volumes, the Council had decided that these should be specially marked in the Catalogue which was being prepared as being *available for reference only*.

New Members Elected.

Edmund Ridsdale Brown, 235, Brunswick Street, Manchester.

C. M. Standish, Prospect House, Weldbank, Chorley.

Samuel Wood Geiser, Assistant in Biology, Upper Iowa University, Fayette, Iowa, U.S.A.

Names Struck off the List.

The following names have been struck off the list in terms of Rule 4 :—

Miss G. M. Grint.

C. M. Hall.

Paper Read.

“A Note on the Occurrence of *Pisidium lilljeborgi* Clessin in the Island of Arran,” by Staff-Surgeon K. H. Jones, M.B., Ch.B., F.Z.S., R.N.

Exhibits.

By Mr. J. D. Dean : Very fine specimens of *Olivancillaria brasiliiana* Lam. ; *O. auricularia* Lam. ; and *Terebra salleana* Desh., from Santos, Brazil ; also a series of exceptionally large *Paludestrina stagnalis* (= *Hydrobia ulva*) from the salt marshes near Carnforth, Lancs.

By Mr. G. C. Spence : Examples of *Holospira tryoni* Pfr., cut to show internal structure, from which he demonstrated the chief specific characters indicated by authors to distinguish between this species, *Holospira tetralasmus* Pilsbry, and *H. piloceri* Pfr. ; apparently these shells agree so closely in external characteristics that it seems annoying to have to break a shell open to find out what it is ! He also showed a specimen of *Brachypodella seminuda* C.B. Ad. with perfect spire, a condition in which this shell is rarely seen ; and *Callaxis layardi* Ad. & Ang., with embryonic shells, eight in number, in situ in body whorl of the shell.

By Dr. Hugh Brooksbank : *Hygromia revelata* Mich., from some Cornish localities, viz., Goldsithney, Marazion, Oct. 26th, 1910 ; Mousehole, Penzance, Oct. 28th, 1910 ; Nanjizal Bay, Land's End, Oct. 31st, 1910 ; Rosemullion, Falmouth, Nov. 12th, 1911 ; it occurred in plenty, and in late autumn the eggs are so abundant as to show the whereabouts of the shells very readily.

By Mr. R. Standen : An interesting series of *Diplommatina* from the Philippines.

By Mr. T. H. Platt : A large number of species representative of the molluscan fauna of Lake Tanganyika ; and varieties of *Puludina victoriæ* Smith, from the south side of Lake Victoria Nyanza.

By Mr. C. H. Moore : *Littorina rudis* var. *jugosa* from Tenby ; *Limnaea stagnalis*, semi-fossil, from a deposit at West Kirby, Cheshire ; and a number of exotic *Cerithiidae*.

By Mr. J. Kidson Taylor : Some very choice examples of *Cypræa tabescens* and its var. *latior*, *C. pulchra*, *C. cinerea*, *C. pulex*, *C. subrostrata*, and exceptionally fine *C. cervus*, with richly coloured and dark base ; also some pretty forms of *Mitra pontificalis* and *M. episcopalis*.

By Mr. E. Collier : *Helix hortensis* from Wallington, Surrey ; a curious form of var. *incarnata*, with lip coloration ranging from white to deep black, the whole series otherwise showing uniform *hortensis* shape.

It was decided to have the following Special Exhibits at future meetings :

The Genus <i>Eucalodium</i> and its Allies	-	Jan. 10, 1912.
Japanese Land Shells	- - - -	March 13, 1912.

408th Meeting, held in the Manchester Museum, Jan. 10th, 1912.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

"The Recent and Fossil Mollusks of the Genus *Alvania* from the West Coast of America," by Paul Bartsch (*from the author*). "Report on the Mollusca of the West Coast of North America," 1857, by P. P. Carpenter (*presented by E. W. Swanton*). "Exchange List of Land and Marine Shells from Australia and the Adjacent Islands," by J. C. Cox. "Faune Malacologique Terrestre et Fluviale de l'Île de Saint-Domingue," by H. Crosse. "Des Tiphobies du Lac Tanganika," by J. R. Bourguignat. "Étude sur le Genre '*Pomatias*' Studer," by M. Caziot. "Synopsis, etc., Molluscorum Viventium Testaceorum, anno 1877-1879 promulgatorum," by W. Kobelt (*presented by J. W. Taylor*); and the usual periodicals received in exchange).

Members Deceased.

Robert Cairns. Mrs. A. Powell.

Votes of condolence with the relatives were passed, and the Secretary was desired to express to them the deep sympathy with which the Council and Members had heard of their bereavement.

Appreciative references were made to Mr. Cairns as a genial companion and a zealous conchologist, who will be a great loss to the Society. It was intimated that an obituary notice was being prepared, which would be read before the Society and published in the *Journal*.

Papers Read.

"*Cypræa pantherina* Sol. in Saxon Graves," by J. W. Jackson, F.G.S.

"Notes on the Non-Marine Mollusca of Morteheo, North Devon," no. 3, by Mrs. M. J. Longstaff, F.L.S.

"Additions to the Mollusca of South Devon and the Record of a New Locality for Uncommon Species in North Devon," by Mrs. M. J. Longstaff, F.L.S.

"Notes on the *Eucalodiidae*," by G. C. Spence.

Exhibits.

By Mr. Edward Collier: *Valvata macrostoma* Steenb. near Lewes, and for comparison *V. piscinalis* from Lewes and Southport, the latter collected in 1876; also *V. cristata* from York; *Flanorbis vorticulus* Troschel from Sussex; and the same species from Poland for comparison.

By Mr. J. Davy Dean: *Valvata macrostoma* from Karegnando, Tornea, Lappmark; *V. frigida* from the same locality; and *V. piscinalis* from Muunioniska, Tornea—all within the Arctic Circle, and all from the Christiernenson Collection. The River Tornea divides Sweden from Finland for some distance and runs into the Gulf of Bothnia just in its most northerly part. *Hyalinia petronella* Charp. and *H. hammonis* Ström, both from Hasselfors, Nerike, Sweden; and also *H. hammonis* Ström and *H. indentata* Say from America for comparison. *H. petronella* is considered by Kobelt as a variety of *H. radiatula*, and *H. hammonis* is only synonymous with the same species.

By Mr. J. W. Taylor: Living *Vitrina hibernica* from the Temple Demesne, Collon, Ireland, collected by Mr. F. H. Grierson; and a dissection of the retractor muscle of *Helicigona arbustorum* by Miss Lebour.

By Mr. C. H. Moore: A number of species of *Cerithium*, *Conus*, and *Ancilla*.

By Mr. G. H. Taylor: *Limnæa pereger* var. *expansa*, from the Macclesfield Waterworks, Teg's Nose, 1907; also the same form from Windermere (collected by Dr. H. Brooksbank, Sept., 1911).

The Special Exhibit of the evening was the *Eucalodiida*, and many examples of the various sections of this interesting group of shells were shown by Messrs. Edward Collier, R. Standen, and G. C. Spence, the latter giving an interesting résumé of their chief peculiarities, distribution, etc.

409th Meeting, held at Leeds University, Feb. 10th, 1912.

This Meeting took the place of the ordinary February Meeting.

Mr. E. Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange.

Candidates Proposed for Membership.

George Howell Murdock, 49, Parliament Hill, Hampstead, N.W.

Charles Jenkinson, 1, High Street, Kettering.

Papers Read.

"Additions to the Census," by W. Denison Roebuck.

Mr. J. W. Taylor gave an interesting Address dealing with *Hygromia rufescens*, its Life-History, Habits, etc., illustrating his remarks by drawings on the blackboard.

Recorder's Report.

The Hon. Recorder (Mr. W. Denison Roebuck) reported that the following new county records had been submitted for authentication, those marked with the asterisk (*) being presented to the Society's Voucher Collection.

By Mr. Charles Oldham :—

BUCKS.—*Limax flavus* from West Wycombe, 3rd February, 1912.

By Mr. John E. A. Jolliffe :—

DORSET.—**Balea perversa* from Ridgway Hill near Upwey, Oct., 1911.

By Mr. J. Wilfrid Jackson :—

WESTMORLAND.—*Pisidium amnicum* from ditch near Hale Moss, Burton-in-Kendal, 1st April, 1907.

CUMBERLAND.—*Pupa secale*, Penrith.

By Mr. F. H. Sikes :—

KENT EAST.—*Vivipara vivipara*, *Hyalinia fulva*, from Yalding. *Aplexa hypnorum* from Hunton.

KENT WEST.—*Pisidium subtruncatum* from pond near Teston.

By Mr. C. E. Wright :—

ORKNEY.—**Clausilia bidentata* taken in 1907.

LEICESTER AND RUTLAND.—**Paludestrina jenkinsi* in thousands in the canal at Leicester, taken by Mr. W. Freeman of Oundle.

By Mr. John F. Musham :—

LINCOLN SOUTH.—*Vallonia excentrica* from Washingborough, Jan., 1912.

By Mr. R. A. Phillips :—

CO. WEXFORD.—*Valvata piscinalis*, *Planorbis albus*, *Pisidium cinereum* and *P. pulchellum* from Enniscorthy, Jan., 1911; *Valvata cristata*, *Planorbis fontanus*, *Pupa muscorum*, and *Aplexa hypnorum*, from Ross-lare, Jan., 1909; *Helix hortensis* var. *lutea* 12345, from near Johnstown, Jan., 1911; *Limnaea auricularia* from a drain east of Wexford, April, 1911; *Zonitoides nitidus*, *Paludestrina stagnalis*, *Pisidium fontinale*, *P. millium*, and *P. pusillum*, from Wexford, Jan., 1911; *Hyalinia lucida* from Wexford, March, 1910.

CO. GALWAY EAST.—*Planorbis glaber*, *Pl. carinatus*, and *Pl. vortex*, from Lough Rea, April, 1910; *Anodonta cygnea* from canal at Ballinasloe; *Acanthinula aculeata*, *Vertigo pusilla*, *V. moulinsiana*, and *Carychium minimum* from Coole, Feb., 1911; *Ena obscura*, *Pupa cylindracea*, *P. muscorum*, *Aplexa hypnorum*, *Physa fontinalis*, *Limnæa palustris*, *L. truncatula*, *Bythinia tentaculata*, *B. leachii*, and *Pisidium amnicum*, from Ballinasloe, March, 1911; *Balea perversa*, *Vallonia costata*, *Vertigo antivertigo*, and *Sphærium lacustre*, from Portumna, 1910.

CO. WATERFORD.—*Vertigo pusilla* from Tramore, May, 1909.

QUEEN'S CO.—*Vertigo moulinsiana* from Durrow, June, 1909; *Sphærium lacustre* from canal at Portarlington, 17th March, 1911.

KING'S CO.—*Hyalinia radiatula*, *Planorbis fontannus*, *Pisidium fontinale*, *P. obtusale*, and *P. milium*, from Birr, 1910.

CO. TIPPERARY NORTH.—*Hygromia fusca* from Dolla, March, 1911; *Planorbis vortex* and *Pisidium amnicum* from the Little Brouna River, at Riverstown, April, 1910.

By Mr. E. Collier :—

SUSSEX WEST.—*Planorbis vortex*, Malling Marsh near Lewes, 19th Sept., 1911.

Exhibits.

By Mr. F. Booth :—*Cyclostoma anceps* Mts., *Streptaxis kibweziensis* Smith, *Rhachis rhodotenia* Mts., *Limicolaria caillaudi* Pfr., from British East Africa; *Dolicheulota swinhœi* Pfr., from Japan; and *Limicolaria martensiana* Smith, from Central Africa.

By Mr. J. Wilfrid Jackson :—Byssus of large Mediterranean *Pinna*, and a glove made entirely from the spun silky fibre of the byssus, from Italy; *Pisidium amnicum* from a ditch at Halé Moss, Burton-in-Kendal, Westmorland (new record for Vice-County 69); *Jamiania secale* from Penrith (new record for Vice-County 70).

By Mr. E. Collier :—*Paludestrina jenkinsi* from the canal, Leicester.

By Mr. J. F. Musham :—A large series of Maltese marine and non-marine shells.

By Mr. J. E. Crowther—*Limnæa stagnalis* from numerous localities, showing variation (especially from the Elland district).

By Mr. J. A. Hargreaves :—Piece of rock "bored" by *Saxicava*. There was an interesting discussion on this point.

Special Exhibit.

A large number of varieties and locality sets of *Hygromia rufescens* was exhibited by Messrs. J. W. Taylor, G. H. Taylor, J. A. Hargreaves, E. Collier, and F. Booth.

Members and friends present :—Messrs. E. Collier, J. W. Jackson, G. H. Taylor and Mrs. Taylor, W. Cash, F. Booth, H. Allen, J. W. Taylor, W. D. Roebuck, J. F. Musham, J. E. Crowther, T. Castle, F. Rhodes, W. H. Hutton, C. T. Cribb, W. Bagshaw, C. H. Moore, J. A. Hargreaves, H. L. Stephenson, J. D. Firth, W. Hewett, W. Withell, T. Stringer, W. H. Western, E. R. Brown, Greeves Fisher, and Prof. Garstang.

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THE
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JULY, 1912.

No. 11.

DESCRIPTIONS OF TWO NEW SPECIES OF MARGINELLA
FROM SAN THOME ISLAND.

BY J. R. LE B. TOMLIN AND L. J. SHACKLEFORD.

(Read before the Society, May 8th, 1912).

PLATE 4.

Marginella dautzenbergi n.sp. (pl. 4, figs. 1 and 2).

Shell obtusely ovate, smooth, polished, and very shining, yellowish or whitish, with six regular rows of dark red-brown spots on the body-whorl, the spots being at some distance apart, and at equal intervals. Reckoning from the apex, in the second and fourth rows the spots are generally somewhat lighter in colour than those in the other rows, and in worn specimens disappear entirely, giving the appearance of a four-banded shell instead of six-banded. In the mouth of specimens in good condition the spots can be seen shewing through. Spire very slightly or not at all raised above the summit of the outer lip; protoconch very blunt, often completely covered by a callus which is a continuation of the outer lip; whorls $4\frac{1}{2}$ in number; suture slight, marked by a narrow band of the same colour as the spots on the body-whorl; aperture elongate, narrow; outer lip strongly thickened, finely denticulate within, in some cases two- or three-spotted in continuation of certain of the rows of spots, sometimes continuing above in the form of a callus as far as the apex of the spire; columella with six to eight plaits.

Long., 6.25 mm.; diam. max., 3.5 mm.

Hab.: S. Thomé Island, Gulf of Guinea. Not uncommon in coral gravel.

This species reminds one a good deal of *M. deburghie* A.Ad. on a small scale, and the spots are of the same character, but of a browner colour.

M. chalmersi n.sp. (pl. 4, figs. 3 and 4).

Shell elongate, fusiform, smooth, shining, white with a very beautiful series of olive-green (or pale reddish) and black markings on the last whorl arranged as follows:—Immediately below the suture rather broad greenish streaks are set somewhat obliquely; then comes a band of upright longitudinal black strokes close together, the strokes being sometimes joined two or three together either above or below; then a band of oriental characters, further apart and somewhat variable both in colour and form; then a solid band of yellowish-green; then a band of black longitudinal strokes (the strokes being rather more oblique than in the second band) which sometimes unite to form characters; below this is another solid band of yellowish-green, often interrupted; then a band of upright black strokes, sometimes united as before; and finally five or six longitudinal green markings on the area at the lower end of the canal. Protoconch blunt, tipped with brown; whorls $4\frac{1}{2}$, flattened; suture but slightly marked; aperture elongate, narrow; outer lip thickened, denticulate within, with about six olive-green linear markings outside; columella four-plaited.

Long., 5 mm.; diam. max., 2.75 mm.

Hab.: S. Thomé Island.

In the few specimens so far received the system of banding is remarkably constant. One or two examples show traces of a line of greenish colour on the last whorl below the suture. The pale reddish-tint (instead of olive-green) is, we think, simply the effect of weathering. In form, this shell resembles *M. fusiformis* Hinds. *M. bavayi* Dautz., also from West Africa, is much larger and differently marked. This species is named after Mr. J. Chalmers, of the West African Telegraph Company's service, who discovered both these species in S. Thomé. The types are in the Brit. Mus. Nat. Hist., and specimens are also in the Manchester Museum.

Land Shells from Largs.—I recently sent the Recorder a small box of shells collected at Largs by the late Rev. R. Boog Watson. The species are as follows:—*Hyalinia lucida* Drap., *H. nitidula* Drap., *H. crystallina* Müll., *H. cellaria* Müll., *H. alliaria* Miller, *H. pura* var. *nitidosa* Gray, *Arion hortensis* Fér., *Pyramidula rotundata* Müll. sub-var. *obscurata* D. & M., *Vitrina pellucida* Müll., *Helix nemoralis* L., *Pupa cylindracea* DaC., *Clausilia bidentata* Ström, and *Cochlicopa lubrica* Müll. Of these *Hyalinia lucida* is a new county record for Ayrshire.—J. R. LE B. TOMLIN (Read before the Society, March 13th, 1912).

THE TRACK OF LIMAX FLAVUS Linné.

By LIONEL E. ADAMS, B.A.

(Read before the Society, November 8th, 1911).

SOME five years ago I was much struck by certain peculiar mucus tracks on some old oak palings near Reigate. The peculiarity consisted in a doubling and twisting in a manner certainly not characteristic of *L. maximus* or any other species with whose tracks I was acquainted, and for a long time I was filled with good intentions of visiting the spot at night when the slugs would be out travelling or feeding; but, what with frequent absences abroad and laziness when at home, these went to serve a useful purpose elsewhere. However, during the spring of this year (1911) I came upon a patch of the same



Feeding track of *Limax flavus*; only a portion finished to show the characteristic cross lines. The arrows indicate the direction of progression. The tracks are sometimes three times the size of the figure.

twisted doubling track on an old wooden drain-cover in our garden; and lifting this I discovered a fair-sized *L. flavus*. That same night I visited the spot with a lantern, and found the individual in the act of writing his characteristic signature on the cover. Further visits to the old palings revealed several well-marked freshly made tracks, some two yards in length; and now I found that the twists and curls occurred only here and there for a few inches, while the rest of the

track was more of the ordinary character, and further observation proved what I had suspected, that the curly portions were spots where the slugs had paused to browse on that green lichen which covers old walls and palings. These feeding places leave permanent scars where the lichen has been eaten away, and may be seen all over suitable surfaces months after the shiny mucus has perished.

When a freshly made feeding track is examined it will be seen to be crossed closely with semicircular mucus lines, which give the track a scaly appearance, reminding one of the ventral surface of a snake's slough. I am still in doubt as to how these lines are made, but after much careful watching it would seem that they are formed by the mucus left round the edge of the front of the foot as the animal keeps shifting its position forward in the act of feeding, or else by the edge of the mantle which overhangs the head while feeding.

There is no mistaking these tracks when once seen. My friend, Mr. C. Oldham, and I tested the correctness of the diagnosis in June last, visiting a series of walls and palings at night where we had noticed the tracks during the day, and in every case we found this species to the exclusion of any other.

The typical travelling track of *L. flavus* is also distinct from that of other species, being thinner, more disconnected, and altogether more erratic than that of *L. maximus*. Both species are "homers," but there is the following difference in their methods of performing the return journey—*L. flavus* often crosses the outward track two or three times, whereas the return track of *L. maximus* very rarely crosses the outward track more than once.

Limax flavus is not generally considered very common or abundant, escaping notice by its nocturnal habits, but this impression often becomes modified when the characteristic and quite diagnostic tracks are looked for in suitable places.

Since the above was written, Mr. Oldham has shown me a large number of similar tracks on beech trunks in Herts., where *L. flavus* has not hitherto been observed, but where *L. arborum* is very common. The mucus of the tracks had perished, but the scars seemed too large to have been made by *L. arborum*, nor have I observed *L. arborum* to make tracks of this character. *L. flavus* hides very effectively in the daytime, while *L. arborum* is usually found in the crevices of the trunks, and I think if the trees were visited at night *L. flavus* would be found.



NOTE ON CYLINDRELLA ÆQUATORIA Morelet.

BY J. R. LE B. TOMLIN, M.A.

(Read before the Society, April 10th, 1912).

THIS species was described by Morelet in the *Journal de Conchyliologie*, 1873, p. 124, pl. v., fig. 1, and is given as having been collected by Dr. Destruges in the neighbourhood of Quito. Morelet comments on the locality as being the "furthest south" for a *Cylindrella*, and more recently Pilsbry, in the *Manual*, has pointed out—evidently with some doubts in his mind—how far Quito is removed from other haunts of the genus.

I received recently from Mr. G. C. Spence a specimen of *Cylindrella*, purchased without data at the Cairns sale, which he thought answered the description of *æquatoria*, with a request for verification if possible.

This shell proved to be a typical example of *C. sowerbyana* Pfr. The type of *C. æquatoria* and the two other specimens which accompany it on the tablet in the South Kensington Museum are all poor and worn specimens, but enough of the sculpture remains to shew that they agree with *sowerbyana* in this as in every other particular.

In order to confirm the identification, Mr. Edgar Smith, at my request, very kindly broke open one of the Morelet specimens. It proved to have the perfectly plain internal spiral which is characteristic of *sowerbyana*. As this species comes from Cuba, we have to suppose either the introduction of the species at Quito, which sounds unlikely, or an error in the locality given by Dr. Destruges.

C. sowerbyana was described by Pfeiffer in the Proceedings of the Zoological Society, 1846, p. 116, so that *æquatoria* Mor. sinks as a synonym.

Helix cantiana Mont. preyed upon by the Song Thrush.—In his Collector's Manual, Mr. L. E. Adams states that he has never observed that birds feed upon *Helix cantiana*, and it may therefore be worth while to mention that in March, 1912, I noticed a "thrush-stone" at Tring, Herts., which was surrounded by the broken fragments of between fifty and sixty shells of this species, whilst *Helix nemoralis*—a more usual victim—was represented by only three shells. In West Hertfordshire I often see "thrush-stones" where the smashed shells of *Helix arbustorum* outnumber those of other species.—CHARLES OLDHAM (Read before the Society, April 10th, 1912).

ADDITIONS TO "BRITISH CONCHOLOGY."

BY J. T. MARSHALL.

PART VII. (*continued from page 306*).

PLATE 5.

P. turricula Mont.—Herm beach (Tomlin). Mr. Tomlin's Herm record, cited by Mr. Marquand,¹ requires confirmation. I do not think this species, common though it is, occurs in any of the Channel Islands, although Mr. Tomlin "certainly found an unmistakable *P. turricula* on the shell-beach" at Herm.

var. **rosea** M. Sars.—Connemara (Tomlin and Dodd)! Aberdeenshire (Simpson)! Doggerbank, Belfast Lough, and Loch Linnhe. This variety is *Tritonium roseum* of M. Sars, and no more than a tinted form of the type.

var. **ecostata** Norman.²—Dublin Bay (Walpole *vide* Norman). Found occasionally with the type, though at Portrush and Portstewart it forms 25 per cent. of the specimens. In this variety the longitudinal ribs are more or less absent.

P. turricula is an extremely variable species, either as regards size, degree of sculpture, or proportions of length to breadth. In the Norwegian seas especially it seems to reach its highest degree of development and variation. Doggerbank and Aberdeenshire specimens attain $\frac{7}{8}$ in. in length. It is usually white, but is sometimes lemon-coloured (especially from the west of Ireland), and more rarely tinged with pink. A small and stumpy form from the Kyles of Bute, in 18f., has the proportions of *P. exarata* Möll. The latter species was dredged by the 'Porcupine' in the Atlantic off Ireland in 164-123of. (Jeffreys), and by the Scottish Fishery Board in the Minch in 63f., and off the Butt of Lewis in 545f. (Simpson)!

P. trevelyana Turt.—Brora, from haddocks (Baillie)! St. Andrew's, from fish stomachs (M'Intosh); Scarborough, Filey, and Whitby, sometimes cast ashore; Frith of Lorne 75f.; Dornoch Frith.

Individual specimens of this and the last species approach each other closely in shape and size, shouldering whorls, and longitudinal ribs; but the sculpture of this is always finer, while the aperture is shorter and the canal more open. The longitudinal ribs vary in number and size, and are sometimes altogether absent, the shell being then evenly decussated, while the young of this form have a considerable resemblance not only to *P. ovalis* Friele=*P. exigua*

¹ Marine Shells of Guernsey, Trans. Guernsey Soc. Nat. Sci., 1901, p. 16, sep. copy.

² Ann. Mag. N. Hist., 1899, vol. iv., p. 133.

Jeff., but also to *P. tenuicostata* M. Sars, though in the latter the sculpture is more flexuous. It was from examples of this decussated form that Brown described his *P. reticulata*, and Macgillivray his *P. decussata*, the latter, however, not being *Fusus decussatus* Couch., which is an allied though distinct species, dredged by the 'Lightning' midway between the Hebrides and Faroes in 500f. and 560f.

Sowerby's figure is a perfect one of the prevalent British form; in Jeffreys' the ribs are coarser and the tops of the whorls shouldered, similar to the Greenland and North American form described by him as var. *smithii*,¹ which is characterised by the whorls being more angulated, and with fewer and stronger longitudinal ribs, though as a matter of fact specimens from all the above localities comprise every degree of sculpture and angularity. Var. *smithii* Jeff. somewhat resembles *P. exarata* Möll., which is a rather critical species, intermediate between *P. turricula* and *P. trevelyana*. The latter name seems to be in general use, though it is subsequent to *P. reticulata* Brown (1827).

The above-mentioned *P. ovalis* Friele=*P. pygmaea* Verr.=*P. exigua* Jeff., was dredged by the 'Triton' between the Hebrides and Faroes in 570f., and a single specimen by the Scottish Fishery Commissioners off the Butt of Lewis in 545f., (Simpson)! Gwyn Jeffreys mistakenly describes the whorls as concave instead of convex, his figure has $3\frac{1}{2}$ whorls instead of $4\frac{1}{2}$, and the dimensions should be 0.2in. by 0.1.

"*P. galerita* Phil., a rare Calabrian fossil," has been figured but not described by Jeffreys² as a British species. Sowerby³ says it is not Philippi's species of that name, and figures it as *P. icenorum* S. Wood, a crag fossil; while Monterosato⁴ holds it to be *P. semicolon* S. Wood. However that may be, there are no grounds for considering it a British species beyond the fact that a dead specimen has been dredged "about fifty miles north of the Butt of Lewis."

Another member of this genus which may be looked for in British seas is *P. declivis* Lov., which was dredged by the 'Lightning' off the Butt of Lewis in 189f., by the 'Porcupine' off E. Shetlands in 64f., N. Shetlands 345f., and Channel slope 567f.; by the 'Knight Errant' in the Shetland-Faroe Channel 300-375f. (Jeffreys); and by the 'Triton' in the latter district in 640f.

P. tenuicostata M. Sars was also dredged by the 'Lightning' in the Shetland-Faroe Channel in 550f., and by the 'Porcupine' on the Channel slope and in the Atlantic off Ireland in 420f. Another station in

1 Moll. 'Valorous' Exp., Ann. Mag. N. Hist., 1877, vol. xix., p. 332 (sep. copy, printed by error 1876).

2 Brit. Conch., vol. v., p. 221, pl. cii., fig. 6.

3 Ill. Ind. Brit. Shells, p. 16, pl. xxvi., fig. 6.

4 Nuova Riv. Conch. Med., 1875, p. 42.

the latter district was given by Gwyn Jeffreys as 664f.,¹ but that was an error; there was no dredging at that particular depth; while Canon Norman takes at a guess the nearest depth to it, and gives 630f.² Its occurrence in the Bay of Biscay is also erroneously recorded by Jeffreys. The geography of the latter author throughout the 'Valorous' Report is lamentably mixed, "Bay of Biscay" being recorded for various stations hundreds of miles away. In point of fact, the 'Porcupine' did not dredge at all in the Bay of Biscay, nor near it, and all records cited from that locality should be disregarded.

Among other members of this genus from the surrounding seas are *P. bicarinata* Couth., which was dredged by the 'Lightning' between the Hebrides and Faroes in 170f., and by the 'Porcupine' in the north and west of the Shetlands in 290f. (Jeffreys); *P. cinerea* Möll., dredged by the 'Porcupine' west of the Shetlands in 290f. (Jeffreys); and *P. mörchii* Malm=*P. cirratu* Brug., dredged in the Shetland-Faroe Channel by the 'Triton,' and six specimens off the Shetlands in 155f. by the Scottish Fishery Board (Simpson)!

Marginella lævis var. **oblonga** Jeff.—Guernsey 20f., Scilly 40f., Freshwater West. In my previous publication of this part I was made to say that "the embryo of this species is very similar in form and sculpture to that of *Clathurella*," but that was an error of the printer in repeating a note on the same page appertaining to *Ovula*.

Cypræa europæa³ Mont.—Low water in the littoral zone. Varies considerably in size, outlines, and number of cross-ribs. The immature shell, which is a constant puzzle to young collectors, gives no promise of the adult stage, and undergoes several metamorphoses before attaining maturity. The very young shell of two whorls is expanded laterally, with a deep umbilicus, and resembles *Lacuna pallidula* of the same size; the third whorl gives it a globular appearance, the umbilicus becomes closed, and it then looks like a half-grown *Stilifer turtoni* minus the style; it next becomes oval, next elongate, next the outer lip overlaps, and then the shell becomes perfectly formed, but without sculpture; this is added last, commencing from the inner margin and gradually extending across the back of the shell to the outer lip. Simultaneously with the appearance of the sculpture the coloured spots are added; there is no trace of them in the half-grown shell, and Jeffreys was mistaken in saying that "the coloured spots appear on the shell when half-grown;" he was probably deceived by the dried remains of the animal. Some Continental writers and collectors divide the spotted from the plain specimens—

1 Moll. 'Valorous' Exp., Ann. Mag. N. Hist., 1877, vol. xix., p. 330.

2 Ann. Mag. N. Hist., 1899, vol. iv., p. 131.

3 Both words of this species as well as the last, and indeed all Jeffreys' figure-names that require the diphthong æ, have been inscribed by the artist in error, œ.

the one as *tripunctata* and the other as *immaculata*, while Montagu described the spotted one as *C. europæa* and the plain one as *C. arctica*. At Guernsey and Herm, where great numbers are collected for ornamenting boxes, they are known by the expressive name of "negro-heads."

var. **minor** Marsh., *Journ. of Conch.*, 1893, vol. vii., p. 263.—Dredged in the coralline zone. Guernsey 2of., Killala Bay and Achil Island, Barra 4of. Figured in 'Crag Mollusca' (vol. ii., pl. ii., fig. 6). There is another form living in the littoral zone which is intermediate in size between this and the type.

C. moneta has been found on the shore at Jersey by Mr. Sturges Dodd, on the beach at Seascale, Cumberland, by the Rev. Charles Crawshaw, and at Tresco by Mr. Tomlin. It is an exotic species.

Ovula patula Penn.—Scilly (Smart and others); Wexford coast 4of. (Walpole); Killala Bay. Very young shells have a prominent spire, which gradually becomes enveloped by the formation of the upper canal. The embryo is very similar in form and sculpture to that of *Clathurella*, and consists of three convex whorls transversely reticulated.

Bullidæ Clark.—Canon Norman prefers to substitute *Tornatina* A. Ad., without explanation, for the well-known name *Utriculus* Brown.¹ The latter dates from 1844, and the former from 1850, so that on the ground of priority alone the change was undesirable. He has also included in it two species which are usually considered *Cylichna* (*nitidula* and *umbilicata*), while for *C. acuminata* he revives *Volvula* of Adams, although there is a prior genus of *Volvulus*, in addition to which "Lovén has examined the animal and ascertained that it is undoubtedly a *Cylichna*."² Then, for other species of *Utriculus*, he resuscitates the genus *Diaphana* Brown, in this following G. O. Sars, whereas Gwyn Jeffreys says that besides being an objectionable name, Brown himself cancelled *Diaphana* in favour of *Utriculus*;³ while Boog Watson makes *Volvula* a sub-genus of *Cylichna*, *Tornatina* he makes a sub-genus of *Utriculus*, and in regard to *Diaphana* he writes:—"G. O. Sars rejects Lovén's name of *Amphisphyra* in favour of *Diaphana* Brown; but this latter name was cancelled by its author in favour of *Utriculus*, and it is obviously impossible to accept *both*, as Professor Sars has done."⁴

Cylichna acuminata Brugui.—Generally, but sparingly, distributed, in sand more or less muddy, in 10 to 90 fathoms. Off Berwick (Howse); Tan Spit, Cumbrae, locally abundant, Mr. Alfred

1 Ann. Mag. N. Hist., 1890, vol. vi., p. 63.

2 'Brit. Conch.', vol. iv., p. 412.

3 Op. cit., p. 419.

4 'Challenger' Gastropoda, p. 646.

Brown having dredged thirty living specimens in one haul; Brodick Bay 4of., Sound of Sleat 30-9of., and Gairloch 3of. (Somerville and J.T.M.); Lamash 10-25f.; Loch Fyne 35f.; Loch Linnhe 25f.; Loch Hourm 2of.; Loch Inver 25f.; Loch Leven 24f.; Minch off Barra 5of.; West Orkneys 45f.

Jeffreys' figure exhibits a conspicuous fold on the pillar, which is incorrect; the shell at that part is merely thickened and slightly reflected, as in Sowerby's.

C. nitidula Lov.—St. Mary's Sound, Scilly, 35f., rather plentiful in one particular dredging, and not hitherto recorded from the south; Southport 11f., a single specimen. The finest come from Stornoway, and are a line and a half in length; this is the var. *major* of Continental writers.

The young of this and the next species are more easily separable than the adults; that of *C. umbilicata* is more globular, with a depressed crown. I have already in a previous paper drawn attention to the transposition of Jeffreys' figures of the two species. Sowerby's figure of *C. nitidula* should not have a cup-shaped depression at the apex, and that of *C. umbilicata* (fig. 11) should be less oval, and exhibit spiral striæ.

C. umbilicata Mont.—Sutherlandshire (Baillie and J.T.M.); Scilly 4of., not uncommon (Smart and others); Guernsey 2of., rare; Aberdovey, a dwarf form; Doggerbank 20-4of.; Connemara, Mayo, and Sligo; Tan Spit, Cumbrae, 15-2of.; off Iona 2of.; Stornoway 1of., very fine.

var. **strigella** Lov. (*Journ. of Conch.*, 1893, vol. vii., p. 263).—Loch Fyne and various parts of the Scotch coasts (Forbes and Hanley); Stornoway 1of., East Shetlands 4of. In this variety, which is larger and coarser, the spiral sculpture is easily observable, and when the lines of growth are also coarser, which sometimes happens, the surface is decussated. In the latter state it is the *Cylichna crebrisculpta* of Monterosato. Gwyn Jeffreys was mistaken in assuming that this variety was described by Lovén from typical specimens in a fresh condition.

C. umbilicata is very sparingly distributed throughout the Hebrides. From about twenty localities thence, only a few specimens have occurred to me in each dredging, but more numerous colonies are living at Iona, Cumbrae, and Stornoway, though not with *C. nitidula*; the only places where I have found the two species living together have been at Aberdovey and Stornoway, where they are about equally mixed. In the Kyles of Bute this species live in 8-14f., whence *C. nitidula* takes its place down to 24f. The shell is difficult to dis-

tinguish from the last if not fresh and perfect. In living specimens the spiral striæ can be seen with an ordinary lens; otherwise the only sure guide is the apical perforation, which is conspicuous in this, but nearly closed in *C. nitidula*. The shell is occasionally oval, particularly from Shetland, and then it resembles Sowerby's fig. 11 in outline.

C. ovata Jeff. (*Journ. of Conch.*, 1893, vol. vii., p. 263).—Dredged off the Butt of Lewis in 545f. (Simpson)! and in the adjacent seas of Britain by the 'Porcupine,' 'Triton,' 'Knight Errant,' and 'Flying Fox' expeditions, and having a wide range in depth.

The figure of the 'Porcupine' and 'Challenger' specimens of *C. ovata*, well depicted by Boog Watson,¹ is different from that of Sars or of Searles Wood,² which latter seems to have been copied by Forbes and Hanley and by Sowerby to represent Jeffreys' species. All these latter may be correct delineations of the Norwegian and Crag shells, which I have not seen, but they agree in being longer and more conical than *C. ovata* Jeff., and accord with the description of Searles Wood, "ovate-conical." But I think it more than probable that two species are here mixed. In Jeffreys' first records of it,³ it is referred to as "*C. ovata* Jeff. MS.=*Bulla conulus* S. Wood non Deshayes (coralline crag)," and as "*Cylichna ovata* Jeff.=?*conuloides* S. V. Wood;" while Boog Watson⁴ cites it as "*Cylichna conulus* (not of S. Wood nor of Weinkauff) var., Jeffreys." These two writers, therefore, are at issue as to what is *B. conulus* S. Wood. Weinkauff's *C. conulus*=*hoernesii* may be put aside, as that is a well-known sculptured shell, and readily identified, although the shape and size accords with *B. conulus* S. Wood. There remains *B. conulus* Desh., a miocene fossil, to which S. Wood ascribed his species, though Jeffreys says it is not that; and there is a "*Cylichna pyramidata* (Norwegian and Mediterranean)," ambiguously alluded to by Jeffreys in his Preliminary Report of the 'Porcupine' Expedition,⁵ which may very possibly have been a too hasty adoption on his part of the *C. pyramidata* of A. Adams for his *C. ovata*. Further, there is *C. obesiusscula* Brugno., which Professor Dall says is the species that Seguenza's Calabrian fossil shell belongs, though Watson and Jeffreys cite Brugnone's species as *C. ovata* Jeff.

1 'Challenger' Gastropoda, p. 664, pl. 49, fig. 9.

2 Crag Moll., vol. i., p. 173, tab. 21, figs. 2a, b, c, as *Bulla conulus*.

3 Rep. Deep-Sea Researches, Proc. Roy. Soc., 1870, No. 125, p. 156.

4 Some of the citations given by Boog Watson in the 'Challenger' Reports are incorrect, and should read:—

Cylichna ovata, Gwyn Jeffreys, Proc. Roy. Soc., No. 125, p. 156.

Cylichna ovata, Gwyn Jeffreys, Proc. Roy. Soc., No. 172, p. 10.

Cylichna ovata, Gwyn Jeffreys, Proc. Roy. Soc., Italian Exp., Ann. Mag. N. Hist., 1882, vol. x., p. 34.

5 Proc. Roy. Soc., 1870, No. 121, p. 432.

Now, *C. ovata* Jeff., as figured in the 'Challenger' Report, is an Atlantic species from very deep water, whereas the *C. conulus* of "British Conchology," on which this species was founded, is "a single specimen from Deal Voe, Shetland, about 10f." The former is very thin and egg-shaped, with the smaller end truncated; the latter is longer, more conical, and rather solid. And I think Gwyn Jeffreys has most probably been too hasty in uniting these two forms as one species; that it will be found that Sars', Wood's, and the "British Conchology" species are identical, and that they are distinct from *C. ovata* of the 'Porcupine,' the 'Challenger,' and of Seguenza.

C. cylindracea Penn.—St. Mary's Sound, Scilly, 35f., a small form rather plentiful in one particular dredging, with *C. nitidula*; it is otherwise a scarce shell in the Channel and Scilly Islands. Fossil in the Belfast deposit (Praeger)!

The largest come from Tenby, Laugharne, and Pendine, where they attain the dimensions given by Jeffreys, six lines by two; but this is unusual, the normal size being four lines by one. The fry are extremely curious; they consist of three whorls, and resemble a *Limacina*; these three apical whorls afterwards become wholly enveloped by the outer lip in a hollow chamber, in which it is arranged at right angles to the axis of the shell, as in typical *Odostomia*. In the first stage of the perfectly formed shell, the cylinder is expanded at the top to make room for the embryonic whorls; it afterwards becomes more thickened and uniform below, until in the adult the cylinder is the same breadth throughout.

C. alba Brown.—East Shetlands (Simpson)! off the Butt of Lewis 189f. and 530f. ('Lightning' and 'Knight Errant'); North Shetlands 345f. ('Porcupine'); Shetland-Faroe Channel 516f. and 570f. ('Triton').

var. **corticata** Beck.—About 20 miles N.E. of the Shetlands 111f. (Simpson)!

Utriculus mammillatus Phil.—Scilly Islands (Smart and others), more plentiful than elsewhere; Freshwater West; Bantry Bay; Pentland Frith 35f.; W. Orkneys 45f.

The sculpture of this species is visible only with a Coddington lens. The papillary apex often projects beyond the apical rim, and in a few cases the next whorl also, while a monstrous form has the whole spire extruding, as in *U. obtusus* var. *lajonkairaana*. Jeffreys' figure shows the apical nipple sunk below the level of the upper rim of the shell, while in Sowerby's it is projecting, as in the majority of specimens; the latter form is var. *apice-prominulo* Monts.

U. truncatulus Brugui.—Fossil in the Belfast deposit (Praeger)!

Live specimens are opaque, but when picked out of shells and are glossy and transparent, sometimes ornamented with spiral pellucid zones; in this state, according to Monterosato, it is *U. semisulcatus* Phil. The same peculiarity is apparent in *U. tornatus* Wats., from the Azores and Tenerife and various other places. Specimens from Limfjord are encircled with several constricted spiral lines, and this is occasionally observable in British examples. The very young are oval, and the upper corner of the aperture projects over the embryo preparatory to enclosing it. In the adult stage the length of the aperture varies considerably. Two abnormal specimens from Guernsey, 2of., may prove to be a new species or monstrosities of this one; they are oblong in shape, the apical nipple is larger, level with and filling up the crown, and the other whorls are invisible; they are somewhat similar in these respects to *U. tornatus* Wats., but are larger, while only the longitudinal lamellæ connect them with *U. truncatulus*. Another form from Guernsey is regularly cylindrical, which island also yields the finest examples. I have examined many living specimens without detecting the operculum with which Professor Lovén credits this species.

var. **pellucida** Brown.—Castle Bay, Barra, in shallow water, and in the Minch off Barra 20-30f. (Somerville and J.T.M.). This variety is usually smaller, shorter, and cylindrical, and resemble some of the forms of *U. obtusus*; but the Castle Bay specimens are very much larger (two lines by one), and instead of being cylindrical or constricted in the middle, they gradually enlarge from the apex downwards, forming an oval cone similar to the British figures of *Cylichna conulus*, for which they might be easily mistaken, but the crown is different.

U. obtusus Mont. — The distribution of this species and its varieties is very extensive: "From Spitzbergen to the Adriatic, and all along the eastern coasts of N. America from Wellington Channel to Cape Cod. . . . Its habitat ranges from low-water mark to 114 fathoms, and it especially frequents brackish water" (Jeffreys).¹

var. **lajonkaireana** Bast.—Not confined to the Shetland and Channel Islands, though most plentiful in those groups. Scilly (Smart and others); Southport, Skegness, Killala Bay, Dublin Bay, Portmarnock, Portrush, Iona, and Barra. Fossil with the type in the Belfast deposit, where a monstrous form occurs in which the spine is as long as the aperture (Praeger)!

var. **minor** Jeff., Med. Moll., Ann. Mag. N. Hist., 1870, p. 20, sep. cop.—"Apice depresso." L. 0.06 in., b. 0.04. This is a reduced *fac-simile* of the large estuarine form, and occurs frequently at Guernsey in 15-22f., and sparingly at Scilly in 30-40f. In the

¹ New and Peculiar Moll., Ann. Mag. N. Hist. 1877, p. 334.

Mediterranean shell, from which this variety was described, the spire is so depressed as to be out of sight when the mouth is towards the observer, and the top of the aperture is level with the crown; in most of those from Guernsey the spire is more or less visible though depressed, and the length of the aperture is variable, but many correspond to the Mediterranean form. According to Monterosato, this is "*U. minutissimus* H. Martin, ex typo."

There are few British shells more variable than *U. obtusus*, either as regards size, shape, solidity, length of spire, or of aperture; but it consists mainly of two principal forms, from which all the others radiate: the type form, which lives in brackish bays and estuaries, and the other an exclusively marine form, inhabiting many parts of our coasts from low water to 30 fathoms. The latter, besides being very much smaller, differs from the former in not being constricted in the centre nor broader at the base, but has an oblong outline, and gradually merges into the var. *lajonkairieana*. Both forms are equally variable, and between the two many varieties might be defined. (An exactly analogous case occurs in the estuarine *Hydrobia ulve* and its marine var. *minor*). In the type, the aperture occasionally exceeds the length of the shell, and the very young resemble the same stage of *U. truncatulus*, but the latter has a hollow or depressed crown, while the former is truncated only. Gwyn Jeffreys' generic figure is the type of the estuarine form and of his description; his type figure is different, and too cylindrical; Sowerby's is perfect; while "British Mollusca" contains several good figures of its variations.

The var. *lajonkairieana* is markedly distinct from the var. *minor*, though equally variable; in all its forms, and at all stages of growth, it has a shorter aperture and a longer spire; but care must be taken not to confuse the young with the same stage of *U. mammillatus*; the two are much alike, though the latter is somewhat more slender and the apex or nipple is larger. Jeffreys' is the best figure, but is wrongly inscribed var. *lajonkairianus*; Sowerby's figures are equally good, though the shell is usually more slender.

There are several dwarf varieties besides the var. *minor*. Jeffreys has described one from the Roach River, Essex, as var. *semistriata*, which has longitudinal striæ at the summit as in *U. truncatulus*; Brusina has described another from Dalmatia, with a depressed spire, as *Cylichna leptoneilema*; and a remarkable form from Guernsey, Scilly, and Barra might readily pass for half-grown *U. truncatulus* var. *pellucida*; they only differ in the latter having the apical rim sharper and the crown depressed; they are oblong in shape, the spire is flattened on a level with the crown, and the aperture extends considerably above the apex.

Another remarkable variety comes from Barra in the Outer Hebrides, and also from Brora in Sutherlandshire; it is thin and oval, the mouth is wide and patulous, but shorter; only the nipple appears above the crown, and the latter is sloping instead of shouldered. This very much resembles in shape and size, but not in sculpture, *U. lima* Brown, an Arctic and a Clyde glacial species, well figured by Sars, but badly by Brown. This thin oval form is estuarine, and has what may be considered its marine counterpart in a shell which, except in size, exactly resembles *U. avenarius* Wats., and which, the author says, "a good deal resembles not *Bulla turrita* Möll., but Sowerby's figure of that species in the 'Thesaurus'"; but I hope to show further on that *B. turrita* is only a synonym of *U. obtusus*. However that may be, these specimens, which I dredged between Guernsey and Sark, are narrowly oval in shape, the upper part is sloping, and the apical whorls project from the main one just enough to be visible. Except in being one-half the size, and the tops of the whorls more distinctly keeled, they agree in the most minute particulars with the diagnosis and figures of Watson's *U. avenarius*, from Port Jackson, Sydney, 2-10f.¹

Bulla pertenuis Migh., an Arctic and N. American shell, is the same thing as our estuarine form, though somewhat shorter and broader; while *B. turrita* Möll., also Arctic and N. American, "closely resembles and corresponds to our var. *lajonkaireana*" (Jeffreys), and is our marine form. *B. pertenuis* is well figured by Sars,² and shows it to be like a short and stumpy estuarine *U. obtusus*, which can be easily matched from Skegness, Portland, and several other places on the British coasts. Forbes and Hanley say that "*Bulla pertenuis* Migh. so closely resembles the var. *jeverensis* that the difference is scarcely appreciable."³ But *Bulla ieverensis* Schr. is a synonym of *U. truncatulus*, and not of *U. obtusus*.

As to *Bulla turrita* Möll., the only noticeable feature in examining large series of them is that many appear broader and squarer at the top, with a tendency to attenuate towards the bottom, true var. *lajonkaireana* being cylindrical; but the former characters accord with many specimens from Jersey, and agrees better with our marine form than with the var. *lajonkaireana* (with which Jeffreys allies it). The protrusion of the apical whorls, though extremely variable, is rarely so pronounced as in var. *lajonkaireana*, being usually only just visible, and in some cases just level with the crown or disappearing from view. An examination of full series of the above forms (particularly from Jersey) will demonstrate that *Bulla*

1 'Challenger' Gastropoda, p. 658, pl. xlix., fig. 5.

2 Moll. Reg. Arct. Norv., tab. 17, fig. 19.

3 Brit. Moll., vol. iv., p. 286.

pertenuis Migh. cannot be specifically separated from the British estuarine *U. obtusus*, nor *B. turrita* Möll. from the British marine form of the same species. Sars' figure of *B. turrita* (tab. 17, fig. 20) is the same as our var. *lajonkaireana*, and although that form is occasionally met with in the north, it is not the prevalent Arctic one. Jeffreys' figure of the type and var. *lajonkaireana* do not exhibit the pillar-fold; that character varies according to age, but is always present in the adult. Neither is it shown in Forbes and Hanley's, Sowerby's, or Sars' figures, but is present in Searles Wood's.

Utriculus ventrosus Jeff.—The solitary example dredged by Mr. Barlee many years ago, and from which this species was described, does not appear to have been added to by the various deep-sea explorations of recent years, though the Marquis di Monterosato gives "Palermo, 90 metres." Nor have I been able to meet with a specimen from a dozen hauls of the dredge "off Glenelg in Skye," at various depths from 20 to 95 fathoms, whence Mr. Barlee obtained his specimen, so that that locality evidently cannot be its home.

Jeffreys' figure gives an erroneous idea of the shell, being drawn equal in length and breadth; it should be globosely oval, in accordance with his description and dimensions. Sowerby's figure (pl. 20, fig. 15) is a back view of a young *Velutina lævigata*, and not this; but his supplementary figure (pl. 26, fig. 9) is a good copy of Jeffreys'.

I have an example of a *Utriculus* that must be very near *U. ventrosus*. It was dredged off Loch Ryan, at the mouth of the Clyde, in 27 fathoms, and is exactly of the same dimensions, is globosely-oval, and apparently adult; but it differs in that the microscopic spiral sculpture is more visible, consisting of finely impressed lines, and the longitudinal sculpture are flexuous lines of growth; the apex also projects and stands just clear of the crown, though probably that is as variable a character in this as in other species of the genus. The upper part of the aperture where it joins the periphery has been chipped away (as it was in Jeffreys' shell), so that that part still requires description. But my specimen chiefly differs from *U. ventrosus* in having the tops of the whorls sharply angulated and surmounted with two keeled lines placed close together. In both the above species the pillar or body of the shell is not barrel-shaped, like its neighbours, but smaller and oval, like some of the *Philine*, and they resemble in some of their features *U. sequenzæ* Wats.,¹ a 'Challenger' and 'Porcupine' species; but the latter is more oval and solid, much more strongly and visibly sculptured (though omitted from the figure by the artist), and the whorls are not keeled. All three come under the section *Amphisphyræ* of Lovén. I have pleasure in naming this shell *U. tomlinianus* (see pl. 5, fig. 1)

¹ 'Challenger' Gastropoda, p. 646, pl. xlviii., fig. 5.

in compliment to J. R. le B. Tomlin, Esq., of Lakefoot, Reading, into whose hands the specimen has now passed, with my collection. I have also a specimen of an undescribed species from the Christianiafjord, 100f., which is somewhat like a young *U. ventrosus* in shape, but has a different crown and pillar.

U. expansus Jeff.—This is another very rare Shetland species, to which I am able to add N.E. Shetlands 111f.; also a specimen off the Faroes in 85f. (Simpson)! S.W. Ireland 40f. (R.I.A. cruise)! Scilly Islands 30-40f. (Burkill and J.T.M.); Land's End, Caldy Island, and Bartra Island. It was also dredged in the 'Porcupine' Expedition off the West of Ireland in 670f., and North of the Hebrides in 542f.

The shell has a peculiar frosted appearance, which appears either in broad spiral bands or in blotches. Two of my Irish specimens have a clear white band encircling the periphery, as may be seen in various species of *Philine*. Jeffreys' figure conveys a wrong impression of the shell; the body-whorl should be shorter and broader, the pillar should be straight, sharp at the base, and the outer lip should be more inflated and describe a half-circle. Sowerby's figure is a copy of this with the faults emphasized. It was perhaps owing to these misleading figures that the Marquis di Monterosato described the same species as *U. quadratus*.¹ Jeffreys' dimensions are more than double those of any of my specimens (about a score); the latter are nine lines in length by eight in breadth, they are more globular than his figure, and show the apex more or less above the crown.

U. hyalinus Turt.—Scilly Isles (Smart and others)! Mayo and Sligo (Miss Warren)! Guernsey 20f., very rare; Southport, Skegness, Whitby, Doggerbank, Bantry Bay, Connemara, Portrush, North and East Sutherlandshire, Barra, and West Orkneys.

As in *U. obtusus*, this varies in the protrusion of the apex and length of the aperture. A more globose form is distributed generally with the type, and some of these, having the aperture level or even higher than the crown, may be mistaken for *U. expansus*. Another form is constricted in the centre. The colour is clear white in dead specimens, but a light horn-colour when living.

Sowerby gives a good figure; Jeffreys' does not exhibit the apex, and the pillar-fold and umbilicus are much too prominent. The dimensions of both figures are too large, indicating two lines in length; the usual size is only half that. I have a couple of specimens from Glenelg, Skye, which are two lines long, but these are altogether exceptional.

U. globosus Lov.—St. Magnus Bay, Shetlands, 60-80f., on a

¹ Journ. de Conchyl., 1874, p. 280.

muddy bottom, very rare (Jeffreys). Also British Channel slope 690f. ('Porcupine')! *Diaphana globosa* and *D. hyemalis* of G. O. Sars are synonyms of this.

Acera bullata Müll.—Herm Island, a dwarf form $\frac{1}{4}$ -in. in length. The usual size is $\frac{3}{4}$ -in. by $\frac{1}{2}$ -in.

var. **nana** Jeff.—This is a line and a half in length by one in breadth.

var. **farrani** Norman (*Journ. of Conch.*, 1893, vol. vii., p. 264).—Connemara (Farran); dredged once in quantity, but not since rediscovered. Dimensions $1\frac{3}{4}$ -in. by $1\frac{1}{8}$ -in. An odd specimen was dredged alive off Boffin Island, in the west of Ireland, by Mr. Woodward in 1901, and subsequently occasional specimens have been trawled by the Irish Fishery Commissioners in the same district, thus showing that it is not extinct nor exterminated.

Actæon tornatilis L.—Alderney and Herm, three dead specimens on the beach (Marquand)! These are the only records from the Channel Islands. The largest specimens come from Pendine, and sometimes attain $\frac{7}{8}$ -in. in length, while a dwarf variety from the Doggerbank is only $\frac{1}{4}$ -in.

var. **subulata** S. Wood.—Knapdale Lochs 11f., Dornoch Frith.

var. **tenella** Lov.—Aberdeenshire, deep water; off Cape Wrath 68f., and Shetlands 51f. (Simpson)! Doggerbank 30f., Loch Boisdale 35f.

var. **bullæformis** Jeff.—Torbay 12f., Doggerbank 30f.

A. exilis Jeff.¹ has been dredged by the 'Porcupine' in the Atlantic off Ireland in 1215f., and by the 'Triton' in the Shetland-Faroe Channel in 570f. In the same volume of the Annals,² but two months later, it was described by Mr. Alfred Bell as a Crag species under the name of ? *A. etheridgei*, and this was repeated and figured by Searles Wood³ in his work as *A. etheridgei*, with *A. exilis* Jeff. cited as a synonym, and the remark—"I presume this is the shell called *exilis* by Jeffreys in his list to Mr. Prestwich's Red Crag paper."⁴ Searles Wood here assumed that Jeffreys' list name in the Geological Society's Journal was its first record, instead of in the previous year and two months before Bell's paper, and it has apparently escaped notice because Gwyn Jeffreys ignored *A. etheridgei* in all subsequent citations of *A. exilis*. A. Bell describes his species as having 5-6 whorls, but Wood's figure (not very good) exhibits 4-5, while Jeffreys' dimensions indicate an immature specimen. It has actually 5-6 whorls, as stated by Bell. One of the specimens procured by the 'Triton' in the Shetland-Faroe Channel was described

1 Med. Moll., Ann. Mag. N. Hist., 1870, vol. vi., p. 85 (p. 21 sep. copy).

2 Op. cit., p. 216.

3 Crag Moll., vol. iii., p. 94, tab. 5, fig. 17.

4 Published in Quart. Journ. Geo. Soc., 1871, vol. 27, p. 486.

by Mr. H. K. Jordan as a new species under the name of *A. browni*,¹ but there was no excuse for this, as I had identified the shell for him and referred him to the necessary figures and text.

Bulla hydatis L.—Portstewart, N. Ireland, an imperfect specimen on the beach (Knight)! It has been recorded by Sir John Murray from "deep water in Loch Fyne," but, as in various other records of the dredgings in the yacht 'Medusa,' they emphatically require confirmation. *B. hydatis* is a gregarious species, and travels in shoals, being sometimes dredged in abundance for a time, and then deserting the place for years.

var. **globosa** Jeff.—This form has its only locality on Dawlish Warren, which I suspect is the same as Clark's locality "Exmouth," although the warren is cut off from Exmouth by the River Exe. It lives with the type in a deep lagoon, to which the sea has access at each tide, and it must be dredged for.

B. utriculus Brocc.—Brora, from haddocks (Baillie)! Scilly Islands 4of.; Penzance, from trawlers; St. Mawes, Fowey, Tarbert 2of.; Brodick Bay 4of., Loch Boisdale 35f., West Orkneys 45f., Dornoch Frith. My collection contains an unusually large specimen, from the Outer Hebrides, which is $6\frac{1}{2}$ lines by $4\frac{1}{2}$.

var. **oblonga** Jeff.—From haddocks from Sutherlandshire trawlers (Baillie)! Only "a single specimen" from Loch Fyne has been hitherto recorded. Besides being more oblong, the base is more pointed and produced.

B. semilevis Seg. has been dredged in 1,000f. off the south-west of Ireland, but at a distance and depth too remote, in my opinion, to be considered a British species.

B. striata Brugui.—I have a specimen of this shell from Grouville Bay, Jersey, a part of the island lying opposite the French coast, where it is not uncommon. Another specimen has been found by Mr. E. Duprey in St. Aubin's Bay, in the same island. Several other specimens have been found in as many places on the British coast, but the species cannot be considered indigenous.

Scaphander lignarius L.—Guernsey and Herm, at low water of spring tides, in muddy sand.

var. **curta** Jeff.—I have this form from the north and east of the Shetlands, but excepting its dwarf size it does not differ in its proportions from young typical specimens. I regard it as a dwarf, thin, deep-water form.

S. punctostriatus Migh.—Shetlands 51f., two specimens, and off the Flugga Light, north of the Shetlands, three small specimens and some fragments (Simpson)! off the Butt of Lewis 189f. ('Lightning'); Shetland-Faroe Channel 57of. ('Triton'); British Channel

and Atlantic off Ireland 420-1380f. ('Porcupine'); S. W. Ireland (R. I. A. cruise).

My note on *Cryptaxis crebripunctatus* Jeff., in the *Journal of Conchology* for 1893 (p. 264) was meant to indicate its occurrence in the Shetland-Faroe Channel, and not to introduce it as a British shell, there being up to the present no record of its being found in the British seas. The generic name is preoccupied, and will have to be altered. Four unidentified species of this peculiar genus were dredged by the 'Porcupine' off the coast of Portugal in 1,095 fathoms.

Philine Asc.—It is remarkable that all the members of this genus are very rare in the Channel Islands, and altogether absent from Jersey except an occasional *P. aperta*. Most of the species of *Philine* have varietal forms marked with a diaphanous band round the periphery. Besides such British varieties as are recorded here, I have observed it also in *P. intricata* Monts. and *P. striatula* Jeff.

P. scabra Müll.—Low-water mark in places to 95 fathoms. Scilly Islands (Smart and others); Mayo and Sligo (Miss Warren)! Sutherlandshire, from haddocks (Baillie)! Borough Island in S. Devon; West Orkneys. Belfast deposits (Prager)!

var. **circa** Marsh., *Journ. of Conch.*, 1889, vol. vi., p. 57.—Scilly Islands (Burkill and J.T.M.); Killala Bay; Arran 25f.

Crag specimens are very much larger than recent ones, and measure "axis half an inch" (S. Wood). An oval form occurs at Arran, some specimens of which have the aperture projecting beyond the spire. Another form frequently occurs which is smaller, shorter, squarer, and more open or patulous.

P. catena Mont.—Low-water to 45 fathoms. Scilly Islands (Burkill and J.T.M.); Mayo and Sligo (Miss Warren)! Guernsey 20f., rare; Torbay, in rock-pools at low spring tides; Doggerbank 25-40f., Connemara, Portrush, Cumbræ 18f., Minch off Barra 33f., Benbecula Sound 10f., West Orkneys 45f.

var. **zona** Jeff.—Mayo and Sligo (Miss Warren)! Guernsey, Land's End, Torbay, Caldy Island, Tenby, and Dornoch Frith. *Not* more depressed than the type.

This species appears to thrive and to be most plentiful from the Land's End to South Devon; it is diffused throughout the Hebrides, but sparingly. My largest are from S. Devon, and measure two lines by one, though two specimens from Gairloch are $2\frac{1}{2}$ lines by $1\frac{1}{2}$. The sculpture is similar to the last species, but much finer. Jeffreys' figure is a bad one; it exhibits no sculpture, the pillar is too large, and the crown too narrow; Sowerby's is better, though the upper angle of the aperture is too high, and the base should be somewhat square instead of obtusely pointed.

(To be continued).

NEW RECORDS FOR BEDFORDSHIRE.

By E. D. MARQUAND, A.L.S.

(Read before the Society, May 8th, 1912).

DURING a couple of months' shell-collecting with my wife and son in the immediate neighbourhood of Bedford last autumn, we were so fortunate as to discover no less than eleven species which are not included among the recorded mollusca of Bedfordshire.

Although this is one of the smallest counties in England, it is by no means a poor one in molluscan life; so that these additions are interesting, even though they do not comprise anything very remarkable. Voucher specimens of all of them have been submitted to the Hon. Recorder, Mr. W. Denison Roebuck, F.L.S., who informs me that the number of land and freshwater shells recorded for this county is now raised to eighty-seven species.

Euconulus fulvus Müll.—Two specimens on the riverside at Goldington; one being unusually large, $3\frac{1}{2}$ mm. diam. \times 3 mm. alt. One in a copse at Ravensden. More plentiful in an osier bed at Fenlake.

Punctum pygmæum Drap.—One under a roadside stone at Renhold.

Pyramidula rupestris Drap.—Abundant on an old wall on the outskirts of Bedford, in company with *Balea perversa*.

Acanthinula aculeata Müll.—Six or eight specimens in various places near Bedford.

Vallonia costata Müll.—Much more common in this neighbourhood than its near ally *V. pulchella*.

Balea perversa Lin.—Plentiful on an old wall on the south side of Bedford.

Ancylus fluviatilis Müll.—Three specimens in the River Ouse on stems and leaves, all belonging to the var. *alba*. One much larger example at Oakley Bridge.

Planorbis spirorbis Lin.—Two alive in a pool on Goldington Green; a few dead shells among river débris.

Vivipara contecta Mill.—Marshes at Kempston and Cardington.

Bythinia leachii Shep.—Occasional in the river and in marshes, often in company with *B. tentaculata*.

Valvata cristata Müll.—One adult and one immature; both dead shells.

In several parts of the Ouse we have found living *Anodonta* with live specimens of *Dreissensia* attached to the shell, sometimes as many as five or six full-grown specimens crowded together. Recently Mr. J. E. Cooper noted the "unusual association" of *Velletia lacustris* and *Ancylus fluviatilis* on water-lily leaves (*J. of C.*, vol. xiii., p. 273). These species are to be found living together on stems of water-plants in the river at Bedford; but *V. lacustris* is by far the more numerous of the two.

Paludestrina jenkinsi in Hampshire.—*Paludestrina jenkinsi* does not appear to have been recorded hitherto for South Hampshire. It occurs in its customary abundance in the marsh ditches at Stanpit near Christchurch. Of some hundreds of specimens which I examined at that place on September 3rd, 1911, all were of the non-carinated form.—CHARLES OLDHAM (*Read before the Society*, April 10th, 1912).

Limax cinereo-niger in Westernness.—At the end of September, 1911, I took some half-grown examples of *Limax cinereo-niger* on fungi in the birch forest at Fort Augustus. They were associated with *Arion ater*, *A. intermedius*, and *A. subfuscus* var. *fuliginea*. —CHARLES OLDHAM (*Read before the Society*, April 10th, 1912).

Variation in *Littorina litorea* L.—Red Wharf Bay lies on the east coast of Anglesey. It consists of a three mile stretch of sand quite free from rocks except at either extremity. Near the centre of this bay, just where a stream flows out, there is a large colony of *Littorina litorea* living on the open sand, and along the edge of a bed of pebbles. The shells are small and much eroded. The erosion is probably due to the influence of the fresh-water to which they are periodically exposed, and also to the ravages of a small boring sponge. The average weight of an adult shell is only two grains, and the average height $\frac{7}{8}$ ths of an inch. Just two miles away, at the eastern extremity of the bay, where this species obtains shelter on the rocks, it attains a large size. The average weight of an adult shell here is 11 grains—fine specimens attain $12\frac{1}{2}$ grains, and measure $1\frac{3}{8}$ inches in height—a striking contrast to their dwarfed relatives out on the open sand.—J. E. COOPER (*Read before the Society*, March 13th, 1912).

PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

410th Meeting held at Manchester Museum, March 13th, 1912.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

“Manual of Conchology,” part 84, by H. A. Pilsbry. “The West American Mollusks of the Genus *Cingula*,” by P. Bartsch. “Monograph of the Land and Freshwater Mollusca of the British Isles,” part 19, by J. W. Taylor. “A Review of South African Land Mollusca belonging to the Family *Zonitidae*,” by Lt.-Col. H. H. Godwin-Austen (*from the respective authors*); and the usual periodicals received in exchange.

New Members Elected.

Charles Jenkinson, 1, High Street, Kettering.

George Howell Murdoch, 49, Parliament Hill, Hampstead, N.W.

Papers Read.

“Conchological Notes from the Nile,” by Lionel E. Adams, B.A.

“Variation in *Littorina littorea* L.,” by J. E. Cooper.

“Land Shells from Largs,” by J. R. le Brockton Tomlin, M.A.

“*Helicella virgata* var. *dilatata* nov.,” by F. H. Sikes, M.A.

TREASURER'S REPORT.

**Statement of Income and Expenditure
FOR THE YEAR 1911.**

Receipts.	£ s. d.	Expenditure.	£ s. d.
Cash in hand	58 15 9	Cost of <i>Journal</i> for July, 1910	12 5 7
Two Life Composition Fees ..	6 6 0	Cost of <i>Journal</i> for Oct., 1910	14 4 6
Subscriptions	45 10 0	Cost of <i>Journal</i> for Jan., 1911	14 0 5
Advertisements	1 14 0	Cost of <i>Journal</i> for Apr., 1911	12 0 10
Sale of Publications	6 16 11	Cost of <i>Journal</i> for July, 1911	12 1 6
		Illustrations	5 0 6
		Reprints	4 17 0
		Stationery	1 9 6
		Taylor's Monograph, parts	
		17 and 18	0 10 6
		Secretary's Expenses ...	6 10 9
		Editor's Expenses, 1911 ...	0 8 8
		Expenses of Annual Meeting	
		at Hanley	2 0 0
		Cash in hand	33 12 11
	<u>£119 2 8</u>		<u>£119 2 8</u>

Recorder's Report.

The Hon. Recorder (Mr. W. Denison Roebuck, F.L.S.) reported that the following new County Records had been submitted for authentication; the specimens of species marked with the asterisk * being presented to the Society's collection.

By Mr. J. R. le B. Tomlin, M.A. :—

AYRSHIRE.—**Hyalinia lucida* from Largs.

By Mr. Geo. H. Weaver :—

ESSEX SOUTH.—*Ena obscura*, one from South Weald, April, 1910.

By Mr. John Roseburgh :—

SELKIRKSHIRE.—*Clausilia bidentata* in abundance at Yair, 25th Feb., 1912.

By Mr. A. W. Stelfox :—

SUSSEX E.—*Vertigo antivertigo*, Pevensey Level, March, 1909.

By Mr. C. E. Wright :—

SUSSEX WEST.—*Ena montana*, Miscombe Hanger.

By Mr. B. R. Lucas :—

DURHAM.—**Cæcilioides acicula*, abundant in drift, between Haverton Hill, and Billingham, 1903.

By Mr. N. G. Hadden :—

MERIONETHSHIRE.—*Vertigo antivertigo*, from a marsh at Fairbourne.

Mr. Roebuck also gave a preliminary report on Vice-County Boundaries.

Exhibits.

By Rev. Lewis Shackelford :—A fine specimen of *Voluta roadknightæ* McCoy, from Flinder's Island, Victoria; and *Vermicularia flava* Verco, from Babel Island, Tasmania.

By Mr. W. Denison Roebuck :—Living *Testucella scutulum*, from Brighouse, found in great numbers in a newly broken-up field adjoining a garden.

By Mr. G. H. Taylor :—A remarkably thin but brilliantly coloured set of *Helix nemoralis*, including a fine example of the lilac coloured var. *studeria*, taken in Pindale, Castleton, Derbyshire, August, 1910.

By Mr. J. Kidson Taylor :—Two specimens of *Anomia patelliformis*, from Jersey, each grown perfectly symmetrically on a shell of *Pecten opercularis*. One of the *Pecten* is very dark and the other a very light coloured var. *lineata*, and the colour of the *Anomia* closely resembles that of the shell to which it has attached itself, the two specimens presenting a striking contrast. He also showed a number of rare *Cypræas* from the Bülow and Cairns Collections, including unusually large *C. sulcidentata* and its var. *xanthochrysa*, *C. albuginosa*, *C. gaskoini*, *C. listeri*, *C. walkeri*, *C. citrina*, *C. stolidata* and its vars. *moniontha* and *dianges*, *C. rashi-leighana*, *C. cumingi*, *C. goodalli*, and others.

By Mr. G. C. Spence :—*Chondropoma latilabre* from Cuba.

By Mr. Davy Dean :—Sections of *Clausilia haueri*, which has no clausium; and *C. dacica* and *C. macarana*, showing the clausium in two positions—free and pressed back; also clausium of one of the Japanese species, *C. javana*.

By Mrs. Gill :—Eight specimens of *Cyclophorus theobaldianus*, from banks of the Irrawady River, Burma, which had been tenanted by hermit crabs.

By Mr. C. H. Moore :—A curious specimen of *Planorbis vortex*, the central portion—first year's growth—pure white, the rest normal; also a fine series of

operculate land shells from Madagascar, Cuba, etc., including fine *C. foliacea*, *C. leai*, and *C. consanguinea*.

In the Special Exhibit of Japanese land shells (*Helicidae*) Mr. Edward Collier and Mrs. Gill showed a fairly representative series of the species known, and Mr. Collier gave some interesting remarks upon the characteristics of the various genera and their distribution in the Japanese Islands.

It was decided to have the following

SPECIAL EXHIBITS AT FUTURE MEETINGS :

April 10th	-	Cochlostyla : Sections Chloræa and Corasia.
May 8th	-	Japanese and Chinese Clausilia.
June 12th	-	Scandinavian Land Shells.

41st Meeting, held at Manchester Museum, April 10th, 1912.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :—

“On some Freshwater Mollusca from the Pliocene Deposits of East Anglia,” by A. S. Kennard and B. B. Woodward. “Molluscs (Non-Marine) [of Suffolk], ex Victoria County History of Suffolk,” by B. B. Woodward and A. Mayfield. “Über Abnorme Bildungen an Schneckengehäusen,” by Dr. H. Strebél. “Anatomy of *Cultellus* and *Azor*,” by H. H. Bloomer. “The Occurrence of *Helicella heripensis* (Mabille) in Great Britain ;—Notes on some British Non-Marine Mollusca,” by A. W. Stelfox. “Land and Freshwater Mollusca (Clare Island Survey), by A. W. Stelfox (*from the respective authors*) ; and the usual periodicals received in exchange.

Candidates for Membership.

G. Lionel Sturt, Lismore, Cavendish Road, Weybridge.

Ernest Guy Maclean Sturt, Lismore, Cavendish Road, Weybridge.

Papers Read.

“Some Notes on the New British Land Shell, *Helicella heripensis* (Mabille),” by Rev. C. E. Y. Kendall.

“Note on *Cylindrella æquatoria* Morelet,” by J. R. le Brockton Tomlin, M.A.

“*Limax cinereo-niger* in Westness,” by Charles Oldham.

“*Paludestrina jenkinsi* in Hampshire,” by Charles Oldham.

“*Helix cantiana* preyed upon by the Song Thrush,” by Charles Oldham.

“*Pisidium liljeborgi* and other *Pisidia* in Carnarvonshire,” by Charles Oldham.

“*Clausilia biplicata* Mont.,” by F. B. Jennings.

Exhibits.

By Mr. J. Davy Dean : A fine series of the *Candidula* section of *Helicella* from the continent, for comparison with examples of *Helicella heripensis* Mabille from British localities.

By Rev. C. E. Y. Kendall : A series of *Helicella heripensis* and its varieties *griseascens*, *lutescens*, and *albicans*, to illustrate his paper.

By Mr. H. Allan, junr. : *Anodonta cygnæa* from the canal, Marple, Cheshire.

By Mr. G. C. Spence : A number of species of *Gibbus* and *Brachypodella*, including the example of *Urocoptis sowerbyana* Pfr. referred to in Mr. Tomlin's note on *Cylindrella æquatoria* Mor. (see p. 323).

By Mr. Charles Oldham : A set of *Pisidia* and *Paludestrina*, to illustrate his notes.

In the Special Exhibit of *Corasia* and *Chloraea*, a fine series of these beautiful shells was shown by Mr. Edward Collier, who pointed out the principal rarities; by Mrs. Gill; and by Mr. R. Standen, who exhibited the Museum set (R. D. Darbshire Collection).

412th Meeting, held at Manchester Museum, May 8th, 1912.

Mr. E. Collier in the chair.

The Librarian reported that the usual periodicals had been received in exchange.

Donations to the Cabinet announced and thanks voted :

Carychium minimum from Punfield Cove, Dorsetshire, by Mr. J. E. Cooper; *Helicigona lapicida*, *Azeca tridens* and var. *crystallina*, all from Rivar Copse, Berks., April, 1912, by Mr. Cecil P. Hurst; *Unio margaritifera*, one from River Slaney, Enniscorthy, Co. Wexford, April, 1912, by Mr. R. A. Phillips.

New Members Elected.

G. Lionel Sturt, Lismore, Cavendish Road, Weybridge.

E. G. M. Sturt, Lismore, Cavendish Road, Weybridge.

Papers Read.

"New Records for Bedfordshire," by E. D. Marquand, A.L.S.

"Descriptions of two New Species of *Marginella* from São Thomé Island, Gulf of Guinea," by J. R. le Brockton Tomlin and Lewis J. Shackelford.

Exhibits.

By Mr. J. R. le B. Tomlin and Rev. L. J. Shackelford : Specimens of the new species described in their paper.

By Mr. J. Davy Dean : *Rissoina inca* d'Orb. from Huasco, Chile; *Otina otis* from Tenby; and an interesting series of freshwater shells collected last month from the River Bela, at Milnthorpe, in Westmorland—including *Bithynia tentaculata* and *Valvata piscinalis* of an unusual golden tint, *Neritina fluviatilis*, *Flanorbis carinatus*, and *Pisidium annicum*.

By Mr. W. D. Roebuck (on behalf of Mr. Cecil P. Hurst) : *Succinea elegans* from the south side of the Kennet and Avon Canal.

By Mr. G. C. Spence : A fine series of the genus *Obba*.

By Mr. R. Woodcock : Exceptionally fine series of *Mactra glauca* and var. *luteola*; *Phasianella pullus* in great variety of coloration; *Lutraria oblonga* with siphons complete; *Donax variegatus*, type, varr. *tristis*, *aurea*, and *leta*; and a set of *Trivia europea*, and varr. *arctica*, *minor*, and *bullata* (=immature form), dredged alive and in beautiful condition, from various parts of the coast of Jersey.

In the Special Exhibit arranged for the evening a large number of species of Japanese and Chinese *Clausilia* were shown by Messrs. Edward Collier and R. Standen; also a fine series from the Manchester Museum (R. D. Darbshire and Layard Collections). Mr. Collier remarked upon the distribution of the genus in Japan, China, and elsewhere, and an interesting discussion followed in which several members took part.

SOME NOTES ON THE NEW BRITISH LAND SHELL,
HELICELLA HERIPENSIS Mabille.

BY REV. C. E. Y. KENDALI.

(Read before the Society, April 10th, 1912).

IN VOL. X., part 1, of the "Proceedings of the Malacological Society" published in March, 1912, Mr. A. W. Stelfox, of Belfast, contributes an interesting and important paper, announcing the discovery in Great Britain of a new species of land shell, *Helicella heripensis* Mabille, hitherto only known on the continent. His paper contains a detailed comparison of this species with its congener *Helicella caperata* Montagu, and a list of localities in twenty of the British vice-counties where it has been found. Mr. Stelfox holds that it is a "good" species and in this opinion he will undoubtedly be supported by those who have collected the shell, as in outward appearance it is far more strikingly dissimilar to *Helicella caperata* than some other already well recognized species of the *Candidula* group. I have written these notes with some diffidence, but trust that my observations made during the past two years may be of some interest to some of my fellow conchologists who have not yet had the opportunity of collecting this species.

§ 1. The shell.

For a detailed description I will refer readers of these notes to the paper by Mr. Stelfox, who has there set out the points of resemblance and difference in a very clear and concise manner. I would only point out that the most striking difference between *H. heripensis* and *H. caperata* lies in the umbilicus, which in the former shell is wide, deep and open, exposing the coiling of the whorls, which are wound excentrically round the axis. In fact in general character *Helicella heripensis* bears the same relationship to *H. caperata* that *Vallonia excentrica* does to *V. costata*. Variation in colour exists to a certain degree, but does not seem so great as in *H. caperata*. Mr. Stelfox describes the shell as "usually of a creamy-brown colour, but often pale cream, with radiating markings." I have specimens which both descriptions fit exactly, and also have taken in this district (North Northants) a number of specimens of a rich fulvous colour, which could suitably be described as

var. *lutescens*.—Shell, a wet sand colour without markings.

I have also some beautiful shells taken near Brighton of a pure white colour with dark apex, which on the analogy of *H. virgata* one would naturally describe as

var. **albicans**.—Shell, white, without markings, apex, dark brown to black.

§ 2. Distribution.

So far I have collected this species in four vice-counties at some eight different places, and have also received specimens from two other vice-counties. And here I must express my best thanks to our eminent conchologist, Mr. J. W. Taylor, who from time to time kindly verified my specimens, and also to Mr. J. Davy Dean, of Lancaster, for similar help.

(a) Leicestershire.

In March, 1910, I took *H. heripensis* at Waltham-on-the-Wolds, five miles N.E. of Melton Mowbray. The habitat was the grass-grown floor of an extensive surface quarry in the Lincolnshire Limestone lying at an altitude of about 700 feet. The molluscan association was as follows:—

DOMINANT	WITH
<i>Helicella caperata</i> Mont.	<i>Agriolimax agrestis</i> L. <i>Helicella heripensis</i> Mab. <i>Hygromia hispida</i> L. <i>Pupa muscorum</i> L.

(b) Huntingdonshire.

At Stibbington, in the N.W. corner of the county, I found *H. heripensis* in September, 1910, along the wide grassy margin of a high road. Here the association of species was as follows:—

DOMINANT	WITH
<i>Helicella virgata</i> daCosta	<i>Helicella heripensis</i> Mab. (sub-dom.) <i>Helicella caperata</i> Mont. <i>Helicella cantiana</i> Mont. <i>Helix nemoralis</i> L. <i>Hygromia hispida</i> L. <i>Hygromia rufescens</i> Penn.

(c) Northamptonshire.

At four localities in the northern part of the county, Autumn, 1910.

i. At Barnack, on Oolitic Limestone, 170 feet.

DOMINANT	WITH
<i>Helicella virgata</i> daCosta <i>Helicella heripensis</i> Mab.	<i>Helicella cantiana</i> Mont. <i>Helicella itala</i> L.

(Note *H. caperata* absent).

2. At Kingscliffe, on Oolitic Limestone, 250 feet.

DOMINANT	WITH
<i>Helicella virgata</i> daCosta	<i>Agriolimax agrestis</i> L.
<i>Helicella caperata</i> Mont.	<i>Helicella heripensis</i> Mab.
	<i>Helicella itala</i> L.
	<i>Helix nemoralis</i> L.
	<i>Hygromia hispida</i> L.

3. At Ufford, on Oolitic Limestone, at 120 feet.

DOMINANT	WITH
<i>Helicella virgata</i> daCosta	<i>Helicella caperata</i> Mont. (sub-dom.)
<i>Helicella heripensis</i> Mab.	<i>Helicella itala</i> L.
	<i>Helicella cantiana</i> Mont.
	<i>Pupa muscorum</i> L.

4. At Wansford, on Oolitic Limestone, at 150 feet.

DOMINANT	WITH
<i>Helicella virgata</i> daCosta	<i>Helicella caperata</i> Mont.
	<i>Helicella heripensis</i> Mab.
	<i>Helicella cantiana</i> Mont.
	<i>Hygromia hispida</i> L.
	<i>Helix nemoralis</i> L.

(d) East Sussex.

1. Lewes (1908), on chalk, at 100 feet.

DOMINANT	WITH
<i>Helicella virgata</i> daCosta	<i>Helicella heripensis</i> Mab.
<i>Helicella caperata</i> Mont.	<i>Helicella cantiana</i> Mont.
	<i>Hygromia hispida</i> L.
	<i>Pupa cylindracea</i> daCosta

2. Ovingdean, near Brighton, Nov., 1910, &c., on chalk, at 200 feet.

DOMINANT	WITH
<i>Helicella heripensis</i> Mab.	<i>Agriolimax agrestis</i> L.
	<i>Helicella virgata</i> daCosta
	<i>Helicella caperata</i> Mont.
	<i>Helicella itala</i> L.
	<i>Hygromia hispida</i> L.
	<i>Vallonia excentrica</i> Sterki

(These are by far the finest specimens of *Helicella heripensis* that I have seen).

(e) South Hampshire.

I have some specimens sent in 1907 to Mr. Dean and myself by the late Mr. C. S. Coles which he collected on Portsdown Hill. Mr.

Coles' attention was drawn to the distinction between the two forms and he very kindly sent the whole of the specimens collected. Of these more than two-thirds were *H. caperata*, presumably, therefore, the dominant.

§ 3. Nature of habitat.

Occurring as it does so frequently, but not by any means invariably, with *Helicella caperata* it would seem that though the conditions of life required by both species are in the main similar, there must be other factors to take into account. My observations would seem to prove clearly that first *Helicella heripensis* is strongly calcophilic, as in every case in which I have met with the species it has been on a calcareous soil. In Sussex and Hampshire it occurs on the chalk of the South Downs. In Leicestershire we find it on the Lincolnshire Limestone (Inf. Oolite) and in Northamptonshire and Huntingdonshire on the limestones of the Upper Oolite. Moreover a careful consideration of the localities enumerated by Mr. Stelfox certainly shows up the the same fact.

Again *H. heripensis* is certainly a xerophile, occurring always on DRY calcareous pastures. At Barnack I found many one day quite active, crawling on a limestone wall, with southern aspect, in the full sunshine of a hot September day. It is probably as little or less affected by drought even than the allied species of *Helicella*.

Again, whether the plant associations supply any determining factor I am unable to say. At Ufford there is nothing to the eye remarkable in the habitat, yet curiously enough it is the locality for the rather rare butterfly *Arge galatea* Linn., which is exceedingly plentiful in this one spot, but seldom found elsewhere in the district. The food-plant of *Arge galatea* is the Timothy Grass, *Phleum pratense*, a very common grass on dry soils. This spot is also the habitat of a somewhat rare plant, the Pasque-flower, *Anemone pulsatilla*, a species given to growing on dry uplands.

To sum up, I believe a dry calcareous pasture, not necessarily maritime, and at any ordinary altitude is the habitat most congenial to *Helicella heripensis*. I do not think it can be described as a "strong" species, as it seldom seems to be the dominant. It is closely allied in nature and mode of life to its near relative in the *Candidula* group, *H. caperata*, which, however, is a much stronger competitor in the struggle for associated life than *H. heripensis* and probably crowds it out in many places otherwise well suited for its existence.

The following analysis will show some of the facts as to association with the other mollusca, as evidenced by the records given above.

Where *Helicella heripensis* is dominant,
H. virgata is companion dominant, with
H. cantiana
H. caperata
H. itala } sub-dominant

Where *H. caperata* is the dominant,
H. virgata again is companion dominant, with
H. heripensis
H. hispida
Agriolimax agrestis } sub-dominant

H. hispida occurs in each case where *H. heripensis* takes the sub-dominant place, in which case *H. virgata* may be absent and *Agriolimax agrestis* present.

CENSUS AUTHENTICATIONS.

BY W. DENISON ROEBUCK, F.L.S., HON. RECORDER.

- Anglesey :** Among the shells in the Conchological Society's Voucher Collection at Manchester is *Vallonia excentrica*, a few taken on Llanfaelog Common, which is new to the Census.
- Berkshire :** Mr. Cecil P. Hurst has been working with much vigour and success Rivar Copse, which is on the western border of this county, closely adjoining Wiltshire. Here he has found *Ena montana* in fair number, and *Azeca tridens* in abundance along with a few of its var. *crystallina*, and *Helicigona lapicida* occurs there also. Examples of all these species have been kindly presented by Mr. Hurst to the Society's Voucher Collection.
- Flintshire :** Amongst some shells found in this county by the Rev. T. Shankland there is a fine example of *Hygromia fusca*, found 10th Oct., 1890, at Leet, Mold, which has been seen by Mr. J. W. Taylor, and is now in the Conchological Society's Voucher Collection. It is a new county record for the Census.
- Herefordshire :** I am indebted to Miss Margaret A. Boycott for a supply of garden slugs found at The Grange, Hereford, May 24th. They include *Limax flavus*, which is new to the Census, several half-grown examples; *Arion hortensis* was very abundant, small and very dark, and there was a single var. *subfusca*; *Agriolimax agrestis* var. *reticulata* one, adult; of *Milax sowerbyi* there were a few typical adults, and a large number of young ones which must be put down as var. *nigrescens*, being very dark grey, almost black, and with dark footsole, and no trace of the brown pigmentation.
- Hertfordshire :** Mr. Charles Oldham has sent along with other species two examples of *Vertigo angustior*, a number of *V. pygmaea*, and of *Vallonia excentrica*, and one of *Cacilioides acicula*, from mole-hills at Wilstone, Feb., 1911.
- Kirkcudbrightshire :** Mr. E. Collier has sent a few slugs from Creetown, 28th May, 1912. One very minute *Arion intermedius* was a new record for the Census; and with it were sent two typical *A. circumscriptus*, and a small example, very brilliant orange in colour, of *A. subfuscus* var. *aurantiaca*.

- Leicester with Rutland** : Mr. C. E. Wright has kindly presented a small *Vivipara contecta* from Caldicote, Rutland, to the Society's Voucher Collection.
- Lincoln South** : Mr. John F. Musham, F.E.S., has during the past winter and spring been examining shakings of moss from various parts of this vice-county, and in doing so has added two species to the known fauna—*Vertigo substriata*, one from Heighington, 16th Feb., 1912; *Hygromia fusca*, one from the same place, 16th April, 1912. Mr. John W. Taylor has verified both these species, and the specimens will ultimately be placed in the County Museum at Lincoln.
- Merionethshire** : Mr. F. H. Sikes, M.A., has kindly presented to the Society's Voucher Collection examples of the following : One *Pyramidula rupestris*, one *Zonitoides nitidus*, and several *Vallonia costata*, all of which are new records for the Census, and were taken in August, 1910, at Llanbedr.
- Northamptonshire** : The Rev. W. A. Shaw has sent for authentication the example of *Sphærium pallidum*, an adult shell, taken by him at Far Bottom, near Northampton.
- Northumberland South** : Mr. A. M. Oliver has submitted the following new records—*Vallonia pulchella*, one from the road-side at Halton, near Corbridge, 3rd Sept., 1910; *Paludestrina stagnalis*, common in the estuary of the River Blyth, 8th Oct., 1910; *Pisidium fontinale*, one from a stream near Kirkley, Ponteland, 13th April, 1912. We are indebted to Mr. Fred. Taylor for verifying the *Paludestrina*, and the others have been authenticated by Mr. John W. Taylor.
- Pembrokeshire** : Mr. H. C. Napier has submitted examples of *Vertigo antivertigo* from marshes near Penally.
- Radnorshire** : The Society has been much indebted to Mr. J. Williams Vaughan, J.P., for his numerous additions to the Census for the Welsh counties, and he has recently sent the following—*Linnæa palustris*, a few found in the old moat round Llechrydd House, near Builth Road Station, 29th May, 1911; *Linnæa truncatula*, several found at Pwl-patty, Glasbury Village, 26th April, 1911; *Sphærium lacustre*, a few; *Pisidium obtusale*, a few; and *Valvata cristata*, one—all from a pool near the Wye in the parish of Llowes.
- Sussex East** : Mr. A. W. Stelfox has submitted a number of new records for this vice-county, which have passed under the eye of Mr. J. W. Taylor. They include *Bythinia tentaculata* and *Aplexa hypnorum*, taken at Pevensey Level, 29th March, 1909; *Anodonta cygnea*, taken at Pevensey, Sept., 1911; *Planorbis cornuus* and *Pisidium amnicum*, taken near Lewes, 13th Sept., 1911; Mr. Lionel E. Adams, B.A., has submitted *Pisidium gassiesianum*, taken in Sept., 1911, at Pevensey Level. Mr. E. Collier submitted *Planorbis vortex* from Malling Marsh, near Lewes, taken 19th Sept., 1911 (by a clerical error this was recorded as for Sussex "West" in the *J. of Conch.*, April, 1912, xiii., p. 318).
- Worcestershire** : Mr. N. G. Hadden has submitted *Vallonia excentrica*, a few, and *Pisidium gassiesianum*, several, taken at Earl's Croome; *Planorbis glaber*, two from a pool at Malvern; *Paludestrina jenkinsi*, plentiful at Mythe Toot, a backwater of the Severn, near Tewkesbury, just within the county boundary.
- Yorkshire South-East** : Mr. J. W. Boulton, of Hull, has kindly presented to the Society's Voucher Collection some examples of *Neritina fluviatilis*, which is common in Sutton Drain, near Hull, but has not hitherto been authenticated from the East Riding of Yorkshire; Mr. J. W. Taylor has confirmed the identification.

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The Journal, which is supported by many prominent Naturalists of the District, deals with all branches of Natural History, and is rapidly increasing in circulation. Amongst the Conchological Notes and Papers which have already appeared are : "Notes on the Freshwater Mussels of Lancashire and Adjacent Counties"; "On the Mollusca from the 'Cave-Earth,' Dog-Holes, Warton Crag"; and others, which contain much valuable information of local and general interest,

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THE

JOURNAL OF CONCHOLOGY.

VOL. 13.

OCTOBER, 1912.

No. 12.

ANNUAL MEETING.—NOTICE TO MEMBERS.

THE Annual Meeting will be held in the Linnean Society's Rooms, by kind permission of their Council, at Burlington House, Piccadilly, W., on Saturday, October 12th, at 3 p.m.

Members who intend to exhibit are requested to furnish particulars of their exhibits and the amount of space required, without delay, to J. E. Cooper, 53, North Road, Highgate, N.

One or two members have kindly volunteered to act as "official introducers" at the Annual Meeting. They will wear red rosettes, and will endeavour to make members known to each other.

Mr. J. C. Dacie has kindly offered to place his office (37, King William Street, London Bridge, E.C.), from 2 p.m. to 6 p.m. on Friday, 11th October, and from 10 a.m. to 1 p.m. on Saturday, 12th October, at the disposal of members who may wish to meet other members in the city, or who may wish to receive or write letters, etc.

Members and Visitors are particularly requested to sign the Roll Book on entering the meeting.

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Pupa anglica Fér., and the species characteristic of south-western Europe—*Hygromia revelata* Mich., *Helix pisana* Müll., and *Testacella*. Due perhaps to climate, or to a greater variety of habitat conditions, we have as dominants at this day throughout Scandinavia such species as *Pyramidula ruderata* Stud. and *Eulota fruticum* Müll. At Rosenland, in the province of Smaland—at a latitude corresponding roughly to that of Edinburgh—we have such a species as *Ena montana* Drap. This is hardly an isolated case, for instance, *Clausilia rolfhii* Leach occurs in Southern Norway, and *Clausilia buplicata* Mtg. in the south-west corner of the peninsula.

A very interesting study lies in attempting to determine the probable origin of the Scandinavian fauna, and for a possible clue I have been directing my attention to the distribution of the later Teutonic species. Occurring in Southern Sweden and Eastern Norway—the Germanic province—are *Helicella strigella* Drap., *Clausilia plicatula* Drap., *Clausilia dubia* Drap., *Clausilia cruciata* Stud., and *Clausilia ventricosa* Drap. Southern Sweden has *Hygromia bidens* Chem. and *Hygromia incarnata* Müll. Certain of our own western or Celtic species are entirely absent:—*Hyalinia helvetica* Blum, *Zonitoides excavatus* Bean, *Hygromia granulata* Alder, and *Pyramidula rupestris* Drap. *Helicella striata* Müll. is recorded only for Öland, an island off the Swedish coast. The distribution of *Torquilla avenacea* Brug. is of interest. Although recorded for the Kinnekulle Mountains near Lake Venern in Southern Sweden, and for Gothland in the Baltic Sea, the record here is Borgholm, Öland, 1880.

The suggestion here, even if slight, of a Gothland land-bridge, is not without a seeming support, if we study the maps appearing in Mr. Taylor's Monograph on the British Mollusca. *Hyalinia lucida* Drap. is recorded by Dr. Westerlund for Gothland and Calmar, and again for Lund. This last, with which might be included Skane, is so often an isolated record, that it suggests a separation from the rest of Scandinavia, at one time, and a union through Denmark. *Hyalinia cellaria* Müll. is in much the same position: recorded for the province of Skane, South Finland, on the opposite or Russian side of the Baltic, Gothland, Calmar, and Carlskrona. *Hyalinia alliaria* Miller has a similar distribution. *Pyramidula rotundata* Müller under such an hypothesis has a distribution quite intelligible. Reported as inhabiting Finland, it occupies also a tract across Central Sweden, and is recorded for both islands, Gothland and Öland. *Helix hortensis* Müller occupies the Baltic provinces, is recorded for Gothland, and has perhaps thus spread westward through Central Scandinavia. *Helicigona lapicida* L. is recorded for Poland and Finland, and probably inhabits the Baltic provinces; it is reported also

for both islands, Gothland and Öland, and has probably extended its range, though not so far, by a similar route. Mr. Stelfox says of this species that in Norway it is quite common in districts composed of granite and schist. Whether there were present the requisite conditions for dispersal in the case of a species like *Helix pomatia* L. it is difficult to say; its position in Eastern Sweden has been up to the present ascribed to artificial introduction.

The geological formation in the Island of Gothland is Silurian limestone, the beds nearly horizontal, but with development of steep cliffs on the western coast. A similar Silurian formation occurs on the opposite, Russian side of the Baltic! In many parts there is an absence of overlying glacial drift, leaving the limestone exposed and giving the characteristic conditions of the "limestone pavement." A few of the plants do not occur on the Swedish mainland, though the flora is closely related to the flora of Öland and to the flora of the Russian provinces on the other side of the Baltic.¹ Gothland, like the mainland of Sweden, is a typical forest region. The historical development of the flora of Gothland has been studied by Sernander. In the "Littorina age" of post-glacial time, there was an extension of the sea in many parts of West Europe. The Baltic had probably been hitherto a fresh-water lake ("the Ancillus (*sic*) Sea,") but now became more extensive. The lower layers of peat in Gothland date from these Ancillus or Littorina periods (named after the characteristic molluscs); they contain a large number of plants, *Phragmites* being abundant. It is likely that the Littorina subsidence came about the end of the Neolithic period. At the present day there are two species of fresh-water shells with an eastern distribution—*Neritina fluviatilis* L. and *Planorbis corneus* L.—which, with *Helix pomatia* L., characterize the Stockholm area.

* * * *

The northern boundary of Sweden is determined partly by the Tornea Elf and partly by the Muonio Elf; the Tornea Lappmark being in Finland and the Lulea Lappmark in Sweden. This remote land has one of the smallest faunas in the world. The village of Karesuando is the most northern in Sweden, and on the Muonio Elf. Muonioniska is a few miles further down the river. The region was, as I have said, visited by Linnæus early in the eighteenth century, or exactly 180 years ago. The following species were collected by Herr Christiernensen on the Russian or Finland side near the above localities, which places may be taken roughly as lying about 200 miles within the Arctic Circle. From Muonioniska, visited in 1879,

1 "The Vegetation of Gothland," by H. Hamshaw Thomas.

Curig lakes—(588 feet) I got a few *P. pusillum* and *P. lilljeborgi*; and *P. pusillum* in Llynau Diwannedd (1,208 feet), the twin lakes on the western slopes of Moel Siabod.

It is satisfactory to have established the occurrence of *P. lilljeborgi* in Carnarvonshire; further search will probably shew that it has a wide distribution in the mountainous parts of Wales.

Mr. B. B. Woodward, to whom the *Pisidia* which are the subject of this note have been submitted, has kindly assisted me in determining the species.

Clausilia biplicata Mont:—I had the pleasure in October last of visiting one of the few remaining habitats near London for this extremely local British snail. The species was plentiful enough at the time of my visit on the bank on which it lives, and is apparently likely to remain so as long as the bank exists, but I am sorry to say that all the indications are that the bank will in a very few years have become a thing of the past. The grass and other vegetation on it was very scanty, probably owing to the phenomenal heat of last summer, but in spite of this shells were surprisingly numerous, including many other species besides the *Clausilia*. The majority of the shells, however, were unfortunately in very eroded condition, and I found it difficult to secure anything like a presentable set of *C. biplicata*. In view of the fact that in Mr. L. E. Adams' "Manual," and also in one or two other works, this species is associated with willows, it may be as well to mention that, whatever may be the case elsewhere, the colony on this bank has obviously no connection with willows, though there were certainly plenty of these trees on the banks of the Thames some little distance away. I will only add that I have written this note in the belief that it will interest northern conchologists to have some recent evidence (the Wilts. records given in this *Journal*, vol. xii., p. 181, by Mr. E. W. Swanton are all very old) that *C. biplicata* has still a claim to be considered a British snail, although it seems only too probable that its ultimate extinction in the London district, owing to the constant extension of building operations, is merely a matter of a comparatively short time (*Read before the Society*, April 10th, 1912).—F. B. JENNINGS. [We think Mr. Jennings takes too gloomy a view of the prospects of *C. biplicata* on the Thames; as there is at least one other spot where this species was flourishing last year.—J. E. C.]

Land Shells from Scilly.—The following species were collected last June during a short stay on the Island of Tresco: *Balea perversa*, *Succinea elegans*, *Zua lubrica* var. *lubricoides*, *Pupa cylindracea*, *Pyramidula rotundata*, *Helicella acuta*, *H. caperata*, *Helix nemoralis*, *Hygromia revelata*, *H. rufescens* var. *rubens*, *Planorbis spirorbis*, and *Limnaea pereger*. The Recorder tells me that *Balea* is a new record for Vice-County I. I am inclined to think that the Scilly Isles ought to form a Vice-County to themselves.—J. R. LE B. TOMLIN.

NOTES ON THE SCANDINAVIAN MOLLUSCAN FAUNA.

By J. DAVY DEAN.

(Read before the Society, June 12th, 1912).

I WANT, as far as possible, to sketch briefly in outline some features relative to distribution in Scandinavia, and, without detailing too fully the species or forms of the land and fresh-water mollusca, to endeavour to find out how far the fauna resembles, and how far it differs from, our own.

We have in vol. v. of this *Journal* an excellent account by Miss Esmark of the shells of Norway, and she gives some glimpses of the difficulties to be surmounted before any serious distributional work can be accomplished. There are also many valuable notes concerning the range of particular species, which enable us to infer much as to the comparative strength or weakness of the various forms. I have not found myself quite in the same case with Sweden. Much of the literature on the shells of this country is either obscure or in publications accessible only to those conversant with the Swedish language. However, a number of the shells of Sweden and Lapland has recently come into my hands, and these are very largely the basis of my notes. The collection is one made by a Swedish naturalist—Herr A. H. Christiernensen—between the years 1870 and 1901. Not only does this collection reveal a power for discrimination between species, which is everything in pioneer work, but it shows that Herr Christiernensen realised the importance of exactly tabulating the locality and date of specimens collected. Further, there is a series of Arctic species from the Tornea Lappmark, the region visited by Linnæus in 1732. Herr Christiernensen was an oologist, but exactly where resident I do not know. All correspondence was done through Göteborg.

The Scandinavian species may be divided into western and Teutonic, as is the case with those of the British Isles. Extending far to the north are the primitive groups of species which, at the time of the earlier land-areas, spread through the Faroes and Iceland to North America, and are now spoken of as the Circumpolar forms. Looking at the fauna as a whole, we notice an absence of the true *Helicellas*, and the presence of several Germanic or eastern Teutonic forms, such as *Hygromia bidens* Chem., *Helicella strigella* Drap., *Torquilla avenacea* Brug., and *Clausilia plicatula* Drap. There are no land operculates nearer than Jutland and Zealand, which are outside the scope of these notes. A conspicuous absentee is *Helix aspersa* Müll., absent also from Germany. There are absent also *Hygromia rufescens* Penn. and

OBITUARY NOTICE.

J. W. BALDWIN.

J. W. BALDWIN, who died at Bromley Cross on June 12th, belonged to the old school of working-men naturalists, so characteristic of Lancashire, who thought nothing of spending whole nights in the open when in search of some particular rarity, and whose highest ambition was satisfied if they succeeded in their quest.

He started as an entomologist, and compiled an excellent local list of *Noctuas*, and also made a small collection of birds' eggs. But his later life he devoted to the study of shells, and for a working-man he amassed a really wonderful collection. He was a very regular attendant and exhibitor at the Conchological Society's meetings, served for some years on the Council, and contributed several short notes to the *Journal*. His most treasured 'find' was the first recorded¹ sinistral example of *Jaminia muscorum* L.

In vol. xii., page 325 of this *Journal* he described a new variety (var. *elongatum*) of *Carychium minimum* from Chatburn. His name will, however, probably be remembered longest in connection with his entomological work, and his contributions on this subject to the periodicals. His training was that of a thorough field naturalist, and he had a most exact knowledge of the habits and habitats of the Lepidoptera of his own district.

Unassuming, quiet, and genuine by nature, he was universally popular with the members who knew him in this Society, as well as in the Bolton Field Naturalist Society. He also took an active part in social and religious life. He leaves a widow and four sons.

We are indebted for the above details to the proprietors of the "Lancashire Naturalist," from which this account is extracted practically verbatim.—EDITOR.



PISIDIUM LILLJEBORGI Clessin AND OTHER PISIDIA
IN CARNARVONSHIRE.

BY CHARLES OLDHAM.

(Read before the Society, April 10th, 1912).

I SPENT a few days in September, 1911, at Capel Curig, searching in the lakes and mountain tarns—with ultimate success—for *P. lilljeborgi*, and incidentally I collected several other species of *Pisidium*. In the mud of a small reservoir at Llanrychwyn (700 feet) *P. subtruncatum* occurred in great abundance, but in the natural lakes and tarns Mollusca were scarce, and an hour's hard work often resulted in a blank or produced at best three or four specimens.

The tarns, one and all, have hard, stony beds, almost devoid of vegetation. Here and there little patches of sandy grit may afford an anchorage for the roots of *Lobelia dortmanna*, *Isoetes*, or *Sparganium affine*, but such conditions are not congenial for *Pisidia*, and it was only where peaty mud occurred, capable of supporting *Equisetum* and *Potamogeton*, that one could hope for any measure of success. The lakes on the northern flank of the ridge which extends from Carnedd Llewelyn to the Conway Valley—Llyn Dulyn, Melyn-llyn, Llyn Cawlyd and the rest, away to Llyn y Parc near Bettws-y-coed—have all been requisitioned as water supplies by the coast towns or by industrial concerns—lead-mines and the like. Their waters, after the long dry summer, were much below their usual level, and two long days' hunting in them yielded nothing. The tarns in Nant Ffrancon and Nant-y-Gwrhyd gave better results. In a small patch of peaty mud in Ffynnon Llugwy (1,786 feet) occurred a beautiful form of *P. pulchellum*, pale yellow in colour, thin in texture, and with the grooves in the line of growth much less pronounced than usual. On the rocky shores of Ffynnon Lloer (2,250 feet) a little mud had accumulated in crevices between some of the big boulders, and by sifting this I got a few specimens of *P. pusillum* and *P. milium*. A small form of *Ancylus fluviatilis* abounded on the stones in the bed of this tarn; and I also took a few small dark-coloured *Limnæa pereger*. Llyn Ogwen (984 feet) yielded a single *P. obtusale* and a distorted example of *Planorbis contortus*. In Llyn Idwal (1,200 feet) there is a considerable area of peaty mud, and here among *Equisetum* and *Scirpus* I got about a dozen specimens of *P. lilljeborgi* and one *P. casertanum* in an hour-and-a-half. The neighbouring Llyn Bochlywd (1,900 feet) yielded only *P. casertanum*, as did Llyn Cwm-ffynnon (1,254 feet). In Llynau Mymbyr—the Capel

Planorbis albus var. *draparnaldi* Beck, *Planorbis rossmaessleri* Auersw., *Planorbis contortus* L., and *Valvata piscinalis* Müll., were brought ; from Karesuando, visited in 1880, *Vitrina angelicæ* Beck, *Hyalinia radiatula* var. *petronella* Charp., and a form of *Euconulus fulvus* Müll. The fresh-water species include the two very remarkable forms—*Valvata macrostoma* Steenb. and *Valvata frigida* Westerlund, a large form of *Limnæa pereger* var. *ovata* Drap., interesting examples of var. *acuminata* Jeff., and a form of *Sphærium corneum* L., perhaps extreme examples of the var. *nucleus* Stud.

Into the question of the variation in the circumpolar forms, well represented in this collection, I do not feel at present competent to go, without further material, and without a closer knowledge of the American species. I may, however, call attention to the *Vitrina angelicæ* Beck, and *Hyalinia petronella* Charp. *Vitrina angelicæ* differs from *V. pellucida* in the greater contraction of the spire, and while this feature is not now considered of specific importance, yet there is present a subtle difference. A similar contraction of the spire will be noticed in several of these Scandinavian Helicoids, and I think a common-sense view is that it is due to climate, and the severe conditions during the growth periods. *Hyalinia radiatula* Alder is here represented by three, if not four, forms. The shell corresponding to our type is the one known as *hammonis* Ström, so labelled in this collection and in a series of shells sent by Miss Esmark to Mr. Edward Collier. Then from Jarlsberg in Norway we have a var. *virescens*, and there are representative examples from Norway, Sweden, and Lapland of the beautiful large form known in Scandinavia as *Hyalinia petronella* Charp. This shell, seen at its best in the examples from Hasselfors, in Nerike, is a pure transparent white, larger, with less rapidly enlarging whorls than is the case with *radiatula* as we know it. Indeed, it is difficult at first sight to reconcile it with that species, until we call to mind the parallel instance of *cellaria* Müll. and its var. *compacta* Jeff. The small *hammonis* is the later, stronger race, and the large *petronella* is the earlier, more primitive form.

My best thanks are due to my friends, Messrs. J. W. Taylor, Edward Collier, Arthur Stelfox, and J. W. Jackson, for help and kind suggestions in the preparation of these notes.

CONCHOLOGICAL NOTES FROM THE NILE.

By LIONEL E. ADAMS, B.A.

(Read before the Society, March 13th, 1912).

A TRIP up the Nile from Cairo to Assouan during the spring of last year (1911) gave me the opportunity of sampling the mollusca whenever the steamer stopped. The only spots along the river where collecting is at all profitable are sandbanks, which are exposed as the river falls, and where the shore slopes gradually down to the water. Even in these situations only "dead shells" are to be found, as flocks of spoonbills, plovers, cranes, herons, and ducks of many kinds leave nothing eatable undiscovered. The banks, moreover, are for the most part perpendicular faces of clay. There are no calm backwaters with "bulrushes" or other water plants, whatever there may have been in the time of the infant Moses; these have retreated further up stream with the crocodile and the Sacred Ibis.

At intervals between Luxor and Assouan the small *Corbicula fluminalis* Müll. was common, and an occasional *Melania tuberculata* Müll. occurred.

At Assouan the natives sell necklaces of shells strung together, some of which are marine and of obscure origin, the only local material being the little solid *Cleopatra bulimoides* Oliv., which is stained red, and strung through the mouth and a small hole roughly pierced in the body-whorl. Throughout the district of the first Cataract, this species and its variety *trifasciata* occurred plentifully, always dead and bleached. I never found a "live" shell during the whole trip; perhaps a dredge would bring living specimens from the mud at the bottom.

As the river runs through absolute desert, and most of the existing vegetation along the banks is on land reclaimed from the desert, it is not wonderful that I did not find a single specimen of any land species.

Helix cantiana Mont. **Eaten by Birds.**—As bearing upon Mr. Oldham's note on page 323 of this volume, I may record that *Helix cantiana* swarmed at Westgate-on-Sea in June last, and there was ample evidence from "stones" of birds feeding on this snail. I found no trace of any other species among the débris.—G. C. LEMAN.

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PROCEEDINGS OF THE
CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

413th Meeting, held at Manchester Museum, June 12th, 1912.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

“A Review of South African Land Mollusca belonging to the Family *Zonitidae*,” part ii., by Lieut.-Col. H. H. Godwin-Austen, F.R.S., etc., *from the author*.

The usual periodicals had been received in exchange.

Papers Read.

“Notes on some Land Shells of Algeria and Tunis,” by Lionel E. Adams, B.A.

“Notes on the Scandinavian Molluscan Fauna,” by J. Davy Dean.

Exhibits.

By Mr. Lionel E. Adams : Specimens of land shells from Algeria and Tunis in illustration of his paper.

By Mr. J. Davy Dean : A collection of Scandinavian land and freshwater shells in illustration of his paper.

By the Rev. C. E. Y. Kendall : *Polygyra thyroides* Say, *P. tridentata* Say, *P. monodon* Rackett, *Pyramidula alternata* Say, *P. perspectiva* Say, *Cochlicopa lubrica* Müll., *Hygromia rufescens* Penn., and *Succinea obliqua* Say, all collected at Goat Island, Niagara, last May ; also *Hygromia rufescens* Penn. and *Vallonia pulchella* Müll. from Quebec, and a *Vertigo* from Montmorency.

414th Meeting, held at Manchester Museum, Sept. 11th, 1912.

Mr. E. Collier in the chair.

Additions to the Library announced and thanks voted :

“A Zoogeographic Study based on the Pyramidellid Mollusks of the West Coast of America.” “Additions to the West American Pyramidellid Mollusk Fauna, with Descriptions of New Species,” by Paul Bartsch. “Bemerkungen zu den Clavatula-Gruppen Perrona und Tomella,” by H. Strebler. “Notes on Non-Marine Mollusca from some Irish Lakes, obtained by the late Major H. Trevelyan, F.Z.S., in 1911,” by A. S. Kennard and B. B. Woodward. “The Marine Mollusca of the Scottish National Antarctic Expedition,” part ii., by J. C. Melvill and R. Standen. “The Brachiopoda of the Scottish National Antarctic Expedition,” by J. Wilfrid Jackson. “A Review of South African Land Mollusca belonging to the Family *Zonitidae*,” part ii., by Lieut.-Col. H. H. Godwin-Austen ; and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted :

From Mr. J. E. Cooper—*Valvata cristata*, Colyford, Devon S.

From Mr. C. P. Hurst—*Succinea elegans*, Kennet and Avon Canal, south bank, Great Bedwyn, Wilts. South.

From Mr. Charles Oldham—*Paludestrina jenkinsi*, Guyhirn, Cambridgeshire.

From Rev. T. Shankland—*Hygromia fusca*, Leet, Mold, Flintshire, 10/10/90.

From Mr. J. W. Boulton—*Neritina fluviatilis*, Sutton Drain, Hull, Yorks. S.E.
Hyalinia lucida, garden at Hull, Yorks. S.E.

Candidates Proposed for Membership.

Miss Florence Jewell, Emsworth, Hants.

Percival Ross Frames, P. O. Box 148, Johannesburg, South Africa.

Members Deceased.

J. W. Baldwin.

Rev. R. Ashington Bullen.

Papers Read.

"Obituary Notice: The Rev. Robert Ashington Bullen, B.A., F.G.S.," by Rev. Canon J. W. Horsley.

"Conchological Notes from Scarborough," by W. Gyngell.

"Note on *Urocoptis lata* var. *producta* C. B. Adams," by G. C. Spence.

"Activity of *Arion ater*," by Margaret M. Bliss.

"The Feeding Track of *Oxystele impervia* Menke," by Keppel H. Barnard.

"Descriptions of Two New Species of *Marginella* from São Thomé Island, Gulf of Guinea," by J. R. le Brockton Tomlin and Lewis J. Shackelford.

Exhibits.

By Mr. J. Kidson Taylor: *Cypræa clandestina* with yellow colouring on extremities, from New Caledonia; and a set of the same species from Mauritius, remarkable for their pellucidity and coloration; *C. flaveola* var. *labrolineata*, and a specimen of *Trivia madagascariensis* var. *granulata* Pease—a variety undoubtedly based upon a juvenile shell.

By Mr. R. Standen: A series of marine mollusca obtained during the Scottish Antarctic Expedition of 1902-4, including topotypes of some of the new species recently described by Mr. J. C. Melvill and himself in the Transactions of the Royal Society of Edinburgh.

By Mr. A. E. Boycott: An interesting scalariform example of *Limnæa stagnalis* from the canal near Hereford.

By Mr. F. Taylor: Very fine and richly coloured *Helicella caterata* and its var. *obliterata* from Conway.

By Mr. C. H. Moore: *Helix nemoralis* of small form and varied banding; *H. caperata*, *H. hispida*, *Clausilia bidentata*, *Jamiania cylindracea*, *Cochlicopa lubrica*, and *Hyalinia pura* var. *nitidosa* from Seascale, July, 1912.

By Mr. G. C. Spence: *Urocoptis sowerbyana* Pfr., and series of *Microceramus* and *Macroceramus* from Cuba.

By Rev. L. J. Shackelford: *Marginella eveleighi* sp. nov., *Marginella melvilli* sp. nov., and *Marginella chudeani* Bavay, from São Thomé Island, Gulf of Guinea.

By Mr. Edward Collier: *Hyalinia helvetica* Blum, *H. nitidula* var. *nitens*, *Zonitoides excavatus* Bean, and *Hygromia granulata* Alder from Friog and Arthog, Merionethshire.

By Mr. W. Denison Roebuck: *Limax arborum* var. *albinus* from Berkhamsted, Herts., taken 26th August, 1912, by Mr. Charles Oldham—a perfect albino—not even pigmented on the eye-spots. *Limax tenellus* from Surrey, collected by Mr. H. Wallis Kew, F.Z.S. This is a new county, still further extending the ring round London.

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R. Brock Watson



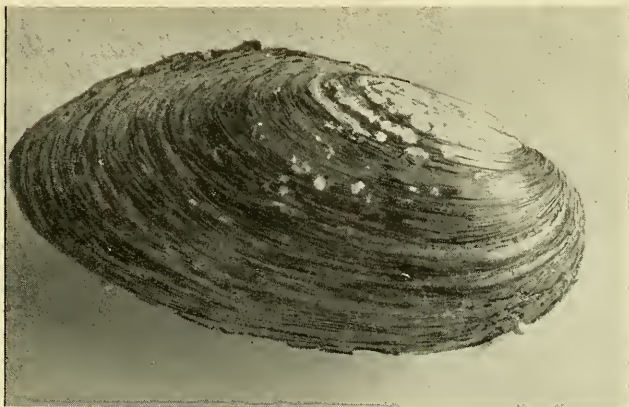


FIG. 1.



FIG. 2.

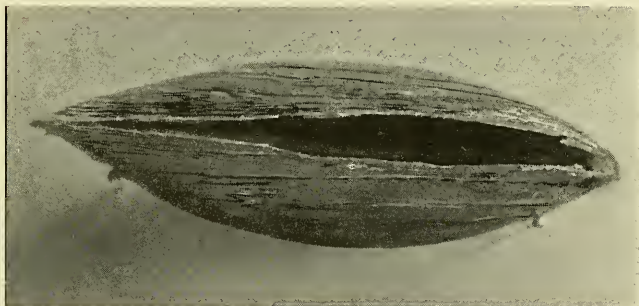


FIG. 3.

Photo. by P. T. Deakin.

FIG. 1. *Pseudanodonta rothomagensis* Loc. Natural size.

FIG. 2. *P. rothomagensis* shewing nodulous umbones.

FIG. 3. *P. rothomagensis* shewing wide gape of lower anterior margin.



*Yours Sincerely,
Robt. Cairns.*



FIG 1.



FIG 2.

Marginella dautzenbergi Tomlin & Shackleford (p. 319).

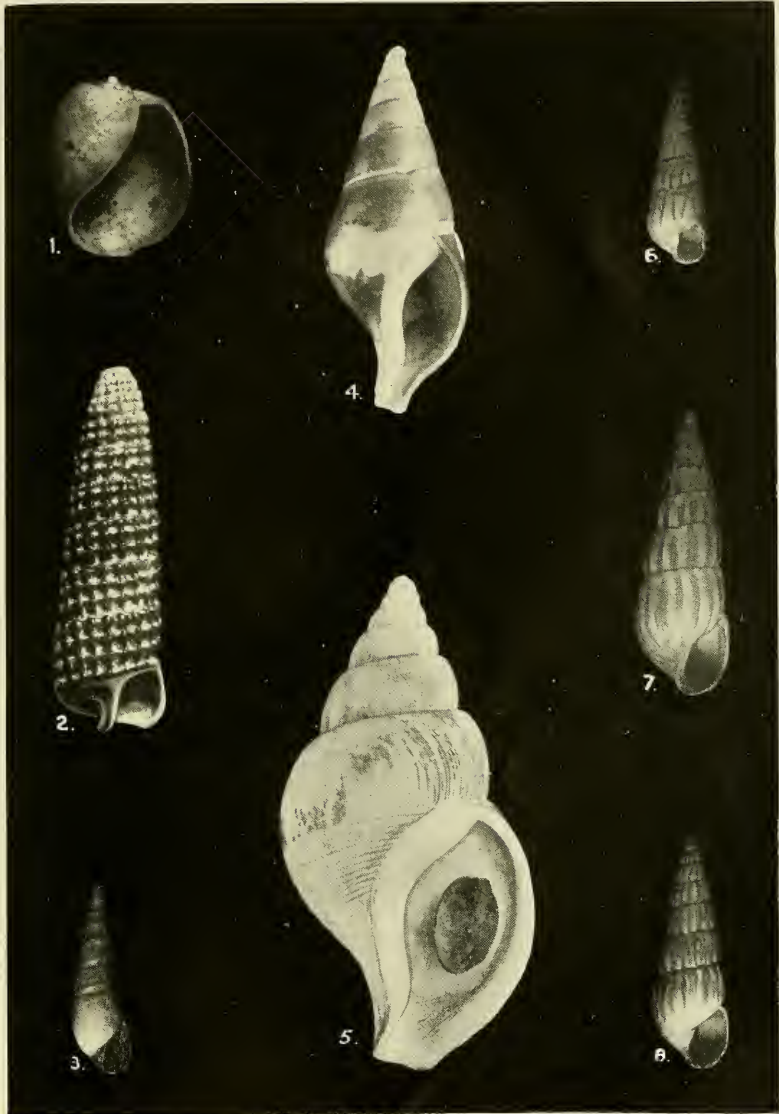


FIG 3.



FIG 4.

Marginella chalmersi Tomlin & Shackleford (p. 320).



1. *Utriculus tomlinianus* Marshall (see p. 334).
2. *Cerithiopsis barleei* var. *interrupta* Marshall (see p. 189).
3. *Eulina perminima* Jeff. ? (see *J. of Conch.*, vol. 10, p. 127).
4. *Fusus consimilis* Marshall (see p. 229).
5. *Fusus ebur* Mörch (see page 229).
6. *Odostomia delicata* Monts. (see *J. of Conch.*, vol. 9, p. 334).
7. *Odostomia multilirata* Monts. (see *J. of Conch.*, vol. 9, p. 332).
8. *Odostomia verticalis* Marshall (see *J. of Conch.*, vol. 9, p. 333).

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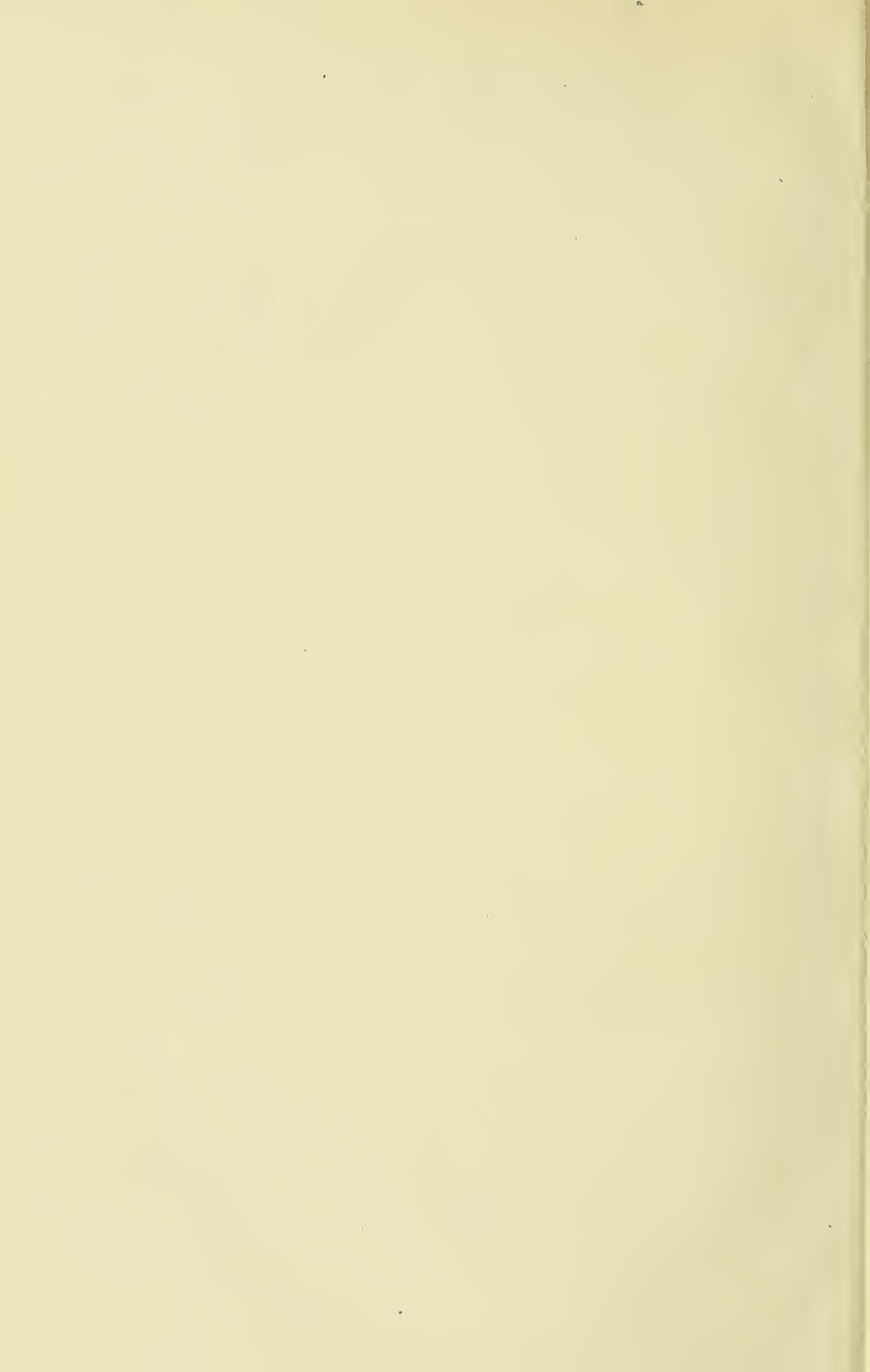
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