OPHTHALMOLOGICAL TRANSACTIONS.

VOL. IV.

TRANSACTIONS

OF THE

OPHTHALMOLOGICAL SOCIETY

OF THE

UNITED KINGDOM.

VOL. IV.

SESSION 1883-84.

WITH

LIST OF OFFICERS, MEMBERS, ETC.

LONDON:
J. & A. CHURCHILL, NEW BURLINGTON STREET.
1884.

PRINTED BY J. E. ADLARD, BARTHOLOMEW CLOSE.

IN EXCHANGE.

Archives d'Ophtalmologie, Panas, Landolt and Gayet.
Centralblatt für praktische Augenheilkunde, J. Hirschberg.
Klinische Monatsblatter, Augenheilkunde, W. Zehender.
Recueil d'Ophtalmologie, Galezowski and Cuignet.
Revue générale d'Ophtalmologie, Dor and E. Meyer.
Transactions of the American Ophthalmological Society.
Revue des Sciences Médicales, Hayem.

NOTICE.

The present volume comprises the proceedings of the Ophthalmological Society of the United Kingdom, during its fourth Session, October, 1883, to July, 1884.

The Society does not hold itself responsible for the statements, reasonings, or opinions expressed in the communications which the Council has deemed suitable for publication.

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Ophthalmological Society of the United Kingdom,

ELECTED AT

THE ANNUAL GENERAL MEETING, JULY 4TH, 1884.

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*.—Denotes Resident Life Members who have paid the Composition Fee.
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GENERAL LIST OF MEMBERS.

ELECTED

O.M. *ABERCROMBIE, JOHN, M.D. (S.), Assistant Physician to the Charing Cross Hospital, and to the Hospital for Sick Children, Great Ormond Street; 39, Welbeck Street, W.

O.M. ADAMS, JAMES E., care of F. Gordon Brown, Esq., 17, Finsbury Circus, E.C. (C. 1880-3.)

O.M. ADAMS, M. A., Surgeon to the Kent County Ophthalmic Hospital, Ashford Road, Maidstone.

ELECTED

1884 †Allison, H., M.D., care of Messrs. Binny and Co., Madras, India.

1884 Anderson, James, M.D., Assistant Physician to the Victoria Park Hospital for Diseases of the Chest; 84, Wimpole Street, W.

O.M. Andrew, Edwyn, M.D., Surgeon to the Shropshire Eye and Ear Hospital; Hardwick House, St. John's Hill, Shrewsbury. (C. 1881-4.)

1883 Andrews, A. G., London Hospital, Whitechapel Road, E.

O.M. Appleyard, John, M.B., Assistant Surgeon to the Bradford Eye and Ear Hospital; 1, Clifton Villas, Manningham, Bradford, Yorkshire.

O.M. Archer, T. Brittin, Senior Surgeon to the Central London and Western Ophthalmic Hospitals; 64, South Molton Street, Brook Street, W.

O.M. Bankart, James, M.B., Surgeon to the Devon and Exeter Hospital, and to the West of England Eye Infirmary; 19, Southernhay, Exeter.

O.M. Barlow, Thomas, M.D., Assistant Physician to, and Assistant Teacher of Clinical Medicine at, University College Hospital; 10, Montague Street, Russell Square, W.C. (C. 1880-81.)

1883 Barton, J. Kingston, 2, Courtfield Road, Gloucester Road, S.W.

O.M. Baxter, E. Buchanan, M.D., Assistant Physician to King's College Hospital; Professor of Materia Medica and Therapeutics, King's College; 28, Weymouth Street, Portland Place, W.

O.M. Beevor, C. E., M.B., Assistant Physician to the National Hospital for the Paralysed and Epileptic; 33, Harley Street, W.

O.M. Benson, A. H., M.B., Assistant Surgeon to St. Mark's Ophthalmic Hospital, Ophthalmic Surgeon to the City of Dublin Hospital, and Examiner in Ophthalmic Surgery to the Royal College of Surgeons of Ireland; 42, Fitzwilliam Square, Dublin.

ELECTED

O.M. Berry, G. A., M.D., Assistant Ophthalmic Surgeon, Royal Infirmary, and Lecturer on Ophthalmology, Royal College of Surgeons, Edinburgh ; 23, Rutland Street, Edinburgh.

1881 Bickerton, T. H., 1, St. James Road, Liverpool.

1884 Bond, Charles J., The Infirmary, Leicester.

O.M. Boon, Alfred, St. Kitts, West Indies.

O.M. Bowman, Sir W., Bart., LL.D., F.R.S. (V.P.), Consulting Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 5, Clifford Street, Bond Street, W. (*Pres.* 1880-3.)

O.M. Brailey, W. A., M.D. (S.), Ophthalmic Assistant Surgeon to Guy's Hospital; Ophthalmic Surgeon to the Evelina Hospital for Children; 16, Orchard Street, Portman Square, W. (C. 1880-3.)

O.M. Broadbent, W. H., M.D., Physician to, and Lecturer on Medicine at, St. Mary's Hospital; 34, Seymour Street, Portman Square, W. (V.-P. 1882-3.)

1881 †Brockman, E. F., Professor of Physiology and Diseases of the Eye at the Medical College, Madras ; Eye Infirmary, Madras.

O.M. Bronner, Edward, M.D., Surgeon to the Bradford Eye and Ear Hospital; 33, Manor Row, Bradford.

1882 Brown, George A., Tredegar, Monmouthshire.

O.M. Browne, Edgar A., Surgeon to the Liverpool Eye and Ear Infirmary ; 86, Bedford Street, Abercromby Square, Liverpool.

1882 Browne, John Walton, M.D., 10, College Square North, Belfast.

O.M. Bruce, S. N., 43, Kensington Gardens Square, W.

O.M. Bubb, J., Surgeon to the Cheltenham and Gloucester Ophthalmic Infirmary ; 6, Royal Crescent, Cheltenham.

1883 †Buller, Frank, M.D., 1351, St. Catherine Street, Montreal, Canada.

O.M. †Burnham, G. H., M.B., 157, Simcoe Street, Toronto, Canada.

ELECTED

O.M. Buzzard, Thomas, M.D., Physician to the National Hospital for the Paralysed and Epileptic ; 56, Grosvenor Street, W. (C. 1881-2.)

1882 Cant, W. J., 13, Silver Street, Lincoln.

O.M. Carter, R. Brudenell, Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. George's Hospital ; 27, Queen Anne Street, W. (C. 1880-3.)

O.M. Charnley, William, M.D., Surgeon to the Western Ophthalmic Hospital ; 14, Old Burlington Street, W.

O.M. Chesshire, Edwin, Senior Surgeon, Birmingham and Midland Eye Hospital ; 58, Newhall Street, Birmingham.

1881 Cholmeley, William, M.D., Physician to the Great Northern Central Hospital ; 63, Grosvenor Street, W.

O.M. Cooper, William White, Consulting Ophthalmic Surgeon to St. Mary's Hospital ; 19, Berkeley Square, W.

1884 Coulter, William, M.D., 50 Chelsham Road, Clapham, S.W.

O.M. Couper, John, Surgeon to the London Hospital, and to the Royal London Ophthalmic Hospital, Moorfields ; 80, Grosvenor Street, W. (C. 1881-2.)

O.M. Coupland, Sidney, M.D., Physician to, and Lecturer on Pathological Anatomy at, the Middlesex Hospital ; 14, Weymouth Street, Portland Place, W.

O.M. Cowell, George (C.), Senior Surgeon, Lecturer on Surgery and Ophthalmic Surgeon to the Westminster Hospital ; Surgeon to the Royal Westminster Ophthalmic Hospital ; 3, Cavendish Place, Cavendish Square, W.

O.M. Critchett, G. Anderson (C.), Ophthalmic Surgeon to St. Mary's Hospital ; 21, Harley Street, W.

1881 Cross, F. R., Honorary Ophthalmic Surgeon to the Bristol Dispensary ; Surgeon to the Bristol Royal Infirmary ; 5, The Mall, Clifton, Bristol.

O.M. Davidson, A. Deas, Ophthalmic Surgeon to Swansea Eye Hospital ; 5, Picton Place, Swansea.

ELECTED

O.M. Davidson, Alex. Dyce, Lecturer on Ophthalmic Surgery, University of Aberdeen; Ophthalmic Surgeon to the Royal Infirmary, Aberdeen; 224, Union Street, Aberdeen.

1882 Deane, Andrew, M.D., Bengal Army, Naini Tal, N.W.P. India.

O.M. Denby, S. C., Assistant Surgeon to the Bradford Eye and Ear Hospital; 1, Camden Terrace, Bradford, Yorkshire.

O.M. Dent, Clinton Thomas, Assistant Surgeon to St. George's Hospital; 19, Savile Row, W.

1883 Dew, Henry, Berkeley Square, Bristol.

1881 Dixon, W. E., 21, New Cavendish Street, W.

1882 Dodge, Stephen, M.D., Halifax, Nova Scotia.

O.M. Duncanson, J. J. Kirk, M.D., Assistant Surgeon, Eye Infirmary, Edinburgh; 22, Drumsheugh Gardens, Edinburgh.

O.M. Eales, Henry, Surgeon to the Birmingham and Midland Eye Hospital; 7, Newhall Street, Birmingham.

O.M. Edmunds, Walter, M.D., Medical Officer, St. Thomas's Home; 79, Lambeth Palace Road, Albert Embankment, S.E.

1883 Emrys-Jones, A., M.D., Surgeon to the Royal Eye Hospital; 10, St. John Street, Manchester.

1881 Farrant, Samuel, Surgeon to the Taunton and Somerset Hospital, and to the Taunton Eye Infirmary; North Street House, Taunton.

O.M. †Ferguson, H. L., Dunedin, New Zealand.

O.M. Fitzgerald, C. E., M.D. (V.-P.), Ophthalmic Surgeon to the Richmond Hospital; Lecturer on Ophthalmic Surgery Carmichael School of Medicine; 27, Upper Merrion Street, Dublin. (C. 1880-1.)

O.M. Fitz-Gerald, W. A., M.D., 9, Ely Place, Dublin.

1882 Fox, Arthur E. W., M.B., 16, Gay Street, Bath.

O.M. Frost, W. A., Assistant Ophthalmic Surgeon to St. George's Hospital; 77, Wimpole Street, W.

1883 †Da Gama, Jerminio Accacio, Khoja Moola, Bombay.

ELECTED

1883 Gibbons, R. A., M.D., Physician to the Grosvenor Hospital for Women and Children; 32, Cadogan Place, S.W.

O.M. Glascott, C. E., M.D., Surgeon to the Manchester Royal Eye Hospital; 11, St. John Street, Manchester.

1882 †Gosse, Charles, M.D., North Terrace, Adelaide, South Australia.

O.M. Gowers, W. R., M.D., Assistant Professor of Clinical Medicine at, and Assistant Physician to, University College Hospital; 50, Queen Anne Street, W. (C. 1880-3.)

O.M. Greenfield, W. S., M.D., Professor of Pathology University of Edinburgh; Heriot Row, Edinburgh.

O.M. Grossman, K. A., Ophthalmic Surgeon Stanley Hospital, Liverpool; 70, Rodney Street, Liverpool.

1881 Gulliver, George, M.B., Assistant Physician to St. Thomas's Hospital, and to the London Fever Hospital; 75, Lambeth Palace Road, S.E.

O.M. Gunn, R. Marcus (C.), Assistant Surgeon to the Royal London Ophthalmic Hospital, Moorfields, Ophthalmic Surgeon to the Hospital for Sick Children, Great Ormond Street; 108, Park Street, Grosvenor Square, W.

1882 *Hartridge, Gustavus, Consulting Ophthalmic Surgeon to St. Bartholomew's Hospital, Chatham, and Assistant Surgeon to the Royal Westminster Ophthalmic Hospital; 47, Kensington Park Gardens, W.

1882 †Henderson, W. H., M.D., Kingston, Ontario, Canada.

1883 Hewetson, H. B., Ophthalmic and Aural Surgeon Leeds General Infirmary; 11, Hanover Square, Leeds.

O.M. Higgens, Charles, Ophthalmic Surgeon to, and Lecturer on Ophthalmology at, Guy's Hospital; 38, Brook Street, W. (C. 1880-3.)

O.M. Hodges, Frank H., Ophthalmic Surgeon to the Leicester Infirmary; 17, Horse Fair Street, Leicester.

O.M. Horrocks, Peter, M.D., Assistant Obstetric Physician to, and Demonstrator of Practical Obstetrics at, Guy's Hospital; 9, St. Thomas's Street, S.E.

ELECTED

1884 Hudson, Ernest, Royal London Ophthalmic Hospital, Moorfields, E.C.

O.M. Hulke, J. W., F.R.S., Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 10, Old Burlington Street, W. (V.-P. 1881-2. C. 1880-1.)

O.M. Hutchinson, Jonathan, F.R.S. (*Pres.*), Consulting Surgeon to the London Hospital, and to the Royal London Ophthalmic Hospital; 15, Cavendish Square, W. (V.-P. 1880-1.)

O.M. Irwin, H. R., Surgeon to the Darlington Eye and Ear Hospital; Coniscliffe Road, Darlington.

1883 Jackson, James, M.D., Collins Street, East, Melbourne, Australia.

O.M. Jackson, J. Hughlings, M.D., F.R.S., Physician to the London Hospital, and to the National Hospital for the Paralysed and Epileptic; 3, Manchester Square, W. (V.-P. 1880-2.)

O.M. Jeaffreson, C. S., Surgeon to the Newcastle-on-Tyne Eye Infirmary; 1, Savile Row, and 2, Fernwood Road, Newcastle-on-Tyne.

1883 †Jenkins, E. J., M.B., Nepean Towers, Douglass Park, Sydney, N.S.W., Australia.

1883 Jessop, W. H. H., Senior Assistant Surgeon to the Central London Ophthalmic Hospital; Ophthalmic Surgeon to the Paddington Green Children's Hospital; 73, Harley Street, W.

1881 Johnson, George, M.D., F.R.S. (C.), Physician to King's College Hospital; Professor of Clinical Medicine at King's College; 11, Savile Row, W.

1882 Johnson, G. L., M.B., Fern Lea, Highfield Hill, Upper Norwood, S.E.

O.M. Jones, Evan, Ty-mawr, Aberdare, Glamorganshire.

O.M. Jones, H. Macnaughton, M.D., 141, Harley Street, W.

O.M. Juler, H. E., Assistant Ophthalmic Surgeon to St. Mary's Hospital; Senior Assistant Surgeon, Royal Westminster Ophthalmic Hospital; 77, Wimpole Street, W.

ELECTED

1882 KEALL, W. P., Surgeon to the Bristol General Hospital, and to the Eye Department; Lecturer on Operative Surgery at the Bristol Medical School; Nelson Lodge, Bristol.

1884 KEMP, J. R., 101, Jermyn Street, S.W.

1881 †KNAGGS, S. T., M.D., 16, College Street, Hyde Park, Sydney, New South Wales.

O.M. LANG, WILLIAM, Ophthalmic Surgeon to the Middlesex Hospital; 26, Upper Wimpole Street, W.

1881 LANGDON, J. WINKLEY, Ophthalmic Surgeon to Preston and County of Lancaster Royal Infirmary; Winkley Square, Preston.

O.M. LAWFORD, J. B., M.D., Curator and Librarian to the Royal London Ophthalmic Hospital, Moorfields; Royal London Ophthalmic Hospital, Moorfields, E.C.

O.M. LAWSON, GEORGE, Surgeon to the Royal London Ophthalmic and to the Middlesex Hospitals; 12, Harley Street, Cavendish Square, W. (C. 1882-4.)

O.M. LEDIARD, H. A., M.D., Surgeon to the Cumberland Infirmary; 43, Lowther Street, Carlisle.

O.M. LIDDON, W., Surgeon to the Taunton and Somerset Hospital, Taunton.

O.M. LITTLE, DAVID, Surgeon to the Royal Eye Hospital, Manchester; Ophthalmic Surgeon, Royal Infirmary; Lecturer on Ophthalmology, Owens College, Manchester; 21, St. John Street, Manchester. (C. 1880-1.)

1883 LUNN, J. R., Resident Medical Officer, Marylebone Infirmary, Notting Hill, W.

1884 MACGREGOR, ALEXANDER, M.B., 256, Union Street, Aberdeen.

O.M. MACKENZIE, F. M., 10, Hans Place, S.W.

O.M. MACKENZIE, STEPHEN, M.D. (C.), Physician to, and Lecturer on Medicine at, the London Hospital; Physician to the Royal London Ophthalmic Hospital, Moorfields; 26, Finsbury Square, E.C. (S. 1880-2.)

ELECTED

O.M. Mackinlay, J. G., Ophthalmic Surgeon to the Royal Free Hospital, and Assistant Surgeon to the South London Ophthalmic Hospital; 15, Stratford Place, W.

O.M. Macnamara, Charles (C.), Surgeon to the Westminster Hospital, and to the Royal Westminster Ophthalmic Hospital; 13, Grosvenor Street, W.

1881 †Maconachie, G. A., M.D., Grant Medical College, Bombay.

1883 Maher, W. O., M.D., 20, College Street, Hyde Park, Sydney, N.S.W.

1883 Mahomed, F. A., M.D., Assistant Physician to Guy's Hospital; 24, Manchester Square, W.

1883 Marlow, Frank William.

O.M. Mason, Frederick, Surgeon to the Bath Eye Infirmary; 20, Belmont, Bath. (V.-P. 1881-4.)

1884 Maxwell, Patrick William, M.B., 10, Lower Mount Street, Dublin.

O.M. McHardy, M. M., Ophthalmic Surgeon to King's College Hospital; Professor of Ophthalmology, King's College; 5, Savile Row, W.

1884 McKeown, David, M.D., 25, St. John Street, Manchester.

1884 McKeown, W. A., M.D., 20, College Square East, Belfast.

O.M. Meighan, T. S., M.D., Surgeon to the Glasgow Eye Infirmary; 219, Gallowgate Street, Glasgow.

1881 Milles, W. Jennings.

1883 Money, Angel, M.D., Assistant Physician to the Victoria Park Hospital for Diseases of the Chest; 14, Langham Place, W.

O.M. Morton, A. Stanford, Senior Assistant Surgeon to the Royal South London Ophthalmic Hospital; 57, Welbeck Street, W.

O.M. Mules, P. H., M.D., Surgeon to the Royal Eye Hospital, Manchester; 20, St. John Street, Manchester.

O.M. Nelson, Joseph, 2, Glengall Place, Belfast.

ELECTED

O.M. *Nettleship, Edward (C.), Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Thomas's Hospital; Assistant Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 5, Wimpole Street, W. (S. 1880-3.)

1881 Nicholson, A., Honorary Surgeon to the Sussex and Brighton Infirmary for Diseases of the Eye; 98, Montpellier Road, Brighton.

1881 Oram, A. M., M.D., Liverpool Street, Sydney, Australia.

O.M. Ord, W. M., M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital; 7, Brook Street, W.

1881 Ormerod, J. A., M.D., Assistant Physician to the National Hospital for the Paralysed and Epileptic; 25, Upper Wimpole Street, W.

O.M. Owen, D. C. Lloyd, Surgeon to the Birmingham and Midland Eye Hospital; 51, Newhall Street, Birmingham.

O.M. Page, Herbert W., Surgeon to St. Mary's Hospital; 146, Harley Street, W.

O.M. Penfold, Henry, Senior Surgeon to the Sussex and Brighton Infirmary for Diseases of the Eye; 7, Brunswick Place, Brighton.

O.M. Power, Henry (V.-P.), Senior Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Bartholomew's Hospital; Surgeon to the Westminster Ophthalmic Hospital; 37a, Great Cumberland Place, W. (C. 1880-2.)

1882 Prichard Arthur William, 31, Victoria Place, Clifton.

O.M. Prichard, Augustin, Consulting Surgeon to the Bristol Royal Infirmary and Eye Dispensary; 4, Chesterfield Place, Clifton. (V.-P. 1881-4.)

1882 Pringle, J. J., M.B., Assistant Physician to the Royal Hospital for Diseases of the Chest, City Road; 35, Bruton Street, W.

O.M. Purves, W. Laidlaw, Aural Surgeon to Guy's Hospital; Ophthalmic and Aural Surgeon to the Hospital for Paralysis and Epilepsy; 20, Stratford Place, Oxford Street, W.

ELECTED

O.M. Pye, Walter, Surgeon to St. Mary's Hospital, and to the Victoria Hospital for Children; 4, Sackville Street, Piccadilly, W.

O.M. Pye-Smith, R. J., Surgeon to the Sheffield Public Hospital and Dispensary, 6, Surrey Street, Sheffield.

O.M. Redmond, D. D., Ophthalmic Surgeon to St. Vincent's Hospital, Dublin; 14, Harcourt Street, Dublin.

1881 †Reeve, R. H., M.D., Surgeon to the Toronto General Hospital, and to the Mercer Eye and Ear Infirmary; 22, Shuter Street, Toronto, Canada.

O.M. Reid, Thomas, M.D. (V.-P.), Surgeon to the Glasgow Eye Infirmary, and Lecturer on Ophthalmic Medicine, University of Glasgow; 11, Elmbank Street, Glasgow.

O.M. Robertson, D. Argyll, M.D., Ophthalmic Surgeon to the Edinburgh Royal Infirmary; 18, Charlotte Square, Edinburgh. (V.-P. 1881-2.)

O.M. Rockliffe, W. C., 9, Charlotte Street, Hull.

O.M. Rogers, G. H., 3, Clifford Street, W.

1884 Rogers, Hildyard, 43, Uxbridge Road, W.

1882 †Roth, Reuter E., 61, Botany Street, Sydney, New South Wales.

1881† Rudall, J. T., 121, Collins Street, East, Melbourne, Australia.

O.M. Ryerson, G. S., M.D., Lecturer on Ophthalmic and Aural Surgery at Trinity Medical School, and Ophthalmic and Aural Surgeon to the General and Sick Children's Hospitals, Toronto; 317, Church Street, Toronto.

O.M. Samelson, A., M.D., 15, St. John Street, Manchester.

1884 Sandford, Arthur V., M.D., St. Patrick's Place, Cork.

1881 Sansom, A. E., M.D., Assistant Physician to the London Hospital; Physician to the North-Eastern Hospital for Children; 84, Harley Street, W.

O.M. Savage, G. H., M.D., Lecturer on Mental Diseases at Guy's Hospital; Medical Superintendent and Resident Physician, Bethlem Royal Hospital, S.E.

ELECTED

O.M. SHARKEY, S. J., M.B., Assistant Physician to, and Joint Lecturer on Physiology and Demonstrator of Morbid Anatomy at, St. Thomas's Hospital; 77, Lambeth Palace Road, S.E.

1883 SHEARS, CHARLES, Eye and Ear Infirmary, Myrtle Street, Liverpool.

1883 SILCOCK, A. Q., M.D., 5, Graham Road, Dalston, E.

1883 SKINNER, D. S., M.D., 1, Bedford Gardens, Campden Hill, W.

1883 SMITH, R. PERCY, M.D., St. Thomas's Hospital, S.E.

O.M. SMITH, PRIESTLEY (C.), Ophthalmic Surgeon to the Queen's Hospital, Birmingham; 21, Broad Street, Birmingham.

1881 SMITH, T. GILBART, M.D., Assistant Physician to the London Hospital; 68, Harley Street, W.

O.M. SNELL, SIMEON (C.), Ophthalmic Surgeon to the Sheffield General Infirmary; 17, Eyre Street, Sheffield.

O.M. SOLOMON, J. VOSE, Surgeon to the Birmingham Eye Hospital; Professor of Ophthalmic Surgery, Queen's College, Birmingham; 22, Newhall Street, Birmingham. (C. 1880-3.)

O.M. SQUARE, W., Surgeon to the Plymouth Royal Eye Infirmary; 14, Portland Square, Plymouth.

O.M. STORY, J. B., Surgeon and Clinical Lecturer on Ophthalmic and Aural Surgery at St. Mark's Ophthalmic Hospital; 24, Lower Baggot Street, Dublin.

O.M. STREATFEILD, J. F. (T.), Senior Surgeon to the Royal London Ophthalmic Hospital, Moorfields; Ophthalmic Surgeon to University College Hospital; and Professor of Clinical Ophthalmic Surgery at University College, London; 15, Upper Brook Street, W.

O.M. †STURGE, W. A., M.D., 15, Rue Longchamp, Nice, Les Alpes Maritimes.

1883 SUTTON, S. W., M.D., St. Thomas's Hospital, S.E.

ELECTED

O.M. Swanzy, H. R., Surgeon to the National Eye and Ear Infirmary, Dublin; Professor of Ophthalmic and Aural Surgery to the Royal College of Surgeons, Dublin; 23, Merrion Square, Dublin. (V.-P. 1880-1.)

1883 †Symons, Mark Johnston, M.D.

O.M. Sympson, Thomas (C.), Surgeon to the Lincoln County Hospital; 2 and 3, James Street, Lincoln.

O.M. Tay, Waren, Surgeon and Ophthalmic Surgeon to the London Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 4, Finsbury Square, E.C. (C. 1880-2.)

1882 Taylor, C. B., M.D., Surgeon to the Nottingham Eye Infirmary; 9, Park Row, Nottingham.

O.M. Teale, T. Pridgin, Surgeon to the Leeds General Infirmary; 38, Cookridge Street, Leeds. (V.-P. 1880-1).

O.M. Thomas, Jabez, Surgeon to the Swansea Hospital and Eye Infirmary; Ty-Cerrig, Swansea.

O.M. Tibbits, Herbert, M.D., Senior Physician to the West End Hospital for Diseases of the Nervous System; 68, Wimpole Street, W.

1883 †Tobin, William, 31, Hollis Street, Halifax, Nova Scotia, Canada.

1883 Tooth, Howard H., M.B., Assistant Physician to the Metropolitan Free Hospital; 34, Harley Street, W.

O.M. Tosswill, L. H., Surgeon to the West of England Eye Infirmary, 49, Magdalen Street, Exeter.

O.M. Tweedy, John (C.), Assistant Ophthalmic Surgeon to, and Professor of Ophthalmic Medicine and Surgery at, University College Hospital; Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 24, Harley Street, W.

1883 Uhthoff, J. C., M.D., Surgeon to the Sussex and Brighton Eye Infirmary; 46, Western Road, Hove, Brighton.

O.M. Vernon, Bowater, J., Ophthalmic Surgeon to St. Bartholomew's Hospital, and to the West London Hospital; 14, Clarges Street, Mayfair, W.

ELECTED

O.M. WALKER, G. E., Surgeon to St. Paul's Eye and Ear Hospital, Liverpool; 43, Rodney Street, Liverpool.

O.M. WALKER, T. SHADFORD (V.-P.), Lecturer on Ophthalmic Medicine and Surgery at the Liverpool Royal Infirmary; Senior Surgeon to the Liverpool Eye and Ear Infirmary; 88, Rodney Street, Liverpool. (C. 1881-4.)

O.M. WALKER, W., Consulting Surgeon to the Eye Dispensary and Eye Wards, Edinburgh; 47, Northumberland Street, Edinburgh. (V.-P. 1880-1).

O.M. WALTON, HAYNES, Consulting Surgeon to the Central London Ophthalmic Hospital, and Senior Surgeon to St. Mary's Hospital; 1, Brook Street, W.

O.M. WATSON, W. SPENCER (C.), Surgeon to the Great Northern Central Hospital and Royal South London Ophthalmic Hospital; 7, Henrietta Street, Cavendish Square, W.

O.M. WEST, S. H., M.D., Medical Tutor and Registrar of St. Bartholomew's Hospital; 15, Wimpole Street, W.

O.M. WHERRY, G. E., M.B., Surgeon to Addenbrooke's Hospital; 53, Trumpington Street, Cambridge.

1882 WILKINSON, T. M., Surgeon to the Lincoln County Hospital; Lindum Road, Lincoln.

O.M. WILLIAMS, R., Surgeon to the Liverpool Eye and Ear Infirmary; 82, Rodney Street, Liverpool.

O.M. WOODHEAD, G. SIMS, M.D., 6, Marchhall Crescent, Edinburgh.

O.M. WORDSWORTH, J. C. (V.-P.), Consulting Surgeon to the Royal London Ophthalmic Hospital, Moorfields; 20, Harley Street, W. [Re-elected 1883.]

RULES.

1. The object of the Society is the cultivation and promotion of Ophthalmology in the United Kingdom, India, and the Colonies.

2. The Society shall consist of Ordinary and Honorary members. All legally qualified medical practitioners shall be eligible as ordinary members.

3. The officers of this Society shall consist of a President, four or more Vice-Presidents, a Treasurer, two Secretaries, and twelve other members, who together shall form the Council and manage the Society's affairs.

4. *Election of Members.*—Candidates shall be proposed on a form provided for the purpose and signed by three members from personal knowledge. The proposal paper shall be read at one Ordinary Meeting, and the Ballot shall be taken at the following Meeting. No election shall take place unless ten members vote, and no person shall be elected who does not obtain four fifths of the votes given. If any candidate, who is legally qualified to practise in India or the Colonies, be not personally acquainted with three members of the Society, the signatures, from personal knowledge, of teachers in the Medical School at which he was educated shall be accepted instead of the signatures of the same number of members of the Society.

5. *Form of Admission by the Chairman.*—Members shall be admitted personally by the following form, after signing their names in the Admission Book, and paying their first Annual Subscription. *Form of admission.*—"By the authority and in the name of the Ophthalmological Society of the United Kingdom, I admit you a member thereof."

6. *Honorary Members.*—The Council shall have the power of proposing men of distinguished eminence in Ophthalmology, or in the sciences bearing upon it, not exceeding ten in number, for election as Honorary members. They shall be elected in the same manner as Ordinary members.

7. *Expulsion of Members.*—A member can be expelled only at a General Meeting specially called for that purpose, and of which a written notice shall have been sent to every member at least fourteen days previously. At least ten votes must be recorded, and four fifths shall carry the expulsion.

8. *Subscriptions.*—The Annual Subscription shall be One Guinea, payable in advance at the date of the Annual General Meeting. Each member on election shall pay an Entrance Fee of One Guinea in addition to the Subscription, but in the case of a member elected at a meeting of the Session subsequent to Easter he shall not be required to pay a Subscription during the next Session. Any member whose Subscription is six months in arrear shall be reminded of the same by one of the Secretaries, and if it be not paid within the current year he shall cease to be a member. Any member may, at any time, pay a Composition Fee of Fifteen Guineas and be thereby exempted from paying any further Subscriptions, such member enjoying all the same rights and privileges as if he were a Subscribing member. Any member resident out of the United Kingdom may pay a Composition Fee of Five Guineas instead of the Annual Subscription, and will then be entitled to receive, post free, a copy of the Society's 'Transactions' each year, and to have his name printed in the list of members; but if at any time he subsequently become a Resident member of the Society, the question of further payment by him shall be decided by the Council. N.B.—The Composition Fee in either instance will include the Entrance Fee.

9. The Officers of the Society shall be elected yearly by Ballot at the Annual Meeting, to which all the Ordinary members shall be summoned one week before. No gentleman shall hold the same office for more than three consecutive years. Balloting lists of the names recommended by the Council for election shall be sent to each Ordinary member, together with the notice of the Annual Meeting.

10. Two Scrutineers appointed by the Chairman at the commencement of the Annual Meeting shall receive the lists during the first hour, and report the result to the Chairman. In the event of equality of suffrage the Chairman shall determine.

11. *The President and Vice-Presidents.*—The President shall regulate all the proceedings of the Society and Council, state and put questions, interpret the application of the Laws, and decide any doubtful points. He shall check irregularities and enforce the observance of the Laws. He shall sign the minutes of General and Council Meetings. In the absence of the President one of the Vice-Presidents, the Treasurer, or some other member chosen by the Meeting, shall perform his duties.

12. *The Secretaries* shall manage all correspondence, shall attend every meeting of the Society and Council, and take minutes, which shall be read at the following meeting. They shall notify to new Members their election. They shall arrange with the President the order of proceedings at all the meetings. They shall have charge of, and keep a register of, all papers communicated, and shall be the Editors of the 'Transactions.'

13. *The Treasurer* shall receive all moneys due to the Society, and make all payments ordered by the Council, keeping an account of all such receipts and payments. He shall keep a printed receipt book for the subscriptions, and every receipt shall be signed by himself and countersigned by one of the Secretaries. He shall present to the Annual Meeting a written Report of the financial state of the Society, signed by himself and by two members of the Audit Committee.

14. *Audit Committee.*—The President, one of the Secretaries, and two Members of the Society nominated by the President at some meeting of the Society previous to the Annual Meeting, shall form a Committee to audit the Treasurer's accounts.

15. The Council shall meet half an hour before the meeting in October, January and May, and half an hour before the Annual General Meeting, and at such other times as they may be specially convened. Three shall form a quorum. The Council shall determine questions by show of hands (or by Ballot if demanded), the President having in both cases a casting vote in addition to his ordinary vote. They shall have the power of filling up any vacancies which may occur in any of the offices of the Society between one Annual Meeting and another. They shall decide upon all questions relating to the reception of communications and to their publication in the Society's 'Transactions.'

16. '*Transactions.*'—A copy of the 'Transactions' shall be sent to each Member of the Society.

17. The Ordinary Meetings shall be held from 8.30 to 10 p.m. on the second Thursday in October, December, January, March, and May, and on the first Thursday in June, and the Annual General Meeting on the Friday after the first Thursday in July.

18. *Visitors.*—Each Member may introduce two visitors on writing their names in the attendance book.

19. *The business at Ordinary Meetings* shall consist in the reading and discussion of papers, which may be illustrated by specimens, drawings, &c. When patients are to be shown they should attend half an hour before the meeting.

20. Communications shall be taken in the order in which they

have been sent in to the Secretaries, subject to the discretion of the President. If an author be not present when the time arrives for his communication to be read, it shall be dealt with as the President may direct.

21. All papers, except those relating to living specimens, must be sent to the Secretaries at least one week before the meeting, together with an abstract suitable for immediate publication in the journals.

22. Nothing relating to the Laws or management of the Society shall be considered at Ordinary Meetings.

23. At the Annual General Meeting proposed alterations of Rules shall be considered and decided upon, notice of such alterations having been given in the summons convening the meeting. Ten shall form a quorum at this meeting, and for the adoption of any alteration of the Laws four fifths of the votes given must be in its favour.

24. A special General Meeting may be called at any time, on one week's notice, by the President or any three members of the Council, the nature of the business being specified in the summons sent to each Member of the Society, and no other business being considered.

LIBRARY RULES.

1. The Library shall be open at the same hours as that of the Medical Society, viz. from 1 p.m. to 6 p.m. daily, except on Saturdays, when it will be closed at 3 p.m.

2. Members will be entitled to read the books belonging to the Society at 11, Chandos Street, between those hours, or to take them out on signing a form provided for that purpose. But any books of extraordinary value may be placed by the Council on a separate list, such books not being allowed to be removed from the Library.

3. A large number of the current periodicals will be accessible to Members in the Library. These will not be allowed to be taken out of the Library.

4. A book must be returned at the expiration of a fortnight if wanted by any other Member. The Librarian will in such a case write to the Member in whose name the book was taken out.

5. If the book be not returned within four days of such notice, a fine of 6d. will be charged for each day that the book is retained beyond such days of grace.

6. Instruments and drawings cannot be taken out of the Library except with the express permission of the Council.

7. A Member taking out a book will be held responsible for its being returned in good condition.

THE BOWMAN LECTURE.

Resolution of Council, September 18th, 1883.

"That in recognition of Mr. Bowman's distinguished scientific position in ophthalmology and other branches of Medicine, and in commemoration of his valuable services to the Ophthalmological Society, of which he was the first President, the Council shall each year, or periodically, nominate some person to deliver a lecture before the Society to be called 'The Bowman Lecture,' which shall consist of a critical *résumé* of recent advances in ophthalmology or in such subject or subjects as the Council shall select, or upon any original investigation, and shall be delivered at a special Meeting of the Society held for the purpose, at which no other business shall be transacted."

LIST OF COMMUNICATIONS

BROUGHT BEFORE THE SOCIETY DURING THE SESSION 1883–4

I. DISEASES OF EYELIDS AND CONJUNCTIVA.

II. DISEASES AND TUMOURS OF THE ORBIT.

III. INTRA-OCULAR TUMOURS.

IV. DISEASES OF THE IRIS.

V. INJURIES AND SYMPATHETIC OPHTHALMITIS.

VI. PANOPHTHALMITIS.

VII. GLAUCOMA.

VIII. DISEASES OF THE LENS AND CAPSULE.

IX. DISEASES OF RETINA AND CHOROID.

X. DISEASES OF OPTIC NERVE.

XI. FUNCTIONAL DISEASES.

XII. AFFECTIONS OF MUSCULAR AND NERVOUS SYSTEMS.

XIII. CONGENITAL DEFECTS.

XIV. NEW INSTRUMENTS.

LIST OF PLATES.

LIST OF WOODCUTS.

INTRODUCTORY ADDRESS

AT THE

Opening Meeting of the Session 1883-4,

October 11th, 1883.

By Jonathan Hutchinson, F.R.S., President.

Gentlemen,—We begin to-day the fourth session of the Ophthalmological Society of Great Britain. In the first place I must thank you heartily for the honour you have done me in electing me your second President. Appreciating this honour most highly, I yet accept it with much misgiving, more especially when I remember who has been my predecessor.

In Mr. Bowman you have enjoyed the services of a President of unequalled fitness and ability—of one, indeed, who had already conferred inestimable benefits on ophthalmic science. His acceptance of the office of President at once secured the success of our infant Society, and in his recent resignation of it we have sustained a heavy loss—one which, I am well assured, it will be quite out of my power, in any degree, to make you forget. The chief satisfaction which I have, in venturing to accept your invitation to succeed him, is the knowledge that he still takes the warmest interest in our affairs, and that I shall always have the advantage of his advice and help.

It will be my duty to mention to you directly, facts which will prove that, although Mr. Bowman has resigned the nominal presidency, he still occupies in relation to us an almost paternal position. Long may he live to do so!

We meet this evening, as you will have observed, in

rooms which have been made much more commodious since our last session, and in connection with this subject I have to give you some important items of information. The first is, that the Medical Society of London, whose tenants we are, on entering upon their greatly improved premises, felt themselves obliged very materially to increase our rent. There was nothing in the least unreasonable in this; indeed, our landlords have throughout acted towards us in a liberal spirit. The proposed increase was, however, in respect to our finances, a very heavy one, and as the Council was desirous to collect a library, and to form a museum of instruments and appliances—both objects demanding outlay,—we found ourselves for a time in a position of great difficulty. It is almost certain that the Society could not have afforded to continue in these rooms and develop itself in the proposed directions had it not been helped by an act of scientific beneficence not often surpassed.

Having acquainted himself with the facts, and noting our position, our ex-President made an offer to the Council to himself undertake the cost of purchase of all fittings necessary for the museum and library, and further, to make a gift to the Society annually, for twenty years, of the sum of £50, in order to defray the expenses of rent of rooms. Need I say that the Council on your behalf thankfully accepted Mr. Bowman's munificent offer, and I have now the pleasure of informing you that we are, in all probability, rent-free for twenty years, and shall be able to devote the whole of our income from subscriptions to the publication of our annual volume. I am sure that you will receive this most liberal gift of your past President as one in the highest degree worthy not only of praise in the present, but of imitation in the future. The pecuniary advantages which it confers upon us are solid, extensive, and durable; but, warmly as we appreciate them, I believe I may say that those who have been most closely associated with the early years of our Society derive yet greater pleasure from the fact, that one so

competent to judge, should in so emphatic a manner have crowned their efforts with his approbation.

I have next to allude to a remarkable coincidence. Mr. Bowman's offer was made only about a month ago, and quite unexpectedly to us all, whereas for at least three months before this, and wholly unknown to him, the Council had had under consideration a proposal to recognise his pre-eminent position in respect to ophthalmology in Britain, and the invaluable services which he had already rendered to our Society. It was from Dr. Gowers that the suggestion had first come that we should found a lectureship to be known as the Bowman Lecture, but it was no sooner mentioned than it was received with unanimous approbation.

I am anxious, for reasons that will be self-evident, to make it clear that the Council's endeavour in this slight manner to do honour to Mr. Bowman, and his liberal endowment of the Society, had no connection one with the other, although the two projects ripened about the same time. Dr. Gowers' proposal has been several times discussed in our Council meetings, and should it meet with your approbation, as I feel sure that it will, the lecture in question will be founded forthwith. Without wishing unduly to bind the executive in future years, the present proposal is that a Bowman Lecturer shall be appointed each year, and invited to prepare for us a critical summary of the best extant information upon some special subject to be selected by the Council, or, if not selected, approved by it.

This lecture will probably be an annual one, and will be delivered at a meeting specially appointed for that purpose. We hope in it not only to permanently associate with our Society the name of a great man, but also to contribute each year something real towards that "advancement of knowledge for the good of man's estate," which has been Mr. Bowman's lifelong aim.

With this statement I end, gentlemen, the announcements which it has been my most pleasing duty to make

to you, but I purpose before sitting down to trespass upon your attention with a few further remarks on our general position and the possible scope of our future work.

I think that we may now fairly congratulate ourselves that the organisation of our Society, if we regard it simply as providing means for the furtherance of research in ophthalmology, is well-nigh perfect. We shall have regular meetings in commodious and central rooms, at which any subject which is brought forward will be certain to receive the attentive criticism of an audience, than which none exists better qualified for the task. We invite in the freest possible manner the production of all new facts, opinions, and suggestions, whether relating to extended series of observations or isolated cases. All that concerns the eye, whether in health or disease, concerns us, and we shall be thankful alike for the single case and the elaborate paper. Nor is there, I am happy to say, any spirit of exclusiveness as regards membership with us. We shall willingly accept the help of all who take an interest in our pursuits. Those who had the largest share in the formation of this Society were careful that it should have a wide basis, and, thanks to their foresight, it has now the good fortune to include amongst its members many, physicians, surgeons, and others engaged in general practice, who are not, and never have been, in any sense, specialists.

To say nothing of the original contributions which we have had from some of these, their help in our debates and their services on our committees have been, and will be in the future, simply invaluable. It is true that we have not yet a library of reference, or a museum. But the first of these desiderata will, I doubt not, soon be supplied, and the other will be put in course of formation to such extent as may suitably come within our lines of work. We shall probably never attempt the formation of a pathological collection, since we have no convenience for its preparation or its display, and there exists, besides, at other institutions, ample provision in this direction.

We do, however, contemplate the formation of a collection of instruments and appliances, and to this object Mr. Bowman's endowment will, as I have said, be in part devoted. Probably also we shall make gradually a collection of drawings and other forms of graphic illustration. These can be easily classified and stored for reference in the drawers of our library. Should it occur to any of our more wealthy friends to emulate Mr. Bowman's noble example, I cannot, for my own part, think of any object to which a second endowment could be more usefully devoted than to the formation of such a collection.

Morbid conditions of the eye, whether external or revealed by the ophthalmoscope, lend themselves with peculiar facility to the artist's skill. If we had the funds I would suggest that, under the auspices of a committee, we should copy, collect, and classify, from all available sources, private and public, published or otherwise, all such illustrations of eye disease as are passably good in execution, and duly authenticated and described. With but few exceptions I would leave aside all in which the history of the individual case is omitted. If this scheme were completed we should find, if I am not mistaken, that we were in possession of a sort of clinical museum which would prove of very great use alike to students and to all engaged in original research. I certainly count this object as chief among the desiderata for which adequate provision has not yet been made.

Hitherto I have been speaking of our arrangements and organisation as a Society for the improvement of knowledge in our special branch. To those who, with me, believe that it would be difficult, in any material degree, to alter these arrangements for the better, it is, I may repeat, a source of great satisfaction to know that they have received the emphatic *imprimatur* of our first President, than whom there is no man living so well qualified to judge.

The improvement of ophthalmic knowledge is unquestionably our first, and by far our principal duty. I

cannot but think, however, that it is possible that in the future such societies as ours may find another kind of work open to them, which is only second in importance.

I allude to the systematic and strenuous endeavour to diffuse rapidly amongst the profession at large, for the prompt benefit of our patients universally, all items of new knowledge which may have been obtained.

There are many directions in which thoughtful help might be given towards this end. We may, in the first place, endeavour to induce as many as possible to join us, and attend our demonstrations and discussions and receive our volumes. We shall not, however, in this way reach many excepting London residents.

It is perhaps possible that something might be done to make some of our meetings, and the reports of them which appear in the journals, more valuable to the bulk of the profession, by becoming less definitely special than they now are. We might, for instance, bring forward for discussion, occasionally, the commoner forms of eye disease —such as are scarcely likely to be often made the themes of original communications. Not only would this help others, but it is very desirable for our own good that we should occasionally make recapitulation in public of our knowledge of common things, and thus ascertain how far our opinions have advanced towards unanimity.

There is another branch of the same topic on which I incline, if you will permit me, to enter into a little more detail, since it offers possibly a sphere for much useful work in the future on the part of societies like ours. It is one, indeed, to which perhaps this Society in particular is more specially called than any other. I refer to the promotion of what may be named *every-day therapeutics*. It is obviously quite possible that the knowledge of diseases of the eye might be cultivated by a few up to a point of very high excellence, and with great finish of detail, and yet remain a possession of the specialist, and benefit but little the family practitioner, and the public his patients. In some degree this state of things is un-

avoidable, and in some departments of our practice we cannot hope to ever escape it. Still, however, it will be admitted by all to be a matter of regret. So far as we can do it, it is our duty to make such knowledge popular —to diffuse it over an area the widest that we can obtain. A practical knowledge of astigmatism is not to be expected from a general practitioner; possibly not even from all who are engaged in the treatment of eye diseases as a specialty. The attempt to use the ophthalmoscope for purposes of diagnosis, although quite possible to a large section of the younger part of the profession, enjoying constant opportunities and fresh from hospital training, would probably, to by far the greater part, prove to be a source of error rather than a help.

Skill in the diagnosis and, as a necessary consequence, in the treatment of a not inconsiderable group of rare diseases of the eye, must always, despite any development of education which it is reasonable to hope for, and any artificial aid which can possibly be given, remain the possession of the specialist only. But it is otherwise in respect to a majority. Almost all the examples of the commoner forms of eye disease come under the care, in the first instance and often throughout, of those who are not specialists, and have perhaps never even had any training in an ophthalmic hospital. Circumstances over which no one has any control render this inevitable. Whether or not the surgeons concerned desire it, they must perforce take charge of "eye cases" as well as of others. It is in reference to practitioners so placed that I would suggest that our Society has possibly a duty to perform. If I trouble you with a few examples, I shall probably be best able to convey my meaning.

Concerning the treatment of syphilitic iritis, there is probably but little hesitation or difference of opinion amongst specialists, and perhaps I could hardly mention another disease respecting which the opinions of specialists are more widely known and accepted. That atropine should be used from the first, frequently, freely, and in

strong solution, and that mercury and iodide of potassium are very useful and ought always to be given, but in no degree compare in importance with mydriatics, I take to be the acknowledged canon. It would be easy to prepare an explicit *schema* for the treatment of this disease, giving the exact strength of the atropine, the frequency of its application, the precise dose of the mercurial, and suggesting a few of the more important means which help success, such as a purgative, leeches to the temples, and low diet. This might be done in ten lines, and so printed in a visiting-list or pocket-book that it should be readily accessible to all. It would be better that such a schema should be propounded under the auspices of a Society than that it should come from an individual. In many parallel instances, the discussion and examination which such *schemata* of treatment would receive at the hands of our Society would, no doubt, be of great use in perfecting them, as well as in adding to their authority.

I do not doubt that there are, at the present moment, whilst I am speaking to you, in the homes, the schools, the workhouses, and the hospitals of England, some thousands of children who are suffering from ulcerations on the cornea, attended with intolerance of light, causing the patient great distress and annoyance through many months, and destined often to leave disfiguring and incapacitating scars. If my own experience may be trusted, I believe that three fourths of these would be almost well in the course of a fortnight under the use of a very weak yellow oxide ointment. Many of them, no doubt, are getting it, but a considerable majority probably are not; for this plan of treatment is not yet universally acknowledged among specialists, and certainly not very widely known in the profession.

If this Society could, after an examination of the subject, determine upon the recommendation of an explicit formula which would be likely to result in the prompt cure of these very troublesome cases, it would confer an immense boon upon the public. Such a formula, so

recommended, would be copied into every medical journal and into every manual. It would be reprinted over and over again, and would become the property of the whole profession.

Is it not somewhat humiliating to reflect that if a quack were to bring out a very weak Pagenstecher's ointment, give it a telling name, and push it into notice as a specific for chronic inflammations of the eye, he would be a public benefactor? No doubt it would often be used in error, but it would even then do little or no harm, and I have not the least doubt that the balance of gain would enormously preponderate. My own experience has been, that since I knew the virtues of this ointment I have been able to abandon almost entirely the use of blisters, setons, and like painful measures, and to effect the cure in a tenth of the time. I have reason to think that a large majority of ophthalmic specialists have had a like experience. Yet we hesitate to come boldly before the general profession and announce loudly an important item of progress. We fear to boast, we dread to impair the scientific spirit by the formation prematurely of general rules; and, seeking to quiet our consciences by reminding ourselves that after all the thing is no secret, we do nothing further in the matter. Our reticence is a loss to the nation, it is an injury to hundreds and to thousands whom the benefits of modern ophthalmological science might reach if we would only consent to throw away our fastidiousness. Is it not a frequent failing among the more scientific part of our profession to become superfine? We dread the spirit of the charlatan and the self-seeker so much, that we come, like David when in presence of the sinner, to "hold our peace *even from good.*" In the individual, scrupulous care in these respects is most meritorious; nothing is less to be desired than that those who believe themselves to have made therapeutic discoveries should deem it their duty to proclaim them ostentatiously. Let them be brought forward in the first instance quietly, and under the cognisance only of those skilled to judge of them.

But the fact that it is meritorious in individuals to abstain from pushing their favorite remedies, only throws the duty, to which I have been alluding, the more definitely upon public bodies like ourselves. No one could impugn our motives or doubt our sincerity, and our verdicts would be received not certainly as final, but as entitled, at any rate, to a temporary acceptance.

Let no one suspect me of wishing to stereotype knowledge or to damp the ardour of any skilled person in the endeavour yet further to improve our therapeutic resources. There is no fear in that direction; and what I am concerned to assert is this, that nine out of ten of the practising part of the profession would most thankfully receive from this Society detailed *schemata* for the treatment of various typical forms of eye disease. Let me further add —without, I hope, hurting anyone's feeling—that I am sure that the use of them would tend immensely to the benefit of their patients as compared with the extemporised prescriptions now employed. It is not in the power even of the most laborious of those engaged in family practice, to keep their minds well stored with details respecting the management of diseases which, although very common with us, are rarities to them.

I might easily mention a number of special types and forms of eye disease—purulent ophthalmia, rheumatic iritis, episcleritis, catarrhal ophthalmia, glaucoma, and the like—for which definite schemes of treatment could easily be laid down. It will, I have no doubt, be objected, that, after all, successful treatment depends upon the correctness of the diagnosis. This statement is almost as obvious as was the famous injunction to "first catch your hare." It is no reason that because diagnosis is difficult, therapeutics should be left in a muddle also.

I might urge further that I believe, working on the same lines, this Society might do much to put the diagnosis of eye diseases more easily within the reach of British practitioners in general.

There is no one present who has not been pained over

and over again by having to treat cases of glaucoma which were brought to him too late. In spite of all that has been done by specialists, and in spite of the fame which iridectomy cures have obtained, it is still the fact that a large proportion of cases of acute glaucoma are unrecognised during the first fortnight by those under whose observation the patients come. Practitioners of the most scrupulous care, of wide general information, and the most conscientious regard for their patient's good, are yet very commonly misled by the acute congestion and severe constitutional symptoms which often attend the early stages of this disease.

It was my fortune, some years ago, to operate upon three cases of this kind in one week, in all of which the proper time for interference had been allowed to pass by, on account of the patients' severe general illness.

In one instance I became acquainted with the facts of a case in which a benevolent country surgeon, aided by two or three friends, was himself maintaining a lady who had lost her sight, and consequently her occupation, from double acute glaucoma. He had himself attended her from the beginning, and when I gently hinted at the possibility—to me, a practical certainty—that iridectomy at the proper time would have saved the lady's sight for the rest of her life, he promptly replied "that the eyes were so much inflamed in the first instance, and the patient so ill, that he was quite sure I should never have thought of operating." I said no more, for it would have been cruel to tell him that these were the very symptoms which denoted the necessity for an operation.

Some years ago, in the early days of the keratome, I felt so strongly on this subject that I had some thoughts of engaging a full page in the 'Lancet' for a big red-lettered anonymous advertisement, so staring that all must read it, stating in a dozen words the symptoms and inevitable result of glaucoma, together with the certainty of its cure by operation.

And now, looking back upon such impulses of enthu-

siasm, I do deliberately declare my conviction that a Society like our own would have been more than justified in taking such a step. At that time acute glaucoma probably had, on British soil alone, its daily victim, whom it left in irrevocable blindness. In the present day the number has been greatly diminished, but it is still, no doubt, very considerable. Our confidence in the remedy which we then hailed has remained unshaken; and it is most certainly a very melancholy thought, that there are thousands now living without sight who might have saved it very easily had there existed any efficient means for the rapid diffusion of the new knowledge.

I must not trespass further upon your patience in this matter. Briefly, what I desire to urge is this, that we ought not to be content with doing our utmost to make knowledge perfect, and to secure its application in our own immediate spheres of action, but that it is well worth a thought whether Societies like our own have not duties to perform in respect to its diffusion. I will not for a moment doubt that a subject so important will receive from you such attention as your judgments may deem it entitled to.

Is it too much to hope that something of the nature of a compendium of ophthalmic therapeutics may sometime be prepared, which shall bear the authority of a Society's consensus? Such a code should of course be destined to modification from time to time, but it would probably from the first be a great advance upon the statements of any individual, both in explicitness, in brevity, and in the amount of practical experience which it would summarise.

Should the Society see its way in the future to any action in this matter, much collateral advantage might be expected by the more detailed attention to therapeutics which would be given by the committees appointed to report.

Had time permitted, I might have ventured to bring before you a few other suggestions as to work which the

Society might undertake collectively—such, for instance, as a systematic examination of symptoms with the object of defining and describing them more accurately; of preparing detailed lists of the more rare types and forms of disease, and giving to each its concise description; and possibly, after this were done, of preparing nosological lists which might assist the labours of hospital registrars.

I have occupied, however, already much more time than I had intended, and must not detain you any longer from the proper work of our meeting.

REPORTS.

I. DISEASES OF EYELIDS AND CONJUNCTIVA.

1. *Two cases of extreme ectropion of the lower lids; different operations.*

By J. F. Streatfeild.

Of these two cases, one of the patients is here this evening so that his present state can be seen, and his former condition is represented in the drawing I have now the honour to present. In this case the ectropion was treated by transplantation of a large piece of skin without pedicle. Thomas M—, æt. 22, came to University College Hospital about a year ago, for the results of very extensive disease of the bones of the face; the nose, and roof of the mouth being destroyed. The disease began when he was fourteen years old, and is I believe a result of *inherited* syphilis. He came under my care because he was chiefly inconvenienced, and perhaps most disfigured by the absolute eversion of the left lower lid. The palpebral conjunctiva was exposed to the extent of seven mm. measured vertically. The cornea had not suffered, but the ocular conjunctiva was very much congested, there was much lacrimation with other consequent inconveniences. On the 13th of March, last year, the patient being under anæsthetic influence, and carbolic acid solution being used for

all the instruments, and to bathe the parts concerned in the operation, I made an incision just below the margin of the everted lower lid, extending from the outer to the inner canthus, and dissected the skin from the lid and its orbicularis muscle, so as easily, without dragging, to bring up the lower lid into contact with the upper one. Then, both being made raw by removing a narrow strip of mucous membrane from the inner margin of the edges of the two lids, they were sewn together with three stitches. In the next place, I measured the size of the raw space, thus left exposed, $1\frac{1}{4}$ by $\frac{1}{2}$ inch, and then I outlined, by cutting just through the cuticle, a piece of skin on the inner aspect of the patient's left arm, midway between the axilla and the elbow; it was of the shape of half an oval divided vertically, and measured $1\frac{5}{8}$ by $\frac{3}{4}$ inches; then having introduced four fine black silk sutures through the edges of this half oval piece of skin, and holding the sutures up together, in my left hand and with equal traction, I dissected the skin piece off from the arm, without any fat, or areolar subcutaneous tissue, and without touching the piece of skin with my hands. Then, at once it was put in the vacant space over the lower lid, the straight side, of course upwards. It shrank very much, and looked opaque yellowish white. Then the four suture needles, two above and two below, were carried through the edges of the skin of the gap in the eyelid, and tied. Two pads of boracic lint and wool, dipped in a saturated solution of warm boracic acid, were put close together, one over each of the united eyelids, and then two turns of a light bandage round the head, over this a large layer of wool, then a piece of thin india-rubber sheeting, and another loose bandage, which with the outer wool, and everything down to the inner bandage, was to be taken off once in every half-hour or hour, so as to keep the parts beneath the inner bandage and pads, wet with the warm boracic acid solution.

On the 14th, the next day, the transplanted skin looked as it did the day before. On the 16th, it looked a little bluish, rather dusky, and slightly swollen. The same

treatment was continued. On the 20th, the slightly bluish tinge of the graft was not more decided, in the greater part of its extent, but all along its *lower* border it was

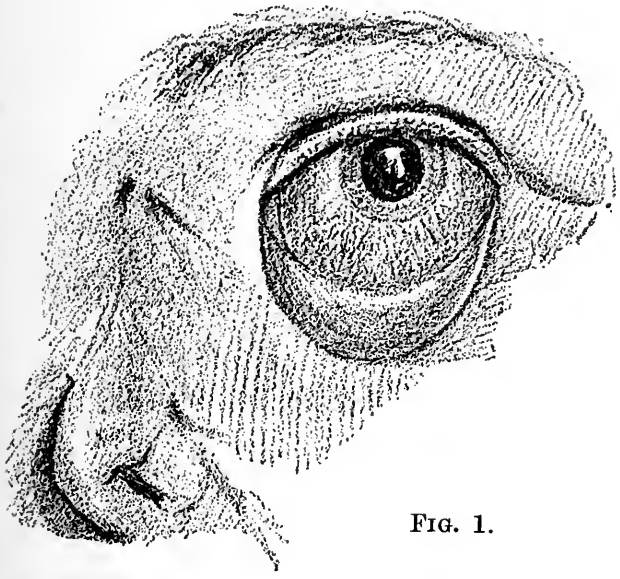

FIG. 1.

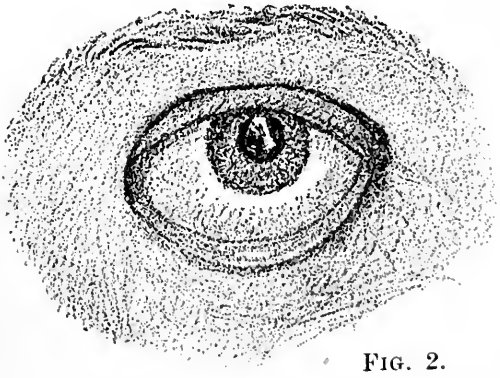

FIG. 2.

much darker, almost black. The epidermis was becoming detached in one piece from the piece of skin transplanted. Dressing continued, as before. On the 24th the trans-

planted skin seemed to have separated itself into two nearly equal parts *horizontally*, the upper next the margin of the lid living, and the lower, hanging almost loose, nearly all dead, dark coloured. On the 27th the whole of this lower half of the graft was now lost and separated, the rest of it was pink and altogether healthy-looking. On the 30th the living half of the transplanted skin was quite safe, and the raw surface below it was healing rapidly. On the 10th of April the gap was filled in and quite healed except at the inner end, where the tears overflow. On the 13th he was discharged.

He returned to the hospital after nine months at the beginning of the present year. The edges of the eyelids were then separated, and made free with a knife, on a director. The left eye has now been again exposed for about six weeks. The patient says the eye is no longer "sore," that he sees better with it, and that it seldom "waters" now. The ocular conjunctiva is now in a normal condition, not red at all.

The deformity is very much less than it was, and the eye is fairly protected now. I suppose the *lower* half of the skin graft died because of the unhealthy cicatricial condition of the skin of the cheek with which it was in contiguity. If it had not died I suppose the cure would have been perfect in every respect.

The other patient is not here this evening. The eyelids in this case have been sewn together, and not yet separated. The patient is a young woman whose lower eyelid was as completely everted as in the first case, the result of a burn. I did the V Y operation six months ago with very incomplete success, so that I have since done another operation by making and dissecting up *two* flaps, pointed downwards as a W (the two middle strokes of the W bisecting the two strokes of the scar of the former Y) and then the inner sides of the two flaps of the W, have been brought up and sewn together. But even this second operation will be but an incomplete success, so that I begin to wish that I had adopted the plan of the large graft, from some

other part where the skin is naturally soft, thin, and pliable.

(*March 13th*, 1884.)

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2. *Jequirity and its value as a therapeutic agent.*

By Arthur H. Benson (Dublin).

Since Wecker published his first experiences of jequirity in the 'Annales d'Oculistique' for July, August, 1882, and Sattler in the 'Klinische Monatsblätter' for May, 1883, recorded the results of his investigations regarding the intimate nature of the ophthalmia produced by it, oculists and physiologists in all quarters of the civilised world have devoted a large share of their attention to this drug. For us who practise ophthalmic surgery in Ireland, any improvement in the mode of treating granular ophthalmia possesses a more lively interest than can be expected to exist amongst those living in communities where this form of conjunctivitis and its consequences are comparatively infrequent.

It is unnecessary for me to occupy the time of this Society by referring to the botanical characters of the plant or to the story of its introduction into Europe as a therapeutic agent. Nor need I trouble you with a description of the results obtained by others. The recent ophthalmic literature is full of such accounts, which are no doubt familiar to all present. What I purpose doing is very briefly to record the mode of preparing and using the infusion, which I have found useful, and to state the results, and then to make a few remarks on the nature of the ophthalmia and the theory of its origin from bacilli.

For the last eleven months I have been using jequi-

rity pretty constantly at St. Mark's Ophthalmic Hospital, and more lately at the City of Dublin Hospital. In all I have employed it in about sixty cases, with almost uniformly satisfactory results.

Preparation.—The mode of preparing the infusion differs in some respects from that adopted elsewhere. The fresh dry seeds, without being decorticated or macerated are ground fine in a hand coffee-mill. Twenty-five grains of the powder are then mixed with one ounce of water and shaken up at intervals for half an hour, when the liquid is ready for use. It is not strained or filtered, but the coarser particles having settled the supernatant fluid is decanted when required for use. In some cases the liquid is not decanted at all. In others it is decanted after having been in contact with the seeds for several days or weeks.

Application.—The mode of application has been pretty uniform. The lids being everted the solution is brushed on abundantly with a hair pencil, the conjunctival *cul-de-sac* being at the same time filled with the liquid. This is repeated from one to ten times in the day, and continued from one to fourteen days according to the result required in each case. In some instances the liquid was dropped into the eye. Both methods produced the same results.

Effect.—The effect of a single application has been, in most cases, the production within six hours of a sharp attack of conjunctivitis, which in another six hours had produced a very definite membrane on the conjunctiva, both of the lids and of the globe, with the occurrence of much pain, swelling, and redness of the lids, photophobia, lacrimation and muco-purulent discharge in abundance. I have never seen the pus fall drop by drop from the lids when the patient bent his head, as Wecker described. Within twenty-four hours the maximum effect had been reached, the membrane could be lifted off the conjunctiva without causing it to bleed, and usually without causing pain. For the next twelve hours or so the inflammation remained at its height. From this time the stage of re-

trogression began, and within twenty-four or forty-eight hours more the membrane had generally wholly disappeared leaving the conjunctiva pale, opaque, and somewhat milky-looking for a day or so longer.

Result.—The result has been in most cases an immediate diminution of the granular ophthalmia and of the pannus when such was present. In most cases the application had to be repeated often and for long periods of time before the granulations were destroyed. In some cases the solution has been applied as often as ninety times within a few weeks. In other cases three or four applications seemed to effect a cure. In one case in particular the most perfect cure has been obtained, but it took three months to get it. The boy had been under treatment in the hospital for five months previous to the use of jequirity, and was treated with sulphate of copper, &c., assiduously all that time, but with hardly any benefit. After three months of jequirity treatment, his conjunctiva was wholly free from granulations, his cornea was clear from the pannus, and the boy looked as though he had never suffered. I have noticed a very great difference in the rapidity with which, under the same treatment, cases will recover; and I am of opinion that jequirity will be found to do comparatively little good where the palpebral conjunctiva is in a thick, soft, congested state, with deep furrows between the granulation masses, and where there is but little pannus, and no tendency to contraction of the tarsus; whilst it will act like a charm on the more definitely trachomatous cases where the conjunctiva is hard and the so-called granulations are prominent and bloodless, and where there is a distinct tendency to entropium and much pannus especially in old-standing cases. I have never found jequirity do permanent harm, even where the cornea was ulcerated. In most cases of chronic ulceration it seems to act beneficially on the cornea, although in some cases the cornea in the neighbourhood of the ulcer became infiltrated. This, however, soon cleared off. In one case an attack of iritis occurred each time the infusion

was applied, but this too passed off in a few days without leaving any permanent traces. This patient had four or five transient attacks of iritis while under treatment for his ophthalmia.

In some forms of strumous keratitis, where with dense pannus the palpebral conjunctiva was almost normal, jequirity destroyed the pannus which other treatment had failed to do, and this without apparently injuring the conjunctiva. It is true that in the hands of some oculists the most untoward results are stated to have occurred, Galezowski, Parisotti, and others cease not to write of the "insuccess of jequirity" and its lamentable results.

The constitutional disturbances caused by the occurrence of jequirity ophthalmia are often very severe; the temperature increases steadily until the membrane is fully formed; it may rise several degrees above the normal. There is headache, furred tongue, restlessness, loss of appetite, and in some cases severe vomiting. The susceptibility of the conjunctiva to jequirity seems to diminish with each attack, until finally it becomes impervious to its influence. A period of rest again partially restores its susceptibility.* To obtain the maximum result in the shortest time, the solution should be applied to the conjunctiva several times at short intervals before the membrane forms. To keep up the effect the conjunctiva should be brushed with the solution three or four times a day for as long as it is desired to keep up the membrane. The stronger the infusion the more intense is the ophthalmia, but it is not proportionate to the strength. It is probably better not to filter the solution, but to leave it in contact with the seeds, decanting the supernatant liquid as required. The process of decortication and

* In this connection it may be noted that the boiled seeds of jequirity are said to be used as an article of diet in Egypt. In India cattle are maliciously poisoned by shooting them with arrows whose points consist of a cone of hardened jequirity paste. The owners of the cattle, however, protect them by previous inoculation with small quantities of jequirity, which gives them immunity from the effects of subsequent larger doses. Cornil and Berlioz found the same thing true of rabbits.

maceration is unnecessary. The perfectly fresh solution within half an hour of its manufacture will produce the ophthalmia. The dry freshly powdered jequirity will also produce the ophthalmia with great intensity.

In jequirity we possess a safe, comparatively speedy, and efficacious method of treating granular ophthalmia.

To what does jequirity owe its remarkable properties? Since Sattler published the results of his experiments it seems to have been generally agreed that the question was a settled one. That there existed in jequirity infusion a bacillus, and that this bacillus produced the ophthalmia, and that without the presence of this bacillus or its spores no result followed the application of jequirity. Many physiologists, notably Cornil and Berlioz,* experimented on rabbits, guinea-pigs, and frogs, and their experiments still further confirmed Sattler's views. I was anxious to make out for myself something of the life-history of this ophthalmia. To find at what period of the inflammation bacilli could be discovered in the secretions from the eye and in the membrane, and thus to connect their development with that of the ophthalmia.

For that purpose in January last I admitted into St. Mark's Hospital three boys suffering from well-marked granular ophthalmia. One application of freshly prepared jequirity infusion was made to each eye. Six hours after, when the irritation began to show itself, microscopical preparations were made of the secretion from each eye. Six hours later slides were again prepared of the secretion and of the membrane, which by this time had formed. Twelve hours later similar slides were taken, and so on every twelve hours till the membrane disappeared, which it did on the third day. These preparations were stained with gentian violet and mounted in Canada balsam. I have here to thank Dr. Keane, the house surgeon at St. Marks, for the care he took in obtaining the specimens, and for the help he gave me in preparing the material for this paper.

* 'Archives de Physiologie,' Nov. 15th, 1883.

My own examination of these preparations of the discharge and of the membrane failed to discover the presence of a single one of the typical bacilli. Fearing that some error of preparation or of observation prevented my seeing the bacilli that I had so confidently expected to find, I brought three *other* boys, all well-marked cases of jequirity ophthalmia, to the physiological laboratory of Trinity College, and asked my friend, Professor Purser, to examine the secretion and membrane for me, which he kindly did. I subsequently brought down slides from three others, and had their secretion examined, but in all these cases also not a single jequirity bacillus could Professor Purser find. We therefore came to the conclusion that they did not exist in the secretions at all or in the membrane.

An examination of the jequirity infusion itself showed that when freshly made (as above described) it was free from bacilli, and remained free for a varying time. I prepared two specimens of unstrained infusion, in, as I believe, an exactly similar way, kept them both unstoppered in my consulting room at a fairly uniform temperature of 60° F. to 65° F. and examined each night and morning. In both the characteristic freely moving bacillus of jequirity appeared only after three days. Some time later I noted that one of the solutions had not changed colour, whilst the other had assumed the usual dirty-green hue which has so often been described. At the end of a week from the first appearance of bacilli, and ten days after the manufacture of this infusion, I noted that the bacilli were entirely motionless, there was a deposit at the bottom of the bottle, which on being examined was found to consist almost entirely of motionless, probably dead bacilli, having all the appearances of those seen in active motion before. The other infusion still swarmed with bacilli in most active motion. I kept these infusions side by side in my room, examining them every now and again, and invariably the one was green and showed innumerable bacilli, in every kind of motion, whilst the other was

clear or only slightly opalescent, without a shade of green, and showed only motionless or dead bacilli lying at the bottom. After six weeks these two fluids still retained their respective characters; the green fluid had, however, become considerably thickened by evaporation, and rapid decomposition seemed to be going on in it, as evinced by a very copious discharge of gas which kept bubbling up through it constantly. Moreover, it had become inhabited by a very great variety of micro-organisms.

Pathology.—Wishing to test the efficacy of these two solutions, each six weeks old, I applied some of the green infusion to one eye, and some of the clear infusion to the other eye, of a boy who came for the first time to my clinique that day. The application was made only once to each eye. When the boy returned next day the conjunctiva of each eye was covered with a membrane of unusual thickness and extent. It occupied the whole of the conjunctiva, both ocular and palpebral, and could be lifted off as a whole. The smaller specimen which I show is from the lower lid of this boy. Microscopical preparations were made of the membrane from each eye, but in these too no bacilli could be found. No further application was made in his case, but the next day he returned with another membrane formed just as thick as the first; this which I show is the membrane raised off his lower eyelid and the ocular conjunctiva. It will be seen that it forms a complete cast of the inferior *cul-de-sac,* and is unbroken except at the extremities. A third membrane formed as thick as the previous; this I show.

I repeated the experiments with these solutions on the eyes of a girl, with exactly similar results; the membranes formed were, however, not so dense as in the case of the boy.

The discharge and membrane are non-infectious.—To try whether jequirity ophthalmia was capable of being conveyed by the discharge from one eye to another, I took a child suffering from a very mild attack of granular

ophthalmia, who had never had jequirity used, and into her eye I transferred the large fresh membrane that was formed on the boy's eye after the first application. I had the two sitting side by side, so that it was transferred without a second's delay, hot from his eye, which was swollen and intensely inflamed, into her eye. Having placed the transported membrane under her upper lid I bandaged her eye, covering it with wool to kept the mass well in contact with the conjunctiva. Next day I examined her eye, and found absolutely no sign of any inflammation whatever having been set up by the membrane.

I then again inserted into her eye a large piece of the second membrane found in the boy's eye, the children here also being placed side by side, and the transfer being effected without delay. On this occasion the eye was not bandaged. The result of this second inoculation was likewise entirely negative. These experiments seem sufficiently conclusive, and, taken in conjunction with those performed elsewhere, show that jequirity cases may with safety be treated in the same ward with other patients.

Jequirity freshly powdered and sprinkled on the conjunctiva will produce a well-marked membrane in the same time as the solution. I ground some jequirity and put it into a muslin bag which I shook over the conjunctiva of the everted eyelids so as to allow the finest dust of the jequirity to fall on it. The eye was then bandaged, and the result was a very thick typical membrane and well-marked jequirity ophthalmia.

In the 'British Medical Journal' of March 10th, in a note on the subject it stated that the active principle of jequirity was a "something which does not exist in the infusion for a certain time after it is made." My experiment disproves this.

Whilst endeavouring to make my observations tally with those of Sattler, and finding it most difficult, I came across Dr. Klein's paper in the 'Centralblatt für die medicinischen Wissenschaften' of February 23rd, in which

he combated Sattler's views regarding the part played by micro-organisms in jequirity ophthalmia, and I was very pleased to find that his results were entirely confirmatory of mine. He found that fresh jequirity infusion without a trace of micro-organisms (as proved by cultivation experiments) produced characteristic ophthalmia; that the conjunctival discharges contained no bacilli; that they possessed absolutely no infective characters, and cultivation experiments with them failed to obtain a crop of bacilli. He found, further, that the infusion if boiled for a certain time lost its power of producing ophthalmia, but did not fail to produce a crop of bacilli, but that these were incapable of producing ophthalmia. From these he concluded that the ophthalmia was produced by a non-organised ferment, something like the pepsin ferments, which was destroyed by boiling, but that the bacilli were merely accidental impurities in the infusion.

It seems then that jequirity ophthalmia can be produced—

1. By the dry jequirity freshly powdered.
2. By the perfectly fresh infusion in which no micro-organisms exist.
3. By an infusion in which active, recently-produced bacilli exist.
4. By an infusion in which the bacilli, having been active, have ceased to move and are presumably dead.
5. By very old (six weeks) infusions, in which an immense variety of different kinds of micro-organisms exist.

Sattler states that corrosive sublimate (1 in 10,000) in a solution of jequirity prevents the formation of bacilli, but permits a very intense ophthalmia. In other words, it matters not whether the bacilli or their spores are present or absent, whether the bacilli if present are alive and in motion or not, the ophthalmia is the same.

On the other hand, no ophthalmia is produced by—

1. *Boiled jequirity* solution (although the bacilli can be grown in it).

2. By the *discharge* from the eye or the membrane formed on the conjunctiva.

It would seem, therefore, that Sattler's views regarding the nature of the active principle of jequirity require modification.

(*March* 13*th*, 1884.)

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3. *On the relation of bacilli to jequirity ophthalmia.*

By W. A. Brailey, M.D., and H. W. Pigeon.

The authors showed a series of preparations showing the development of the bacilli in the infusions of jequirity. The bacilli began to appear directly the infusion was made, and went on increasing in number for two days. They continued abundant till the fifteenth day.

The discharges from the ophthalmia produced by inoculation with recent jequirity infusion were found to contain bacilli immediately after the inoculation, but the number of these gradually decreased for four hours, subsequent to which time no bacilli were to be found without re-inoculation.

The authors concluded that the bacilli found in the discharge were simply those introduced by the inoculation, and that the bacilli do not grow in the conjunctival sac, and are not essential to the inflammation produced by jequirity.

(*December* 13*th*, 1883.)

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4. *A case of severe conjunctivitis with formation of membrane on the corneæ, caused by whisky thrown into the eyes.*

By G. A. Brown (Tredegar).

On the 18th of September last (1883) I was called to see a man, æt. 50, by trade a whitesmith. I found both his eyes closed, the lids greatly swollen, and a yellowish, sanious, semi-purulent discharge was escaping from between them. I had some difficulty in opening the lids sufficiently to expose the globe, when the corneæ appeared covered in their lower half by a diphtheritic-looking membrane, which peeled off at its edges, leaving the surface of the cornea clear, but was firmly adherent at its central parts. The upper half of the cornea was clear. The conjunctivæ were deeply injected but were not chemosed, in several places there were slight ecchymoses. The man complained of constant and severe circumorbital pain and great intolerance of light, and there was considerable constitutional disturbance. I could get no history beyond a statement that the man had been drinking heavily, and that the attack had commenced suddenly two days before.

I ordered the eyes to be gently syringed every two or three hours with a tepid solution of boracic acid, and belladonna fomentations to be constantly applied, and I prescribed a grain of opium every sixth hour and a brisk saline purgative in the morning.

The following day the man was much easier, the discharge had diminished, the swelling of the lids was less, and the membrane was still further loosening at the edges. By the third day of my attendance the corneæ had become clear, but the injection of the conjunctivæ and the ecchymoses were present for a few days longer, together with some photophobia. At the end of a fortnight, however, the man had completely recovered.

He subsequently confided to me that his wife, irritated by his continual intemperance, had thrown a glass of neat whisky, which he was about to drink, into his eyes, and had thus caused the state of things above described.

(*March* 13*th*, 1884.)

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5. *Peculiar conjunctival affection.*

By Anderson Critchett and Henry Juler.

Hannah H—, æt. 50, married; health good. Nine months ago she had an attack of "cold in the eyes" accompanied by gritty sensation, muco-purulent discharge, and redness of the conjunctiva. Since then the eyes have never been quite well, but during the last six weeks the right eye has steadily become worse.

Present condition.—Right eye: the whole fornix conjunctivæ is greatly thickened so that both the upper and lower *cul-de-sac* are almost obliterated, and the upper lid cannot be everted. The ocular and palpebral conjunctivæ are also thickened and congested. The central three fourths of the cornea are clear and unaffected, but at the circumference the conjunctival layer is seen to be thickened and opaque. V. = $\frac{6}{36}$. *Left eye:* the cornea is unaffected. The ocular and palpebral conjunctivæ are slightly congested, but that of the upper *cul-de-sac* is becoming similarly thickened to that of the right eye. V. = $\frac{6}{18}$.

(*December* 13*th*, 1883.)

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6. *Papilloma of the conjunctiva.*

By Anderson Critchett and Henry Juler.

The patient is a healthy girl, æt. 14. Vision normal. For some five years a small reddish mass has been noticed near the inner canthus of the right eye. This has steadily increased to its present dimensions. It has never given rise to any pain, and now only causes occasional discomfort. The growth consists of a fleshy-looking mass, similar in colour to the caruncle. It is about 2 cm. wide and ½ cm. thick. It occupies the inner half of the palpebral sac, being situated between the lower lid and the globe. The greater portion of its surface is free and moveable, whilst its base is firmly adherent to the lower *cul-de-sac*. When the eyelids are closed the free edge of the growth just protrudes through the inner portion of the palpebral fissure.

(*December* 13*th*, 1883.)

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7. *Bony tumour of conjunctiva* (*microscopical section*).

By Simeon Snell (Sheffield).

Florence W—, æt. 13, was admitted into the Sheffield General Infirmary on September 30th, 1882. Her mother informed me that since earliest infancy she had observed in the right eye "a piece of skin," which protruded when the child turned the eyes to the left. There had been no complaint of pain, and no notice was taken of the condition mentioned, until a few weeks previous to coming under my care, since which time it has appeared to have increased in size and has become more inconvenient. Examination disclosed a tumour situated beneath the con-

junctiva, between the cornea and the external canthus, and somewhat under cover of the upper eyelid. It was more distinct when the eye was turned inwards. It was about the size of an almond or less, and felt hard at the centre. On October 2nd the conjunctiva was divided and the growth readily removed; the wound was closed by sutures. On the 6th she left the infirmary.

The growth consisted of adipose and fibrous tissues, with a central hard nucleus about the size of a large pea; it was surrounded by a fibrous covering (periosteum). Dr. J. B. Story, of Dublin, kindly made for me the beautiful section of the hard nucleus which I show this evening. It is an excellent example of true bone. It presents Haversian canals, lacunæ, and canaliculi of typical character.

The presence of a tumour containing true bone in the situation of the case related must be very rare. Mr. Anderson Critchett, in the 'Transactions,' vol. ii, relates a similar case, which he deemed unique. Mine closely resembles his in its situation, and in probably being congenital.

(*July 4th*, 1884.)

The prevention of blindness from ophthalmia neonatorum.

At the March meeting of the Society, in consequence of a communication by Dr. David McKeown, of Belfast, a committee was appointed consisting of the President, Mr. Frederick Mason, Dr. C. E. Fitzgerald, Dr. Argyll Robertson, Mr. Brudenell Carter, Mr. Priestley Smith, Mr. Tweedy, Mr. R. Marcus Gunn, Dr. David McKeown, and the Secretaries, to investigate as far as possible the relative frequency of blindness from ophthalmia neonatorum in this country. At the June meeting the Committee presented the following report which was duly adopted. It should be added that the resolutions are substantially

the same as the ones originally proposed by Dr. D. McKeown.

In answer to a very large number of inquiries from private persons, ophthalmic and lying-in hospitals, and from institutions for the blind, we have received twenty-three statistical replies, all of them from institutions for the blind.

Four of these, viz. those of the Belfast Deaf, Dumb, and Blind Institution, the London Society for Teaching the Blind to Read, the Blind School at York, and the Blind Institution at Hull are decidedly superior, being tolerably explicit. Moreover, the answers appear to us from other evidence to be trustworthy. In the first (Belfast), 30 per cent. of the persons concerned owe their blindness to ophthalmia neonatorum. In the second (the London Society, &c.), 20 per cent. are certainly blind from this disease, but from the extremely frequent occurrence of "congenital cataract" and "cause unknown" in cases of blindness from birth, we are of opinion that at least another 10 per cent. should be added, thus making again 30 per cent. In the third (the Yorkshire School), 41 per cent. are blind from this cause. And in the fourth, that at Hull, five cases out of fourteen personally examined by Dr. Rockliffe, 35 per cent., are with certainty attributable to the same disease.

The statistics of the other institutions are so inexplicit as to be of little direct value, but their figures, so far as they go, point to about the same results. It will be observed that these numbers agree substantially with those of foreign investigators, notably those of Reinhard, who, on investigation of twenty-two German blind asylums, found 658 blind from this disease among a total of $2165 = 30\frac{1}{2}$ per cent.

The Committee also recommend the adoption by the Ophthalmological Society of the following resolutions, which they have slightly modified from those originally suggested by Dr. David McKeown.

(1) That the purulent ophthalmia of newborn infants being the cause of a vast amount of blindness, mainly because of the ignorance of the public regarding its dangerous character and the consequent neglect to apply for timely medical aid, it is desirable to instruct those in charge of newborn children by a card, in substance as follows :

Instructions regarding newborn infants.—If the child's eyelids become red and swollen, or begin to run with matter, within a few days after birth, it is to be taken without a day's delay to a doctor. The disease is very dangerous, and, if not at once treated, may destroy the sight of both eyes.

This to be distributed through the medium of the Poor-law and Birth Registration organisations of the United Kingdom. In England the Relieving Officer, and in Scotland the Inspector of the Poor should, in every case of labour under the Poor-law system, read to and leave with the person obtaining the order for medical aid, or the persons in charge of the patient, a copy of the card. In Ireland the card should be attached to the order for medical aid in such cases, and the person who gives the order and card should, before doing so, read the card to the applicant. The Registrar of Births should read and hand to each person registering a birth a copy of the card.

(2) That the advocacy and aid of the medical press be solicited in drawing general attention, and especially that of the authors of text-books on midwifery, of the lecturers on the same subject for students and midwives, and of the various institutions which train, and charitable institutions which employ midwives, to this important subject.

(3) That a copy of the first resolution be forwarded to the respective Presidents of the Local Government Boards of England and Ireland, and of the Board of Supervision in Scotland, and such other persons, if any, as may be necessary, and that a deputation be appointed to wait upon the said Presidents and other persons, if necessary, and urge upon them the official adoption of the views therein

expresed, and to take such other steps as they consider necessary.

Signed, FREDK. MASON,
Chairman of the Committee.

This report having been adopted, the following members of the Society were appointed to take charge of the report, in accordance with Resolution 3, viz., Sir William Bowman, Bart., F.R.S.; Mr. Jonathan Hutchinson, F.R.S.; Mr. Brudenell Carter, Mr. Tweedy, Dr. David McKeown, and the Secretaries.

On the motion of the President, a vote of thanks was accorded by acclamation to the Committee who had drawn up this report, and to the representatives of the Obstetrical Society who had given valuable aid to that Committee.

II. DISEASES AND TUMOURS OF THE ORBIT.

1. *Case of proptosis, first of one and then of the other eye, in association with enlargement of various glands.*

By Jonathan Hutchinson, F.R.S.

Mr. S—, a Hindoo barrister, came over to England in September, 1882. I saw him in consultation with his brother, who was a surgeon, on the day after he landed. His right eye had been lost by inflammation after an operation for the removal of an orbital tumour, and his left eye was now in a condition of extreme proptosis. The lower lid was everted, and the whole of its mucous membrane exposed. The prominence of the eyeball and the eversion of the lid were very much greater than they are shown in the photographs, as these were not taken until about two months after the commencement of treatment.

Mr. S— believed that the condition of his left eye was now almost exactly similar to that of the right at the time the operation was performed. It is to be noticed that the proptosis was decidedly downwards. The movements of the eye were not much interfered with, but there was much conjunctival congestion and chemosis. The edge of the lacrimal gland, greatly enlarged and very firm, could easily be detected on a level with the upper margin of the orbit. On careful examination I could not feel certain of the existence of any definite tumour-growth in other parts of the orbit.

The upper eyelid hung rather loosely, but it was of course quite impossible to close the lids. There was a general puffiness of the whole of the face, especially in the parotid region and under the jaw. The subcutaneous

cellular tissue and fat being abundant definite examination was rendered difficult.

Mr. S— brought with him an excellent narrative of his case, written out by Mr. Cayley, of Calcutta, who had attended him there, and by whom the operation had been performed. It appeared that Mr. S— had always had full eyes, and that about three years ago it was for the first time noticed that his right eye was rather more prominent than the other. There was, however, nothing that was inconvenient or unsightly until about two years later, when the prominence had very greatly increased, and a firm tumour could distinctly be felt in the region of the lacrimal gland. Subsequently another growth was recognised in the lower part of the orbit. There was little or no pain, and Mr. S— was in his usual health. By degrees the eyeball was so much pushed out that the lids would not cover it. Mr. Cayley's notes state that the cornea had begun to look steamy, and the sight was somewhat affected. In April, 1882, an operation was performed, and the external canthus having been freely divided, the lids were dissected up and down, and first the lacrimal gland removed and next a firm lobulated mass, which occupied the outer and lower part of the orbit and adhered firmly to the periosteum. As far as could be ascertained, the whole mass was got away, and without injuring the eye or its muscles.

For a few days after the operation sight remained good, but eventually suppurative inflammation of the orbit ensued, the eyeball was again pushed out, and the cornea sloughed. After this the remains of the eyeball collapsed and receded, no fresh growth in the orbit taking place. The tumours removed were examined by Dr. MacConnell, the pathologist of the Calcutta Medical College, who described the one as glandular and developed from the lacrimal gland, the other as composed of fibro-adipose tissue, the fibrous elements preponderating; ("delicate, nucleated, fibro-elastic filaments").

Such was the history of the eye which had been first

affected and which was now lost. It is to be especially noted, as bearing upon the nature of the new growth, that there had been no recurrence, the condition of the parts in the orbit being much as is usual after suppuration of the eyeball from any other cause. At the time that the operation was performed there was no reason to suspect anything amiss with the left eye, but within a week Mr. S— was alarmed by finding that it was taking on exactly the conditions which had been observed in the first stages of the right. It became prominent for a time and then receded, and then became prominent again. He now determined to come over to England for advice, and left Calcutta on July 22nd. During the voyage the proptosis very greatly increased.

The condition of things at the time that he landed I have already described. It was sufficiently alarming, and Mr. S— was in great distress, regarding the loss of his remaining eye as almost inevitable. On the most careful examination I could detect nothing in his general health nor elicit any facts in his personal or family history which threw any light on the nature of the disease. He had worked hard in his profession, but had always enjoyed fairly good health. The proptosis, although attended by some difficulty in breathing, had not been associated with headache, nor as yet with any material diminution of sight.

As the result of the operation in the other orbit had not been encouraging, I decided to try, for a time at any rate, other measures. Mr. S— was admitted into Fitzroy House, a hospital home, and was treated by the sedulous application of ice over the forehead, the eye itself, and to the back of the neck. He also took six grain doses of iodide of potassium. Within a week a very considerable improvement had taken place; the eyeball was less prominent, the swelling of the conjunctiva less, and the lacrimal gland not so easily felt. The same measures of treatment were persevered with for about a month, when the recession of the eyeball was such that he could

close the lids. It was at this stage that the photograph was taken.

There was still, however, a roll of everted mucous membrane visible below. At this time Mr. S— was allowed to go out, and the use of the ice was much interrupted; for a week also he omitted the iodide. A relapse took place, and the border of the lacrimal gland again came prominently forward. I now suggessed a consultation with Mr. Bowman and Mr. Nettleship, and this took place in the early part of November. It resulted in an increase of the dose of the iodide and the addition of small doses of mercury.

It should have been stated that before this I had discovered that the edges of the parotid gland on each side could be distinctly felt, projecting as a firm lobulated mass forwards on the masseter. The edge of these glands, although not quite so hard, was to the touch remarkably like that of the lacrimal gland. There was also some enlargement of the lymphatic glands on both sides of the neck. The result of the more vigorous treatment was as satisfactory as it had been in the first instance, and my note on December 6th states that the eye had receded so that he could again quite close the lids, that the lacrimal gland could be discovered only by deep pressure, and that both the parotid and the lymphatic glands were very much reduced in size. Mr. S— at this time appeared quite well and was accustomed to take much exercise.

A month later he returned to Calcutta. The eyeball at this time had receded almost to its natural position, but there was still a narrow rim of everted mucous membrane visible between it and the lower lid. He was to continue the iodide and increase the dose if threatened with relapse.

In attempting to investigate the nature of this remarkable case, we must remember that amongst the conditions which were demonstrable was the enlargement of glands of three different functions, a salivary gland (the parotid), the lacrimal gland, and the lymphatics of the neck. In

each instance the enlargement was firm and fleshy, quite painless, and without tendency to inflammation. The increase in size of the lacrimal gland, although coincident with the proptosis, certainly did not cause it. The gland overhung the eyeball and was moveable on it. We are driven therefore to the belief that there must have been some swelling of the fibrous or fatty contents of the orbit which caused the prominence of the globe. Whatever it was it appeared to be capable of spontaneous diminution and prone to relapse, and to be, as well as the enlargement of the several gland structures, definitely under the influence of the iodide of potassium.

Remembering the degree of recovery which took place and the fact that there has been no fresh growth in the right orbit, it is not possible to entertain the suspicion of malignant disease. My impression is that the case should be placed in the same group with certain rare examples of the symmetrical formation of ill-defined but more or less lobulated masses of fibro-fatty tissue in the region of the neck. This affection was, I believe, first well described by Brodie. I have seen several examples of it, and Mr. Morrant Baker has reported a series of cases in the 'Transactions of the Clinical Society,' and has very carefully investigated its nature. In several cases portions of these tumours have been excised and demonstrated to consist of fibrous and fatty tissue. But in at least one case under my own care there appeared reason to suspect that the case was complicated by adenoma, death ensuing with symptoms of intra-thoracic disease. I have never as yet in any of these cases observed the symptom of proptosis, nor witnessed enlargement of the lacrimal gland, but in a case which was sent to me recently by Mr. George White, of Hackney, the parotids were enlarged in exactly the same way as has just been described in the case of Mr. S—.

In this instance, the patient, a man æt. 40, had huge symmetrical masses on the back of his neck and under his jaw, whilst in each forearm near the elbow there were

several of the common subcutaneous fibro-fatty tumours. I show a photograph of this patient.

I excised a portion of one tumour and proved that it consisted of fat. It is to be clearly recognised that in these cases the condition is one not of new growth, but of hypertrophic development. The fatty masses are continuous with the subcutaneous fat. They are, however, remarkably local and are not coincident with any marked tendency to general obesity. In the case first mentioned they were associated with isolated fatty tumours in the forearms.

It seems probable that we ought to widen our views of this group of affections and not too much restrict conception of its features to the typical and more common cases described by Brodie and Mr. Morrant Baker. In these the patients are almost always men, and the fatty outgrowths occur at the back of the neck. In women, if I mistake not, there is a parallel affection in which the fat accumulates not at the nape, but deep in the root of the neck. The cases which I have cited prove that in some instances there is with the tendency to local fat hypertrophy a liability to increase in size of glands. Perhaps on closer examination we may find that this conjunction is the rule instead of the exception. Very probably the apparent increase in the size of the glands is due rather to overgrowth of interlobular fat and cellular tissue than to increase of gland elements. This would explain why we find glands of very different functions simultaneously affected. There may be cases—and I think I have seen some—in which general hypertrophy of glands of the same nature occurred without any form of fatty outgrowth; for example, symmetrical hypertrophy of the parotids. The physical cause of the proptosis in Graves' disease is not well understood, and in many cases it appears to be in part at least hypertrophy of fat. This singular malady may possibly be a member of the same family group.

It is to be noted that some of the cases of the Morrant Baker type are accompanied by very marked disturbance

of nerve functions. The man whose case I have mentioned was excitable to the verge of insanity. It is to be noted further that these fatty outgrowths are liable to remarkable alterations in size in connection with the state of health and mode of life of the patient. Mr. Baker has observed that they usually happen to be heavy beer drinkers and are benefited by abstinence. I can corroborate this observation, and may add that I have known definite reduction of size from change of air from London to the country.

I fear it may be thought that I have entered upon a disquisition which is surgical rather than ophthalmic. It must be remembered, however, that my aim has been to discover the nature and probable cure of a malady which is special so far that it leads to destruction of the eyes, but which probably in all its relationships outsteps the domain of the ophthalmologist.

(*July* 3*rd*, 1884.)

Dr. Stephen Mackenzie remarked that he was very much interested to hear towards the close of Mr. Hutchinson's paper some remarks on Graves' disease in which he appeared to trace some relationship between his case and that disease. He would like to ask Mr. Hutchinson whether any change was found in the thyroid body or any pulsation of the vessels of the neck, or whether palpitation or evidence of disturbance of the heart's action or rhythm had been observed. Of course, it would not be contended by anyone that Mr. Hutchinson's case was a characteristic example of Graves' disease, but it seemed to have certain alliances with that disease. It was a point on which there was now a general agreement that the immediate cause of the proptosis in Graves' disease, or the anatomical condition that was associated with it, was an overgrowth of the orbital fatty and connective tissue. But this was not the primary cause that led to the proptosis, there being an antecedent vascular disturbance which led to this overgrowth by over-supply. Now, the

application of ice to the neck was known to have a remarkable influence not only on the swelling and vascular excitement at that part in Graves' disease, but in diminishing also the proptosis. It was therefore a point of much interest in Mr. Hutchinson's case that the proptosis subsided in a great measure in the first instance on the local application of ice. It was true that iodide of potassium was at the same time administered in small doses. The impression conveyed to his mind was that Mr. Hutchinson believed at the time that the ice was the active agent in reducing the swelling. It was therefore important to ascertain from Mr. Hutchinson what was the small dose of iodide of potassium administered in the first instance, and to what extent this was augmented. Mr. Hutchinson had drawn attention to the fact that several glands with quite different functions underwent enlargement in his case. In Graves' disease, whether it was regarded as a disease of the central nervous system, the brain or spinal cord, or of the cervical sympathetic nervous system, there was, in any case, a widely-spread vascular disturbance, and it was readily conceivable that in Mr. Hutchinson's case a widely-spread vascular disturbance of nervous origin was the cause of a simultaneous enlargement of glands functionally disassociated.

Mr. Eales (Birmingham) was much interested in the case described by Mr. Hutchinson, as he had a case, which appeared to be precisely similar, under his care at the present time, and which he had thought almost if not quite unique. It was that of a man, aged about 45 years, who had for many years worked as a puddler at a glass furnace, who came to the Eye Hospital some weeks ago in consequence of a rapid protrusion of both eyes, accompanied by headache. On admission there was considerable exophthalmos of both eyes, most marked on the left side, much conjunctivitis, and considerable chemosis—moreover, the lacrimal glands were found remarkably swollen, and protruded forwards under the cartilage of the upper eyelid. The left side of the face, which was most

exposed to the fire, presented the results of chronic scorching. Both optic discs were of a rosy pink hue and the retinal vessels were larger and more numerous than is usual, but there was no effusion on the papilla. He (Mr. Eales) considered the condition of the fundus oculi rather as the result, the man being constantly before the fire, than a new condition associated with the proptosis; as this appearance was often found in puddlers and remained unaltered for several weeks. In the present case, though all the other symptoms had considerably subsided under treatment by iodide of potassium, vision was unimpaired.

Prof. Brockman (Madras) inquired what nationality Mr. Hutchinson's patient belonged to. Elephantiasis, he said, was common amongst the Eurasians, and not infrequently was accompanied by proptosis. In these cases mercury and iodide of potassium were useful. Possibly Mr. Hutchinson's was a case of this nature.

Mr. Hutchinson, in reply, said that his patient was of the Indo-European stock, that is, a Hindoo. He did not believe, however, that either race or locality afforded any explanation of the disease, for it had appeared quite as exceptional to the distinguished surgeons who had seen him in Calcutta as it had to himself. He had carefully questioned the patient on this point, and he stated that he had never heard of any Hindoo who had suffered in a similar manner. It was not desirable to connect the case too closely either with Graves' disease or with the symmetrical fatty outgrowths which were associated with Mr. Morrant Baker's name; whilst it had features of resemblance to both it differed from them both in some important particulars.

Thus, the patient had never suffered from palpitations, nor displayed any nervousness or irritability of temper, as is usual in the former, nor had he any enlargement whatever of the thyroid. From the fatty outgrowth type the case differed in that there were no fatty growths on the nape of the neck, whilst proptosis was a symptom which had, he

believed, not yet been observed in any case of this class.

In spite, however, of these important differences, it was, he thought, of much interest to place these several maladies together as individual members of the same family group. There were certain cases in women, usually in those a little past middle age, which were characterised by the development of ill-defined fatty lumps symmetrically placed deep in the neck. These were, he believed, almost always attended by nervousness and irritability, and were liable to remarkable variations in connection with change of air and varying states of health. Cases of the Morrant Baker type almost invariably occurred to men. It might be suggested that something of the nature of vaso-motor disturbance favouring local hypertrophies was the bond of connection between the different members of a family group which he had tried to constitute. This, however, was conjecture, the important practical point being that the local use of cold seemed to be of great value in controlling them. It was his knowledge of the value of cold in Graves' disease which had in part induced him to use it in the present instance.

In reply to those who had asked whether he thought that the cold or the iodide of potassium had been the chief agent in the cure, he must say that it was impossible to speak with confidence. He felt no doubt that both had helped. The dose of iodide had never exceeded fifteen grains every four hours.

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2. *Orbital tumour* (*sarcoma ?*).

By A. Emrys-Jones, M.D. (Manchester).

Mary C—, æt. 50, was admitted to the Manchester Eye Hospital on June 2nd, 1883. She received a blow

over the right eye twelve years ago. For the last two and a half years the eye has "watered occasionally and has been puffed up from time to time." She noticed at this period that the right eye was at a lower level than the left. Her general health has been excellent and her family history good.

Right eye pushed down; no exophthalmos; ciliary border of right eyelid a quarter of an inch lower in level than left. On digital examination of upper lid, an elastic lobulated tumour can be felt below the upper border of the orbit, extending deep into the orbit.

Motion upwards diminished. Vision $\frac{6}{6}$. Media of eye normal. Left eye normal. A longitudinal incision about an inch and a half long was made over the tumour and the tissues were carefully dissected and as much of the growth removed piecemeal as possible, numerous adhesions to the bone being found. The wound healed by first intention and movements upwards became more free.

On August 11th, nodular growth distinctly felt in same position. A similar incision was made and growth again removed; wound healed satisfactorily.

She complained of severe pain over the right eye and some hard glands could be felt in front of lobe of right ear, and at present (December 13th) some small hard glands can be felt in front of sterno-mastoid muscle in the neck, and patient looks yellow and cachectic. The tumour has not grown much lately.

My friend, Professor Dreschfeld, reports that, microscopically it is composed entirely of small round cells with large granular nuclei, some fine embryonic blood-vessels filled with blood-corpuscles. He thinks it must be a sarcoma, and he says if it had occurred in the retina he would call it a glioma on account of the close resemblance of the cells to glioma cells. No glandular structures can be detected, although from its position it is probably connected with the lacrimal gland. In some respects it resembles Mr. Power's case described in page 253 of the second volume of the Society's 'Transactions,' but it seems

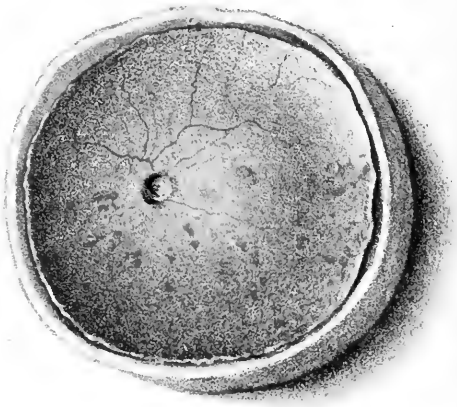

Fig. 2.

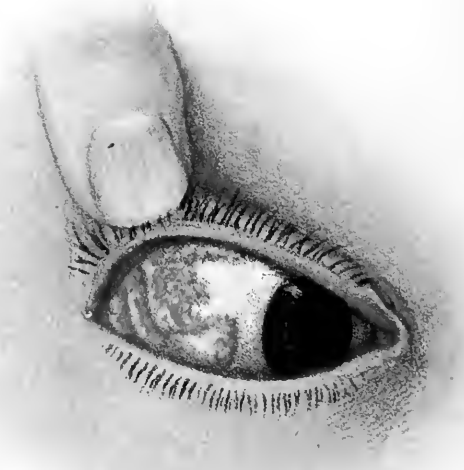

Fig. 1.

West, Newman & Co chr. lith.

DESCRIPTION OF PLATE I.

Fig. 1 illustrates Mr. Nettleship's case of Lymphatic Nævus of Orbit, &c. (p. 47).

The figure shows, moderately well, the tortuous, beaded vessels, filled by clear yellow fluid, which were present on the outer and upper part of the eyeball. From a drawing by Miss Boole.

Fig. 2 illustrates Mr. Nettleship's case of Glaucoma with Retinal Hæmorrhages (p. 108).

The hæmorrhages are confined to the lower half of the retina, and the corresponding retinal vessels are so small as to be for the most part invisible. The specimen had been placed in strong alcohol immediately after enucleation. The drawing (enlarged about twice) was made by Miss Boole.

to be of a decidedly more malignant type from its greater proneness to recur.

(*Living specimen. December 13th,* 1883.)

P.S.—July 29th, 1884.—I saw the patient again to-day. There has been no recurrence of the growth, and her general health has improved.

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3. *Nævus, ? lymphatic, affecting the brow, orbit, and exterior of the eyeball, with lamellar cataract. No cataract in the other eye.*

By E. Nettleship.

(With Plate I, fig. 1.)

Michael D—, æt. 15, presents a large, partly degenerated, subcutaneous nævus, affecting the temporal part of the right brow and the cavity of the orbit; the eye is considerably protruded, but its movements are free; the cornea is obviously smaller than that of the other eye.

In the upper-outer part of the ocular conjunctiva a number of tortuous, beaded vessels of large size and filled with clear, yellowish fluid, were visible when he first applied for advice at the Moorfields Hospital (January, 1884). These vessels (tolerably well shown in Plate I, fig. 1) are, for the most part, situated at some distance from the cornea, and are probably dilated lymphatics.

The lower part of the ocular conjunctiva (not shown in the drawing) was, on admission, in a state of translucent, semi-solid, yellowish œdema, but showed no distinct vessels.

It seems probable that the mass of the nævus is composed, partly at least, of dilated lymphatics like those seen on the eyeball; but that it also contains blood-vessels with

thin walls is proved by the fact that on one occasion the swelling became a good deal ecchymosed after it had been handled.

The pupil of the corresponding eye is considerably smaller than that of the left; it becomes larger when shaded, but does not dilate to the normal extent under atropine. A well-marked lamellar opacity of moderate size is seen in the lens. So far as can be made out the fundus shows nothing unnatural; but there is marked enlargement and tortuosity of the anterior ciliary vessels over the insertion of the internal rectus. Vision = fingers at 18″.

There is a large pigmented patch of skin (mole) on the lower part of the neck on the same side behind the clavicle.

The left eye is normal in all respects; its lens clear; V. = $\frac{20}{20}$, H. m., 1 D.

March 13th, 1884.—The network of lymphatics is now seen to extend all round the globe at a distance from the cornea; probably it was in the same condition before, but the œdema of the lower part, which has now disappeared, obscured the then state.

(*Living specimen. March 13th,* 1884.)

III. INTRA-OCULAR TUMOURS.

1. *Two cases of retinal glioma, in one of which shrinking of the eyeball occurred without perforation.*

By Simeon Snell (Sheffield).

Case 1.—R. H. T—, a little boy aged about 18 months, was brought to me at the Sheffield General Infirmary on April 13th, 1877. The mother stated that when nine months old the child had a "fit" and was ill for a fortnight; again, at twelve months, he had an attack of "congestion of the brain," and he was subsequently ill in the same way. After the first illness he was noticed to be losing his sight, but his parents observed nothing wrong in the appearance of the eyes; later on, the left eye had become enlarged.

At the time of his coming under my notice there was a yellowish-white deposit situated in the interior of each globe at its posterior part. This appearance was much more marked in the left than in the right eye, which was also somewhat increased in size. The diagnosis formed at this time was that the case was an instance of strumous deposit in the eye (pseudo-glioma). The immediate development of the case appeared to support this view. It was decided for the present to watch its progress.

During the next three months the left eye increased much in size, the globe became filled with the deposit, the iris was infiltrated, and exudation appeared in the anterior chamber. The eyeball next began to soften and shrink, but at this time (September 14th, 1877) it was noticed that the right eye, which had remained almost

quiescent, its condition having altered but little since first observed, now commenced to go through apparently the same stages as the fellow organ. Instead, however, of beginning to soften and shrink like the left, after having reached a similar point, its course was very different. On February 13th, 1878, it is stated that the right globe was enlarged, there was exudation in the anterior chamber, and the pupil was opaque looking. Again, on April 8th —and the patient had not been brought to me between these dates—the eyeball had so increased in size as almost to fill the orbit, the cornea was destroyed in part, and there was a tendency to fungoid protrusion. Removal of the globe was advised and the eyeball was excised at the date just given. Section of the eye showed it to be completely filled with a growth which, examined microscopically, left no doubt as to its gliomatous nature.

In a few weeks the disease had returned in the orbit, and after filling this cavity appeared on the cheek, forming a tumour as big as a large orange. The patient died from exhaustion on August 28th, 1878.

A post-mortem examination was made the next day. It was limited to the head. The left orbit contained the merest stump of the globe. The tumour was traced into the right orbit and found to be continuous with the optic nerve. There was considerable emaciation of body.

Case 2.—Early in 1877, a little baby, Sarah D—, aged about 8 months, was brought to me on account of a peculiar appearance the parents had noticed in her eyes. The child had had no "fits." Since she was three months old attention had been directed to her eyes, but the father recently in playing with her had particularly noticed a "shining" in the right eye. When brought to me, in the interior of the right eye at its posterior part was a whitish-looking growth (?) and vessels were distinctly traced over its surface. A similar appearance, though very much less developed, was noticed in the left eye. The diagnosis made was glioma in both eyes, and in this

opinion my esteemed friend, Mr. Gillott, who saw the case, concurred. The right eye was blind, but in the left a measure of sight remained. The patient was admitted into the Sheffield General Infirmary, and on February 25th, 1877, the right eyeball was excised.

My friend, Dr. Dyson, was good enough to examine with me the growth in the interior of the excised globe with the microscope. As the result of the examination we were lead to hope it was not gliomatous but rather caseous tubercular matter with calcareous concretion. The child remained under observation for some time and then the mother ceased attending at the Infirmary with her. Three years later, however (April, 1880), she was again brought to me in consequence of the altered condition of the remaining eye. After the excision of the right globe, the child had been able to see big objects, and up to about two years of age could play with her toys. For the last three months especially the eye had been getting worse, and quite recently its progress had been rapid. Now the interior of the globe was filled with the growth. On April 19th the left eyeball was enucleated.

Dr. Dyson also in this instance kindly gave me his valuable assistance in the microscopic examination of the contents of the removed eyeball. The gliomatous nature of the disease was readily recognised.

After a short time the patient ceased to attend, and it was not until the succeeding March (1881) that I again saw her. My attention was directed to a prominence on the forehead a little above the left eyebrow. It was not larger than a walnut and it had been noticed only for a few weeks. The parents had observed it first when no bigger than a pea. There had been no return of disease in the left orbit, and the right remained, exactly as it had done since the enucleation of the globe four years and a half previously, perfectly healthy. The tumour on the forehead rapidly increased in size, and by the early part of May was larger than an orange.

On July 15th it measured nine inches across and seven inches from above downwards. Its limits on the right were more defined, but on the left it extended gradually into the temple as far as and above the ear; the left upper lid was drawn out and somewhat involved, and the growth reached well down the nose. Large veins coursed over its mottled and distended surface.

On September 2nd the measurements of the tumour were fifteen inches across by thirteen vertical, and there had been some bleeding from one of the veins over the left orbit; this recurred at different times, and the surface towards the inner side became more or less ulcerated. The patient died on September 28th.

Permission to remove the tumour for preservation was granted. It was found firmly attached to the bone, which was honeycombed and sent numerous bony spiculæ into the substance of the growth. The frontal bone was densely thickened at some parts and very much thinned at others. During a change of house surgeons the specimen became lost.

It must be mentioned that the parents stated that the child received a blow on the forehead before the formation of the tumour in that situation.

The cases I have related are not as complete in some particulars as one would have liked, but I believe they are of interest and worth placing on record.

The first one would appear to be rare; at least I cannot find a precisely similar one recorded. When the patient was first seen the diagnosis was by no means easy, but after short observation the appearances seemed more in accord with those one is accustomed to associate with strumous deposit, pseudo-glioma. The subsequent shrinking of the left eye, and that without perforation, apparently confirmed the diagnosis. The development, however, in the right eye ultimately of unquestioned glioma with the return of ths disease, naturally calls in question the accuracy of the opinion formed in the first instance. It will be admitted that the left eye underwent the changes expected

of it, if the disease were one of the varieties described under the term pseudo-glioma, and it may be added that up to a certain point the processes in the two eyes were identical. It may be regarded as possible that, in the right eye, the glioma was engrafted on such a condition as the diagnosis would indicate. Sarcomata, it is well known, are in a similar manner met with in eyes damaged by injury or disease, as well as in other regions.

On the other hand, it is possible, looking at the case with the after-history before us, to regard it from the outset as glioma with an unusual course. I have never seen a glioma present the appearances this case did at the commencement of the attendance. Temporary shrinking has sometimes been reported in glioma.

Dr. Brailey tells me of a case of his in which a semi-shrunken globe was filled with degenerated glioma. Such an amount of shrinkage, ultimately to a mere button, has not, I fancy, been previously reported in a gliomatous eye. It is to be regretted that at the time the remains of the left globe were not examined microscopically. Atrophy of malignant growths, it is well known, is met with in other regions. I extract the following quotation from 'Bryant's Surgery': "In rarer cases, the cancer withers 'atrophic cancer,' the disease slowly progressing to a point and then disappearing by a gradual process. In this way cancerous tubercles will appear and disappear, cancerous nodules will form and fall off by the contraction of their own fibres. In this way cancer may become cured or so stationary as not to interfere with life."

It appears to me that opinions may well differ on these hypotheses. Perhaps the latter will be more readily accepted, and I may add that Dr. Brailey takes such a view of the case. My thanks are due both to him and Mr. Nettleship for kindly looking through my notes and giving me their opinions.

The second case is also of interest, though it cannot be viewed in the same light as the first. The microscopical examination of the eye first removed led Dr. Dyson and

myself to hope that the condition was non-gliomatous. It is, however, probable that it was in reality glioma; indeed, the subsequent history points to its having been of this nature.

There can be little doubt that the disease was congenital in both eyes. The other points of interest are:

(*a.*) The non-return of the disease in the right orbit up to the death of the child, a period of four years and a half.

(*b.*) The quiescent state of the disease in the left eye for two years or more.

(*c.*) The non-return of the disease in either orbit, but on the forehead, and that, it is stated, following a blow.

(*March* 13*th*, 1884.)

Dr. Brailey had observed at Moorfields in 1876 a case reminding him of that of Mr. Snell, of which the following account had been written at the time:

"Laura S—, æt. 9 months, had her *left* eye excised by Mr. Hutchinson on July 17th, 1876. It was painful and evidently shrinking. Its tension was somewhat diminished and its cornea small, very prominent, hazy, and vascular. The anterior chamber was filled with blood.

"After excision the globe was found to be somewhat squared, the retina was detached into an umbrella shape, only adhering at the optic disc and ora serrata, and at a point to the outer side of the disc. The substance occupying the vastly reduced cavity of the detached retina is tough and fibrous and bluish white in colour. It is evidently inflammatory and by its contraction the cornea is drawn into its present very convex shape. The detached retina is much thicker than normal, and its external layers contain much black pigment mixed with a pinkish-white basis substance which appears to be inflammatory in its origin. The pigment granules are mostly in cells which are rather elongated in shape. The microscope shows nothing that can be taken as indicating the existence of a glioma. The anterior surface of the iris is covered with a pinkish layer which also blocks the pupil.

"The *right* eye has an appearance exactly like that of intra-ocular glioma. There is a whitish reflex from behind the lens with blood-vessels upon it. Its tension is normal. It appears to have perception of light from the nasal side. This eye was excised some years later, and was found to contain a true retinal glioma.

"The parents stated that the child had never had any illness. When it was three months old they noticed a white reflection with blood-vessels on it coming apparently from the back of the left eye. When the child was six months old the eye became red and was apparently strongly inflamed. The other appearances did not alter materially up to the time of excision.

"Nothing was thought to be the matter with the *right* eye till four days before excision. Then they noticed in certain lights a white appearance from the back of it, exactly like the other except that they did not see any vessels on it. There was never any inflammation.

"The parents have been married three years, and have good general health. The eldest child is two and a half years old and the patient is nine months old. There have been no other children and no miscarriages. The father is a butcher living in the country."

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2. *Sarcoma of choroid.*

By George Cowell and Henry Juler.

Ann M—, æt. 37, married. Family history good, no cancer, no syphilis. Patient is a healthy-looking woman. Vision was always good till two years ago, when she noticed floating specks in front of the right eye. This was followed by dimness in reading. She first came under our notice in January of the present year (1884) and was shown to the Society at the March meeting. At that

time the patient could only count fingers with difficulty in the lower and inner portion of the right visual field. The vision of the left eye was normal ($\frac{6}{6}$ and Sn. 0·5). With the ophthalmoscope the retina was seen to be pushed forwards over the upper and outer quadrant of the fundus where it was of a light greyish colour. The surface of the projecting portion appeared to be slightly striated as if from superficial vessels. The remaining two thirds of the fundus presented a good red choroidal reflex, but the details of the fundus as to the optic disc and retinal vessels were obscure. The tension of the globe was increased to T + 1. The abdominal vessels of the globe were tortuous and distended. There was no pain.

After the March meeting the vision of the affected eye became much worse, the retina became totally detached, and perception of light was abolished. The eye was excised in April.

The globe was then hardened in Müller's fluid and bisected in a frozen state, when it was found to be occupied over the upper and outer third by a pigmented, lobulated tumour; this, as shown in the jelly preparation, extends inwards to the centre of the globe and forwards nearly to the lens. The retina is situated immediately in front of the tumour. Over the rest of the fundus the retina is seen to be separated from the choroid; the sub-retinal space was here occupied by serum.

Microscopic sections of the tumour have been made and are upon the table; they show the tumour to be of the nature of a pigmented sarcoma, and to have commenced in the choroid.

The optic nerve, the sclerotic, and surrounding tissues are apparently free from the disease. It is now over a month since the eye was excised, and we hope that there will be no recurrence of the affection.

(*Living specimen. March 13th and June 5th,* 1884.)

IV. DISEASES OF THE IRIS.

1. *Case of serous cyst of iris.*

By W. J. Cant (Lincoln).

The case I wish to bring before the Society is that of a man, æt. 40, who was first seen by me in February, 1884. He stated that when a boy his right eye was injured by a piece of steel, and although the injury caused severe inflammation at the time, as far as he knew, it completely recovered, so that he was unable to detect any alteration, either in vision or appearance. About three years ago he noticed that "the coloured part of his eye was a little puckered at the upper part," but it caused him no pain, and he took no more notice of it till about twelve months ago when he found his sight failing, which gradually increased so that he became quite unable to follow his occupation, his left eye being already useless from opacity of the cornea. He occasionally had aching in and around the eyeball.

On examination I observed a tumour about the size of a small pea, of a skim-milk whiteness, growing from the periphery of the upper segment of the iris, but intimately connected with it as far as the margin. The iris was very much drawn towards the tumour, atrophied and altered in colour, on the right side of the tumour it being of a light yellow colour, and on the left almost black, with a peculiar reddish thread skimming the edge of the iris on the nasal side. The tumour appeared to be in contact with the cornea and lens. The pupil, when not under the influence of atropine, was as nearly as possible filled up by the tumour. Fundus-reflex could be obtained

through the tumour. The eyeball tension was increased (T + 1 or 2). Vision equalled $\frac{5}{24}$, but his sight was very "misty," and he could only read 16 J., and that with difficulty.

Taking into consideration the increasing growth of the tumour and of the tension I decided to attempt its removal.

On February 23rd, chloroform having been given, a corneo-sclerotic section was made in the upper segment, the tumour seized with a pair of iridectomy forceps and removed with a piece of iris. There was free bleeding into anterior chamber. The wound healed without a bad symptom. The iris being drawn upwards towards the line of incision, a downward iridectomy was made.

The vision has greatly improved, V. = $\frac{5}{18}$ clearly, and he reads 2 J. easily. There is no trace of inflammation, and the tension is normal. He is able to do his work without any difficulty.

(*July 4th*, 1884.)

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2. *Serous cyst of iris.*

By W. Adams Frost.

History.—William M—, æt. 28, under care of Mr. Waren Tay at Royal London Ophthalmic Hospital. Left eye wounded by a fork at age of four, no operation at the time. At age of eighteen years an operation (iridectomy ?) performed by Mr. Bubb, of Cheltenham. Patient thinks that appearance of eye was then much as now, but that the cyst did not extend so far over the pupil. He thinks that the growth increases very slowly, and that the sight of this eye has been gradually deteriorating for many years. There have never, within his recollection, been any inflammatory symptoms.

Present condition.—Left eye, just external to the vertical

meridian of cornea and 2·5 mm. from its upper margin, is a transverse cicatrix, 1·5 mm. long. Occupying the upper and inner quadrant of anterior chamber is an opalescent, semitransparent, rounded swelling; anteriorly it appears to touch the cornea by its most prominent part, and posteriorly to rest on the lens. It extends quite to the periphery of the chamber, while its pupillary edge projects about half way across the pupil. The posterior surface, as far as it can be seen, is lined by a layer of uveal pigment, and this is continued round its lower border. The swelling terminates below in a regular rounded extremity, which is separated by a very narrow chink—through which there is a good fundus-reflex—from the lower edge of the artificial pupil made by the former iridectomy. The cyst as well as the iris seems to be adherent to the corneal cicatrix above, and it is difficult to define its exact limit.

Examined by oblique illumination the cyst is of a milky colour and is semitransparent.

With the ophthalmoscope a fundus-reflex can be obtained through several parts of the cyst.

The free portion of the pupil is as active as is usual after an iridectomy. Fundus slightly blurred, owing apparently to haze of the lens; nothing abnormal seen. V. $\frac{6}{60}$. Right eye normal.

(*June 5th*, 1884.)

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3. *Granular-looking body on iris.*

By F. H. Hodges (Leicester).

Lizzie H—, æt. 17, Stoke Allway, Leicestershire. Patient noticed right eye to be "red" first week of December, 1883; it became slightly painful, and she came to me on December 18th. Granular-looking body

size of millet-seed on outer rim of right iris, close to sclera; slight ciliary injection. Pupil dilated freely under atropine except at point of granular body. On December 28th iritis with adhesions; A. C. half full of pus. Pus evacuated by incision with keratome. Pus reaccumulated, but on January 7th, 1884, was completely absorbed. Granular body slowly and painlessly increased; perforated sclera, and appeared outside. Specks like inflammatory deposits formed in deeper layers of cornea. Tension has never increased, now = −1. V. = $\frac{6}{60}$. No family history of tubercle or cancer.

(*Living specimen. March 13th*, 1884.)

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4. *Growth on iris (? tubercular).*

By W. Lang.

Henrietta M—, æt. 5, a well-grown child, pale and flabby, with good features and sound teeth. The mother says the child was always healthy, with a ruddy complexion, prior to last winter, when she caught a cold. Since then she has always been ailing with a series of colds. Came to the hospital on May 31st. The mother had noticed the eye to be bloodshot about a fortnight before, and about four days before she had noticed a yellow spot in the eye.

On admission the cornea was hazy, with two spots seen on its posterior surface, and numerous growths on the iris, the larger being on the lower part of the iris. The growths were yellowish in colour, with blood-vessels plainly seen on the surface. The iris was bound down by numerous adhesions, and the lower part of the A. C. contained fluid pus. The growths have gradually increased in size in spite of mercury and Ol. Morrh., coalescing, and now

nearly fill the lower part of the A. C., the growths on the posterior surface of the cornea remaining the same.

The family history is good. The patient is the eldest of four children, all healthy; no miscarriages.

No changes in lungs. Left eye healthy.

(*Living specimen. July 4th,* 1884.)

P.S.—August 5th.—The growths on the iris have all coalesced, and now fill the lower part of the anterior chamber, and cover the iris almost entirely up to the level of the upper part of the pupil. The cornea is still hazy, and the deposits on its posterior surface remain the same. The child's general health is fairly good.

V. INJURIES AND SYMPATHETIC OPHTHALMITIS.

1. *On the various forms of sympathetic disease of the eye and their bearing on the theories of its transmission.*

By W. A. Brailey, M.D.

Some two years and a half ago I had the opportunity of bringing before the International Medical Congress the results of my microscopical examination of many cases of sympathetic disease.

I then dealt only with the one best recognised form, the sympathetic inflammation of the uveal tract, and I indicated a microscopical similarity between the different cases I examined.

In each one there were cells either in small isolated clusters or in a continuous layer on the lower part of the posterior surface of the cornea and also round the blood-vessels of the papilla, extending thence along the central vessels of the optic nerve.

The iris showed, if it were but slightly affected, clusters of cells in its middle layers. Or, if the iritis were severe, the whole iris was densely packed with similar cells and cells were also found making a stratum of adhesive inflammatory exudation on its posterior surface. Its blood-vessels had their walls thickened and their lumen occupied by a proliferation of their endothelial layer.

If cyclitis accompanied the iritis the inflammatory cells were mostly in the connective tissue layer of the ciliary body internal to the muscular fibres, where they were distributed either in clusters or in a dense stratum occupying its whole thickness. The exudation cells were on the

internal aspect of the ciliary body and overlying pars ciliaris retinæ.

If the choroid were also implicated the cells occupied similarly its middle layer, but there were no exudations on either of its surfaces.

To these characters of sympathetic inflammation, that is to say, of the inflammation in the second eye, I still rigidly adhere.

But there are many eyes which we have no opportunity of observing except in their clinical aspects, which fail to coincide entirely with this description. Thus, though I have found deposit on the posterior corneal surface in each of the four cases I have examined pathologically, I have recorded such in only about one third of the cases that I have been able to observe in their clinical aspect alone. I am sure, however, that this number is understated, for I have but of late years become aware of the care that may be required to find them. Moreover, I have observed at least one instance where they were present only in the earlier stages and, conversely, one where they were not found when the patient was first seen, but became clearly apparent in the course of some weeks.

There are, moreover, many cases which can only be observed clinically (those in which there are punctate deposits on the back of the cornea, with the iris dull and sluggish and the anterior chamber deep), in which it is difficult to suppose that the implication of the uveal tract is more than of a slight nature. Such cases are connected by transitional forms of gradually increasing severity with the more severe typical forms above described. I think that future observation will show the existence of dots on the cornea in every case at some period of its course.

Since then I have observed many more cases of sympathetic disease both in their clinical and pathological aspects, and I have been surprised to find in how large a proportion of them some structure other than the uveal tract is implicated, either conjointly with this or to all appearance alone.

For example, out of fifty-three undoubted cases of sympathetic inflammation of the uveal tract leading to excision, which are comprised in 763 cases of enucleation in $5\frac{1}{3}$ years at Moorfields, I have noted thirty cases of pure uveitis, the iris being *always* implicated, and, as far as could be judged from the clinical appearances, the ciliary body *often*, and the choroid, in addition, *sometimes*. But dots were observed on the cornea in fourteen of them, and a more marked implication of the cornea, making a distinct kerato-iritis, was found in ten. Probably the keratitis punctata should form a larger proportion, especially at the expense of the kerato-iritis, for some of the reasons given above.

But on looking over the hospital books for the same period, I find, after carefully excluding the numerous cases where there was the slightest evidence that the keratitis might be due to some general constitutional condition, fifteen cases where, under circumstances such that sympathetic inflammation might reasonably be expected to arise, *i.e.* perforating wounds or ulcers, recent or old, the cornea of the other eye has become inflamed once or several times. It is difficult to refuse to such the name of sympathetic keratitis. They are in reality far more common than my figures, derived from the statistics of enucleation, would show, for they, unlike sympathetic uveitis in this country, have comparatively rarely been the cause of the enucleation of the first eye.

I have at least two such cases under my care at Guy's Hospital at this moment, and I can recall to mind many others of recent occurrence. Also, I find, in the same way, thirty-one cases where at the time of excision of the first eye there was in the other some ophthalmoscopic evidence of neuritis such as a redness and slight haziness of the disc. It will be said with justice that such appearances are difficult to be sure about. This I grant, especially with regard to variations in the colour of the disc. But the same reason would render them liable to be overlooked, and indeed, I think they are far more common than I have

represented, partly for this reason and partly because the patient often is unable, on account of the associated symptoms of sympathetic irritation, to bear the light of an ophthalmoscopic examination.

Closely allied to and probably consequent on these morbid conditions are atrophies of the disc, of which I have observed one apparently due to sympathy, and since that observation one other (see page 87), and haze of vitreous, of which I have seen four instances, two being uncomplicated, one associated with choroiditis, and one with detachment of the retina.

I have also occasionally observed cases where the affection of the sympathising eye is a conjunctivitis with a greater or less amount of muco-purulent discharge (for a case subsequently recorded see page 73). In the same way most of the cases of so-called sympathetic irritation present some conjunctival or ciliary injection. It is impossible to draw the line between this condition and the conjunctivitis with muco-purulent discharge just referred to, and again between that and the graver and more undoubted lesions of sympathetic inflammation.

With regard to other phenomena of sympathetic ophthalmitis, I have been much struck by three cases in which the affection of the sympathising eye, a comparatively mild iritis, was ushered in by swelling of the lids so marked as to be out of all proportion to the severity of the iritis according to our usual experience of such inflammations.

I have also noted two cases where, the first eye having been for long free from pain and tenderness, the outbreak of sympathetic iritis was accompanied by severe neuralgic pain affecting various branches of the fifth nerve of that side and extending from the vertex and the post-aural region to the teeth of the lower jaw, whereas the pain in the eye itself was comparatively slight.

With regard to the disease in the *first* or exciting eye, I have had to modify my previous views very considerably. Formerly I supposed that the disease in the first eye was always a severe adhesive inflammation and that this must

be, to some extent at least, in activity at the time of the outbreak of sympathetic disease.

But I have since then seen many cases of undoubted sympathetic ophthalmitis, where the first eye, perhaps a mere stump at the time of the outbreak, was neither tender nor painful, having been quiet for long, even for years, and several where such, when examined microscopically, presented at the most but very doubtful signs of present inflammation.

And the history of several cases has distinctly impressed upon me the truth of the observations of others, that eyes shrunken and perfectly quiet after panophthalmitis may excite "genuine sympathetic iritis."

I have even recorded a case where an eye, shrinking from a small intra-ocular sarcoma, was the cause of a typical sympathetic iritis with keratitis punctata, and of another where a sarcoma in the first eye was followed by numerous vitreous opacities in the second.

Thus the condition of the exciting eye may vary extremely, and these various conditions may be the results of very different causes, from the most common, perforating wounds (45 cases out of 58), through spontaneous inflammations (10 cases out of 58), and blows with blunt instruments (2 cases), to the rarest, the choroidal sarcoma (1 case above mentioned).

Moreover, the parts affected do not correspond in the two eyes. True it seems necessary that in the *first* eye the uveal tract should be inflamed, but this is in all probability simply because no inflammation, whether traumatic or otherwise, could be of considerable severity without implicating this adjacent very vascular tissue. I may here note that the choroidal sarcoma was accompanied, as is usual, by uveitis.

Thus iritis or kerato-iritis in the first eye may give rise sympathetically either to a pure iritis, occasionally with hypopyon, a kerato-iritis, an iritis with keratitis punctata, or to an affection of the conjunctiva, optic disc, or even vitreous body.

It appears to me that these facts, if admitted, are strongly opposed to the theory of direct transmission of the inflammation from one eye to the other by whatever route, whether by inflammatory cells in the blood or by a continuous actual neuritis, either of the ciliary or optic nerves, or by an inflammation of the fibres of the inter-sheath space of this last, not that it needs any particular display of evidence to contradict what after all is solely or principally a theory.

I have said, and I venture to say again, that there is no pathological evidence before us of the least value to show an actual travelling neuritis of any nerve as the cause of sympathetic ophthalmitis. True the optic disc of the first eye is usually somewhat swollen, and the fibres of the subdural space bear some excess of nuclei. But these changes are far more pronounced in any ordinary case of purulent iritis than in the vast majority of the eyes exciting sympathetic disease.

Inflammatory changes extending along the central vessels of the nerve are also markedly well seen in iritis serosa, but, though deposits on the posterior corneal surface occur so commonly in the sympathising eye, I have only once seen, and then somewhat doubtfully, an iritis serosa give rise to sympathetic disease.

The clinical case observed by Snellen, where a meningitis* leading to deafness accompanied a sympathetic ophthalmitis, is of decided importance, but its precise bearing upon the transmission of sympathetic inflammation remains undemonstrated.

With regard to the ciliary nerves I can speak more confidently. I have examined the long ciliaries in many cases, sometimes in the second, but more often in the first eye, but I have never seen any proof that an inflammation travelling along them is the cause of the transmission of the disease. There may be in some cases an excess of inflammatory cells surrounding them before their exit from the eye, but that is only when the adjacent choroidal,

* 'Trans. International Medical Congress, 1881.'

scleral and episcleral tissues participate markedly in the inflammation. Such cells do not appear to be out of proportion to or to extend beyond the inflammatory changes in adjacent structures.

But the cases where sympathetic disease occurs after excision of the exciting eye have a strong bearing on this question. The industry and keen observation of Nettleship have recorded two such cases and called attention to seven more in the practice of others. I have observed at least five at Moorfields, one of which occurred ten months, one three months, one two months, one five weeks, and one two weeks after excision. In all of them marked symptoms of sympathetic irritation preceded the enucleation.

One of Nettleship's cases occurred twenty-two days, and the other twenty-three days after excision. That of Cowell, which Nettleship also records, broke out twenty-five days after the removal of the exciting eye. One, reported by Snell in the 'Transactions' of this Society for 1882, was of thirty-two days, and one, by Frost, of twenty-two days' duration from excision.

Lawson has recorded in the "Moorfields Hospital Reports,' vol. x, a case in which sympathetic inflammation came on after the lapse of nine years. Whether this last case was, as the history given appears to indicate, considered simply as a relapse, or whether it was a primary outbreak of sympathetic disease, is much the same with regard to its bearing on the theory of direct transmission. If the disease is communicated only by direct transmission why should relapses occur, as they do frequently even within the sphere of my personal observation, without any apparent corresponding difference in the condition of the first eye?

But what other theory can we accept conformably with the above observations?

The symptoms of irritation produced in the second eye, whether such be pain, lacrimation, photophobia, obscurations, failure of accommodation, or perhaps even vascular

congestions, can be satisfactorily explained by the transmission of the irritation from the first eye to a nerve-centre and then back through the corresponding nerve of the opposite side.

The nerves concerned are generally admitted to be the fifth pair with their centres, to which we must add, on account of the obscurations that sometimes occur, the optic nerves themselves.

Out of twenty-nine cases of sympathetic irritation taken at hazard from those observed and recorded by myself, sixteen were relieved, seven were unaffected, and six rendered worse by excision of the other eye. In the first cases the change must be merely a functional one, but in the others some permanent affection of the second eye must have resulted from the irritation of the other.

Some similar cases have been explained by the entanglement of the ciliary nerves in the cicatrix of excision. And others are clearly due to the irritation of the socket by an artificial eye. The first explanation is rather hypothetical, and the entanglement has rarely been demonstrated, but the second is of tolerably frequent occurrence. In my cases referred to above there was no evidence of any such cause.

The permanent change in the second eye may reside in the nerves, in their centre, or in the tissues of the eye itself. In the absence of any evidence of structural change we may presume that the nutrition of the second eye is lowered more or less permanently by the influences transmitted from the fellow eye.

I am satisfied that a single eye is more prone than one of a pair to disease; for example, to cataract, especially of the nuclear form, to iritis, and to corneal ulcers. And I ascribe this liability to an alteration in its nutrition depending on the previous occurrence of disease in the first eye or even to the operation of enucleation itself.

I admit the difficulty of establishing such a proposition, since out-patient rooms do not furnish a fair sample of one-eyed patients. Naturally persons having but one eye

would, more readily than others, apply for treatment of slight affections of it.

There is no doubt but that a defective eye is more liable to disease than a sound one. This is markedly shown in spontaneous suppurations of such eyes and even in the occurrence of sarcoma in them.

I observe also that eyes, the subjects of recent severe operations, for cataract, for example, are more liable than others to the occurrence of small corneal infiltrations and iritis. Such phenomena appear to me precisely similar in their causation to those of sympathetic disease, except that the evidences of lowered nutrition are restricted to the one eye.

I have also become impressed with the fact that an injury or operation affecting an unsound eye is unduly likely to excite sympathetic disease, especially if the fellow eye is also defective. It is in this way that I account for the comparatively large number of cases, amounting to 1·3 per cent. of the total number of eyes excised at Moorfields during my curatorship of eight years, where the needling of so-called opaque membranes has started sympathetic disease.

If then sympathetic irritation is transmitted from one eye to the other through a functional nerve condition, and if the irritation, with or without an increased liability to morbid processes, persists after the removal of the other eye, we can only (in the absence of any cause of irritation in the empty socket) ascribe it to an altered nutritive condition of the second eye, and it is immaterial to our purpose whether this lowering of vitality has its seat only in the tissues of the second eye, or depends on an altered condition of a nervous centre.

Why should not the same explanation be applied to the phenomena of sympathetic inflammation? Against it would be proofs of direct transmission and also points of dissimilarity between the two conditions of inflammation and irritation. Forms of disease intermediate between the two conditions would be in favour of it.

The evidences of direct transmission, that is to say by continuity of inflammation, are extremely slight. I have previously stated (page 67) why I hold the optic, and more decidedly still, the ciliary nerves, faultless in this respect. And it is clear that the more various the phenomena of sympathetic disease are shown to be, the more difficult it will be to establish direct transmission. The undoubted fact that the anterior region of the second eye, viz., the iris or cornea, is the first and frequently the only part affected, is opposed to the arrival of the disease by the optic and ciliary nerves.

The early and great swelling of the lids (page 65) and the whitening of the eyelashes recorded in certain cases by Hutchinson and Nettleship are not without weight in this direction.

In the same way, how can direct transmission explain the occurrence of sympathetic disease weeks, months, and perhaps even years after the removal of the first eye and certainly very long after the subsidence of active inflammation in the first eye ?

All these things will, however, be reasonably explained by the supposition of such an altered nutritive state of the second eye as would be induced by the morbid functional nerve influence derived from an inflammation, atrophy, or even absence of the first. This would render it liable far beyond other eyes to inflammations clearly dependent on constitutional conditions, *e.g.* syphilis and rheumatism, and also to inflammations which in the absence of such evidence we are used to call *spontaneous*.

Such inflammations would be commonly severe ; they would be liable to recur ; they would attack the parts usually most liable to inflammatory disturbances.

Sympathetic inflammations are marked by their severity and intractability, and I have lately had abundant evidence of their liability to relapses.

As regards the resemblance of so-called sympathetic irritation to sympathetic inflammation, I have stated that a very considerable percentage of the cases of irritation

are not relieved by excision and that some cases are even rendered worse.

Sympathetic inflammation is usually not relieved by excision, but I have observed sufficient cases to satisfy my mind that the disease is *sometimes* favourably influenced by the excision of the exciting eye.

Sympathetic irritation may arise directly, whereas sympathetic inflammation takes at least a certain time, say two weeks. But such a change of nutrition as could produce obvious structural disease could not be induced directly. The occurrence of sympathetic inflammation weeks, months, or years after the removal of the other eye is perfectly in accord with the theory of diminished resistance to disease.

Cases occur of sympathetic inflammation without previous irritation, and more frequently of irritation followed by inflammation. Those where irritation is the sole symptom are of course by far the most common of all. But the fifth nerve contains other fibres than sensory ones. I mean that irritation of the second eye may indirectly cause a lowering of its nutrition, but that other nerve-fibres, the so-called trophic fibres, will induce this condition directly. I do not admit that a sharp line can be drawn between sympathetic irritation and inflammation. An iritis may appear to be very different from photophobia, but if the latter condition is accompanied by a vascular congestion the two conditions then become drawn together. For I can see no line of demarcation between a vascular congestion and an inflammation with microscopic evidence of an increased cell exudation. And if it be admitted, as I firmly believe to be the case, that vascular congestion, conjunctival or ciliary, or conjunctivitis with muco-purulent discharge, is an occasional symptom of sympathetic irritation, I repeat that I can see no limit between this and sympathetic inflammation.

It has been recorded that dental neuralgia is sometimes followed or accompanied by conjunctival injection and even iritis of the same side. But such cases, though they may

bear upon and support the views that I maintain, may yet be explained by supposing that there is a general affection of the fifth nerve of that side, or of certain parts of it.

The outbreak of glaucoma in the second eye immediately after operative interference with the first, bears a more direct relation to the points in question.

If it were asked why should the eye alone, of all organs in the body, be liable to sympathetic disease, I should reply, *first* it has not been shown that certain other organs, the lungs, for example, do not suffer in the same way ; and *second* that no two organs of sense stand to each other in anything like the same relation as the eyes.

These cover the same ground and see better together than separately, whereas, so far as my rough observations go, sounds coming from the side are heard better when the opposite ear is blocked up than with the two together.

And the immunity or comparative immunity of the lower animals may be accounted for by the comparative independence of the two eyes in them. For example, there are few animals in which the fields of vision cover the same ground as they do in man.

(*December* 13*th*, 1883.)

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2. *Muco-purulent conjunctivitis of sympathetic origin.*

By W. A. Brailey, M.D.

Abraham J—, æt. 66, had a blow on his right eye by a piece of wood fifteen months ago, in consequence of which the cornea is now shrunken and opaque and adherent to the iris. It is probable that a sloughing ulcer was the immediate result of the injury. Two weeks after the injury the *left* eye began to discharge, having been

previously perfectly healthy, and the discharge has continued up till the 29th November, 1883, when the right eye was excised. For some weeks previous to the excision the conjunctivitis had been treated with various drugs, but showed no material improvement. The treatment was continued for six weeks after excision, but the condition remained much the same. Vision with + 9 D. amounted to $\frac{6}{12}$ under atropine. He had never worn glasses for distance till about two weeks after the excision.

(*Living Specimen. January 10th*, 1884.)

Mr. Spencer Watson said that Dr. Brailey had stated that in a certain percentage of eyes affected with sympathetic ophthalmitis he found "dots" on the cornea, and the inference seemed to be that this peculiar condition (punctiform keratitis) was characteristic of sympathetic ophthalmitis. Mr. Watson, however, had seen this kind of keratitis under varying conditions, such as those of syphilitic and rheumatic iritis and in cases in which no peculiar constitutional disease was present, but he had not observed it in cases of traumatic origin. He thought therefore that the occurrence of these punctiform deposits was by no means a characteristic lesion in sympathetic ophthalmitis. There seemed to be some vagueness as to the kind of affection intended to be described as sympathetic ophthalmitis in Dr. Brailey's paper, and it would therefore be desirable to have the affection more strictly defined. If we were to accept the occurrence of conjunctivitis in the uninjured eye as evidence of sympathetic disease due to an injury of the fellow eye it would be difficult to arrive at any satisfactory definition. As to the theory that the removal of an injured eye actually excited sympathetic ophthalmitis it was hard to reconcile it with the old axiom that having removed the cause the effect was also removed. The mere sequence in point of time could not be taken as evidence that the two events were related as cause and effect, and hence it was open to question whether the operations performed for glaucoma

were always the cause of glaucomatous attacks in the second eye. It was more probable that the second eye was affected by a cause common to its own and the previous attack, or possibly in other cases to some underlying constitutional cause. The interval that had elapsed between the two attacks might only indicate that the disease in the last affected eye had been longer in coming to maturity than hat to which attention had been first called. The same reasoning would apply to all other instances in which the two eyes were affected by a similar disease, but with an interval between the periods at which they were attacked.

Mr. Story (Dublin) referring to the patient exhibited by Dr. Brailey, thought that it was rather stretching the use of the term to attribute the conjunctivitis to sympathetic inflammation. He did not see in its occurrence anything more than a mere coincidence. He was of opinion that it was very desirable that our list of sympathetic inflammations should not be lengthened. In reference to the paper, and the theory as to the origin of sympathetic inflammation therein propounded, he felt that he could not allow such a theory to pass unchallenged. No one had as yet produced inflammation by reflex irritation of a nerve. Sympathetic ophthalmitis, he pointed out, possessed certain peculiarities. Thus irido-choroiditis, if produced by sympathetic inflammation, was peculiar in its course. If caused by simple reflex action, then removal of the other eye ought to have a much greater effect than it had. If caused by direct transmission, then the removal of the cause would not have much influence. All diseases had at one time or another been attributed to disturbance of the sympathetic system. Congestion from nerve irritation did not run on to inflammation, nor did the congestion of one eye from a foreign body in the other lead to sympathetic ophthalmitis. His own experience did not permit him to say whether keratitis punctata was constant or not.

Mr. W. Adams Frost asked whether the conjunctivitis showed any unusual obstinacy in yielding to treatment, and whether it differed in any other respects from an ordinary case of conjunctivitis? As the case stood, there seemed to be no evidence whatever of its being of sympathetic origin. He was surprised that Dr. Brailey considered that the fact of the conjunctivitis not being improved by enucleation of the injured eye was in favour of its being of sympathetic origin. It seemed to him, on the contrary, that if such improvement had immediately followed the operation that circumstance would have been evidence in favour of its being of that nature. He also took exception to one of the premisses on which Dr. Brailey rested his theory,—namely, that there was no line of demarcation between conjunctival injection such as was met with in the so-called sympathetic "irritation" and a muco-purulent conjunctivitis such as was present in Dr. Brailey's case. It appeared to him, on the contrary, that there was this distinction, that in the one case there was merely dilatation of existing vessels, and if any excessive secretion only that of normal character, whilst in the other there was emigration of leucocytes leading to the formation of morbid secretion. Dr. Brailey claimed that the cases in which sympathetic mischief did not make its appearance until after the enucleation of the exciting eye were not more difficult to explain on the *reflex irritation* than on the *direct transmission* theory; it was, however, surely difficult to conceive how a reflex irritation could occur months after the removal of the exciting cause. If, on the other hand, we assumed that there was a process gradually extending from the one eye to the other by continuity of tissue there was nothing very surprising in the morbid process appearing in the second eye if it was well on its journey before the starting-point was removed.

Mr. Nettleship said: I agree with Mr. Story that Dr. Brailey has given us but little evidence that the conjunctivitis in the patient shown this evening is sympa-

thetic. The patient is predisposed by his age to chronic muco-purulent ophthalmitis, and it is highly probable that the conditions and treatment immediately following his accident, such as bandaging, especially with wet applications, and the use of atropine, would set up the state of things we see. Before adding conjunctivitis to the group of sympathetic diseases, we may fairly ask Dr. Brailey to give us the detailed particulars of the cases which he thinks are of this nature, and which seem to be tolerably common in his experience.

Passing to the very important paper which Dr. Brailey read at the last meeting, I would make the same request as to the several forms of disease which, in addition to the common form, Dr. Brailey asks us to recognise as sympathetic. I find it very difficult, in the absence of detailed cases, to accept Dr. Brailey's belief that mere diffuse keratitis or mere papillitis are ever sympathetic in the sense of being produced by a wound of the opposite eye. Papillitis of course occurs, and sometimes quite early, in cases of sympathetic ophthalmitis, but in the present state of our knowledge it may, I think, always be attributed with greater probability to extension from the adjoining choroid than to a primary optic-neural inflammation ; such early and acute choroiditis would not necessarily produce any marked ophthalmoscopic changes. The same criticism applies in general terms to the assertion of uncomplicated optic atrophy as a sympathetic disease ; let us have the cases in detail.

In respect to the mode of transmission of sympathetic inflammation from one eye to the other, it seems to me that if those who incline to believe in a travelling of neuritis along the ciliary nerves hold their belief on slender anatomical evidence, the position of such as are disposed to deny this mode of transit is at least as difficult. Dr. Brailey knows, even better than I, how, recently, descending inflammation has been shown, largely by Gowers, Stephen Mackenzie, Edmunds and himself, to furnish the true explanation of almost if not quite all

cases of papillitis from intracranial disease. Yet the optic nerve is easy to examine in comparison with the ciliary nerves, for these besides being numerous and very small, are available only in such small bits as may chance to be removed with the enucleated globe. The mere failure to find in every case histological signs of inflammation in such fragments of nerve-tissue, under the ordinary conditions of examination, does not, of itself, go far to disprove the hypothesis of a travelling neuritis.

Mr. McHardy said : After paying every attention to Dr. Brailey's case of so-called "sympathetic conjunctivitis" I fail to recognise any sort of evidence that the reported conjunctivitis had any such causation as clinical ophthalmologists understand by the prefix "sympathetic." After the foregoing avowal, I would mention that in only one instance have I seen an unquestionable sympathetic ophthalmitis ushered in by conjunctivitis.

In that instance, however, the rebellious nature of the conjunctivitis occurring in a man at the prime of life, and its sequel in general uveitis and turbidity of the vitreous humour, served to establish the true nature of the case,* an ample report of which I furnished for Mr. Nettleship's instructive communication† on "Sympathetic Ophthalmitis setting in after Excision of the Other Eye."

Should not some concurrent or immediately associated inflammation of structures other than the conjunctiva be observable, in addition to the ordinary symptoms of conjunctivitis before an example of this most ordinary affection of senile eyes is ascribed to such an exceptional cause as sympathetic influence, and this too on the sole ground that the fellow eye is judged to be one capable of exciting sympathetic mischief ?

I have not yet learned that the deposits upon Descemet's membrane characteristic of serous iritis (keratitis punctata or aquo-capsulitis) are present, though not invariably

* 'St. George's Hosp. Reports,' vol. ix, pp. 496, 505, 508 (1878).
† 'Trans. Clinical Soc.,' Case ix, p. 216, vol. xiii, 1880.

observed, at one stage or another of *every* example of sympathetic ophthalmitis.

Nevertheless, I am convinced of the very great frequency with which such serous iritis does occur in the course of sympathetic ophthalmitis. We are therefore debarred from pronouncing the persistent absence of these deposits from Descemet's membrane as decisively negativing the sympathetic character of an ophthalmitis. So again, their presence is not enough to establish the sympathetic causation of an ophthalmitis. I am most familiar with these characteristics of serous iritis in a class of cases unassociated with a previous traumatism, or syphilis, or rheumatism, or gout, but usually coincident with some neurosis, often contemporary with uterine functional disorders, commonest about the establishment and cessation of menstruation, sometimes subject to very notable periodic exacerbations, unduly prevalent in the victims of malaria, exceedingly tedious and obstinate under treatment, very prone to relapse into a low form of uveitis, usually attacking the second eye several weeks or as much as six months later than its fellow, and so much commoner in females than in males, that I have seen at least ten examples in the former to one in the latter. I venture to suggest, therefore, the importance of especially noting the sex in particular, as well as the age, also the sexual and constitutional condition of all patients who present this symptom in connection with a so-called sympathetic ophthalmitis. Might not our views of the causation of such serous iritis be materially modified, according to the sex, age, and general condition of the patient?

3. *Sympathetic ophthalmitis not appearing till after enucleation of exciting eye.*

By W. Adams Frost.

Henry T—, æt. 25, admitted into St. George's Hospital November 9th, 1883. He stated that there was nothing amiss with his eyes until a month previous to admission, when in clipping a horse some hair flew into his right eye. The eye became much inflamed and continued so up to the time of his admission. There was no history of syphilis or rheumatism.

On admission.—Right eye, general conjunctival injection most marked in circum-corneal zone, on inner side a few vessels encroaching on the cornea. Lower half of the cornea thickly dotted with punctate opacities. Pupil irregular and fixed, presenting numerous synechiæ. T. n. Left eye normal in all respects.

November 14th.—Slight prominence noticed of ciliary region above.

17th.—An iridectomy was performed upwards.

December 1st.—Conjunctival injection slight. Ciliary staphyloma as before operation. He was now discharged at his own request, but returned and was readmitted a few days later.

6th.—Eye very painful; ciliary staphyloma increased in size; anterior chamber very shallow.

15th.—An iridectomy downwards was attempted, but owing to the rottenness of the iris and its firm adhesions none could be removed. Ten days later he again left the hospital.

January 28th.—Readmitted. Eye very painful, and had been so for several days. Ciliary staphyloma larger. Vision = p. l., with good projection. Left eye normal.

February 2nd.—The right eye was enucleated.

7th.—Very slight conjunctival injection noticed in left

eye. Numerous punctate opacities on lower half of cornea and three fine adhesions of iris below. On dilating the pupil with atropine a ring of uveal pigment could be seen on the lens capsule. No pain or tenderness. Fundus slightly blurred, no distinct evidence of neuritis. Vision not noted. The eye was covered with a black bandage, atropine used three times a day, and from February 18th to March 22nd pilocarpine injections were given, beginning with gr. $\frac{1}{16}$ and increasing to gr. $\frac{1}{4}$.

23rd.—Cornea clearer. Adhesions as before. Vision $= \frac{6}{9}$.

March 19th.—Only one adhesion remaining. No opacities on cornea. Vision $= \frac{6}{6}$.

April 2nd.—Discharged. Vision normal. One adhesion remaining. To continue atropine for a few weeks.

Examination of the enucleated eye.—One half mounted in glycerine jelly (specimen shown). Mr. Jennings Milles kindly examined the other half (section shown) and reported as follows: "There is an upward circumscribed staphyloma of the ciliary region, the sclerotic is here much thinned. Beneath the staphyloma is a nodule originating in the posterior part of the ciliary region; this has pushed the sclerotic outwards, and the ciliary body inwards and forwards, destroying the uveal pigment and the pars ciliaris retinæ covering its inner surface. The nodule consists of small round cells of inflammatory origin closely packed together—a localised purulent cyclitis. Spreading inwards from the nodule between the iris and lens is a layer of connective tissue. There is well-marked plastic iritis, the whole iris being firmly adherent to the capsule at the pupillary margin; its parenchyma is filled with small round cells, frequently in groups.

"*Lens* normal.

"The *vitreous* contains a large number of cells in the neighbourhood of the nodule, apparently chiefly migration cells.

"*Retina* normal, with the exception of a slight increase of cells round the blood-vessels.

"The *choroid* is thickened in its whole extent, especially in the region of the papilla. Anteriorly there are groups of cells; posteriorly these groups seem to have merged together."

(*July 3rd*, 1884.)

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4. *Note on the treatment of sympathetic ophthalmitis.*

By George E. Walker (Liverpool).

As it was confidently declared, by more than one member of the Ophthalmological Section at the last Association meeting, to be impossible for one eye which had undergone the complete sympathetic process to recover useful sight, I think I am justified in bringing before you the case of the young woman whom I now present to you. She was brought to me in March, 1877, by her mother, who stated that four and a half years before her right eye was cut across by a piece of mug, and enucleation, or rather abscission was performed on account of the second eye having shown signs of inflammation. In spite of the operation the disease progressed, and when she was brought to me the pupil was quite closed, the iris bulged forwards, and the sclerotic thinned and blue as you see it now. Of course there was mere perception of light. I was very unwilling to interfere, seeing that all authority was on the side of leaving such eyes alone. But her mother urged me to operate, saying that I could make her no worse and I might make her better. This I thought unanswerable, and operated. Like others, I had attempted these cases before and had failed by the methods which have been advocated, such as incising the membrane, or cutting out with scissors a triangular piece. This time I grasped the centre of the false membrane with iris forceps, and using considerable force, tore out the false membrane together

with some iris. The vitreous being fluid escaped, and the eye collapsed, but it soon plumped out and healed as you now see it. Some seventeen weeks after, she read Sn. $4\frac{1}{2}$. Now her vision for distance is $\frac{1}{3}\frac{5}{0}$ and she reads 1 J. When she is at her best V = $\frac{1}{2}\frac{5}{0}$. I ought to have mentioned that two months after the operation, I used mercurial inunction freely, and I have no doubt this greatly influenced the recovery. Since then, I have operated on four similar cases with benefit in each case, very slight in one, more in another, in which I think, were I permitted, I could restore sight; and in two very good results indeed; in these latter I removed nearly the whole of the iris as well as the false membrane.

(*March 13th*, 1884.)

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5. *A case of sympathetic ophthalmitis with whitening of the eyelashes.*

By E. Nettleship.

Jessie S—, æt. 23, is an undergrown and very stupid woman. Her left eye is in a late stage of severe sympathetic inflammation; the globe somewhat shrunken, squared, and very soft (T. − 2 or 3), the pupil blocked, the iris buff-coloured and showing several large vessels, the cornea clear; there is still fair perception of light. All the eyelashes of both eyelids on this side are quite white, and are said to have got so since the eye became bad; the hairs of the eyebrow are not altered, and there is no perceptible change in the skin of the lids or brow. The lashes on the other (right) side are of their natural black colour.

On the August Bank Holiday of 1882, she fell downstairs and injured the right eye; she had no sight in it

afterwards, and was subsequently told it had been "ruptured." She seems to have had no advice for about two months, when she went to the Westminster Ophthalmic Hospital, where not long afterwards (about three months from the injury) the eye was excised.

Her account of the failure of the sympathising (left) eye was far from clear. On the whole it seems probable that this did not begin until some weeks after the removal of the exciting eye; but I should not like to record the case as certainly one of post-operative sympathetic disease. The attack was evidently of the sub-acute type with some neuralgia at times, but no severe pain and no great congestion; the failure of sight, "like a mist," was the first symptom that attracted her attention.

This case resembles, in the bleaching of the eyelashes, a case which I saw under Mr. Hutchinson's care at Moorfields some years ago, and which I think was described in his lectures at the College of Surgeons. In that case, if I remember rightly, the eyes were lost, one after the other, with severe plastic inflammation of the uveal tract, exactly like that seen in ordinary sympathetic ophthalmitis, but of spontaneous, *i.e.* not traumatic origin. Cases of spontaneous destructive irido-choroiditis in both eyes are of course not so excessively rare, and the occasional occurrence of this peculiar change in the eyelashes, both in them and in ordinary sympathetic inflammation, strengthens the probability that the pathological processes are essentially the same in the two groups of cases. There has of late been a tendency to go back from the doctrine that sympathetic inflammation is transmitted by the fifth or at least by the ciliary nerves. Cases such as the one now narrated seem distinctly to favour that belief.

(*Living Specimen. December 13th*, 1883.)

6. *Enucleation within forty-eight hours of severe contused wounds of eyeball and orbit. Severe subacute iritis of remaining eye setting in several weeks later, probably sympathetic. Recovery of good sight.*

By E. Nettleship.

Thomas D—, æt. 41, a railway engine driver, had his right eye injured in a railway accident in August, 1882. The other eye was not injured. The damaged eye was excised by Dr. C. W. Philpot, of Croydon, within forty-eight hours of the occurrence. Dr. Philpot tells me that the eye was "very badly smashed and the muscles bruised and pulped. The optic nerve was cleanly divided at the operation by one cut of the scissors, but judging from the state of the muscles it may have been previously injured beyond the point of division. It seems likely that in the accident the man was thrown against some small projecting knob or angle which smashed into the orbital cavity. The orbital tissues did not heal kindly, an unusual amount of suppuration following the operation."

Six months after the accident, Feb. 14th, 1883, the man applied at St. Thomas's Hospital with iritis of the remaining (left) eye. The eye was moderately congested, the iris fleshy-looking, the pupil small, irregular from numerous adhesions and blocked by membrane; T. n.; vision so bad that he could hardly see his way about and could not make out 20 J.

He stated that the eye had become affected about a month or six weeks after the accident above detailed; it was painful, irritable, watery, and slightly bloodshot, and the sight got very dim. The inflammation lasted about a month, then the eye became quiet and the sight improved a little until a few days before admission, when the eye again became inflamed. The man did not come again for five weeks (March 20th). At that date the eye had im-

proved very much in appearance and in power of sight. The iris was almost natural in texture, but the adhesions and membrane in the pupil were unchanged and atropine had very little effect; T. n.; anterior chamber natural; vision $\frac{20}{40}$ imperfectly and words of 4 J. (there was a minute clear hole in the pupillary false membrane). I have not seen him again; at the last visit he had just got his award from the company, and was going away to live in a distant part of the country.

Of course the question in this case is whether the iritis was sympathetic or due to some other cause? In its chronic course and the formation of tough adhesions and membranes it resembles a sympathetic case more than any other. But if it were sympathetic the attack was doubly peculiar; peculiar because it did not begin until long after removal of the exciting eye, and because the exciting organ was removed so soon after the injury that inflammatory changes could have only just commenced in it. We may ask whether the sympathetic inflammation may not have been excited by some of the bruised orbital tissues which inflamed after the operation? And this explanation seems on the whole not unlikely.

Against the sympathetic hypothesis is the apparently permanent recovery with good sight, and the fact that, though there was no evidence that the man was syphilitic, four years previously he had been laid up for two months by rheumatism in the hip, knee and elbow, on the same side (left) as the iritis; but there had been no inflammation of the eye then.

(*Dec.* 13*th*, 1883).

7. *Sympathetic neuritis without other visible structural change.*

By W. A. Brailey, M.D.

Mary Ann R—, æt. 27, was admitted to Guy's Hospital under my care on March 31st, 1884.

On March 6th the left eye was cut with a piece of broken crockery, the wound extending transversely through the entire cornea and ciliary region of the inner side. After the accident she had no vision in the eye. It was red, but little painful. She kept it tied up, but had no medical treatment. Two weeks later there was some little pain in the right eye and she noticed that its sight began to fail. She therefore came to the hospital.

On admission.—The wound of the *left* was united, but the iris was adherent to it very closely and extensively. Some opaque lens substance was visible. She had perception of light. There was some ciliary injection.

The *right* eye looked perfectly normal. It was not tender. Slight pain was mentioned, but it did not seem to be or to have been more than trifling and of doubtful position. The iris looked normal and dilated fully to atropine. Vision = $\frac{6}{60}$, barely. Field complete. Colour vision normal.

Ophthalmoscopically.—The media were clear. The disc was slightly swollen and whiter than normal, its margins were blurred; the vessels from it were smaller than normal; some of them had faint white streaks edging them in the immediate neighbourhood of the disc. Some small tortuous vessels were visible in the neighbourhood of the yellow spot.

Both the eyes were tied up. Atropine drops were used, and $\frac{1}{16}$ grain of perchloride of mercury was administered thrice daily. Two days later (April 2nd) there was no pain in either eye.

April 16th.—*Right eye.* The disc appears more swollen

and rather more white. The vessels beyond the margin of the disc are tortuous and in places obscured.

She thinks the vision is slightly improved, but for the last three days she has had severe pain on the internal side of both orbits.

23rd.—The pain has ceased for some days and she leaves the hospital to attend as out-patient.

29th.—Vision slightly better. A blister ordered to the temple for four nights.

May 13th.—Vision = $\frac{6}{36}$ (1 letter). *Left* sees hand moving at five feet.

20th.—*Right* Vision = $\frac{6}{36}$.

27th.—A little pain over brow for the last two days and vision = $\frac{6}{60}$ only. She is still taking mercury, and both eyes are still tied up.

The sight gradually improved till July 4th (the day of the meeting) when *right* vision = $\frac{6}{18}$. The optic disc is less swollen and decidedly more white. No fine vessels are visible on it. Its margins are still blurred. The arteries from it are smallish and slightly bordered with white near the disc ; the veins are of fair size and somewhat tortuous, especially those running upwards.

Remarks.—The sympathetic nature of the affection of the *right eye* is inferred from the fact that it began two weeks after the injury to the other, this injury being of a very grave nature. A careful inquiry into the history of the case failed to reveal any other cause of the neuritis.

(*July 4th*, 1884.)

Mr. W. Adams Frost mentioned a case of sympathetic ophthalmitis which was under the care of Mr. Tay,* in which the changes in the anterior part of the uveal tract were comparatively slight, and in which perfect recovery of vision took place, but in which optic neuritis was present, the swelling of the disc persisting long after all other symptoms had disappeared.

* This case has not been published.

8. *Specimen showing traumatic detachment of retina and choroid.*

By W. Adams Frost.

Edward A—, æt. 27, admitted into St. George's Hospital under the care of Mr. Brudenell Carter (by whose permission I publish the case), February 8th, 1884. Left eye wounded by a splinter of wood eight days before admission.

On admission.—A jagged wound in lower half of cornea extending just beyond its margin. Anterior chamber full of blood.

February 16th.—Globe enucleated. Bisected and mounted in glycerine jelly.

Retina completely detached and forced out to centre of globe. The *choroid* was similarly detached, except for about 3 mm. round optic nerve entrance, and formed a complete sheath round the detached retina-globe, filled with coagulated and fluid blood. Blood in optic nerve-sheath.

(*Card specimen. May 8th,* 1884.)

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9. *Total detachment of retina; globe filled with organised blood-clot.*

By W. Adams Frost.

Harriet B—, æt. 19, admitted into St. George's Hospital under Mr. Frost, February 21st, 1884. At age of three right eye injured in a fall; no vision in that eye since. Globe enucleated, bisected, and mounted in glycerine jelly. Globe small. Cicatrix in cornea near centre to which iris adheres. Lens reduced to a dense white membrane 1 mm. thick. Retina totally detached. Cavity of globe completely filled by a firm solid mass of dark colour; organised blood-clot.

(*Card specimen. May 8th,* 1884.)

VI. PANOPHTHALMITIS.

1. *A case of pseudo-glioma.*

By H. Lewis Jones.

(Communicated by Bowater J. Vernon).

Emily S—, æt. 1 year and 9 months, was admitted into St. Bartholomew's Hospital under the care of Dr. Gee, to whom I am indebted for permission to bring the case before you.

On October 4th, 1883.—The patient fell down twelve steps and bruised her forehead, but did not seem to be much hurt. Next day (Oct. 5th) she screamed, became insensible, squinted and had a fit.

On Oct. 6th the mother brought her to the hospital. She had a fit in the surgery.

On admission.—She is a well-nourished child; her face is flushed, her head retracted; she has a bilateral internal squint, is very restless, and vomits frequently, pulse rapid and irregular. Temp. 102°, resp. 35.

Family history.—Mother has been subject to cough for nine years and spits blood at times. She was born with imperforate anus and has an internal squint of left eye. *Father* undersized and has delicate health. Has external squint of right eye. No syphilis.

7th.—Resp. 40, pulse 140. Head strongly retracted.

8th.—Partially unconscious; at 8 p.m. her temperature rose to 107·4° and there was a slight general convulsion; after tepid sponging and an ice cap to the head the temperature fell to 102° at midnight; pulse then 176.

9th.—On the 9th there was some coryza, and injection of conjunctiva.

10th.—Head still retracted, knees drawn up, some red blotches on chest and limbs, best marked on legs and feet (not like measles in the opinion of Dr. Gee).

11th.—Since admission five days ago, the child has become shrunken, pale, tremulous, and fretful, and lies in an unconscious state. There is to-day acute iritis with hypopyon in the right eye.

12th.—Retraction of head less, otherwise as on 11th.

14th.—The iritis is much improved, the pupil well dilated by atropine, the hypopyon absorbed; a white flake of lymph lies in the pupillary aperture. Mr. Vernon saw the patient and found well-marked optic neuritis in the other eye (the left). The child is less fretful and less unconscious.

From 14th to 26th there was slow improvement in the symptoms. On 26th the temperature fell below the normal for the first time. Some urine also was obtained and found to be slightly albuminous. Only a slight film now in pupil of right eye. The patella tendon reflex on both sides is exaggerated.

November 5th.—Left optic disc and retinal vessels well defined. Right pupil clear, slight ptosis of right eyelid. There is no fever; the child is cheerful and intelligent.

16th.—She was transferred to another bed facing the light, and it was noticed that there was a whitish reflex from within the eyeball of right eye.

Mr. Vernon saw the patient on Nov. 21st and gave the following report.

R.—Detachment of retina by a yellowish translucent mass behind. *Pupil.*—Fixed, dilated. *Iris.*—Atrophied, bulging forward, and, owing to the extreme shallowness of the anterior chamber, in contact with the cornea. *Cornea.*—Slightly nebulous. Tension of eyeball much diminished.

L.—Optic disc rather discoloured and indistinct as if from past neuritis. *Choroid.*—Deficient in pigment, probably congenital.

28th.—Urine still slightly albuminous.

The child remained in the hospital until December 18th. No change occurred, but she grew more plump and rosy.

At the date of the meeting there was no change in the condition of the right eye.

(*Living specimen. January 10th,* 1884.)

VII. GLAUCOMA.

1. *Clinical observations which appear to indicate a means of reducing the danger from malignant glaucoma while increasing the efficacy of iridectomy in the treatment of primary chronic glaucoma.*

By M. M. McHardy.

The usually trifling value of isolated examples of any but the most rare disorders would prevent my recording the facts of the two following cases, did I not recognise in them such exceptional circumstances as appear to warrant my soliciting your patient attention thereto. Moreover, I am unwilling to longer delay affixing such small link as my own experience may furnish, to that almost irresistible chain of evidence which, laboriously constructed from widely-scattered fragments, goes so far towards establishing that rational pathology of glaucoma and its treatment, which Priestley Smith has given to the world in his Jacksonian prize essay, and by his subsequent work.

Some preface to the curtailed notes of the cases will promote both brevity and clearness.

In common with the majority of the most experienced ophthalmic operators, I have long believed, and taught, that the treatment *par excellence* for primary chronic glaucoma is by iridectomy, performed through an extensive initial incision, the whole length of which should be, as nearly as practicable, in the plane of the external angle of the anterior chamber; a large portion of iris being excised, quite up to its ciliary attachment, along the whole length of the primary incision. It has been my habit to supplement such iridectomies by interdicting the

wearing of any compress over the eye after completion of the operation, the primary incision for which it is desirable should heal by a wide and porous, or elastic cicatrix, rather than by one which is close and resisting.

Guided by the above conviction regarding the desiderata of an iridectomy for the treatment of primary chronic glaucoma, one naturally considered what was the largest initial incision warranted by the special circumstances, and justified by the behaviour of large, similarly placed, incisions through the ocular envelope. This brought one to reflect upon the initial incision for the extraction of full-sized hard cataracts by either the modified linear section or by De Wecker's peripheric flap section. It was then obvious that it should be very exceptional for an average adult eye to succumb from a well-placed, well-executed, corneo-scleral incision, having an external chord of at least 10 millimetres. For the extraction of a cataract a primary incision of such dimensions is usually dictated by the average bulk and diameter of the body to be removed through it.

The following questions then suggested themselves and could only be answered by the results of actual experience :

Could a larger, somewhat similarly placed incision be safely practised when it was *not* intended to remove the lens ? This question is answered in the affirmative by my own experience in upwards of twenty-five cases of primary chronic glaucoma treated and cured by iridectomies ; the primary incisions for which have had an external chord with a minimum length of 10 mm.

To what, if any, greater extent could the incision be advantageously carried, and why ? The occurrence of primary glaucoma should, *cæteris paribus*, lead us to suspect the presence of an exceptionally large lens. Priestley Smith's admirable paper, in the last volume of our ' Transactions,' indicated that cataractic lenses were probably smaller than transparent lenses of like ages. This led one to anticipate that in elderly non-cataractic adults we should encounter lenses larger than those which usually

present in the extraction of senile cataracts. Hence, that for its easy delivery a transparent lens would require a larger ocular wound than would a cataractic lens of equal age. Furthermore, the conditions of the anterior chamber in glaucoma are prohibitory to any such approximation of the length of the internal to the external chord of the incision, as is practicable in operating for extraction; when the point of the linear knife, in puncturing, may be safely directed some 70° below the chord of the projected initial incision.

Those who accept Priestley Smith's theory of primary glaucoma must recognise that in a safe removal of the lens, in its capsule, we should find the most radical cure for the most sight-destroying of eye affections. The conditions of the lens, however, in ordinary primary glaucoma would forbid its removal save in the capsule. Before attempting to practise the removal, in their capsules, of such transparent lenses, the surgeon would have to feel the ground very carefully and to advance his efforts very cautiously.

At a loss for any trustworthy evidence upon the facility or reverse with which such lenses could be extracted, I judged that the first essential to deciding the point was to practise an initial incision of such ample size that a minimum obstacle would be offered to the exit of any encapsuled lens which might present. However, the risk of unduly favouring the development of malignant glaucoma can never be banished from the mind of an operator meditating upon these cases. Too many have experienced a larger percentage of such disaster than the 2 per cent. which fell to the lot of Von Graefe. But—Is not malignant glaucoma after iridectomy due to an advance of the lens against the cornea? Is not its almost invariable consequence destruction of the sight of the eye? Advance of the lens would be hardly less favoured by a *restricted* post-corneal incision than by one which was both larger and more extensively post-corneal than that which is daily practised for extraction. The latter incision would, however, almost certainly allow any lens which became

displaced forwards to escape, and would thus prove the *first* step towards favouring the much-desired removal of the lens, and would furnish, as suggested by Pagenstecher, a very ready means of release from the horrors and dangers which attend malignant glaucoma, developing in an eye from which the lens cannot get away.

By such arguments I was led to design the following as my ideal initial incision, which I make by transfixion with a narrow stiff linear knife, in cases of primary chronic glaucoma ; viz., *the external chord of the incision has a length equal to the diameter of the cornea* (*viz., about* 12 *mm.*) *and externally the entire incision lies parallel with but one millimetre posterior to the margin of the cornea.* When the particular features of any eye forbid my making quite such an incision, I am not content with one less than would suffice for an ordinary extraction, and my belief that such an extensive incision is not usually practised leads me to trouble you with my experience of its application, and to solicit your valuable criticism upon its merits or demerits ; while, moreover, I see some hints that it may prove to be a pioneer of the practical treatment by removal of the lens of certain unpromising cases of glaucoma.

I instituted this section with a full appreciation of the gravity of extracting such lenses, as has been well said by Priestley Smith in a footnote on page 230 of his Jacksonian essay. I now have notes of upwards of thirty cases of chronic glaucoma in which I have practised the section already described. In no instance have I been able to associate any unfavourable sequel with the exceptionally large section. One eye was totally lost through hæmorrhage which occurred some few minutes after completion of the operation, and speedily expelled, first the lens, and then the bulk of the vitreous humour.

In every case the following course, which has given me the greatest satisfaction, was adopted from the moment of completing the operation.

Dressings.—Over the closed eyelids a double layer of lint is laid, and kept moistened with cold boracic lotion.

The case has the constant attention of a nurse, who is provided with a pad of cotton wool, with which she is instructed to afford the eye *temporary* support should the patient strain, through vomiting, sneezing, coughing, or ejecting excreta.

The case of Eliza G—, æt. 53 (exhibited January 10, 1884), furnished my only example of malignant glaucoma, after iridectomy by the above section. She was the subject of chronic glaucoma, of from five to eight months' standing, with occasional exacerbations in her symptoms. She applied with right T.+2, left T.+1 and other typical symptoms. The right pupil was dilated, and did not contract, neither did the tension diminish in response to eserine. On the afternoon of November 14th, I performed an upward iridectomy, with a rather larger section than is usual for extraction, but owing to the extreme shallowness of the anterior chamber, found it impossible to remove as much iris as I could desire, and left the case in the hands of experienced persons. Five hours later the eye was hard and painful; the next morning it was chemosed and presented a typical example of malignant glaucoma. Twenty-two hours after the operation the lens in its capsule escaped spontaneously. I then examined the wound, from which no vitreous humour was protruding, but in which there was a considerable prolapse of those portions of iris which I had failed to withdraw on the previous day. Judging that any interference at the wound would then be meddlesome and mischievous, a firm compress was applied, as after any senile cataract extraction, and the eye has since continued to make an uninterrupted recovery, the bulging of the cystoid cicatrix gradually diminishing and the sight improving to what we usually consider to forebode a good result, after cataract extraction, viz. counting fingers at 65 cm. without any lens. It has not been deemed prudent to make a more exhaustive examination of the acuity of vision.

The left eye was treated on December 5th by a similar iridectomy, at which a larger segment of iris was more

thoroughly removed than was possible in the right. The second eye made a satisfactory recovery. It is noteworthy that the left eye has never ceased to be full hard since the operation wound closed, and has occasionally exhibited an almost morbidly high tension; while the right, *now aphakial*, eye has shown no glaucomatous symptoms since the lens escaped.

John T—, æt. 49, applied May 9th with sympathetic ophthalmitis of the left eye, which was tender, photophobic, injected, and weeping. The right globe was shrunken and painless; it had been blinded fourteen years previously by "a blow from a $2\frac{1}{2}$ in. cut clasp nail."

The exciting stump was immediately enucleated. The sympathising eye was, as far as possible, kept in total darkness, and atropine drops were used to break down some posterior synechiæ which were found to have formed.

May 17th.—Iritic symptoms almost disappeared; there is a single posterior synechia at lowest part of pupil, which is widely dilated elsewhere. Eye feeling uneasy and full. T. + 2.

Three days later.—The excess of tension has subsided under the occasional use of eserine, and an absolute interdiction of the atropine drops.

June 20th.—Recurrence of definite glaucomatous symptoms; T. + 2, not relieved by eserine, but which subsided after an immense upward iridectomy, from which the eye recovered very satisfactorily.

During September the glaucomatous symptoms recurred and persisted in spite of everything short of operative treatment, until V. was reduced to perception of light. I then again explained the gravely critical bearing of the case to the patient, and on October 4th he submitted his sole eye, with T. + 2, V. = perception of light, pupil irregularly wide but attached by one fine posterior synechia at lowest part, to operative treatment. I made a section such as described, only downwards; the iris did not prolapse, I introduced forceps to seize the iris near the posterior synechia, withdrew a considerable segment of iris,

was detaching its ciliary border, when I discovered the edge of the lens presenting; then, rapidly completing my excision of iris, I removed the speculum, steadied the globe by two finger-pulps applied over the upper lid, and had the infinite satisfaction of seeing the entire lens, in its capsule, escape on to the lower lid, unfollowed by any vitreous humour. The eye was then treated as after an ordinary cataract extraction, and made a steady recovery. Its tension never rose above normal, and its vision quickly improved to counting, without a lens, fingers at 50 cm.

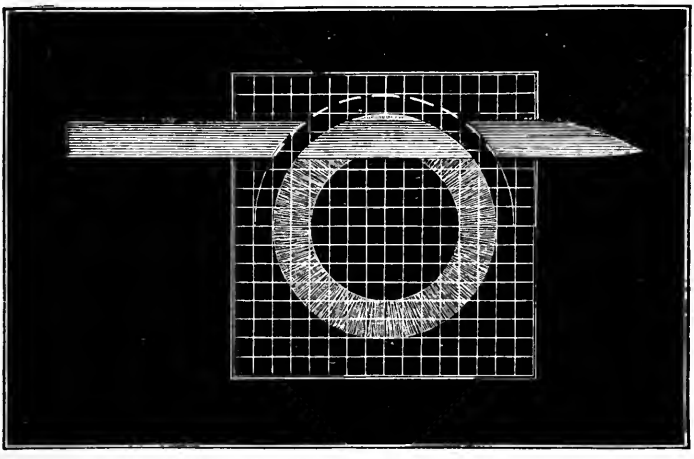

DIAGRAM TO SCALE* (ENLARGED 2 DIAMETERS).

Each subdivision represents a square millimetre. The cornea is represented as 12 mm., and the linear knife as 2 mm. in width. The interrupted line shows the extent and position of the section now advocated. This diagram demonstrates that with the puncture and counter-puncture placed exactly 1 mm. posterior to the corneal margin, and using a knife just 2 mm. wide, the chord of the incision is given precisely the dimensions recommended, if only a vestige less than ½ mm. of iris be left visible above the edge of the knife during the transfixion.

and with suitable lenses the eye now exhibited can read 1 J. fluently, and has distant Vision = $\frac{6}{18}$ Snellen.

Another case (exhibited January 10th, 1884), James

* This is reduced 20 diameters from the exhibited diagram and model knife, which with others of similar construction greatly facilitate class demonstrations of ocular sections.

T—, æt. 47. A case of chronic glaucoma which was treated by two such iridectomies performed on the right and left eyes respectively on April 18th and May 9th last year. They show how close a union may occur without any compress being worn after the iridectomy, and that after the close union of even such extensive sections the tension may remain threateningly high. With its ametropia corrected the left or better eye now has V. $= \frac{6}{12}$.

After judging the desirable size for the incision, I decided upon the above-named *description* of its maximum limits, for the practical reason that it rendered the operator independent of any measurements other than his eye could at once gauge upon an inspection of the patient's cornea.

Furthermore, with one exception, I have never practised this section upon a patient who was not fully anæsthetised by the inhalation of ether; and, though I have notes of some vomiting shortly after eleven of the operations, it did mischief in not more than one case,—that one in which hæmorrhage worked destruction.

(*March 13th*, 1884.)

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2. *Acute glaucoma of four weeks' duration, treated by cyclotomy; recovery of good vision.*

By George E. Walker (Liverpool).

The case which I bring before you to-night is one which I showed to the Ophthalmological Section of the British Medical Association, at the meeting held last autumn in Liverpool.

It was then in an incomplete state, and as the tension of the eye was still in excess, there could be no possibility of dispute as to its having been glaucomatous.

William A—, a master cabinet maker, æt. 55, came to me on the 7th of July, 1883. I found his right eye

suffering from an intense attack of acute glaucoma; the tension stone-like, pupil dilated, vision reduced to the barest perception of light, and the pain proportionately great. He gave the following history: up to the year 1881 he had always enjoyed good sight, and had no ocular trouble; but at this time he began to suffer from severe headache, which was accompanied by acute pain in the eyes and followed by drowsiness and languor; also on going into the open air the eyes would fill with water. These were the usual symptoms until the early part of June, 1883, when the right eye began to be painful and inflamed, so that on or about June 14th he sought medical advice. The symptoms increased, and he came to me on the 7th of July. It appears, therefore, that we have a history of an attack of acute glaucoma lasting at least a month.

The case seemed to me so bad that I despaired of doing much more than relieving pain, and, as the sequel will show, the eye was in such a profound state of disease that had I made any large incision in all probability I should have destroyed it at once.

I began by instilling freely a four-grain solution of eserine which gave him no relief but which put the circular ciliary fibres on full stretch. I asked him afterwards whether it had increased his pain, as I have observed it do so in similar cases, but he said the pain was so bad before that he thought it impossible for it to become worse. I waited long enough for the drug to act fully, and then operated after the manner I have described, viz. keeping open the lids with a wire speculum I seized the lower part of the conjunctiva with toothed forceps, thrust a very narrow knife well within transparent tissue through the lowest part of the cornea, through the iris, and then depressing the point of the knife withdrew it, cutting through all of the ciliary body up to the sclerotic, but without enlarging the corneal wound. The eserine had done its work well, seeing that the circular fibres snapped like a fiddle-string. The characteristic pain

ceased instantly and the smart of the operation in a very few minutes afterwards. Scarcely any aqueous was lost, so that the tension appeared not perceptibly affected, and next morning it was about the same. I therefore ventured on using a quarter-grain solution of eserine once daily for a week, then twice daily. The tension slowly went down, but I think the eserine had little or no effect, the solution being too weak to have an appreciable influence on the diseased muscle. Later on I shall mention how, under different circumstances, a strong solution produced different effects.

Twenty-five days after the operation I showed him to the Section at Liverpool. The tension then was so far in excess, not only in this eye but also in the other, that one gentleman advised me to perform iridectomy or sclerotomy at once on both.

But vision had improved so much that two days before this advice was given, that is twenty-three days after the operation, he could read with 10-inch glasses, which he had used six or seven years before the attack, No. 6 of Wecker's type, and a fortnight after this, vision for distance was $\frac{15}{50}$. He improved further up to $\frac{15}{30}$, and then his health began to give way and his sight to retrograde, what with the long strain of the glaucoma and the cares of business which were now superadded. Generally it was manifested in debility and loss of appetite.

To recruit his health he went to visit a friend, a flower-gardener, in the vale of Gresford, where he injudiciously worked in gathering flowers. The heat of the weather and the bright colours of the flowers had a very bad effect on his eye, and he came back to me on October 22nd, when I found he had an attack of keratitis beginning at the cyclotomy wound and spreading upwards. For this I prescribed a one-grain solution of eserine and some tincture of quinine, and sent him to Alnwick, in Northumberland, his native place, where he stayed three weeks and came back another man.* His vision so improved that

* He told me, however, that he was soon obliged to give up the use of the

on November 25th it was $\frac{15}{25}$ and 1 J., on December 16th $\frac{15}{20}$, and on February 15th, 1884, some of $\frac{15}{15}$.

I have not mentioned so far his glasses for distance. When his acuteness became sufficient to profit by glasses I found + 1 gave him most help, then after a few weeks 36 inch, then 32, 28, and now for the four weeks ending February 15th, a 26 in. + gives him most help. On February 25th, 30 + suits him better; he has been using his eyes much lately.

Of course, after four or five weeks of acute glaucoma considerable limitation of the field was inevitable. Horizontally the limitation is not nearly so great as one might expect, but vertically it is great. The vertical field of vision, however, has considerably enlarged of late.

In the disc one can see how nearly total extinction of sight was imminent. A physiological cup has been greatly deepened, but still it is very distinguishable from a fully developed glaucomatous excavation.

The iris shows several points of adhesion to the lens, but I have never dared to use a mydriatic in order to gratify curiosity as to the real extent of them.*

A striking illustration of the efficacy of hyposcleral cyclotomy is afforded by the following case:

Wm. H—, æt. 57, a master of a Dock Board Flat, was sent to me last summer on account of pain in the right eye. I found a scar at the lower and inner part of the sclero-corneal junction and a cyst of the iris attached to the scar. He had also cataract and some posterior synechiæ. I cut through the anterior synechia, cyst and all, and sent him home. He had great pain all night and next morning, but a single instillation of eserine stopped

one-grain solution of eserine, as, although it did him good at first, it afterwards caused his eye to flush up and become painful. On trying this myself I found his statement to be quite correct. I think that the posterior synechiæ were caused at this time, but the cloudiness of the cornea prevented recognition of the iritis.

* Since the reading of this paper I have dilated the pupil with duboisine, without producing any unfavourable symptoms.

it, and the eye soon recovered. As he had good perception of light I thought I might make an attempt to improve it, but knowing from the effects of the former operation how easily the eye could be provoked to inflammation I passed a cataract needle through the cornea and made an experimental minute cross-cut in the anterior capsule. I could not detect any change in the capsule with a pair of 5 in. glasses, so minute was the cut, but it was enough. Before he reached his home the eye was violently painful and the lids much swollen. He was most eloquent afterwards about the pain he suffered all through the night, and when I saw him next day he was quite stupid, did not know me until I spoke loudly to him, and then answered in a confused manner. The eye was stony hard, so at once I instilled a four-grain solution of eserine freely, and, after giving it time to act, operated after the plan above described.

At once his long, deep-drawn sighs of relief showed what a load of pain had been lifted.

He told me afterwards that he had been quite out of his mind, and I believed him.

The eye gave no further trouble, and I suggested that he might have the cataract removed in a short time. But I fear he is too loth to run the risk of a recurrence of such suffering as he experienced after the first, and still more after the second operation, for I have never seen him since my hint about further operative treatment.

I propose now to make a few brief remarks on the causation and cure of glaucoma. In 1879 I published an essay on the subject, in which, reasoning from the relief of glaucoma by section of the ciliary body, I made these propositions:

1. That all glaucoma is inflammatory, whether acute or chronic.

2. That it is produced by inflammation of the ciliary body, the immediate cause of the increase of tension being the blockage of the trabeculæ of the ligamentum pectinatum.

3. That the *modus curandi*, whether by iridectomy, sclerotomy, or by cyclotomy, is through the rest of, and relief of tension in, the inflamed ciliary body, brought about by the operation, thereby allowing the inflammatory products to be absorbed from the ligamentum pectinatum especially, and so bringing about the normal efflux from the eye.

4. That the ultimate cause of glaucoma is the excessive action of the ciliary muscle, chiefly of its circular fibres in hypermetropic eyes, in which group the vast majority of glaucomatous attacks occur; and that, therefore, by correcting defects of refraction by means of suitable glasses, we may guard against and prevent such attacks.

In myopic eyes, also, there is often over-action of the circular fibres of the ciliary muscle.

The first and second of these propositions now appear to most ophthalmic surgeons to be truisms; few think otherwise than that all glaucoma is inflammatory, and that it is chiefly through blockage of the ligamentum pectinatum that the rise of tension occurs. Of course much has been discovered since I drew these inferences from the action of cyclotomy. The adhesion of the periphery of the iris to the cornea is an anatomical fact which could not be inferred, and there are other minutiæ, which need scarcely be named in this short review. But the blockage of the trabeculæ is the main factor, and probably in recent cases the only necessary one, the others being mere subsidiaries.

But about the third and fourth propositions there is no such agreement. I am not sure whether I do not stand alone in maintaining them.

The third, that the three operations iridectomy, sclerotomy, and cyclotomy—*in acute glaucoma* be it always understood—cure by the ordinary method of relief of inflammatory tension as in furuncle, anthrax, phlegmonous erysipelas, &c., I think few would doubt, had they, as I have done repeatedly, felt a tense ciliary muscle snap like a fiddle-string at the touch of the knife in the operation

of cyclotomy. Iridectomy and sclerotomy acting in a more roundabout way do not convey that ready instruction to the mind afforded by the simple and direct operation of cyclotomy.

The instant relief afforded by the last-named operation, even before the withdrawal of the knife from the eye, and therefore before the very slight escape of aqueous can have complicated matters, shows that the essential thing is the relief of inflammatory tension in the ciliary body, and not the mere temporary lessening of the hydraulic tension of the globe.

Besides, as has been seen by several now present, in the case shown here to-night, the tension after cyclotomy takes many days to reach the normal standard, the only explanation of which is, that until the inflammatory tension of the ciliary body is relieved, and the inflammatory products absorbed, the organ cannot accomplish its duty.

In iridectomy and sclerotomy an artificial drainage goes on for some time, unless the wound heal at once, when the tension rises. Hence the frequent observation that an imperfect iridectomy, one in which a tag of iris has prolapsed and kept the wound open, often succeeds better than one in which the wound heals up soundly and at once.

Dr. Brailey suggests that sclerotomy and cyclotomy cure by opening up a new channel into Schlemm's canal.

This may be so, but, as far as iridectomy is concerned, I cannot see how it is possible for this operation to do otherwise than absolutely close and destroy all access to Schlemm's canal so far as the incision extends. Surely when the iris is torn from its connection with the ciliary body the raw surface must heal up with cicatricial tissue, and therefore be less likely to allow absorption to take place than the normal tissue, even though inflamed.

So much for the *modus curandi* of acute glaucoma.

For chronic glaucoma, if the disease be far advanced, I submit that all operations when they give relief, do so by forming a subconjunctival fistula. The scleral wound

does not form a cicatrix of filtration because scar tissue is just as impermeable to fluid as healthy tissue. As I have shown, it will stand a pressure three times the normal pressure of the eye, and probably three times three more.

Unless the wound heal up before the intra-ocular pressure has time to reassert itself, it cannot heal, but leaves a fistula over which the conjunctiva heals and so forms a cystoid cicatrix. I have seen this occur several times after cyclotomy for chronic glaucoma, being able to watch the process with great ease.

But the most important of all the propositions which I have made is, that glaucoma depends on overtaxed accommodation. If this theory be correct then we can, by early correction of deficiency of refraction, prevent glaucoma as easily as smallpox can be prevented by vaccination.

I will adduce very shortly a few proofs. Some years ago I operated on a lady who had lost one eye completely by glaucoma. A year afterwards she came saying that the other eye presented exactly the same symptoms as those which preceded the destruction of the first. She wore a suitable glass and came back a few weeks after having lost the symptoms altogether. The patient I have shown to-night had in the left eye almost T. + 2 when I operated on the right. He has been treated only by glasses, yet the tension is now normal.

But there are certain anatomical conditions elucidated by Dr. Brailey which seem to prove my case up to the hilt. He finds in cases of glaucoma dependent on adhesions of the iris to the cornea, that the sclerosis and atrophy of the ciliary region is most intense and complete at that part which is most dragged upon by the adhesion. Now, if this be the case, viz. that an anterior synechia of, may be, a few months' standing, shall cause sclerosis and atrophy of the ciliary body opposite to it, why should not a drag all round the ciliary region by a constantly contracted circular muscle going on perhaps from the time of learning letters to middle age, produce a similar effect? It would be impertinent for me to dwell long on this.

The phrase which I used more than five years ago to denote this, viz. "ciliary spasm," is now current technical language, and everyone has seen patients requiring, say, − 1·5 D. for distance and yet, after the spasm has been released, showing a hypermetropia of + 1·5 D. That is, there has been a ciliary spasm of 3 D., which is as if a patient were reading small print constantly for three or four years. This is a very mild instance. I have seen many greater, and so, no doubt, have most of us.

Then the fact brought out by Dr. Brailey, that in the early stages of simple glaucoma the sclerosis, &c., is more marked at some points than others, can be accounted for. Most of such eyes are astigmatic, and therefore the lens has to be more acted upon in the meridian corresponding to the meridian of lesser curvature of the cornea. Hence that part of the ciliary muscle which has to accomplish this must be more overworked than the opposite, and therefore more likely to be first inflamed.

(*Living specimen. March 13th*, 1884.)

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3. *Examination of a glaucomatous eye in which retinal hæmorrhages were present, and were distributed in a manner suggestive of obstruction to the descending branches of the central vessels.*

By E. Nettleship.

(With Plate I, fig. 2.)

Amelia W—, æt. 58, a laundry-woman, who had never worn spectacles, began to notice "rainbows" and mist with her left eye about six months before admission; two or three months later the right also began to fail. She had no pain and the sight did not vary much from day to day, though generally rather better in the evening.

She was admitted on June 6th, 1883, into St. Thomas's Hospital. With the L. she had only perception of light; p. about 6 mm. when shaded, acting somewhat to light; O.D. very pale and deeply cupped; numerous hæmorrhages seen in the retina, but their distribution not noted. T. + 1. R. counts fingers, F. extremely contracted (varying from 10° to 5° from fixation point); p. rather smaller than left, and fairly active to light (from 5 to 4 mm.); T. ?+. State of anterior chambers not noted, but had they been very shallow I should certainly not have performed sclerotomy. Urine 1015, no albumen, no sugar.

On June 8th sclerotomy was performed upwards in each eye under ether; eserine had been used, but the ps. would not contract well. All went well in the R., and six weeks later sight had improved to seeing the test-board at 20′, choosing +4 D. for this distance, and reading letters of 16 J. with +9 D. No prolapse occurred, and the wounds, separated by a narrow scleral bridge, remained flat. In the L. (the worse eye), though a similar scleral bridge was left, the iris prolapsed freely into the first (or puncture) wound, on the table; and although it was perfectly replaced with a small vulcanite spatula, the prolapse recurred next day, and the eye became very painful. An anæsthetic was again given and the iris removed, but not successfully, and a little vitreous escaped. Temporary relief followed, but pain and irritability returned and the lens began to get hazy; the eye was therefore excised on July 10th.

On opening the globe, equatorially, whilst quite fresh, the lower half of the retina was found to be studded with very numerous blood patches of various sizes; it was at once placed in strong alcohol, and the accompanying drawing was afterwards made (Plate I, fig. 2). All the hæmorrhages are situated below a line running horizontally through the disc and yellow-spot; they show a tendency to radial grouping, they extend far forwards, and it is to be noted that all the vessels of the affected half of the retina are extremely small, only one artery and two

veins being visible, and these with difficulty. The vessels distributed to the other half, though no doubt smaller than during life, are all easily visible. As these appearances suggested that the bleeding had been caused by an obstruction to the return of venous blood from the lower half of the retina I hoped to be able to find evidence of venous thrombosis. Arterial occlusion might also probably account for the appearances.

Although the case is not an example of typical *retinitis hæmorrhagica* such as is believed with much probability to be often due to venous thrombosis, the arrangement and distribution of the extravasations are very similar, and considerable interest would therefore attach to the determination, in the present specimen, of the local cause of the hæmorrhages. I have, however, not succeeded in positively proving the existence of occlusion in any of the vessels. In many of the veins on the disc and in the retina, the blood-corpuscles are represented by bodies of various sizes, some larger, others smaller than natural, as if some breaking up and amalgamation of corpuscles had taken place; and these appearances are not found in the choroidal veins, nor in sections of the trunk of the central retinal vein in the optic nerve. They certainly suggest a condition of stagnation in the veins referred to. Most of the arteries were extremely thickened, alike in the retina, choroid, and optic nerve; but none were seen to be occluded.

(*July 4th*, 1884.)

4. *Glaucoma with retinal hæmorrhages, thickening of retinal veins, and obliteration of arteries.*

By E. Nettleship.

(With Plate II, fig. 1.)

Martha B—, 45, married 23 years, has had nine children. Admitted at St. Thomas's Hospital in February, 1883, with double absolute glaucoma. Sight had been failing in the left, and probably in the right, for about two years, when nine or ten weeks before admission a severe acute attack with headache, vomiting, and delirium (?) came on, and she went blind.* The eyes had now become quiet, but T. was + and the anterior chambers shallow. The ophthalmoscopic appearances in the left were not particularly noteworthy; the disc moderately cupped and not very pale, very marked spontaneous arterial pulsation on the disc, no vascular changes and no hæmorrhages.

But in the right, the appearances shown in Plate II, fig. 1, were seen :—The disc is deeply cupped, extremely pale, and shows only a small number of the central vessels, and these much shrunken, on its area. The *retinal arteries* (except the ascending main division) either become invisible shortly after leaving the disc, or are traceable further on only as white lines; the ascending division, though very small, is pervious for a long distance, but one of its chief branches is obliterated and white. The *veins* at some distance from the disc are represented by thick white bands; as they approach the disc a blood-column of greater or less width appears in all, though the upper main vein (corresponding to the pervious artery) is the only one carrying anything like a natural quantity of blood. This vein is extremely tortuous and is obscured, close to

* From the appearances it is probable that the right eye had been blind for a much longer time.

the disc, by some mottled extravasations. Another vein, the descending temporal, is also very tortuous, but only at a long distance from the disc, and near this tortuosity also are a number of hæmorrhages; a few are also seen in other parts. The white cords representing obliterated veins are seen to be broader than the normal veins would be at corresponding distances from the disc.

The patient looked in good health, but was weak in body, and her memory and articulation were defective. A double bruit was heard over the base of the heart, and the pulse was collapsing (water-hammer); urine 1030, free from albumen; lungs and abdomen normal. For some time (two years) her manner had been "odd," and she had been subject to "numby fits" in the right arm with "loss of speech, and pins and needles." During the acute glaucoma she was "quite out of her mind," but had been "sensible again" for a fortnight before admission. She was taken in (under Dr. Bristowe's care) for a short time, and during her stay had several attacks, beginning with emotional excitement and going on to noisy delirium with delusions that she was going to be killed. After one attack she had a distinct "lisp" in her speech for a short time. Temperature normal throughout. She has lost one child from "heart disease," and has a sister who has had numbness and loss of power in one leg.

The coincidence of aortic insufficiency with increase of tension in the eye is probably enough to account for the obliteration of the retinal *arteries*, though we must assume the existence of some other factor to account for this occurring in the right eye alone. The cause of the *venous* thickening, also confined to the right eye, is not clear.

(*Card specimen. March 13th*, 1884.)

DESCRIPTION OF PLATE II.

Fig. 1 shows the ophthalmoscopic appearances in Mr. Nettleship's case of Glaucoma with Thickening of Retinal Veins and Obliteration of Arteries (p. 112).

Right eye; erect image. From a drawing by Miss Boole.

Fig. 2 shows the ophthalmoscopic appearances in Mr. Nettleship's case of Central Guttate Choroiditis (p. 164).

Left eye; erect image. From a drawing by Miss Boole.

Fig 1

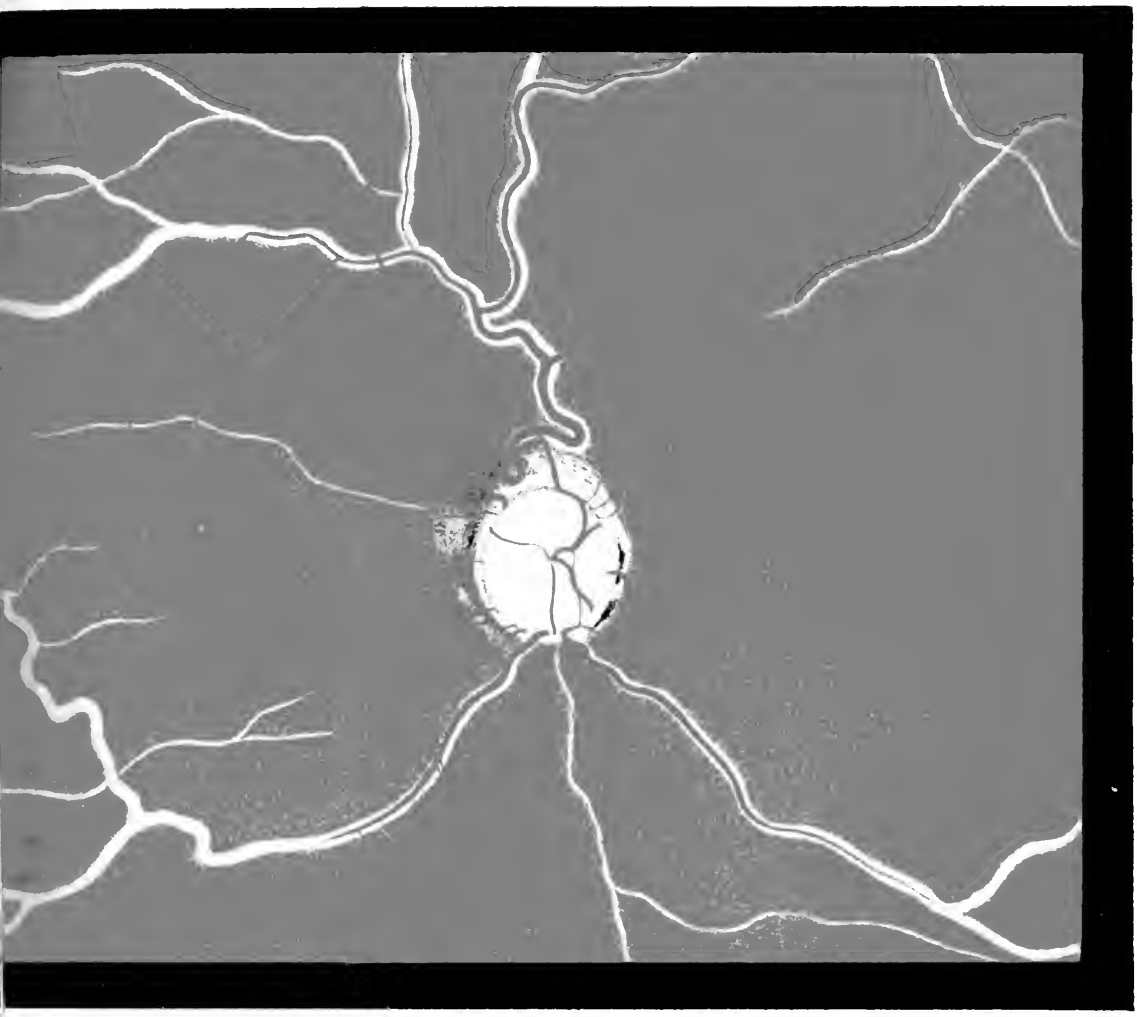
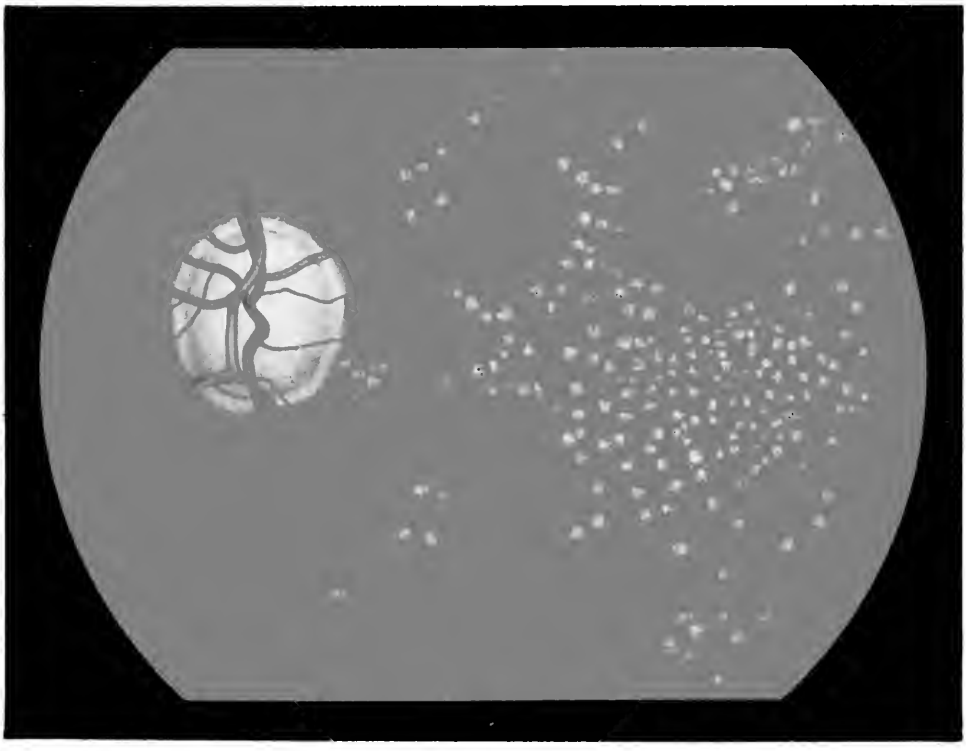


Fig 2



5. *Chronic glaucoma with a new connective tissue growth in the right vitreous springing from the glaucomatous cup.*

By W. Lang.

(Under Mr. Adams' care.)

James W—, æt. 48, labourer. Right and left both "operated on." Right ten years ago at Manchester. Left sixteen months ago at St. Bartholomew's Hospital. Right, no p. l. Pupil very wide, scarcely any iris visible; edge of lens shows. Disc cupped, but filled by a new growth which spreads forwards into vitreous nearly as far as ciliary processes, principally on the outer half of globe. Vessels are seen springing from the retinal vessels and then coursing in the growth, which is white in colour and of a fibrous appearance.*

Left field much contracted, forming a narrow horizontal slit stretching outwards. Vision $\frac{6}{60}$, Hm. 2·5 D. $\frac{6}{12}$, 1 J. with 5 D.; deep glaucomatous cup. No other change.

(*Living specimen. May 8th,* 1884.)

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6. *Case of glaucoma following a blow in a boy, æt.* 14, *the symptoms of which were relieved by eserine.*

By W. A. Brailey, M.D.

Henry H—, æt. 14, was brought by Dr. Matcham to Guy's Hospital on September 21st, with the pupil of the *right* eye fully dilated and fixed, and the tension increased to 2. The vision was $\frac{6}{60}$ and 16 J. at 10″; the fundus reflex was more dull than in the other eye; the disc, though

* A painting by Mr. Morton showed the course of the vessels perfectly, and Mr. Milles showed a similar condition under the microscope.

sufficiently visible, appeared a little misty. In all other respects the eye appeared normal, inclusive of the anterior chamber. The left eye had V=$\frac{6}{6}$ and 1 J. at 10″. It was quite unaffected.

The history taken by Mr. Pigeon showed that eight days before at 10.30 p.m. he received a blow on the right eye from the cork of a ginger-beer bottle. The eye, though not painful, was kept closed as a precaution till morning, when the vision appeared about as defective as on admission.

Within an hour of the time of his being first seen the tension was reduced by means of one instillation of a four-grain solution of eserine sulphate from T. 2 to T. n. (slightly full). The vision had improved from $\frac{6}{60}$ and 16 J. at 10″ to $\frac{6}{24}$ and 4 J. at 7″. The pupil was contracted fully, though not to the typical pin's point. Next day, September 22nd, at 10.30 a.m., the vision had again fallen. V=$\frac{6}{60}$ and 16 J. at 10″, and the tension was +1.

Eserine was then ordered thrice daily, and the vision and tension again improved as before; afterwards showing still further slow improvement.

On September 28th the drops were omitted with a resulting increase of the tension, &c., as before, nor did a hypodermic injection of $\frac{1}{6}$th grain of hydrochlorate of morphia cause any improvement. This, however, was not sufficient to contract the pupil.

September 29th.—The eserine was resumed.

October 2nd.—V=$\frac{6}{12}$, 2 J. at 7″, T. full (one hour after eserine).

4th (one hour after eserine).—V=$\frac{6}{12}$, very slight improvement with −·75 D., 1 J. at 6″ hesitatingly. T. full. Field complete.

9th (no eserine to-day).—T. full, pupil medium sized, slightly excentric upwards, reaction to light extremely slight. V=$\frac{6}{12}$ and 4 J. at 7″. No pain. One instillation of hydrobromate of homatropine now made; T. n. (full). Pupil dilates and is circular. Optic disc slightly hazy, apparently from haze in the vitreous,

but its details are sufficiently visible for me to be able to say that it is about normal. Fundus reflex not so bright as in the other eye. V=$\frac{6}{24}$ only, H.=2 D., V=$\frac{6}{12}$ perfectly. No pain or inconvenience noted.

11th (day of meeting).—No eserine to-day. P. medium sized. O. D. as before. Says V. not quite so good since the homatropine. Slight opacities in lens near its anterior surface, markings in the form of slight stellate difficult to recognise, except by oblique illumination. T. still a little fuller than in the other eye.

There is no obvious change in this case to account for the tension, except perhaps the condition of the pupil.

Certainly the tension falls when this is contracted. Is this due to the tension on the iris at the periphery of the anterior chamber causing a stretching of the fibres between the spaces of Fontana, and thus opening out these and causing a more ready access of the fluids of the anterior chamber to the canal of Schlemm?

If this explanation of the fall of tension be allowed we must admit that the ways of outflow when thus opened out are more than equal to the passage of the fluids of the normal eye. And as the tension remains full even under the use of eserine we are driven to admit an increased inflow into the eyeball upon which the tension may be reasonably considered to depend. In this connection the haze of vitreous may be noted. The author has pointed out the invariable increase in the cell elements of the vitreous in glaucoma.

(*Living specimen. October* 11*th,* 1883.)

VIII. DISEASES OF THE LENS AND CAPSULE.

1. *On* 200 *operations for extraction of cataract.*

By Charles Higgens.

In March, 1879, I read before the Royal Medical and Chirurgical Society, a paper "On One Hundred and Fifty Operations for Extraction of Cataract," which is published in the Society's 'Transactions' for that year (vol. lxii). The cases on which the present paper is based occurred between May, 1878, and February, 1883.

The 200 operations were performed on 175 patients, of whom 93 were males and 82 females. Both eyes were operated upon in 25 patients. 181 of the cataracts were nuclear, 19 were cortical.

The results are collected under three heads: successful, partially successful, and failures. Under the first head are placed all eyes which, aided by a suitable convex lens, could read types from Snellen ·5 to Snellen 4, or 1 J. to 16 J. at a distance of about 20 cm. to 50 cm., and had vision for distance = $\frac{6}{6}$ to $\frac{6}{60}$, could tell the time on a watch a fortnight or three weeks after the operation; or in patients, unable to read, could see the stitches in a shirt wristband or thread a large sewing needle. One case, counted successful, could only read 19 J., but the patient suffered from retinitis pigmentosa, which was the cause of the want of sight. The number of successful cases is 175 (87·5 per cent.)

Under the second head are placed eyes which could see to count fingers, tell one from the other, and whether the back or front of the hand was looked at. The number of partially successful cases is 9 (4·5 per cent.).

Under the third head are placed all eyes that saw no

better, or worse than before the operation. The number of failures is 16 (8 per cent.); of these, however, two might be brought under the second head by further treatment. Anæsthetics were given in all but twelve of the operations.

Loss of vitreous occurred eight times. A traction instrument, sharp hoop or scoop, was used in fourteen instances.

Secondary operations—needling opaque capsule, iridectomy and cutting through opaque membranes with scissors —were required in 38 cases (19 per cent.).

Two methods of extraction were employed. A small flap section either upwards or downwards, associated with iridectomy performed at the time of extraction or some weeks or months previously, and an oblique corneal section (Bader's or Leibreich's extraction).

By the first method 176 cataracts were removed, 121 by upper sections, 55 by lower. The second method, in all instances with downward section, was employed in 24 cases, in 7 of which a small piece of iris was removed.

My experience since the publication of the first table has led me to almost entirely discard every other method of operating in favour of the small flap section, with iridectomy performed at the time of extraction in cases of mature cataract, and as a preliminary, not less than a fortnight before the extraction, in cases of immature cataract. In the majority of cases I make the section upwards, but when operating without anæsthesia or in cases where I expect any difficulty I make it downwards.

The section is made with a Graefe's knife; it should lie entirely in the sclero-corneal junction and form a flap consisting of about one third of the cornea. The iridectomy should be narrow, but extend through the whole breadth of the iris. I do not aim at making a conjunctival flap, but if the conjunctiva stretches over the knife, as is often the case, and is cut at a distance from the incision in the sclero-corneal junction I have no objection to it.

(*May 8th*, 1884.)

2. *On a preliminary precaution to be taken in cases of cataract extraction, when there is, or has been, any lacrimal obstruction or catarrh.*

By J. F. Streatfeild.

I may take it for granted that the proportionate number of successful as compared with the unsuccessful results of cataract extraction is very much greater than it was a quarter of a century ago, and also that one of the most worthy objects of the ambition of any eye surgeon is that he might be able to reduce the present very small percentage of failures as a consequence of this very common and most important operation. With this object in view I venture to claim your attention for a short time to a matter which you will admit to be of very great practical importance, speaking generally, and if I add to this that I have now in my mind particularly, some cases of cataract requiring extraction, in which an unsuccessful result means *absolute* failure, and *total* loss of the eye, the subject must appear to be of the *greatest* importance. The cases in question are those which are complicated with lacrimal obstruction, or catarrh (not in itself a very important matter, and happily not a very common complication of cataract, for there is no connexion between them but in the fact of their occasional coincidence), but when it happens that thereis a cataract requiring extraction, and a lacrimal obstruction, or catarrh, of the same eye, it is a very serious matter indeed; for without any special and extraordinary preliminary precautions, such as I am about to propose, the operation in such cases (as I have said) involves a probable, if I may not say a certain, failure of the worst kind, and as the cause of failure in these cases has been overlooked or misunderstood, this catastrophe seems to me to have been almost inevitable; the eye was lost absolutely—even a partial success was, I believe, well-nigh impossible with the imperfect precautions

which hitherto only may or may not have been taken in such cases. If, for these exceptional cases, I can point to a certain preliminary precaution which will give an average and ordinary chance of success to the subsequent extraction operation, that is to say (considering the favourable statistics of average cases of cataract to be operated on, and eliminating beforehand, as I propose, the unfavourable prognostic complication of these exceptional cases) a chance which is almost a certainty, I venture to think that my suggestion will be adopted, or at least that you will try it, in the cases to which it is applicable. As I have said I am not now concerned with the cases of *partial* failure of cataract extraction, with those, for instance, which are the result of early or late iritis subsequent to the operation, but only with some of those in which the eye is *quite* spoilt, as a consequence of the cataract extraction; a secondary operation is therefore in these cases out of the question, and no imperfect vision is to be obtained in any way,—the eye in fact is absolutely lost. If the result in these complicated cases is not always as fatal to vision as I have suggested, I feel sure that I am not much exceeding the truth. To return to the particular point of my argument, the unfortunate cases to which I am alluding are those in which suppuration follows purulent infiltration of the corneal wound, when it occurs as the direct and immediate consequence of the extraction operation,—the common, almost invariable, beginning of the suppuration of the whole eye. These cases are of course not common, because the absolute loss of an eye after cataract extraction operation from any cause is happily a rare event, and the suppuration cases are only some of these absolute losses. (In my experience I may say that most of the absolute losses have been the result of suppuration: of the last six absolute losses after extraction at Moorfields three were the result of suppuration.) Now, as I have been so unfortunate as to have two such cases within the past year, one in private practice, and the other at Moorfields, and as both were in every respect alike (but

that, in the former case, I used greater antiseptic precautions)—my attention has been more particularly drawn to this way by which eyes are lost sometimes after extraction. I will relate the case of the hospital patient, the last case I have had, and the last case I hope I shall have, and, at least as regards the cause from which these two losses have resulted, I have some reason for the hope I have expressed, as I shall endeavour to induce you to believe. The reason why the eye is thus lost by suppuration after cataract extraction is generally said to be obscure, I may say unknown. It is not at all satisfactorily accounted for, surmises are indulged in, but I am now inclined to think it is generally due to some lacrimal obstruction and secretion of purulent matter from the outlets of the tears, in connexion with the eye operated on. But, you will say, who would ever think of operating for extraction when there is any lacrimal catarrh, or at least when there is any purulent regurgitation from the lacrimal sac, or indeed any pus of any kind or from any part of the mucous surfaces within the palpebral aperture? I am willing to admit that no operator would do this, and to assume that there is no eye surgeon who would not be careful to ascertain in a general way, and in the usual manner, before operating for cataract extraction, that there was no slight, chronic and persistent secretion from the lacrimal or conjunctival mucous membranes. Of these two, the latter may be seen for the most part, and some part of the conjunctiva at least is always seen, but the state of the lacrimal mucous membrane is much less easily investigated, and, as it is not so obvious, if it is not ostensibly diseased, it is so much the more likely to be considered to be in a healthy state when it is not so, no suspicion of its abnormal condition having been aroused. A purulent discharge from either mucous tract is liable to recurrence, and such a discharge from the *lacrimal* mucous membrane is, I think, even more likely to recur than the conjunctival discharge at any time, especially if an operation on the eye has been done,—it

is more hidden and obscure when it does recur, so that altogether there is great risk, in such cases, even if no discharge, purulent or otherwise, can be found at the time, when any one of the more considerable operations on the eye is to be performed. We must try, by deep pressure made over the lacrimal sac, if any accumulated fluids can be expressed and made to regurgitate, but the lacrimal sac is a cavity imperfectly compressible; perhaps it is lax and dilated by former distension, perhaps its lower outlet, the nasal duct, is perfectly patent, and then, although nothing can be squeezed from the sac, so as to appear on the conjunctival surface, it may be nevertheless secreting pus in small quantity, and an inconspicuous quantity of pus will be sufficient to infect the corneal section, to poison the wound, and so to ruin the eye, which otherwise, as regards the operation, promised to do perfectly well. We must therefore not be contented to look at the conjunctiva, and to try, before extracting cataract, if there is any regurgitation from the lacrimal sac on pressure with the point of the forefinger; we must also inquire if the eye has been any way inflamed and particularly if it has been, at any time, habitually, a *watery* eye. For, although there is no present or recent lacrimation from obstruction, and no catarrh of the lacrimal mucous membrane, we know how small a cause, perhaps affecting primarily the conjunctiva, will generally induce a recurrence of the inflammation of the lacrimal mucous membrane, whether it is propagated from below or from above. In this way, as it is continuous with the conjunctiva, and as, when the operation of cataract extraction is done in the ordinary way, the conjunctiva is exposed for some time, compressed by the speculum, torn slightly by the fixation forceps, and probably cut with the knife, I am in no doubt of the reason why, when a cataract is extracted, when there has been also, at a former time, inflammation of the lacrimal mucous membrane, and probably obstruction of the nasal duct, this inflammation is then at once set up afresh, pus soon follows, and reaches the corneal wound, before

it is healed. In this way it is, I think, that, generally at least, eyes are lost by suppuration; there may be no trace of lacrimal or any other discharge, purulent or otherwise, but for the reason I have given it comes to much the same thing, practically, if there is the latent proclivity. And, for my part, I will do no more cataract extractions if I know of, or even if I have reason to suspect this latent proclivity, till I am assured that this risk, however remote it may be in any case, is completely obviated and no longer existing. It is now my object to show that this can be done. The particular case I have to relate for this purpose, as an illustration, is the following:

John L—, æt. 68, a thin and healthy countryman, was admitted at the Moorfields Eye Hospital on the 4th of July last year, with cataracts which, in both eyes, were mature, and in this and in every other way were fit for operation and promised well; but both the lower lacrimal puncta were somewhat everted, and consequently there was an overflow of the tears in either eye. The lower canaliculi were consequently slit. Pus was found in the lacrimal sac on either side. After this the nasal ducts were probed every day, or nearly every day, for ten days. This was very successful; the cure seemed to be complete, there was no more purulent or any other discharge from the lacrimal sacs. And therefore, on the 16th of the same month, I extracted, without any difficulty or mishap, the left cataract. On the 17th, the day after the extraction, suppuration had begun, with the usual signs and symptoms, as a purulent infiltration of the wound at the upper part of the cornea. It spread rapidly from thence, the eye was very soon lost for all practical purposes, and on the 23rd it was excised. The patient left the hospital on the 2nd of August. On the 24th of November he was readmitted. I had now to do with the right eye and its surroundings; there was some lacrimation, but no evidence of any pus in the discharge from the sac at this time. The lower canaliculus, which had been slit, was patent. The eye was in all respects

healthy, the cornea, anterior chamber, and iris, all the parts in front of the opaque lens, were normal. The right nasal duct was probed occasionally. On the 9th of December the eye was still in much the same condition; the tears still collecting, in small quantity, at the inner canthus, and, at times, with very little excitement, running over the margin of the lower lid. As before, there was no appearance of pus or muco-purulent matter, in this fluid; no regurgitation from the sac on pressure. The patient thought the eye was much less "watery" than it was when he was last admitted. Now, this was a very unsatisfactory state of things; there was no difficulty in passing the large probes; the case was better, not well. There was, or there seemed to be, no pus in the discharge, but there might be again, as I knew by past experience, at any time. I dared not operate for extraction on this eye when he had but this eye to depend upon, and it was in much the same condition as that of the other eye which he had lost. The patient had absolute confidence in me, which I did not feel in myself, and the result of my deliberations was that I determined, in his case, to resuscitate the old operation for the total obliteration of the lacrimal sac, the canaliculi, and all the lacrimal mucous surface, which was so troublesome, and, in such a case as this, so threatening and dangerous. This operation used to be done occasionally, twenty years ago, not as I now propose it, for the purpose of securing an eye, before cataract extraction, from purulent infection, but for chronic obstinate discharge from, and distension of, the lacrimal sac from obstruction of the nasal duct. (This was before the time of the very large and much more efficient probes for the nasal duct which are now in use.) The treatment may be considered heroic, but I could think of nothing else to be done, and I could not help thinking that, by thus destroying the abnormally secreting mucous surface, I should make sure of a good result, for there was no other point in which the prognosis was unfavourable. I did not therefore hesitate, or make any further delay.

On the 10th of December he was anæsthetised, the upper canaliculus of the right eye was slit, from the punctum to the lacrimal sac (the lower canaliculus of this eye had been slit, as I have said, and was patent). When the bleeding had stopped the eyelids were held widely apart, the eye itself being covered and protected, and the pointed end of Paquelin's *thermo-cautère* was passed rapidly in the direction of first one and then the other canaliculus, along them, and quite into the sac. I then made a skin incision over the lacrimal sac, rather longer than the whole of its extent, downwards and a little outwards, between the root of the nose and the lower eyelid; this was then continued more deeply and quite into the mucous cavity itself, and, when the bleeding was arrested, the two edges of the deep incision were held widely apart for me with retractors, and I applied the broader end of the cautery very freely and repeatedly to all parts of the exposed mucous surface, from the top to the bottom of the sac, for it is very difficult to be sure of the destruction of mucous membrane. The cavity was stuffed with carbolic-oiled lint. On the 22nd the hollow space was filling up slowly. The mucous membrane seemed to have been completely destroyed. On the 1st of January this year, the wound had healed. The sac and the canaliculi were apparently obliterated. There was slight lacrimation, but there was no pus or any muco-purulent matter in the eye. On the 6th of this month the patient left the hospital. On the 23rd of April he was again admitted. There was then a depressed scar in the place of the lacrimal sac, and a small hole leading down in that direction. There was also an indication of a part of the lower canaliculus; there was no discharge, but the eye was a little watery, with tears only. The following day I used the cautery again to the fistulous orifice and to the remains of the lower canaliculus. On the 8th of May I used the cautery a third time, to satisfy my scruples and suspicions. On the 20th there seemed to be no trace of the canaliculi remaining, and no indication left of a lacrimal sac; both seemed to have been

completely destroyed at last. There was now no discharge upon the conjunctival surface at any time, the flow of tears was not much, and it was no longer troublesome. On the 2nd of June I extracted the cataract of the right eye; there was no mishap at the time of the operation. The eyelids were washed with a (1 in 40) solution of carbolic acid before the operation, and boracic acid ointment (gr. x to ʒj of vaseline) was smeared on the dressing. A weak solution of boracic acid was used subsequently every day to bathe the eye, and the same ointment was reapplied with the after-dressings. On the 9th, that is to say after a week, the eye was examined. It looked well; there was very slight congestion; the pupil well dilated (with atropine, which was used once daily). He had had no untoward symptoms. On the 16th he had a little pain, slight ciliary congestion, and photophobia, but the pupil continued to be well and widely dilated; a blister was applied to the temple. On the next day the pain was less, but there was considerable spasm of the orbicularis, together with the intolerance of light. From this time to the 23rd all these symptoms decreased, and at that time the ciliary congestion, pain, photophobia, and muscular spasm were gone, the conjunctival redness had almost disappeared; the eye was a little watery, with tears. There had not been at any time, since the extraction operation, any conjunctival discharge, and the pupil continued to be large and black. There was a small portion of the remains of the lens capsule to be seen in it. The wound is now well healed, and I suppose he cannot fail to have good vision when the time comes for this to be tested.

I need only remark that, in this case, I have succeeded according to my intention, and I do not see how, in another such case, I can fail in excluding the risk which is incurred by extracting cataract when there is a suspicion or a probability of purulent infection of the corneal wound, from the common source of this infection. For if, as I believe, the pus which is the source of this pecu-

liar danger, comes from the lacrimal, not from the conjunctival mucous tract, and if the lacrimal mucous membrane is destroyed, or shut out from its connexion with the surface of the eyeball, it cannot poison the wound in the cornea, and the loss of an eye, after extraction, by purulent infection will become a very much less common event than it has been hitherto. Allow me to reiterate that the danger is almost as great in extracting cataract, that is to say, in making a large section of the cornea, when there *has been* lacrimal obstruction or catarrh, as there is, or would be, in doing the operation at the time when pus is obviously present; because, in the former case, there is such a strong probability that a discharge from the lacrimal sac will reappear after the operation, and pus reappear in it, before the wound in the cornea is healed. I need not detain you by trying to set aside the objections, which are not practically very strong objections, to the obliteration of the lacrimal sac. At least in these cases, in which I am now advocating a revival of this obsolete practice, it seems to me to be absolutely necessary in order to succeed in operating for cataract subsequently.

(*July 4th*, 1884.)

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3. *The treatment of cystoid cicatrix after cataract extraction.*

By John B. Story (Dublin).

The subject which I have the honour to bring before the Ophthalmological Society is of considerable interest, and does not seem to have hitherto received the attention its importance deserves. Since the peripheral linear extraction of Von Graefe has been in vogue few oculists in large practice have failed to see occasionally the good results obtained by a cataract extraction rendered nuga-

tory by the occurrence of a cystoid cicatrix, and what is worse, in some cases an actual suppuration of the whole globe brought about directly or indirectly by means of this curious affection. And yet the text-books are silent upon the treatment of this condition, and a careful search through ophthalmic literature throws such little light upon the subject that the history of the following case cannot, I think, be without its value in the dearth of more authoritative statements than we at present possess.

Mrs. P—, an extremely corpulent old lady of between 50 and 60 years of age, consulted me first in May, 1881, with commencing cataracts in both eyes, the right lens being the more opaque of the two, but neither cataract being ripe enough for operation. With the left eye, which had hitherto been her worse eye owing to a corneal nebula, she had $V=\frac{5}{20}$. The disc in this eye was healthy; that in the right could not be seen. The opacities in both lenses were more marked at the posterior poles and at the equators than elsewhere; projection and reaction of the pupils were normal, and the tension was perhaps slightly on the high rather than on the low side of normal.

January 31st, 1882, I extracted the cataract from the right eye by a 3 mm. peripheral flap upwards, making a small iridectomy, and meeting with no difficulty in delivering the nucleus. However, the patient was extremely unruly, and, after the easy delivery of the nucleus, in her struggles a quantity of perfectly fluid vitreous escaped, rendering it necessary to bandage up the eye without removing all the cortex. I should mention that according to my usual custom, on this occasion strengthened by the request of the patient herself, the operation was performed without anæsthetics. As I have stated, everything connected with the eyeball was normal, except that its tension was perhaps a little higher than I liked (it was far from being anything so high as T+1), and if the patient had consented I would have preferred to operate with a preliminary iridectomy. However, Mrs. P— absolutely

refused to submit to two operations when one might suffice, and I saw no sufficient reason to prevent me from operating in the ordinary manner.

Seven days after the operation the wound was closed by a greyish gelatinous-looking matter uniting its edges, but the latter were some distance apart. The anterior chamber was pretty deep, and there was a good deal of cortex in the pupillary area. Atropine was used, probably on the second day and subsequently to guard against iritis, but I have no note of the first application of the mydriatic. Three weeks later the eye was healthy, except for the existence of an iritic hernia at the inner corner of the wound, and there was still some cortex in the pupillary area. It was not for another five months that I noticed the presence of a cystoid cicatrix at the inner corner of the wound, but the cyst was not, as has been asserted by some writers, a simple extension of the hernia iridis, the transparency of the wall being produced by absorption of the pigment; it occurred to the outer side of the hernia in the greyish gelatinous-looking cicatricial tissue.

I treated the hernia of the iris successfully enough by bandaging, although the patient's skin and disposition were both so irritable that it was difficult to apply a pressure bandage with proper regularity and firmness, but the cystoid cicatrix did not yield to this treatment at all, though after some weeks it became stationary and did not increase in size. Every now and then as far as I could ascertain the fluid escaped through its apex, and afterwards slowly re-collected inside. Some time before the appearance of the cyst I did a secondary needle operation, leaving a perfectly clear black pupil, which to my great regret became again closed over by a delicate membrane some weeks later. The cortex had by that time absorbed completely, and I had only the posterior capsule to divide. In October, nine months after the extraction, V. was greater than $\frac{2}{20}$, and the patient read 14 J., and was able to see her way about with the operated eye, the other being use-

less. Ffteen months after the operation she could read Wecker 6, the cicatrix remaining nearly unaltered during all this time, and the tension of the eye being generally, when I examined it, either normal or subnormal. I noted it often as −1 or −?

In July, 1883, I performed a successful cataract extraction upon the left eye, with which, in spite of the corneal nebula, she now sees well both walking in the streets and reading. In September the cystoid cicatrix in the right eye began again to enlarge, the tension being rather below than above normal at all my examinations. I noted it as T−? The patient complained of photophobia, and stated that the left eye was getting uncomfortable owing to the state of the right one. The base of the cyst was broad, extending over both cornea and sclerotic, and having a diameter of 5 mm. Its height might have been about 3 mm.

I was not able to find any authoritative statements in ophthalmic literature upon the treatment of such cysts except that of Von Graefe published in his 'Archives' in 1862, in the article which is still the *locus classicus* for the subject.

This treatment, as will be seen later on, would not have effected a cure in my case, and as at the time I thought it would not be sufficient for the purpose, I had to initiate a method of treatment for myself, which can hardly be regarded as original, as Von Graefe warns us against the use of such measures in the paper quoted above.

On October 16th I divided the cyst horizontally with a Graefe's knife, and six hours later I touched the wound with solid nitrate of silver with the object of producing sufficient inflammatory reaction to close the fistulous opening beneath. This cauterisation I repeated on the four following days, the result being an ulcer nearly 2 mm. in diameter just at the corneo-sclerotic junction, to the outer side of the place where the old hernia of the iris had been, the position of which was still marked by some black pigment in the inner side of the ulcer, the pupil too being slightly drawn up towards that side.

For ten days I ceased to cauterise, and merely applied the continuous bandage, but then finding no improvement I had recourse to the nitrate of silver again, using it very freely five or six times in the course of the succeeding ten days. During all this time fluid freely escaped from the ulcer, moistening a piece of filtering paper continuously as long as I kept it in contact with the orifice, which I used to do on every occasion as long as the patient permitted it—and I should mention that during all this time I could detect no perceptible difference in the size and depth of the anterior chamber, neither after the first operation, nor during the process of soaking up the fluid with filtering paper. I used latterly very fine pointed pieces of caustic, and inserted them well into the ulcer. I found the best method of preventing the effects of the caustic from spreading was dabbing a little bit of vaseline on the place as I removed the nitrate of silver. On November 17th, one month after the incision, I found for the first time no fluid escaping from the cicatrix, which looked firm and flat, although it still had a darker hue than the neighbouring tissues. I kept on the bandage for another fortnight after this, and the cure remaining permanent I then allowed the patient to dispense with it. The eye is now no trouble to her, and the cicatrix perfectly flat and firm; Tn. The opacity in the pupillary area interferes extensively with vision, but affords a fair prognosis if the patient submits to another needle operation.

I do not know exactly how often I cauterised the little fistulous opening. I have notes of eleven cauterisations, but I probably did half as many more. It is hardly necessary to state that I proceeded most tentatively in my first cauterisations, and did not use the caustic freely until emboldened by the perfectly harmless result. I hesitated for a long time before using it at all, and at one time intended to use the actual cautery in place of it. Indeed, it is not improbable that the actual cautery would have produced equally good results.

In conclusion I would formulate the following pro-

positions: Cystoid cicatrices as sequelæ to operations upon the eye occur, so far as is known, only in the sclerotic, not in the cornea. Their development is favoured as Schmidt asserts by the presence of an iritic hernia, but they are not merely the final stages of such herniæ, as has been supposed by some. The communication between the cyst and the anterior chamber is certainly small, as was ascertained by Von Graefe in the first published work upon the subject in the 'Ophthalmic Archives' in 1862. Whether cases occur in which no such communication exists at all I cannot undertake to say. The affection may in some cases be merely a cystoid degeneration of cicatricial tissue, and not in any wise a distension of the cicatrix from intraocular pressure. The intraocular tension is commonly subnormal. This corresponds with the experience of that acute observer Von Graefe in the paper already quoted, and is in conflict with the experience of Becker given in Graefe und Saemisch Handbuch, vol. v. In severe forms of the affection the treatment proposed by Von Graefe, that of excising the anterior wall of the cyst and applying a pressure bandage, is insufficient to effect a cure. Good results may be obtained by combining this treatment with the free use of nitrate of silver. If discreetly used, this caustic produces no evil consequences when applied to this susceptible region in the neighbourhood of the much-dreaded ciliary body.

(*January* 10*th*, 1884.)

IX. DISEASES OF RETINA AND CHOROID.

1. *On anæmia as a cause of retinal hæmorrhage.*

By Stephen Mackenzie, M.D.

Retinal hæmorrhage is a condition sometimes met with in connection with anæmia, and from the fact that it is especially met with in the severe and fatal cases of idiopathic anæmia, or progressive pernicious anæmia, there is a growing tendency to look upon retinal hæmorrhage as a diagnostic sign of this particular and dangerous form of anæmia. I propose on the present occasion to bring under notice a series of cases of secondary anæmia, some of which recovered and one of which died, and then to discuss the significance of retinal hæmorrhage in relation to anæmia. The series includes three cases of hæmatemesis from ulcer of the stomach, two cases of cancer with great anæmia, and one case of scurvy.

Case 1. *Ulcer of stomach; repeated profuse hæmatemesis; recovery.*—Hannah S—, æt. 29, machinist. Admitted into London Hospital, March 9th, 1881.

Family history.—Rheumatism in family. Brothers and sisters died of some brain affection. One sister has consumption.

Past history.—Has been a machinist since eleven years of age. Has had long hours, and worked in a dark room lighted by gas. Was married seven years ago and has had three children; one living. Last three or four months has been subject to headache and "swimming in the head," but apart from this she has had pretty good health. Appetite generally good; no indigestion; bowels regular.

Present illness.—Dates from February 10th, four weeks before admission. Hurrying to her work in the morning brought on palpitation and great dyspnœa. When she arrived at the workshop she fainted. On recovery she vomited "about a pint" of blood, bright red and unmixed with food (had taken very little breakfast this morning). Some brandy was given her and she again fainted. On again coming to she felt a craving for fresh air and soon vomited again (about half a pint), the blood this time being mixed with the brandy she had just taken. Then she fainted a third time, but did not vomit again. Was taken home, but did not go to bed at once, for if she lay down a stifled feeling came over her. The same evening she fainted and vomited "pure blood" twice (quantity stated to be Oij and Oss).

Felt very weak the next day, had giddiness and pain between the eyes.

During the next ten days she twice vomited dark-coloured blood (diet had been milk and beef tea). *She had no pain* with the vomiting, or at any time, *except* after eating a chop for dinner a fortnight before admission.

The last fortnight she has vomited three times, but no blood.

The last week only had slight epistaxis, which relieved the pain between eyes. Has remained weak and giddy, having singing in the ears and specks before the eyes. Motions have been very dark-coloured.

On admission.—Patient is fair complexioned and fairly well nourished. Pallor of lips, palpebræ, conjunctiva, and face is very striking. She had nearly fainted in walking across waiting hall of out-patient department. Slight headache. Slight œdema of legs.

Digestive system.—No pain with food or at other times. Often has a bad taste in mouth. Appetite fair; bowels costive. Liver and spleen appear normal. Pain over region of right ovary and tenderness on pressure.

Vascular system.—Heart-sounds at apex clear though

feeble. Over aortic cart. a soft first-sound murmur. Pulse soft, full, and regular.

Respiratory system.—Physical signs healthy. Shortness of breath on exertion.

Blood.—Corpuscular richness 42·9 per cent., 1 colourless to 420 coloured.

Urine.—Contained a trace of albumen.

Fundi.—Pale. Retinal hæmorrhages in each eye. In the right fundus above and to the outside of the disc is a small punctate hæmorrhage, and a much larger extravasation in the lower segment. In the left fundus above and to the inner side of the disc are several flame-shaped hæmorrhages.

March 19th.—Corpuscular richness 52·8 per cent., 1 colourless to 352 coloured. Milk and arrowroot make her feel sick.

21st.—Feels stronger; smarting in epigastrium unchanged by food. Occasional headache, vertigo and palpitation. Some tenderness over seat of pain.

25th.—Corpuscular richness 72·9 per cent. Still marked anæmia. No œdema.

April 12th.—To get up one hour. To have milk puddings.

17th.—To have fish and bread.

May 3rd.—Hæmorrhages disappeared from right eye: traces only in left retina.

5th.—Retinal hæmorrhages disappeared in both eyes. Corpuscular richness 73 per cent.

20th.—An attack of nausea and pain in epigastrium and between shoulders came on after a meal, accompanied by a feeling of suffocation and faintness and by palpitation. To go back to milk and beef tea again.

24th.—Still some pain in epigastrium.

June 3rd.—Much better. Fundi normal.

12th.—Gets up half a day now. Feels much stronger and less languid; colour has much improved. Lips almost normal. No giddiness lately. No pain anywhere. No tenderness on firm pressure over abdomen. Appetite

good. Has meat again to-day. No pain after food. Lungs and heart normal. Corpuscular richness 89·7 per cent., 1 colourless to 286 coloured.

Temperature usually about normal, occasionally 100° at night. Albumen disappeared from urine six days after admission. Had seven attacks of hæmatemesis during first ten days.

Blood.

	Corpuscular richness.	Proportion colourless to coloured cells.
March 9	42·9 per cent	1—420
„ 19	52·8 „	1—352
„ 25	72·9 „	—
May 5	73· „	—
June 12	89·7 „	1—286

Case 2. *Ulcer of stomach; severe hæmatemesis.*—Charlotte G—, æt. 36, was admitted under my care on April 29th, 1882, complaining of pain in the præcordial region, slight swelling of the feet, loss of flesh, and that she vomited blood three weeks ago.

Family history.—Is good. Patient was born and had always lived in London; she married at the age of 19, had nine children, five of which are living and quite well, the other four died when young of measles and scarlatina. Her husband died eighteen months ago. She had always been a healthy woman, never having during her recollection been laid up before her present illness. She has had to work very hard, and has been exposed to vicissitudes of weather. Her occupation has been that of a herring-curer, and since her husband's death she has often been out hawking. There is no history whatever of intemperance, though she may have had one or two glasses of ale daily.

Present illness.—Patient was quite well until a few days before Easter Monday (about three weeks ago). About this time she noticed that she was losing flesh, becoming pale in the face, experiencing a sense of weight and occasional pain in the chest, and gradually feeling weaker. Her appetite, which previously had always been good, began

to fail her, and she would have considerable discomfort and flatulence after taking food. Notwithstanding that she felt ill, and that she was having a good deal of trouble about her children, she was married to a second husband on Easter Monday. On her way home from the church she felt very faint, had severe pain in "the pit" of the stomach, and vomited a large quantity of blood. (She feels sure that she vomited the blood, and has never had any cough). The blood was dark, almost black in colour, very clotted, and she thinks was slightly mixed with food. As soon as she got home she brought up some more blood, making, it is said, about a quart in all. She was then brought to the hospital, but as she refused to remain in she was sent home with some medicine. She has never been able to leave her bed since, and her mother-in-law says that she was "out of her senses" for a week after this. She has had no convulsive seizure of any kind. There is no history of hæmophilia in the family.

When admitted.—Patient appeared very absent-minded and frequently contradicted her own statements. Her face had a pasty, anæmic, somewhat œdematous look, and the feet, and legs also, pitted slightly on pressure. Her conjunctivæ and all her mucous membranes were extremely anæmic, there was no headache and no ascites. She only complained of slight pain over the heart, and would lie in bed in any position. Temp. 101,° respirations 32, and her pulse, which was small and somewhat thready, 116. Her tongue was large, flabby, pale, and slightly coated; teeth were well-formed and regular, and there has been no sickness since that described above. Her bowels are regular, and her motions quite normal. No pain or distension in the abdomen, the liver dulness extends from the sixth rib to the costal margin, no tenderness and no jaundice.

Heart.—Apex beat is in the nipple line, somewhat heaving in character, heart's dulness extends from mid-sternum to the left nipple line. There is a blowing systolic murmur heard at the apex, conducted slightly into the axilla, there is also a double roughish sound heard

over the mid-sternum, which is localised to a small area and suggestive of pericarditis. There is no præcordial pain, and there is no dyspnœa. The respirations quite easy, 32 in the minute. Beyond a few scattered râles here and there in the chest there are no adventitious sounds in the lungs.

Eyes.—Patient reads No. 2 Nettleship with either eye.

Ophthalmoscopic examination; Right.—The disc is normal but very pale, the veins are dark, somewhat tortuous, and very disproportionate in size from the arteries, which are excessively small, and in places indistinct. There are several whitish patches in the outer half of the retina, and scattered here and there amongst them are some small linear and flame-shaped hæmorrhages. These as well as the white patches are mostly to be observed in the outer and lower quadrant of the retina. The white patches do not appear to invade the yellow spot region, but there is a large, opaquish white patch diffused a little below and to the outer side of it.

Left eye.—The changes here are similar in nature to those just described, but both hæmorrhages and white patches are much fewer and smaller than those observed in the other eye. The disc is not swollen, there is a trifle of myopia in both eyes.

Patient has passed 40 oz. of urine in the last twenty-four hours, which is clear straw in colour, acid in reaction, has a specific gravity of 1008, and contains neither albumen, sugar, nor casts.

The red corpuscular richness is 45 per cent. and there are 5 per cent. of white corpuscles.

May 5th.—Patient has been improving since admission; she is a better colour, has not been sick, complains of no pain, and insists that she is quite well. There is still a systolic murmur heard at the apex, but the friction sounds have altogether disappeared. Her urine has been examined daily, but although it is still of low specific gravity it contains no albumen.

There are fewer hæmorrhages in the retina; at the lower

part of the right fundus there are patches of diffused, dull whiteness, with small central hæmorrhages.

May 6th.—*Blood:* Red corpuscular richness 44 per cent.; white corpuscular richness 1·5 per cent.

11th.—Red corpuscular richness 50 per cent.; white corpuscular richness 1·4 per cent. Patient is improving rapidly.

16th.—Changes in the fundi are clearing up; there are only one or two scattered hæmorrhages now to be seen, and very few white patches. Patient has greatly improved in appearance, colour has come back into lips, cheeks, and fingers. There is now neither bruit nor pericardial friction.

22nd.—Patient refuses to stay in the hospital any longer, but she is looking much better and says she feels quite well. There are two small hæmorrhages in the left eye at the upper part of the fundus. The red corpuscular richness is now 68 per cent.; the white corpuscular richness, 1·2 per cent. She is taking her food well, there are no dyspeptic symptoms.

The patient at this date, at her own request, left the hospital, but reported herself as an out-patient for some months. The hæmorrhages and white patches entirely disappeared from the retina and the general condition greatly improved. The heart remained very excited for many weeks, but the murmur disappeared.

Blood.—April 2nd.—Coloured corpuscles 45 per cent., colourless 51 per cent. May 6th.—Coloured corpuscles 44 per cent., colourless 1·5 per cent. 11th.—Coloured corpuscles 50 per cent., colourless 1·4 per cent. 23rd.—Coloured corpuscles 68 per cent., colourless 1·2 per cent.

Case 3. *Ulcer of stomach. Severe hæmatemesis.*—Sarah H—, æt. 29, dressmaker.—The patient applied for treatment at the London Hospital on September 12th, 1883. Whilst in the waiting room she fainted, and on regaining consciousness vomited a quantity of altered blood (amount not estimated). She was admitted to the ward.

She had been engaged in dressmaking since the age of ten, has worked under favorable hygienic conditions, and walked about three miles a day. Is a total abstainer. About a fortnight before admission she felt a good deal of discomfort from pain in the chest, behind the sternum. She attributed it to the smell of paint to which she was exposed. On September 8th she was walking upstairs at the workshop and suddenly felt so faint that she had to lean against the wall to support herself. She recovered and continued her work until the evening, when, feeling worse, she was assisted home and stayed in bed on the following day. She then resumed her work, feeling better until the day when she applied for treatment, but it subsequently transpired that her motions had been somewhat black for the few preceding days.

On admission, September 12th, she was slightly anæmic in lips and face, and her complexion rather dull. Her pulse was 100, respirations 25, the temperature 98·5°. She complained of throbbing in the head. There were no noticeable signs of disease in the fundi. The apex beat of the heart was an inch below and an inch and a quarter to the inner side of the nipple line. There was a slight systolic bruit. Tongue slightly furred, bowels confined.

September 14th.—An enema was given, which brought away a good deal of fæces mixed with altered blood-clots.

15th.—About 4 p.m. on this day she vomited about sixteen ounces of blood, previous to which she had singing in her ears, and her vision became blurred. She became very anæmic.

16th.—She vomited a small quantity of blood.

17th.—Has had no more vomiting. She looked washy white, and her lips were bloodless. Temperature in morning 98·8°, in evening 101°.

18th.—During the night she felt chilly, and her temperature was found to have risen to 103°. Her pulse this morning was 120 and bounding.

Her blood was examined, and it was found that the

coloured corpuscles were 34·6 per cent., hæmoglobin 24 per cent.

Her condition now was very striking. She appeared exsanguine. The whole surface of the body was of a uniform pallor, the lips and gums and palpebral conjunctiva appearing almost white. She gazed vacantly into the air, and paid no heed to what was passing around her. Her sense of hearing was a little impaired. When her attention was aroused she answered questions in a slow deliberate manner, but lapsed into the same indifferent condition. Her manner and marble-like whiteness, were statuesque. The right pupil was fully dilated by atropine. The retinal arteries and veins were pale and unusually translucent. The papilla and retina appeared normal. Temp. 103°.

On September 19th.—The retinal veins were noticed to be a little tortuous, but pale. There was an appearance suspicious of a small hæmorrhage in the superficial layer of the retina below the left disc. Temperature 101°, pulse 132.

20th.—No more vomiting. Pulse 140, temp. 100·5°. She had the same waxy appearance and abstracted look.

No hæmorrhages whatever are to be seen in the retinæ in the afternoon. Coloured corpuscles 30·2 per cent., hæmoglobin 23.

In the evening a small hæmorrhage was noticed in the left retina, on a branch of the ascending artery, some little distance from the papilla. It was about one-fifth the diameter of the disc and had a white centre. It occupied the nerve-fibre layer. It was the only unequivocal hæmorrhage. The margin of the papilla is distinct, the veins large, and both veins and arteries pale. Had the same vacant look and waxy appearance.

22nd.—The hæmorrhage observed on the 19th still present, but fading. Just below it and close to another vessel was another fresh hæmorrhage of about the same size. She had up to this time been fed by nutrient

enemata, but was now able to take milk by stomach. Her temperature was 100·5° in the morning, 100° in the evening.

23rd.—Coloured corpuscles 34·8 per cent., hæmoglobin 20 per cent.

24th.—The two first hæmorhages still noticeable, but fading. A fresh one, of small size, is seen below and to the inner side of the left papilla. When seen in the afternoon it had no white centre, but when seen in the evening it had a distinct white centre. Patient, though still very pallid, was improving. Temp. 99°.

25th.—Coloured corpuscles 41·4 per cent., hæmoglobin 27·0 per cent. The vacant look was not so marked, and general appearance better. Still extremely pallid.

26th.—No more hæmorrhages in fundi, and that first noticed had quite disappeared. General condition much improved. Takes fluid nourishment. Ice bag that had been applied to epigastrium now discontinued. Temp. 98·8° morning, 99·5° evening. Coloured corpuscles 38 per cent., hæmoglobin 27 per cent.

29th.—Looked better, but still very pallid. There was very little trace of the retinal hæmorrhages.

October 2nd.—Coloured corpuscles 36·8 per cent., hæmoglobin 23 per cent.

3rd.—Left eye: The remains of the older hæmorrhages had quite disappeared. There was, however, another hæmorrhage larger than any of the others some distance above and to the inner margin of the disc, not situated near to any vessel.

Right eye: Some distance below and to the inner side of the papilla was a small white speck, possibly the remains of a hæmorrhage, the eyes not having been examined for two days.

5th.—The hæmorrhage that was noticed on the 3rd fading.

8th.—Coloured corpuscles 35·6 per cent., hæmoglobin 29 per cent.

The temperature up to this date had been remittent;

the morning temperature being about normal, whilst the evening temperature averaged about 100°. The pulse remained about 120. She took milk and bread and pudding. Was free from pain. Her manner had become quite natural, and she was cheerful, but great pallor remained.

Since this date her condition has been one of continued progress; nothing illustrates this better than the blood chart.

	Red corpuscles.	Hæmoglobin.
Sept. 18	34·6 per cent.	24 per cent.
20	30·2 „	23 „
23	34·8 „	20 „
25	41·4 „	27 „
26	38 „	27 „
Oct. 2	36·8 „	23 „
8	35·6 „	29 „
11	42·8 „	30 „
12	35·8 „	28 „
15	48·2 „	35 „
16	59 „	40 „
19	63 „	46 „
23	67·4 „	53 „
25	77·6 „	58 „
28	80 „	61 „
31	84 „	66 „
Nov. 5	85 „	66 „
10	90 „	68 „
16	88 „	70 „
23	92 „	80 „
30	90 „	78 „

With the exception of some pain and vomiting after taking solid food at the end of October, patient had no further symptoms. She was sent to Brighton on December 1st, when she looked and felt quite well, and was able to eat minced meat, and bread and butter and eggs.

Case 4. *Cancer of pyloric end of stomach; great anæmia.*—Arthur B—, æt. 35, admitted into the London Hospital under my care July 13th, 1881.

The patient had an epigastric tumour, pulsatile and

expanding, over which and along aorta a bruit was heard. These symptoms suggested the presence of aneurysm, which was disproved by the necropsy.

Anæmia, which was present on admission, was progressive and became extreme. On August 25 I noted: "The anæmia now is really extreme, approaching that seen in idiopathic anæmia, the pink colour having disappeared from the matrix of the nails. His temperature has been high for the last few nights, but there is no discoverable cause for its elevation. There is no general distension of the abdomen, nor is it anywhere tender; there are no changes in the lungs. There is no indication save the anæmia to indicate internal hæmorrhage. It is possible that the anæmia is the cause of the elevation of temperature.

"*Ophthalmoscopic examination.*—At some distance from the right disc on the temporal side, just below a horizontal vessel there is a narrow red streak like a small superficial hæmorrhage. Some distance higher in the upper and outer quadrant are two irregular white patches very small in size." On the following day it was noted: "Above the right disc and just to the inner side of the middle line two small hæmorrhages can be seen."

August 29th.—A V-shaped hæmorrhage seen below the right disc this morning.

September 5th.—The hæmorrhages above the right disc have almost disappeared, but there remain several below. The white patches are slightly enlarged and run together. There are several small hæmorrhages in the left fundus; one in the upper and outer quadrant, small and with a white centre. There is a white patch in lower and inner quadrant.

9th.—There are two or three new hæmorrhages in the left eye; one on a level with the disc on the temporal side, one on each side of a white patch. The right disc appears to be œdematous, and so does the retina in its vicinity. Some of the vessels, especially the main veins, are partially concealed in the œdematous retina. There

is a fresh white patch above the yellow spot, and another white patch higher up, just below a large vein. There are no fresh hæmorrhages. The left eye presents similar appearances. The white patches are more numerous ; no albumen in urine.

The conditions persisted ; the patient became progressively weaker and more anæmic and died October 1st.

At the necropsy, cancer of stomach at pyloric end was found. No disease of kidneys.

Case 5. *Abdominal cancer ; great anæmia.*—Emma L—, æt. 61, admitted on August 15th, complains of a dragging-down pain on the left side and increasing weakness.

Family history.—Unimportant, no history of cancer.

Personal history.—Never had any illness until thirty-two, when she had inflammation of the kidneys after confinement ; she has had pain in the left side of the abdomen for years, but the pain has never been severe enough to prevent her from working. Last October (1882) had a severe attack of diarrhœa, and after this she was left in a very weak condition and began to lose flesh, strength, and colour, and this dragging-down pain in the left side began.

On admission.—She is a weakly, anæmic-looking woman with a faint yellowish tinge in face and conjunctiva ; the pain in the left side is almost constant and is relieved by lying on that side.

Physical examination.—Heart : A systolic murmur at apex and base. *Lungs* clear. The liver is enlarged, extending nearly to umbilicus. The left side of abdomen is occupied by a more or less rounded somewhat nodular growth, extending from just below ribs to the iliac fossa ; it is uninfluenced by change of posture, but affected by the respiratory movements ; the tips of the fingers can be passed between it and the costal cartilages. The tumour pulsates distinctly (up and down), but there is no audible bruit. The cervix is high in vault of the vagina, and is short but freely moveable.

August 25th.—A few small hæmorrhages in fundi. Hæmoglobin 30 per cent. Coloured corpuscles 46·5 per cent.

Sept. 11th.—The pain is more severe; she is much weaker and does not take any solid food, but has nutrient enemata three times a day. Hæmoglobin 23 per cent. Red corpuscles 50·6 per cent.

26th.—General condition much the same. The tumour remains about the same in size and shape. Hæmoglobin 20 per cent. Red corpuscles 46·4 per cent.

October 9th.—Hæmoglobin 22 per cent. Red corpuscles 40·5 per cent.

26th.—The shape and condition of tumour about the same. Patient is much weaker and is kept alive by nutrient enemata; the pain is more severe and has to be moderated by morphia. Hæmoglobin 26 per cent. Red corpuscles 32·2 per cent.

Case 6. *Scurvy with dilatation of the heart and retinal hæmorrhages.*—This case was brought before the Royal Medical and Chirurgical Society by Dr. Hale White, March 3rd, 1883, with the following abstract:

The patient was admitted into the Seamen's Hospital on November 13th, 1882. He had left Calcutta four and a half months previously, and whilst there had had dysentery. On admission he was very sallow, and evidently the case was a severe one; there was swelling of the gums and the usual bruise-like swellings about the body. The apex beat was in the fifth space one inch outside the nipple line, the area of cardiac dulness was increased, there was in the third left intercostal space a loud systolic murmur, the first sound at the apex was muffled, and arterial murmurs were present in the neck. Pulse was weak and almost thready. In the right eye were two large hæmorrhages, one above and one below the disc; they were striated at the margin, white in the centre. The blood showed only 40·5 per cent. of the normal number of white corpuscles and only 20 per cent. of the normal quantity of hæmoglobin. The

patient remained in the hospital a fortnight, and was treated with lime-juice and put on full diet. He steadily improved; the retinal hæmorrhages became less distinct. The red corpuscles increased to 63 per cent., and the hæmoglobin to 35 per cent. The basic systolic murmur disappeared, but the apex beat remained in the same position. It was pointed out that this case presented the following points of interest: firstly, the influence of the previous dysentery in making the attack of scurvy severe, which severity was evidenced by the marked blood changes; secondly, the presence of retinal hæmorrhages, a very unusual occurrence as compared with other anæmic diseases, and to be explained by the fact that scurvy as seen nowadays was not severe enough to produce retinal hæmorrhages; and thirdly, the dilatation of the heart. It was shown that this is the only recorded example of this condition in scurvy, and that, considering the close alliance of this disease to other anæmic diseases in which it was known that the heart was fatty, it was presumed that here also this was the cause of the dilatation.

Various writers (Quincke, Litten, Saundby, Mules, and others) have stated that retinal hæmorrhage occurs in connection with the anæmia of cancer, hæmatemesis, uterine hæmorrhage, &c., but as far as I know observations on this point have not been recorded which show the exact degree of anæmia with which such hæmorrhage is associated. It is as a contribution to information on this point that these cases seem to me to be of value.

It will be seen that in all these cases the corpuscular richness was below 50 per cent. of the normal, the hæmoglobin being, in some of the cases, reduced to an equal or greater degree. From a consideration of these cases the conclusion may be drawn that when the corpuscular richness falls below 50 per cent. or below half the normal quantity the tendency to hæmorrhage becomes developed. This induction leaves out of consideration the estimation of the hæmoglobin. The quantity of the latter exercises a qualifying influence, according as it is greater, equal to,

or less than the corpuscular deficiency. Retinal hæmorrhage is certainly rare, as a consequence of anæmia alone, when the corpuscular richness exceeds 50 per cent. The lower the degree below 50 per cent. to which the blood-corpuscles fall, the greater is the tendency to retinal hæmorrhage; and thus it is that in the cases of that extreme degree of anæmia to which some would restrict the terms "idiopathic" or "progressive pernicious," retinal hæmorrhage is very common, and all but constant. In such cases the corpuscular richness falls to as low as 20, 15, or even 10 per cent. Retinal hæmorrhage does not always occur when the corpuscular richness sinks to 50 per cent., or even much lower, and it may be that other factors contribute to its occurrence. But at 50 per cent. the liability to hæmorrhage occurs, whatever has produced the corpuscular deficiency, and in cases of anæmia in which improvement takes place, when this point is passed the liability to hæmorrhage is lessened or ceases.

For these reasons I regard 50 per cent., or the half of the 100 per cent. in ·000022 cubic millimetres of blood, as a critical point below which the corpuscles cannot sink without grave danger to the patient. It is of practical importance to have a ready means by which, in the absence of the hæmocytometer, we can gauge whether the corpuscular richness is above or below this point. I believe the following will be found serviceable. As long as any pink colour can be seen through the finger-nails, in the nail-bed, it will be found that the patient has above 50 per cent. of red blood-corpuscles, and when all colour has disappeared from beneath the nails it may be assumed that the corpuscular richness is below 50 per cent. Of course this is a rough test, but I have often tried it against the hæmocytometer, and so far have always found it correct. This takes no cognisance of the hæmoglobin richness, an important element in anæmia, but I have not been able to determine how far we can estimate in this manner the degree of deficiency of blood-colouring matter. The accuracy of the test was well shown in Case 3.

When the corpuscular deficiency was below 50 per cent., all colour had disappeared from the matrix of the finger-nails. When the hæmic chart showed the corpuscular richness at 60 per cent., I remarked, before looking,—we ought to find the colour returning to the nails; and such we found to be the case.

In an interesting article on a case of "progressive pernicious anæmia," Drs. Ransome and Mules* point out, from a consideration of some recorded cases, "that retinal hæmorrhages commence when the corpuscles have dropped to 32 per cent. or thereabouts." The above series of cases make it clear, however, that the corpuscular richness cannot sink below 50 per cent. without the liability to retinal hæmorrhage.

(*December 13th*, 1883.)

---

2. *Hæmorrhage in region of macula.*

By A. Stanford Morton, M.B.

(With Plate III, fig. 1.)

Henry C—, æt. 35, came to Moorfields on the 4th of Feb., 1884, under the care of Mr. Tay, to whom I am indebted for permission to bring forward the case. For a month he had experienced aching pain over the right brow, and a fortnight previous to his visit he discovered accidentally on covering the other eye that the sight in the right was very defective. The vision in this eye was 20 J., and on examining him with the ophthalmoscope I found the appearances which I have represented in Plate III, fig. 1. On taking his field of vision some days later I found an absolute scotoma corresponding in shape and position to the hæmorrhage.

Since his first visit there have been very considerable

* 'Brit. Med. Journ.,' 1883, vol. i, p. 1112.

DESCRIPTION OF PLATE III.

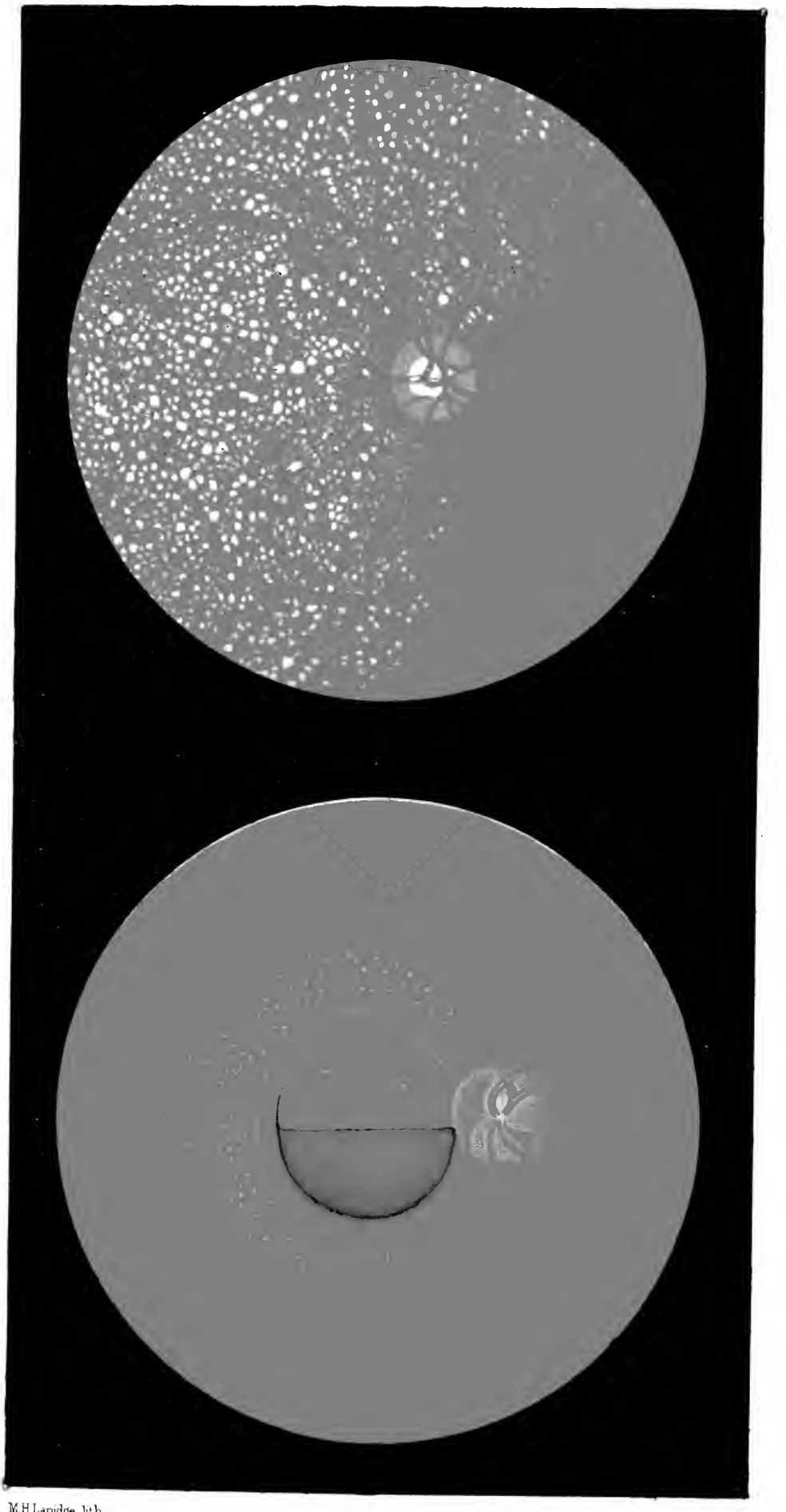
Fig. 2 illustrates Messrs. Critchett and Juler's case of Disseminated Choroiditis (p. 161).

Right eye; erect image. From a drawing by Lebon and Co.

Fig. 1 illustrates Mr. Stanford Morton's case of Hæmorrhage in the Region of the Macula (p. 149).

Right eye; erect image. From a drawing by the author.

Fig 2.



M.H.Lapidge lith.

Fig. 1.

Hanhart imp

changes in the appearances. The large semicircular hæmorrhage, as well as the smaller ones on the upper half of the circular area, underwent gradual absorption, and the retina was thrown into folds over the site of the hæmorrhage. When examined on March 31st, though there had been a little fresh hæmorrhage, the patient's vision in the right eye was 1 J. and $\frac{20}{20}$ partly. There is not any history of a blow, and the patient's health has been generally good, with the exception of what he calls "rheumatic gout." The first attack of this was in the large joint of the great toe, and most of his larger joints have been affected, but not any smaller than the wrist and great toe. The patient's father was gouty, and his eldest brother has "rheumatic gout." The urine is normal, the heart sounds are normal, but the radial pulse feels very firm on pressure. The patient states that for the last two years he has had epistaxis from the right nostril once or twice a week; that these attacks ceased from the time he found his sight defective until two days before his vision was found to be 1 J. and $\frac{20}{20}$. Vision in the left eye is normal, but there are a few changes near the disc and a minute circular hæmorrhage towards the periphery. It appears as if there had been a large circular hæmorrhage subsiding by gravitation till it became semicircular with the convexity downwards. It seems also probable that it is of gouty origin.

(*May 8th*, 1884.)

P.S. (July 1st.)—When seen a few weeks since the absorption was still proceeding, the retina was regaining its normal appearance, and the vision remained as when last tested.

Mr. Nettleship said that a single very large and dense retinal hæmorrhage of semicircular, or possibly in the first instance, as Mr. Frost had just suggested, circular outline, was not very uncommon at the yellow-spot region, though not, he believed, in other parts. It seemed probable that

this remarkable regularity of outline was due to some peculiarity in the anatomical arrangement of the retinal structures at the yellow-spot region. Such colossal solitary extravasations probably depended on rupture of a single, rather large, artery whose coats were diseased, and not upon any general disease, or retinal venous obstruction.

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3. *Syphilitic retinitis with retinal hæmorrhages and growths of new blood-vessels from the disc into the vitreous humour.*

By E. Nettleship.

(With Plate IV, figs. 1, 2.)

John K—, æt. 50, commissionaire, an Irishman, was admitted at St. Thomas's Hospital on August 23rd, 1883. Sight had been failing for seven months or more, the left being the first to begin and the worst. He had had a chancre a year previously, followed by a full attack of secondary symptoms.

The condition of the eyes was as follows:

Right sees $\frac{20}{100}$ and 16 J.; a posterior synechia at lower edge of pupil; numerous webs in the vitreous; a good many rounded hæmorrhages of rather small size at the fundus, chiefly at the upper part of the periphery, also several dark ones, apparently in front of the retina, near the y. s.

Left, opacities in the vitreous; extensive deep detachment of the retina; slight congestion.

The subsequent course of the *right* was as follows:

September 6th.—There is a close meshwork of very small, tortuous vessels on the outer side of the disc, and another small patch of vessels on the inner side; no evidence of obliteration of any of the central vessels; disc pale and hazy.

Fig 1

Fig 2

DESCRIPTION OF PLATE IV.

Illustrating the ophthalmoscopic appearances in Mr. Nettleship's case of Blood-vessels in the Vitreous Humour during an Attack of Syphilitic Retinitis (p. 151).

FIG. 1 was taken in September, 1883. Right eye; erect image.

FIG. 2 shows the appearances in the same eye in March, 1884.

From drawings by Miss Boole.

October 9th.—Vitreous much clearer ; still many hæmorrhages at y. s. and at upper periphery.

23rd.—There is now a flat, transparent, vascular membrane attached to the outer border of O. D. and projecting straight forwards into the vitreous ; its vessels are looped and very numerous, one larger one forming its anterior free border. The top of the membrane is seen with + 4 D. (The drawing represented in Plate IV, fig. 1, was taken at about this date.)

December 6th.—Condition unaltered, except that the hæmorrhages have disappeared ; still some fine webs in vitreous. Vision not $\frac{20}{200}$; 14 J., barely with + 4·5 D.

January 14th, 1884.—The vascular veil has now bent over towards nasal side of disc.

February 21st.—Two fresh growths of vessels are now seen in the form of long, narrow leashes, one passing up and out, the other inwards, from the upper part of the disc. The original vascular membrane has bent over still more towards the nasal side of the disc.

March 8th and 10th.—Drawing represented in Plate IV, fig. 2, made. The vitreous has cleared and the retinal hæmorrhages have been absorbed.

Course of the *left* eye.—Towards the end of August this eye became inflamed and painful ; it inflamed again in September and about the middle of November, by which date there was a circular posterior synechia with bulging of the iris and T. + 1.

On November 16th a satisfactory iridectomy was done, much fluid escaping from behind the iris. The eye continued inflamed and liable to severe attacks of pain, though T. was n. and the iris flat.

On the 29th the right had become irritable ; the left having no p. l. and being still painful was excised. Retina totally detached ; some small spots of choroiditis.

Mercury has been given at intervals for a considerable portion of the time since his first admission and he is easily affected by it (diarrhœa and salivation).

There is nothing of special interest in the previous

history: he was in the army from 1860 till 1881, but never went abroad, and had scarcely any illness except an attack of chronic rheumatism. Urine free from albumen and sugar. Has not had ague or scurvy. When a boy used to bleed from the nose, but does not bleed severely when cut.

(*Living specimen. March* 13*th*, 1884.)

P.S. (Aug. 21st.)—R. has improved V. $\frac{20}{100}$; with + 2·5 D. reads 14 J. fairly. Fundus much as at last note, but there is now a good deal of white opacity (connective tissue) about the bases of some of the vascular growths; the veil-like growth at the disc has turned so that its plane is now nearly horizontal instead of vertical as before. He has had no medicine for many months.

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4. *On tortuosity of retinal vessels in association with hypermetropia.*

By Stephen Mackenzie, M.D.

(With Plate V, figs. 1, 2; VI, fig. 1.)

For the opportunity of seeing this case and bringing it before the Society I am indebted to Mr. Streatfeild, under whose care the patient came at Moorfields.

M. W—, aged 20, Hereford, was always delicate. When eleven years old her sight was much affected, she had "inflammation of the eyes," and was under the care of an ophthalmic surgeon for two years. She was suited with spectacles, and advised to use them regularly, but she does not appear to have done so. For two years after this she suffered from hysteria, and at the end of this

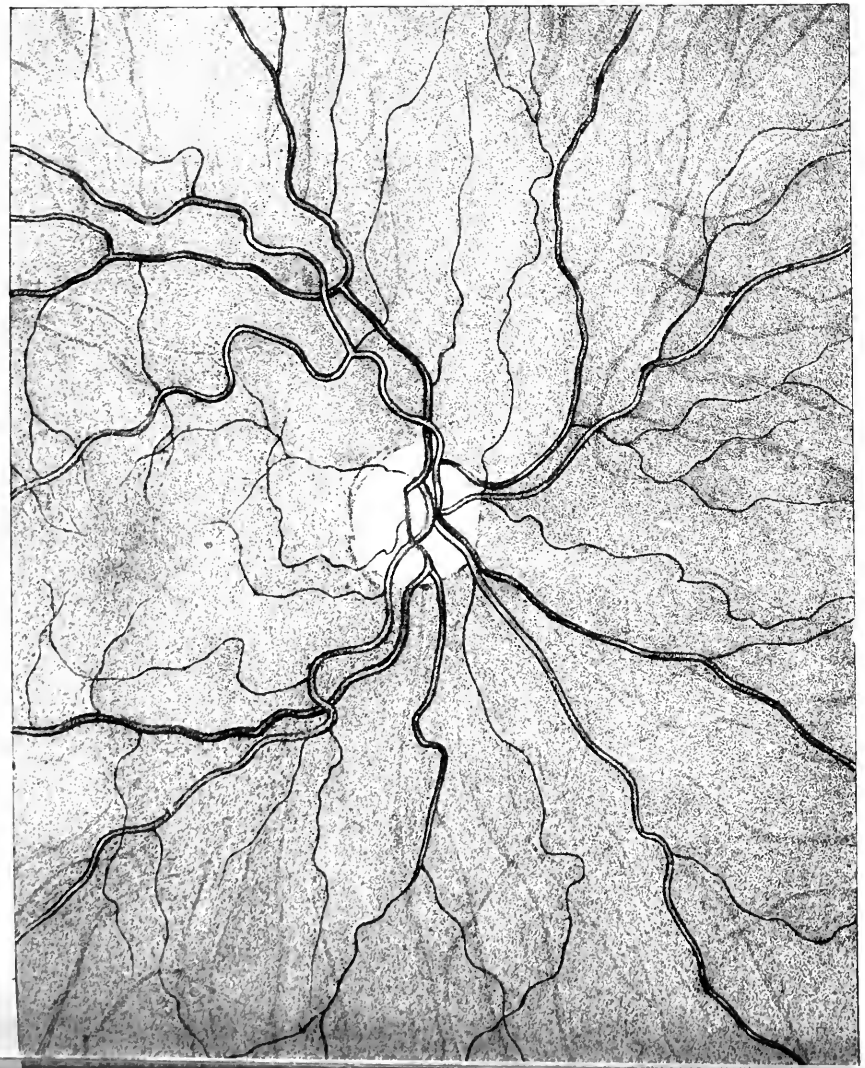


Fig 2

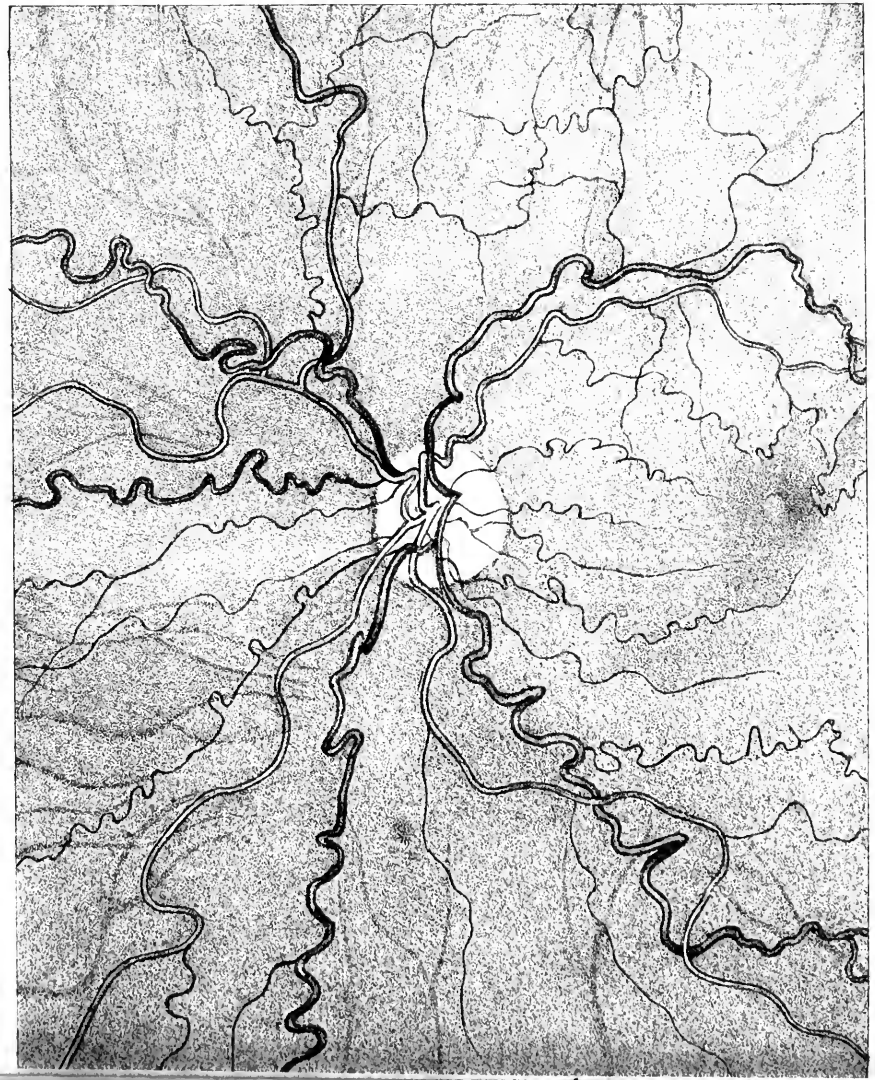


Fig 1

Labong & Co

DESCRIPTION OF PLATE V.

Illustrating Dr. Stephen Mackenzie's case of Tortuosity of Retinal Vessels in Connection with Hypermetropia (p. 153).

FIG. 1 shows the ophthalmoscopic appearances in the left eye.

FIG. 2 the same in the right eye (nearly normal).

Erect image.

From drawings by Miss Boole.

period her sight was better. She then, being sixteen, went to school, when her sight again failed, especially with the left eye. She got some glasses from an optician which she used for twelve months, but during this time her vision steadily deteriorated. She tried stronger glasses, but these only suited her for a short time.

During the last eighteen months, and especially in the last twelve months, her vision has still further diminished and she has had much pain in the head, along the temples, especially on the left side. She never quite loses the pain, but it is worse in the evening with artificial light. The headache, she says, is not like an ordinary one ; it is a throbbing, shooting sensation and the head feels heavy. She suffers a good deal from constipation. The catamenia have been scanty, lasting for only part of a day, during the last year.

She has two brothers whose sight is good. Her father and mother are free from any ocular defect, nor does she know of any in the family.

Without spectacles she cannot see to read or sew. With + 2·5 D. her vision is a little improved, but she cannot then see to read.

In the *left eye* (Plate V, fig. 1) the retinal veins are extremely tortuous. The main trunks are slightly dilated and twisted, and coiled round in places in a corkscrew-like manner. The branches of the veins share in the tortuosity, but are not dilated. Most of the arteries are natural, but a few of the smallest are a little tortuous. Disc oval, congested. In the *right eye* (Plate V, fig. 2) the veins are scarcely at all tortuous, presenting a marked contrast with the opposite eye. The following are Mr. Streatfeild's notes as to refraction :

R. { Vertical meridian + 2·5 D. over corrects.
R. { Horizontal ,, + 8 D. over corrects.
L. { Vertical ,, + 3·5 D. over corrects.
L. { Horizontal ,, + 8 D. over corrects.

But the vision was not improved by cylindrical glasses.

Strabismus convergens, right occasional.

Heurteloup tried and relieved headache slightly. Bromide of potassium made throat dry.

When she left off attendance there was no improvement.

V. with both eyes together = $\frac{20}{0}$, with + 2·25 D. = $\frac{20}{200}$.

In the case of a girl æt. 12, I showed on Dec. 13th, 1883, with extreme tortuosity of the veins of left retina (Plate VI, fig. 1), slightly of veins of right, there was hypermetropia, but I had not attached any significance to the fact. Mr. Nettleship, however, suggested to me its importance, and the advisability of having the refraction carefully tested.

This has been kindly done by my colleague, Mr. James Adams, with the following result:

V. { R. $\frac{20}{50}$ Hm. less than 0·5 D., no improvement with sph. lenses.
L. $\frac{20}{30}$ Hm. 1 D. Each reads 1 J., at 12″.

Under atropine. { R. vertical meridian M. 0·5.
horizontal ,, H. 2·5.
with + 3 D. axis vertical V. = $\frac{20}{40}$ imperfectly.
L. H. 2·5 D., V. = $\frac{20}{30}$.

I have at the present time under care at the London Hospital, a girl æt. 17, suffering from rather severe anæmia.

The retinal veins in both eyes are distinctly tortuous, though not to anything like the same degree as in the two others. Her vision is as follows:

V. { R. $\frac{20}{20}$ Hm. 0·5 D.; 1 J. at 12″.
L. $\frac{20}{20}$ Hm. 0·5 D.; 1 J. at 12″.

Under atropine. { R. $\frac{20}{0}$, H. 1·75 D., V. = $\frac{20}{20}$.
L. $\frac{20}{0}$, H. 2 D., V. = $\frac{20}{20}$.

In the case of tortuosity of the retinal veins in a patient the subject of vesicular emphysema I reported last session, an illustration of which appears in 'Transactions' vol. iii (Plate III, Bis), I have unfortunately no note as to the refraction, but I believe had there been any peculiarity it would have been recorded.

In Mr. Benson's case there was hypermetropia, but

whilst this was in R. = 3 D. and in L. = 1·75 D., the tortuosity of the vessels, both arteries and veins, "existed nearly to the same degree in each eye" ('Trans.,' vol. ii, p. 56, Plate III, fig. 1). Of Mr. Nettleship's two recorded cases,* in Case 1 there was asthenopia caused by a considerable degree of hypermetropic astigmatism. The tortuosity was confined to the veins, in every part of the fundus of each eye. The refraction of the two eyes is not separately stated. In Case 2 the tortuosity was confined to the veins, and the patient was emmetropic.

It is evident, therefore, that in most of the cases in which the condition was so marked as to merit placing on record, the tortuosity of retinal vessels, whether of veins only or of veins and arteries, has been associated with hypermetropia simple or astigmatic. In some of the cases the tortuosity has been greatest in the eye in which the hypermetropia predominates. In other cases, however, the tortuosity has been equal in two eyes with very different degrees of hypermetropia, and has been present in an emmetropic person. Some of the patients have complained of headache, which has predominated on the side where the greatest tortuosity of vessels and hypermetropia prevailed, but this has not been relieved by the correction of the hypermetropia.

The subject is evidently one inviting further contribution and elucidation, and I hope members will state their experience on the association of tortuosity of retinal vessels (slight or severe) with hypermetropia.

(*May 8th*, 1884.)

* 'Trans.,' vol. ii, p. 57, Plate III, fig. 2.

5. *Direct arterio-venous communication on the retina.*

By R. Marcus Gunn.

(With Plate VI, fig. 2.)

Lily W—, æt. 11½, came under observation at the Hospital for Sick Children, Great Ormond Street, in January, 1884. She had previously been under the care of Dr. R. Lee, at that hospital, on account of severe headaches.

History.—As a baby she was delicate; when a month old had convulsions. She grew stronger when about nine months old, and continued in fairly good health, with the exception of an attack of bronchitis, until the age of four years. At this date she had inflammation of the brain and was laid up for six weeks. During this illness her head was drawn backwards and she was unconscious. When nearly recovered she had an eruption of small bullæ over the cheek, arm, and leg of the left side; slight scars remain. Two years later she was again mentally deranged for two or three days, when suffering from an abscess in connection with a bad tooth. She has always, her mother says, been highly excitable and very quick intellectually. For the last four years or more she has been subject to severe headaches; at first they occurred two or three times daily, each attack lasting from fifteen minutes to one or two hours. She used to feel sick at the time, and once she vomited and retched considerably just after the headache had passed off. Lately they have been less frequent and seemingly less violent than formerly. The pain is chiefly in the vertex and occiput. During the attack her face looks grey and pinched, and her mother says that the white of her eyes looks red when the pain is very severe. The headache seems to be brought on by any excitement, as when she is at play or working hard at school. No history of injury.

DESCRIPTION OF PLATE VI.

Fig. 1 shows the ophthalmoscopic appearances in Dr. Stephen Mackenzie's case of Tortuosity of Retinal Vessels with Hypermetropia (p. 154).

Left eye; erect image. From a drawing by Miss Boole.

Fig. 2 shows the ophthalmoscopic appearances in Mr. Marcus Gunn's case of Arterio-venous Communication on the Retina (p. 156).

Left eye; erect image. From a drawing by Miss Boole.

TRANSACTIONS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM, VOL. IV.

In Plate VI, fig. 2, the place of junction of the principal descending vein with the large vessel that establishes the arterio-venous communication has been accidentally omitted.

The omission is supplied in the accompanying figure.

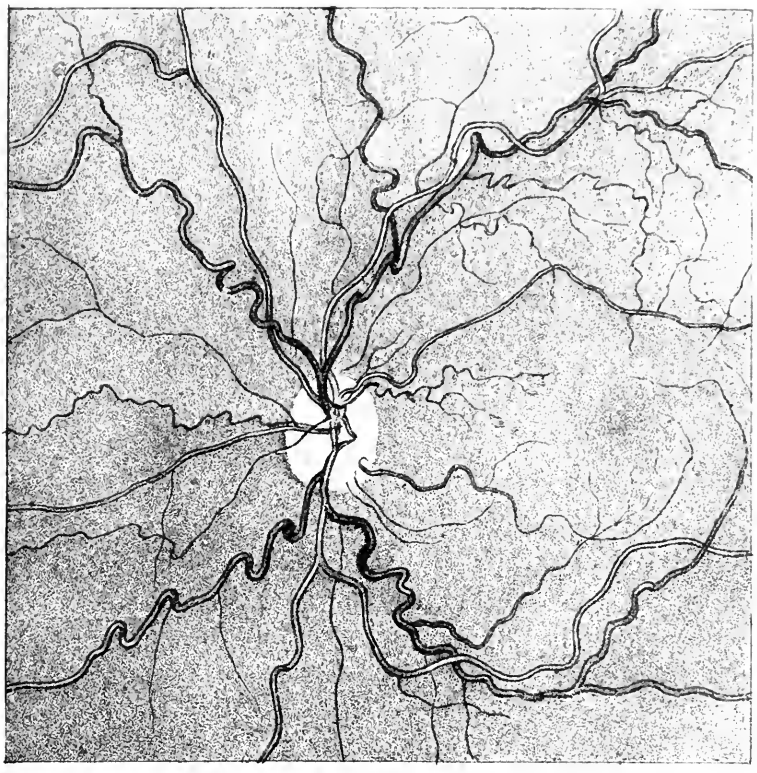
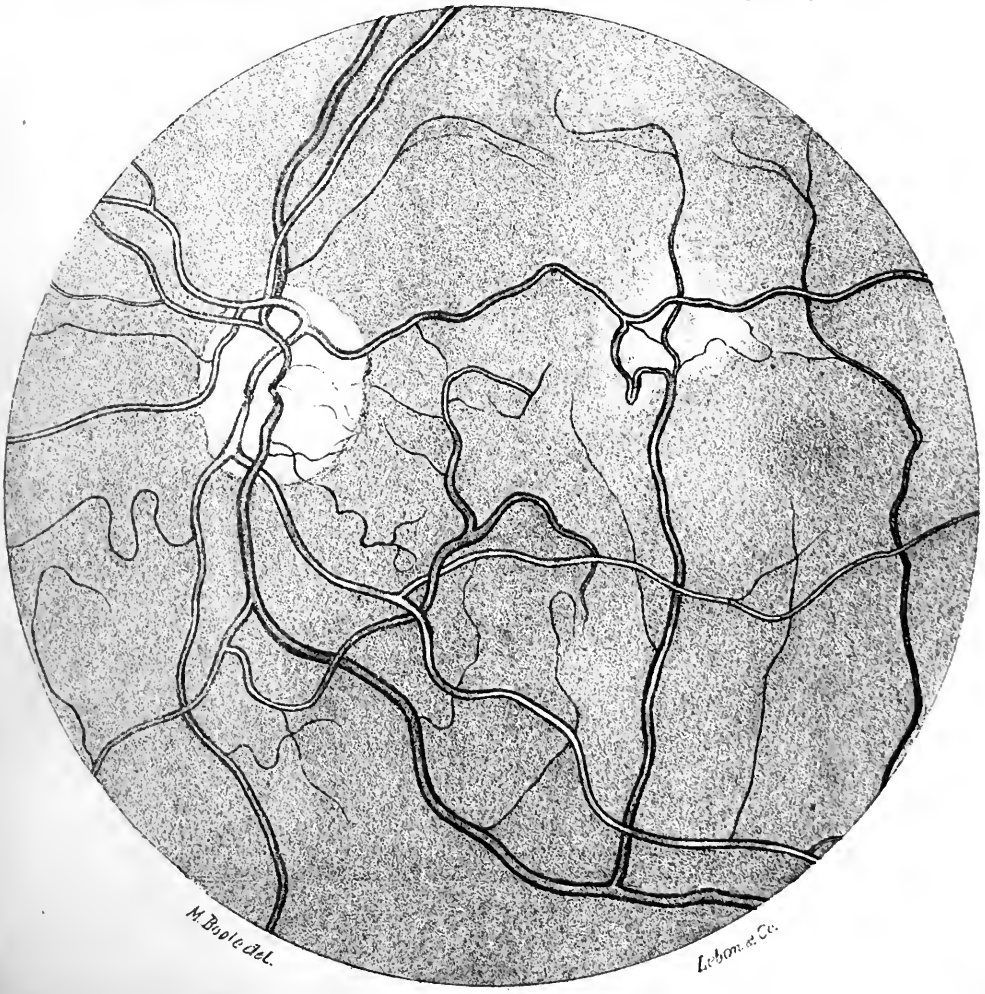


Fig 1.



Present condition.—The patient is a quick, intelligent, highly nervous girl, with fair hair and light blue irides. Her face is pale and rather puffy; her pupils are wide, active to light and with convergence, but decidedly oscillatory. Urine (morning), sp. gr. 1010, acid, no albumen, no sugar.

On *ophthalmoscopic examination* of the *left eye* the attention is at once attracted by the presence of a large vessel running vertically immediately to the inner side of the yellow spot. On tracing this vessel downwards it is found to be a branch of the inferior temporal vein. Following it upwards we find that soon after passing the level of the y. s. it bifurcates; one of the terminal branches continues upwards in the line of the vessel, while the other passes upwards and inwards for a short distance and then opens directly into an artery, viz. the superior temporal of the retina. In addition, there are other minor peculiarities in vascular distribution to be found in this fundus. Several of the retinal veins appear to commence abruptly, doubtless having their origin in the choroid and piercing the retina vertically. In one place a vein begins in this abrupt manner and soon attains a large size and dark colour, while further on it becomes much smaller again, and lighter in hue before it ultimately joins the inferior nasal vein of the retina. The relief of the dilated portion of this vessel is probably due to another communication with the choroidal circulation, concealed by the vessel itself.

In the *right* eye there are two cilio-retinal arteries at the outer side of the disc.

Under atropine H. = 1·75 D. Vision = $\frac{20}{20}$.

Her father and his family generally are very nervous; one or two of them have had peculiar mental symptoms. Family history otherwise is unimportant.

(*Living specimen. March 13th*, 1884.)

6. *A third instance in the same family of symmetrical changes in the region of the yellow spot in each eye of an infant, closely resembling those of embolism.*

By Waren Tay.

A male child, æt. 6 months, shown with changes in the region of the yellow spot in each eye, precisely resembling those shown in Pl. III, vol. i, of the 'Transactions.' In this child, however, there is also atrophy of the optic nerves. When a few weeks old the baby simply showed marked evidences of optic neuritis. When first seen no defect of general nutrition or spinal feebleness could be detected. He seems now, however, to be beginning to fail as the first child did.

This is the third instance in the same family. The history of the first child is given in the first volume of the 'Transactions,' p. 55. He died at the age of one year and eight months. The second child, a boy also, was seen within a few months of birth with very similar conditions as to the eyes. There was nothing noticeably wrong with his muscular or nervous system generally. After the age of six months he began to get "weak all over" like the first child, and gradually became quite helpless. When eighteen months old (on June 2nd, 1883) he was admitted into the London Hospital. He was then precisely in the condition of the eldest born when first seen. He had slight convulsive seizures not noticed in the elder child; he turned "black in the face and became quite stiff for a minute or two." Subsequently he had a definite epileptiform convulsion one morning. The right side of the body was perfectly rigid, and the eyes deviated to the right; there was also twitching and drawing up of the right angle of the mouth. The optic discs were in a state of atrophy and the yellow-spot region in each eye

precisely resembled the drawing. The patient brought up about half an ounce of blood on June the 22nd. He had a fit which lasted about an hour on the evening of the 23rd, and another on the 24th. The child had no further fit, but gradually sank. He died on June 26th. The temperature was normal till June 10th; then it varied from 100·5° to 103·5°. Post-mortem examination refused.

(*Living specimen. January 10th,* 1884.)

July, 1884.—The mother promised to attend with the baby from time to time. She did not do so more than once or twice. She cannot be found (on personal inquiry) at the address which I obtained from her myself.

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7. *Tubercle of choroid.*

By P. H. Mules, M.D. (Manchester).

(With Plate VII, fig. 1.)

The drawing which I bring before the Society this evening appeared to me sufficiently rare to warrant more than a passing notice. The detection of miliary tubercles in the choroid during life has not been so often reported as to have lost its interest, nor am I aware that there exists a coloured representation similar to the one I show this evening, which I believed to be a typical example of miliary tubercles of the choroid. This has been since substantiated by post-mortem examination.*

In my own experience and that of my colleagues, extending in the aggregate over a large number of cases, we have here the one solitary example of tubercles

* Microscopical sections of the tubercles were exhibited at the meeting.

of the choroid seen by us during life, an experience participated in by Dr. Ashby, physician to the Children's Hospital at Pendlebury, near Manchester, to whom I am indebted for these preparations, and who has placed his notes of this case at my disposal. The specimens were found in a girl, æt. 10, the victim of acute miliary tuberculosis attacking all the viscera and further developing in the meninges. The course of the case was exceedingly rapid, the child dying within fourteen days from the apparent commencement of her illness.*

Of the appearances seen at both fundi whilst the child lay in a semi-comatose condition two days before her death, the drawing gives a faithful representation.

Some eight to ten nodules were observed, surrounding the disc at varying distances, yellowish white at the centre, shading towards the base to the colour of normal choroid, and in three instances underlying the retinal vessels, the little masses being circular and much smaller than the disc, whilst there was also evidence of double optic neuritis. No more faithful description can be given than that found in Dr. Gowers' work on 'Medical Ophthalmoscopy.'† At the post-mortem examination the lungs were found loaded with miliary tubercle; the kidneys, liver, and spleen were studded throughout their substance with similar deposits, and fine tubercle was found on vessels in the Sylvian fissures. The eyes were removed with the hope of detecting bacilli in the choroidal tubercles; the staining and, subsequent examination was carried out by Dr. Maguire in the Pathological Laboratory of Owens College, and, although exceptional care was taken, no rods could be found. I confess I was not disappointed, because in a case of tuberculosis confined to the eyeball, which I had the honour of bringing before the Society, every known staining was tried without avail to detect bacilli. Whether they exist as a spore which will not stain, or whether,

* A full report of the case will be found in the 'Medical Times' for 1884, vol. ii, p. 80.

† p. 198.

DESCRIPTION OF PLATE VII.

Fig. 1 shows the ophthalmoscopic appearances in Mr. Mules's case of Tubercle of Choroid (p. 160).

Right eye; erect image. From a drawing by the author.

Fig. 2 shows the ophthalmoscopic appearances in Dr. Walter Edmunds's case of Papillo-Retinitis from a case of Cerebral Tumour, but with appearances closely resembling those usually seen in Albuminuric Retinitis (p. 291).

Right eye; erect image. From a drawing by Miss Boole.

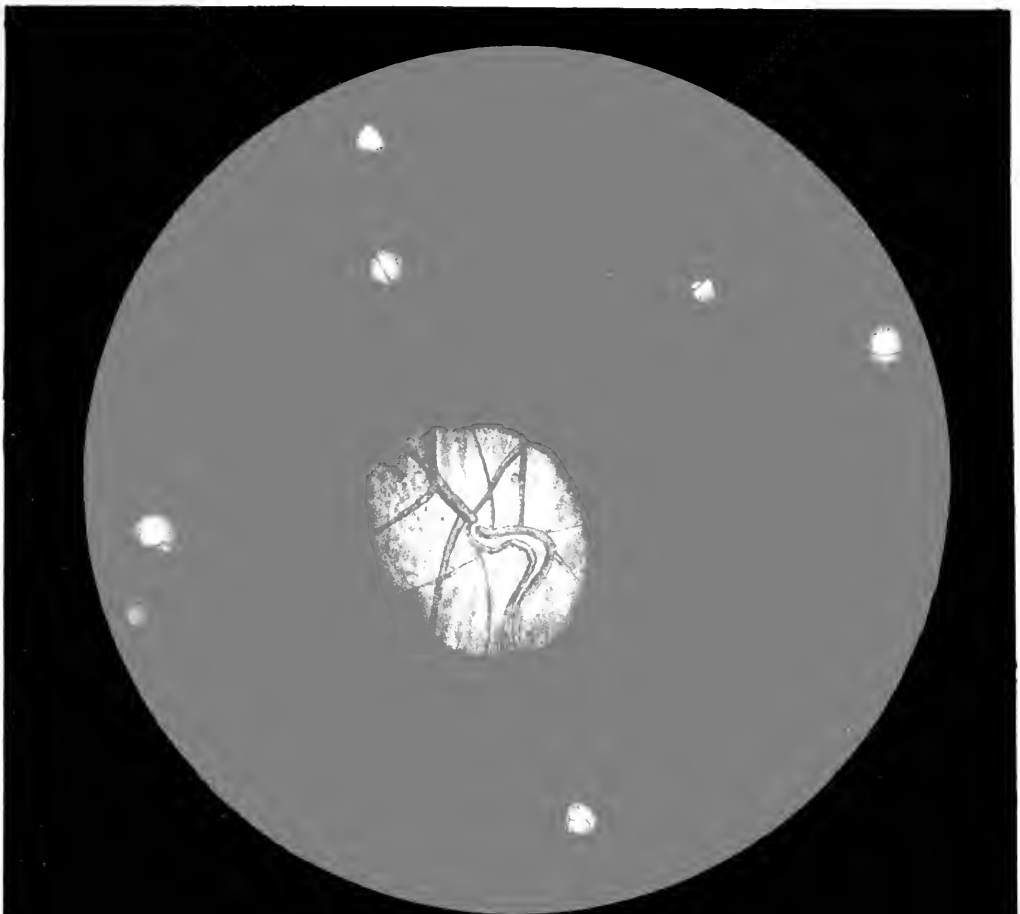

Fig. 1.

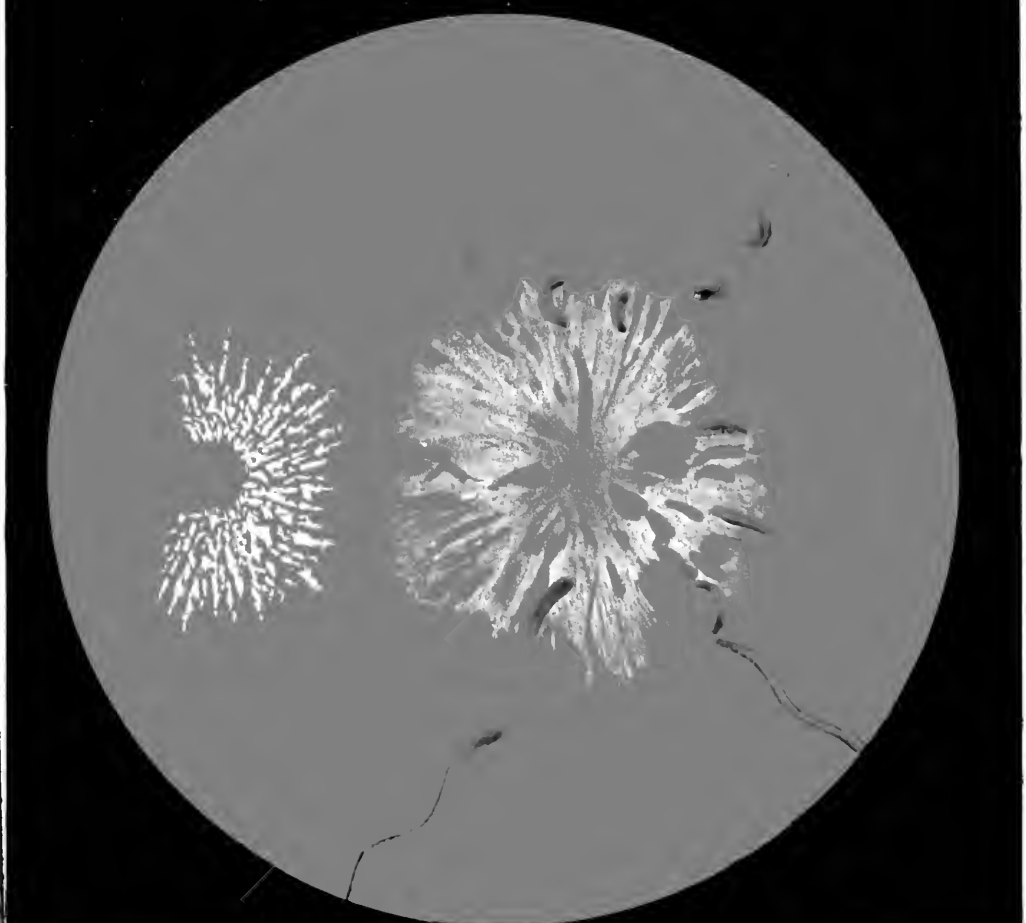

Fig. 2.

West, Newman & Co. chromo. lith.

having originated a fresh development in the shape of these masses of lymphoid cells, the bacillus is superseded, leaving these new organisms to finish the work it has commenced, we know not; it is sufficient, so far as this paper is concerned, to say that in the above-named cases, specially in that of primary tuberculosis of the eyeball, tubercle existed, but no bacillus. The microscopical appearances seen in logwood-stained sections in no way differ from those that have been recorded before—the giant-cells fairly numerous, and patches of retrograde tubercle to be easily detected.

I would only further add that the ophthalmoscopic appearances taken alone are hardly diagnostic of tubercle as apart from other choroidal affections, notably the very early stage of choroiditis disseminata, but taken in conjunction with other symptoms they appear to perfect the chain of evidence should there be a link found wanting.

(*June 5th* 1884.)

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8. *Disseminated choroiditis.*

By Anderson Critchett and Henry Juler.

(With Plate III, fig. 2.)

Sarah D—, æt. 46. There is a distinct history of acquired syphilis five years ago (syphilitic sore followed by rash, sorethroat, &c.).

The left eye became first affected three years ago, when she gradually lost the sight over the inner half of the left visual field. A year ago this eye became greatly inflamed and the vision disappeared entirely. The right eye has also been slightly red from time to time, but its vision has not been particularly defective; in fact, the patient was unaware of the diseased condition of this eye until she

came under our treatment at St. Mary's Hospital in March last. The state of the fundus of the right eye is one which we have thought would be interesting to the Society, for although the vision is equal to $\frac{6}{6}$ of the distant and 0·5 of the reading types of Snellen, yet we find innumerable whitish-yellow circular patches scattered over the fundus; these, as represented in Pl. III, fig. 2, occupy not only the greater part of the periphery, but also the yellow-spot region of the fundus.

The case has been treated as one of secondary syphilis. Mercury has been given in the form of inunction by the axilla, just short of salivation, during the last six weeks.

Since this treatment was commenced the white spots on the choroid of the right eye appear to have receded and become less numerous.

The visual acuteness is still normal and the visual field presents no marked scotomata.

In the left eye there appears also to be much improvement, for when we first saw her, there was bare p. l. in this eye, whilst at the present time she can count fingers in the outer part of the visual field.

(*Living specimen. June 5th*, 1884.)

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9. *Central senile guttate choroiditis (without defect of sight).*

By E. Nettleship.

Daniel L—, æt. 61, slipper maker, an Irishman, admitted at the Moorfields Hospital in July, 1883, stated that his left eye had been failing nine months and the right four months; as, however, he was hypermetropic but little reliance could be placed on his account. He had been subject to winter cough for many years, but had otherwise had good health. No history of syphilis could be obtained;

married ten years, wife had never been pregnant. Urine free from albumen and sugar, sp. gr. 1015. Notwithstanding the position and abundance of the choroidal disease, visual acuteness was but little impaired.

V. { R. $\frac{20}{100}$, Hm. 3·5 D.=$\frac{20}{20}$; with +6 D.=1 J. / L. $\frac{20}{200}$, Hm. 3· D.=$\frac{20}{30}$; with +6 D.=4 J. } Tension and field of vision normal in each eye.

The drawing (shown at the meeting) is from the erect image of the right eye; exactly similar changes were present in the left eye. At the region of the yellow spot in each eye are numerous dots of choroidal disease. They are very small, uniformly scattered, yellowish-white, and free from pigment accumulation. The smallest of all are round, but the larger ones are often rather irregular as if formed by the confluence of two minute ones. The dots look as if caused by deposit rather than atrophy, the boundary of each dot being rather softened, not sharply defined. The disc and retinal vessels show no marked change.

This case and the next are good examples of an early stage of the disease described by Tay and Hutchinson in the 'Ophthalmic Hospital Reports' for 1875, vol. viii, p. 231, and are presented for comparison and contrast with the case of central choroidal atrophy also exhibited* (*vide* p. 165).

(*Living specimen. March 13th*, 1884.)

* They may alsc be compared with a case published by Mr. Adams (*vide* 'Trans. Ophth. Soc.,' vol. iii, p. 113); the appearances, however, are not the same.

10. *Central guttate choroiditis without defect of sight; premature presbyopia.*

By E. Nettleship.

(With Plate II, fig. 2.)

The drawing (Pl. II, fig. 2) shows the appearances of the erect image in the left eye. A number of small, perfectly circular, pale greyish-yellow spots are thickly congregated at the yellow-spot region, and more thinly scattered all around that part, reaching on the nasal side as far as the disc; in these outlying parts the spots are usually grouped in small patches, or in linear series as if following the course of some large vessel or nerve in the choroid. Some of the spots are more defined than others, but none are sharply cut; the most defined ones are surrounded by a shaded grey ring such as might be produced if the pigment epithelium were pushed aside by a slightly prominent nodule; there is nothing suggesting proliferation of the pigment epithelium. The small retinal trunks which feed the lower half of the yellow-spot region are larger and more tortuous than usual, and it is just in this part that the spots of disease are thickest; indeed, the upper half of the yellow spot is nearly free, and its retinal vessels are so small that the artist has not shown them. Discs perhaps rather pale; retinal vessels normal. No choroidal disease elsewhere.

The other eye showed changes exactly similar in kind and very nearly as abundant.

The patient, Sarah C—, æt. 41, married, came to St. Thomas's Hospital for spectacles early in the present year.

V. { R. $\frac{20}{20}$ Hm. ·5 D.
{ L. $\frac{20}{20}$ Hm. ·5 D.

Although only forty-one, she required + 4·5 D. for reading at 22 cm., *i.e.* she had no accommodation what-

ever. I have unfortuately no note of the pupils, but they were certainly not dilated. Her sight had been "weak" since a severe illness following parturition fifteen years before; no other history obtainable.

(*Living specimen. May 8th*, 1884.)

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11. *Central senile areolar choroidal atrophy.*

By E. Nettleship.

(With Plate VIII, fig. 1.)

Caroline M—, æt. 60, married, admitted at the Moorfields Hospital in October, 1883, only able to see letters of 20 J. with each eye. Refraction slightly H. Sight has been fading for twelve years (perhaps only from Pr.), but has got decidedly worse only four months. Has had eighteen children; health has been good except for some chronic rheumatism; urine contains neither albumen nor sugar. Father was blind for six years before he died, but no details are known. Patient attended at hospital a few times, but no change occurred in the sight or ophthalmoscopic appearances.

In each eye a large area of atrophied choroid occupies the central region of the fundus; in the *left* it is almost perfectly circular, in the *right* it is rather larger and not quite so regular in outline.

The drawing (Pl. VIII, fig. 1) is from the erect image of the left eye. The disc is situated on the nasal border of the diseased area. Over the nasal portion of the area the atrophy is complete, only a few white lines seen against the slightly grey background remaining to indicate obliterated blood-vessels. Towards the temporal side the atrophy becomes gradually less marked, and on this part very conspicuous thickening of the coats of the large vessels is

noticed, a change which no doubt passes on to their complete obliteration. The diseased area is sharply defined everywhere except at the extreme outer part. The choroid bounding its lower border is darkened, possibly by capillary congestion, but with this exception there is no evidence of inflammation preceding the atrophy; nor is there any accumulation of pigment. The first change seems to be the disappearance of the chorio-capillaris; this is well seen at the right hand lower part of the drawing, where, although the large vessels show as yet but little change, the limit of the disease is marked by the sudden cessation of the "stippled" appearance produced by the epithelial and capillary layers. The disc shows no marked change and the retinal vessels are normal.

The case illustrates one variety, well marked and not very rare, of senile disease of the choroid. A similar case is given in the 'Hand Atlas' of Wecker and Jaeger, fig. 97; the patient was a woman æt. 60; only the right eye was affected, and the disease had begun about two years previously with the appearance of large muscæ and a grey cloud before the sight; the affected eye was emmetropic, the other hypermetropic.

The disease here illustrated does not seem, so far as we yet know, to have anything in common, anatomically, with the central guttate choroiditis of Tay and Hutchinson (*vide* p. 163); but the similarity in the age of the patients and in the region affected suggests some similarity of cause.

The thickening (? atheroma, ? sclerosis) of the large choroidal vessels (chiefly veins) seen in this case is not uncommon in other varieties of choroidal atrophy near the disc, especially in elderly persons.

(*Living specimen. March 13th,* 1884.)

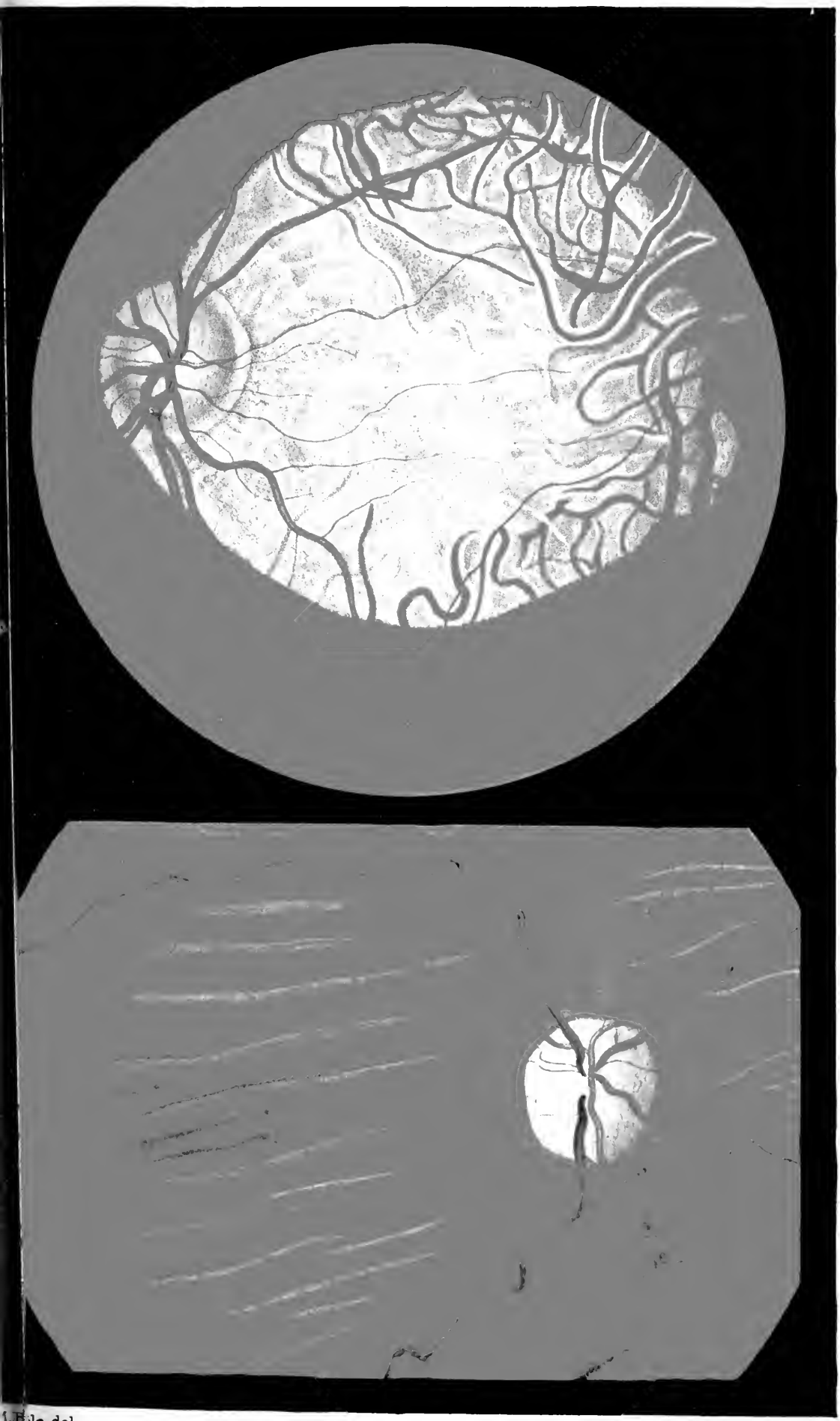
DESCRIPTION OF PLATE VIII.

Fig. 1 shows the ophthalmoscopic appearances in Mr. Nettleship's case of Central Senile Areolar Atrophy of Choroid (p. 166).

Left eye; erect image. From a drawing by Miss Boole.

Fig. 2 shows the ophthalmoscopic appearances in Mr. Nettleship's case of Peculiar Lines on the Choroid after Papillitis (p. 167).

Right eye; erect image. From a drawing by Miss Boole.



T. Bale del.

West, Newman & Co. chromo. lith.

12. *Peculiar lines in the choroid in a case of post-papillitic atrophy.*

By E. Nettleship.

(With Plate VIII, fig. 2.)

The drawing (Pl. VIII, fig. 2) shows the erect image of the right fundus. The disc is pale, its margin in parts slightly hazy, the retinal veins still tortuous and rather turgid, the retinal arteries somewhat shrunken. Vision is almost abolished (hand moving only). About eighteen months before the drawing was made the eye had passed through an attack of papillitis, but beyond the fact that this was well marked, no particulars have been kept.

The peculiarity is the presence of a number of straight lines in or upon the choroid running parallel with one another nearly in the horizontal direction. These lines are longest and broadest at the yellow-spot region; they are equally numerous, though finer, to the nasal side of the disc, and a few are seen above; they are all horizontal, not radiating from the disc. Below the disc there is disturbance of the superficial (epithelial) pigment, but no straight lines are seen. Each line shows a dark and a light border; these change to some extent when the direction of the light is altered, as if the dark were at least partly caused by a shadow; it is, however, certainly in part due to pigment. The lines look as if due to a number of delicate ridges or plaits, such as might possibly have been left by the subsidence of an œdema of the choroid. Œdema of choroid is often seen in microscopical specimens of cases of papillitis from brain disease.

The other eye is in the same state, but vision not quite so bad ($\frac{20}{100}$ and 10 J.).

The patient is a man (Arthur H—), now æt. 36, who was in the Queen Square Hospital for the Paralysed and Epileptic, under Dr. Hughlings Jackson and Dr. Ferrier

in the summer of 1882 for fits affecting the right side more than the left, with numbness of the right side at times, and other cerebral symptoms. The papillitis and defective sight were present in August, 1882, when I saw him (by the kindness of Dr. Coxwell, then house physician), but made no note of the ophthalmoscopic condition. He is now under the care of Dr. Beevor, who tells me that the symptoms point to a cortical tumour of the left hemisphere, about the ascending and third frontal convolutions. He had syphilis when about thirty, and the brain disease is undoubtedly due to that cause.

I am indebted to Dr. Beevor for the opportunity of seeing the man again and for permission to have the drawing made.

(*Living specimen. May 8th*, 1884.)

Dr. Stephen Mackenzie remarked that he had two cases under observation at the present time, in which a white streak or scar passed from the papilla in the direction of the yellow spot. In each case there had been papillitis from brain disease. He had not been able to satisfy himself as to the nature of the condition, which was very closely alike in the two cases.

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13. *Nævus of the right temporal and orbital region; nævus of the choroid and detachment of the retina in the right eye.*

By W. Jennings Milles.

William M—, æt. 15, was brought to the hospital by his mother because he was blind in his right eye. The history as stated by the mother was that the boy was born with a large birthmark involving the eyelids on the right side; that this birthmark had never been markedly

discoloured, but varied considerably in size; that the right eye had apparently been a good one till the boy was six years old, when it was found to be blind, and that there had never been any complaint of pain in this eye. The birthmark had somewhat diminished in size during the last few years.

His condition on examination was as follows. There was some deformity on the right side of his face, produced by a puffy swelling, involving the orbital and temporal regions and reaching outwards to the hairy scalp. It had all the appearance of a nævus, but scarcely affected the skin at all. The lids were distinctly puffy. There were no dilated vessels in the conjunctiva. The cornea was clear, the anterior chamber rather shallow, the pupil was dilated and inactive to light, the lens was clear, and the retina was completely detached and closely in contact with the posterior surface of the lens. T. n., V. = bare p. l.

The left eye was myopic with some asthenopia when used.

The right eye was excised and the following pathological changes were found. The *retina* is detached in an umbrella form (as seen in the specimen mounted in glycerine). A roughly circular area of the choroid measuring about 20 mm. in diameter, and occupying the posterior and outer part of the globe, consists of a soft spongy porous structure; it is thickest in the centre, where a cross section measures $2\frac{1}{2}$ mm.; on its inner surface the pigment is irregularly heaped up with a tag projecting towards the detached retina. The porous structure is very distinct to the naked eye.

Microscopically it is a simple angioma consisting of dilated veins and capillaries; there are at places large dilated spaces filled with blood, in fact a cavernous angioma. The pigmentary layer of the retina is remaining with choroid greatly altered, and converted into a connective tissue layer.

(*May 8th*, 1884.)

Dr. Brailey said: If this is a genuine case of nævus it appears to me somewhat remarkable that there should be found associated with the affected part of the choroid some of what are usually reckoned inflammatory products, *e.g.* a fibrous layer on the inner surface of the lamina vitrea of the choroid, and *in* the inner layers of the affected choroid itself, very near to the lamina vitrea, a small hard plate exactly resembling an earlier stage in the formation of bone.

Dr. Stephen Mackenzie thought that very great interest attached to Mr. Milles's specimen. Dr. Allen Sturge had described a case at the Clinical Society some years ago ('Clin. Soc. Trans.,' vol. xii, 1879, p. 162), in which there had been a congenital port-wine mark on one side of the face, with tortuous retinal vessels and changes in the choroid on the same side. The patient had suffered from epileptiform seizures of the side of the body opposite to the port-wine markings, and Dr. Allen Sturge was inclined to attribute the partial epileptic seizures to a nævoid condition of the vessels of the brain similar to that which existed in the face and eye. Mr. Nettleship had made a careful ophthalmoscopic examination in this case. Dr. Horrocks had recently brought before this Society ('Trans.,' vol. iii, p. 106) a case in which there was a nævoid condition of the face and eye, with clonic convulsions on the opposite side of the body. The anatomical evidences afforded by the beautiful microscopical preparations exhibited by Mr. Milles were therefore very important in establishing that a nævoid condition existed in the choroid. This, whilst it did not prove that a nævoid condition of the vessels existed on the same side of the brain, lent a certain support to the view that such a state might be present in cases in which, with nævoid conditions of the skin of the face and tunics of the eye, unilateral nervous symptoms were present on the opposite side of the body.

Mr. Nettleship said that in Dr. Allen Sturge's case referred to by Dr. Stephen Mackenzie there was distinct

evidence that the affected eye was larger than the other, the cornea being wider and the refraction being considerably myopic (the other eye being hypermetropic); the choroid, moreover, was seen to be darker than in the other eye. In a case of nævus of the orbit, which he had shown at a previous meeting, the eye on the affected side appeared smaller than its fellow, and its lens showed lamellar cataract.

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14. *Ossification of choroid, causing repeated attacks of sympathetic irritation.*

By W. Adams Frost.

George S—, æt. 43, admitted into St. George's Hospital April 3rd, 1884, under Mr. Frost. When thirteen years old the right eye was injured by a kick from a horse; vision in that eye was destroyed at once, and permanently. Since then he has had several attacks of conjunctival injection and tenderness in the injured eye, lasting usually about a fortnight; during each of these attacks there has been conjunctival injection with overflow of tears and great intolerance of light in the other eye. The last attack was five years ago, the present commenced five weeks ago.

When admitted.—R: conjunctival injection, large opaque scar on cornea, T. — 3, no p. l.

L: No conjunctival injection, but free lacrimation, V. = $\frac{6}{9}$.

Right eye enucleated, globe bisected and mounted in glycerine jelly (Priestley Smith's method). Lens almost entirely absorbed. Total detachment of retina. Greater part of choroid converted into bone, which in one situation formed a rounded nodule projecting 4 mm. into the vitreous chamber.

(*Card specimen. May 8th,* 1884.)

X. DISEASES OF OPTIC NERVE.

1. *An analysis of cases of intracranial tumour with respect to the existence of optic neuritis.*

By Walter Edmunds and J. B. Lawford.

In a communication to the Society last session we expressed the opinion, based chiefly on microscopical observations, that the optic neuritis which occurs in intracranial disease is due to the presence of a secondary meningitis.

If this be so it is to be expected that tumours about the base of the brain would be more likely to cause optic neuritis than those situated towards its convexity.

To ascertain if such be the case we have collected from various sources notes of 107 fatal cases of cerebral tumour, and have analysed them with special reference to the presence or absence of optic neuritis at the time when they were first examined ophthalmoscopically; and it is to be understood that in the table the statement "no optic neuritis" means only that there was no optic neuritis at a stage of the case when the other symptoms were well developed, and does not necessarily imply that optic neuritis did not supervene before the close of the case.

The cases are divided into ten groups, and the result of the analysis is as follows:

(1.) Tumours in the frontal lobes, anterior to the cortical motor regions. Ten cases. Optic neuritis was present in eight of the cases and absent in two.

(2.) Tumours in cortical motor area. Twelve cases. None of these had optic neuritis when first examined, in only three is it noted that it subsequently came on, and in

two other cases it is expressly stated that it was absent throughout.

(3.) Tumours of occipital lobes. Nine cases. In five cases there was optic neuritis, and in four there was not.

(4.) Other tumours in hemispheres (not more precisely localised). Ten cases. Optic neuritis present in six, absent in four.

(5.) Tumours of the ganglia at or about the base of the brain. Twenty cases. Optic neuritis present in seventeen, absent in three cases.

(6.) Tumours of temporo-sphenoidal lobes. Three cases. Optic neuritis present in one, absent in two cases.

(7.) Tumours of cerebellum. Twenty-three cases. Optic neuritis present in twenty cases, absent in three. Of the twenty cases who had optic neuritis, seven were actually blind on admission to hospital, and two others became blind before death.

(8.) Tumours of medulla and pons. Nine cases. In three there was optic neuritis, and in six there was not.

(9. Tumours springing from meninges, involving cortical motor areas of hemispheres. Five cases. Four had and one had not optic neuritis.

(10.) Meningeal growths in other situations. Six cases. Four had and two had not optic neuritis.

GROUP I.—*Tumours of Frontal Lobes.*

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
1	F.	32	Double optic neuritis passing into atrophy	Gummatous tumour of anterior part of left frontal lobe	Knapp, in Knapp's Arch., vol. iv.
2	F.	32	Epileptoid attacks; double optic neuritis, worse in right; later left hemiplegia	Glioma in right frontal lobe; dura mater adherent	Gowers, B. M. J., 1879, vol. i.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
3	M.	60	Right hemianopsia; no optic neuritis	Glio-sarcoma in left frontal lobe of cerebrum; chiasma normal; left optic tract small	Archiv f. Path. und Physiol., 1875.
4	F.	32	Double optic neuritis	Ill-defined tumour in right frontal lobe; "optic nerves appear to be invaded by inflammation from meninges"	Gowers, Medical Ophthalmoscopy.
5	F.	34	Optic neuritis	Tumour in left frontal lobe; membranes adherent; chiasma compressed	Habershon, Guy's Hosp. Reports, 1879.
6	F.	39	Blind; atrophy of optic nerves	Tumour in right anterior lobe of cerebrum, extending backwards into middle fossa; optic nerves compressed and atrophied	St. Thomas's Hosp. Rep., 1880.
7	M.	25	No optic neuritis	Gumma in anterior lobe of right hemisphere; ventricles not involved	St. Thomas's Hosp. Rep., 1880.
8	M.	41	Late neuritis in right eye; left normal	Tumour in both anterior lobes of brain	St. Thomas's Hosp. Rep., 1882.
9	M.	36	Double optic neuritis (fortnight before death)	Endothelioma occupying whole of right frontal lobe; dura mater adherent	Philipson, Med. T. & G., 1882, vol. ii.
10	M.	53	Double optic neuritis six weeks before death	Tumour, size of Tangerine orange, in right frontal lobe; similar tumour in left frontal lobe; a third tumour in right occipital lobe	Russell, B. M. J., 1881, vol. ii.
			GROUP II.—*Cortical Lesions.*		
11	M.	49	No optic neuritis	Tumour in ascending frontal convolution	Hughes Bennett, Brain, vol. v.
12	M.	44	Never optic neuritis; right hemiplegia	Tumour at base of superior frontal and corresponding part of ascending frontal convolution	Ferrier, Brain, vol. vi.
13	M.	52	For months no optic neuritis; later optic neuritis, which subsided and reappeared	Several small tumours; largest in upper part of left parietal lobe. (He had right-sided convulsions and right hemiplegia)	Gowers, Medical Ophthalmoscopy.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
14	M.	40	No optic neuritis; crural monoplegia	Caseous tubercular degeneration at upper extremity of fissure of Rolando	Ferrier, Brain, vol. iii.
15	F.	9	Left-sided convulsions and paralysis of left leg; no optic neuritis	Tubercular mass in upper extremity of two central convolutions of right hemisphere	Sharkey, Lancet, 1883, vol. ii.
16	M.	38	No optic neuritis	Tumour, $1\frac{1}{4}$ diam., involving white matter, subjacent to ascending frontal and aseparietal convolutions	St. Thomas's Hosp. Rep., 1884.
17	M.	?	Never optic neuritis; convulsions, beginning in right foot; right hemiplegia	Glioma, involving superior and ascending frontal convolutions, on left side	Hughlings Jackson, Lancet, 1882, vol. i.
18	M.	37	Convulsions, beginning in right leg; no optic neuritis, but came on six weeks before death	Tumour in upper and hinder portion of left frontal lobe; ventricles distended with fluid	H. Jackson, M. T. & G., 1875, vol. ii.
19	M.	29	No optic neuritis; unilateral epilepsy, followed by temporary hemiplegia	Tumour, involving second and third frontal convolution, on right side	Russell, M. T. & G., 1874, vol. i.
20	F.	Adult	Convulsions of right arm; no optic neuritis	Glioma involving posterior part of superior frontal and adjacent part of ascending frontal convolutions	H. Jackson, M. T. & G., 1875, vol. i.
21	M.	52	Right-sided fits, chiefly limited to right arm; for some time no optic neuritis; later optic neuritis came on	Tumour upper part left parietal lobe; three smaller tumours on surface	H. Jackson, M. T. & G., 1875, vol. i.
22	M.	22	No optic neuritis ? signs of previous neuritis; epileptiform seizures beginning in left thumb	Tubercular tumour, size of hazel nut, in third right frontal convolution; microscopical examination of optic nerves—normal (Pagenstecker)	H. Jackson, M. T. & G., 1872, vol. ii.

Group III.—*Tumours of Occipital Lobe.*

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
23	F.	36	Double optic neuritis; vision almost lost in both	Tumour, size of billiard ball, in left occipital lobe	Hamilton, Brain, vol. vii.
24	F.	61	No optic neuritis observed at any time	On median surface at apex of right occipital lobe a cyst surrounded by softening, which was limited to the cortex	Haab, in Klin. Monätsbl. für Augenheilk., 1882, p. 146.
25	F.	8	Double optic neuritis appeared 14 days after first observation	Tubercular tumour on median surface of apex of right occipital lobe; another in second right frontal convolution	Haab, in Klin. Monätsbl. für Augenheilk., 1882, p. 146.
26	M.	55	Choked disc in left eye only	Gumma in left occipital lobe	Pooley, in Knapp's Arch. für Augenheilk., vol. vi.
27	F.	21	Double optic neuritis; hemiopia	Glio-sarcoma in left occipital lobe adherent to membranes	Ludwig Jany, in Knapp's Arch., vol. xii.
28	M.	56	Optic neuritis in left only; no later ophthalmoscopic examination	Tumour 1¼ in. diameter in left posterior lobe, closely adherent to dura and pia mater	Pooley, in Knapp's Archives, vol. v.
29	M.	—	Right hemianopsia aphasia; right hemiparesis; no optic neuritis	Myxosarcoma in occipital lobe; optic tracts chiasma and optic nerves normal	Jasbrowitz, Centralblat f. Pract. Augenheilk., 1877.
30	M.	30	Epileptoid attacks; visual amaurosis; no optic neuritis early in case, later stage not known	Sarcoma in right occipital, extending into posterior part of right parietal lobe	Gowers, B. M. J., 1879, vol. i.
31	F.	59	Double optic neuritis	Tumour size of goose's egg in posterior half of left hemisphere; did not extend to base of brain	Burney Yeo, Brain, vol. i.

GROUP IV.—*Tumour of hemisphere not otherwise specified.*

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
32	M.	40	Double optic neuritis; defect of sight	Glioma at posterior extremity of centrum ovale on right side	Jamieson, M. T. and G., 1882, vol. ii.
33	M.	60	Right hemiplegia and aphasia; no optic neuritis	Tumour in left cerebral hemisphere	St. Thomas's Hosp. Rep., 1883.
34	F.	19	Commencing optic neuritis	Tumour in upper part of right cerebral hemisphere	J. E. Shaw, Brain, vol. v.
35	M.	26	No optic neuritis; later optic neuritis only in eye on side opposite to tumour	Tumour size of pigeon's egg on surface of right hemisphere	Field, Brain, vol. iv.
36	F.	36	Never optic neuritis	Large cystic new growth in left centrum ovale	Habershon, Guy's Hosp. Reps., 1879.
37	F.	16	No optic neuritis; hysterical symptoms; blindness	Tumour in medullary substance of middle lobe superior to lateral ventricle	Hughes Bennett, Brain, vol. i.
38	M.	46	Double optic neuritis	Tumour in corpus callosum extending laterally into white substance; no meningitis	St. Thomas's Hosp. Rep., 1880.
39	M.	25	Double optic neuritis	Fibro-sarcoma of right hemisphere	Nieden, Archiv. f. Augenheilk., 1881.
40	M.	18	Double optic neuritis	Tubercular tumour size of pigeon's egg in right ventricle; basal meningitis	Bouvin, Klin. Monätsbl. f. Augenheilk., 1884.
41	—	—	Double optic neuritis; subsequent atrophy	Glioma, size of an apple, in cortex of right hemisphere	Stümpfell, in Archiv für die Med. Wiss. Dec., 1882.

Group V.—*Tumours involving ganglia at base of brain.*

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
42	M.	25	Double optic neuritis	Tumour in corpora quadrigemina, causing absorption of right optic thalamus	Duffin (Clinical Society), M. T. and G., 1876, vol. ii.
43	F.	25	Nearly blind, double optic neuritis	Tumour springing from surface of right corpus striatum and optic thalamus	St. Thomas's Hosp. Rep., 1883.
44	M.	42	At first double optic neuritis; later white atrophy	Tumour (glioma) in right corpus striatum and right prefrontal lobes	Fox and Field, Brain, vol. iii.
45	M.	7	No optic neuritis on admission; slight neuritis 4 days before death	Tubercular tumour in corpora quadrigema; tubercular meningitis	Bristowe, Brain, vol. vi. See also Oph. Soc. Trans., iii, p. 151.
46	M.	4	"Commencing optic neuritis"	Tubercular mass in 3rd ventricle, involving both thalami; meningitis	Bristowe, Brain, vol. vi.
47	F.	13	Double optic neuritis; left eye sees well, right eye only counts fingers; later optic atrophy and blindness	Tumour in third ventricle; optic commissure stretched and softened	Gowers, Medical Ophthalmoscopy.
48	F.	43	Optic neuritis	Tumour in lenticular nucleus of the corpus striatum, optic part softened, but not invaded	Gowers, Medical Ophthalmoscopy.
49	M.	24	Double optic neuritis	Tumour in front of and involving corpora quadrigemina	Gowers, Medical Ophthalmoscopy.
50	M.	14	Double optic neuritis	Tumour in right optic thalamus and right side of corpora quadrigemina	Ferrier, Brain, vol. v.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
51	M.	24	Headache, weakness of limbs; moderate optic neuritis	Sarcoma between posterior parts of optic thalami, invading corpora quadrigemina; very slight meningitis contiguous to the nerves, which were found microscopically to be inflamed	Gowers, B. M. J., 1879, vol. i.
52	M.	21	Double optic neuritis	Tumour of pituitary gland, pressing on and causing aneurysm of carotid artery of one side	E. L. Holmes, in Knapp's Arch., vol. iv.
53	M.	—	Left hemianopsia; double optic neuritis, later atrophy	Syphilitic tumour in front of and below left optic thalamus; two cysts at base of brain	Mohr, Graefe's Archiv., 1879.
54	M.	44	Left homonymous hemiopia; left eye neuritis, right consecutive atrophy	Tubercles in right half chiasma; tubercular meningitis	Hjort, Zehender's K. M. f. Augenh., 1867.
55	M.	23	"Temporal hemiopia;" no optic neuritis; not examined at close of case	Tumour in front of chiasma between optic neuritis; second tumour beneath pons Varolii; acute meningitis	Saemisch, Klin. Monätsbl. f. Angenheilk., 1865.
56	M.	—	Double optic neuritis	Syphilitic tumour in neighbourhood of corpora quadrigemina	Landsberg, Centr. für Pract. Angenheilk., 1878.
57	F.	6	Optic neuritis (only had one eye)	Tumour size of walnut filling third ventricle and pressing downwards	Dehio, Centr. für Med. Wissench., 1882.
58	M.	21	Slight optic neuritis	Cyst in region of right gyrus hippocampi reaching forward to tuber cinereum	Marchaud, Graefe's Archiv., 18, ii, p. 64.
59	M.	41	Vision affected; double neuritis, worse in left	Tumour on right side of interpeduncular space pressing on right optic nerve and tract	St. Thomas's Hosp. Rep., 1879.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
60	F.	4	No optic neuritis at first; day before death left disc blurred, right not seen	Tumour in right crus; tubercular meningitis later	Warner, M. T. & G., 1880, vol. i.
61	M.	51	Optic neuritis in left eye only; left hemiplegia	Tumour on right side, outside corpus striatum and optic thalamus	H. Jackson, M. T. & G., 1874, i.
			Group VI.—*Tumours of temporo-sphenoidal lobes.*		
62	F.	45	No optic neuritis; case simulated hysteria	Tumour in left temporo-sphenoidal lobe	Bruce, Brain, vol. vi.
63	M.	52	No optic neuritis	Tumour of large size in left temporo-sphenoidal lobe	St. Thomas's Hosp. Rep., 1880.
64	F.	59	Slight optic neuritis; frequent examinations	Large glioma in right temporo-sphenoidal lobe; small tumour in right hippocampus major; tumour appearing at base	H. Jackson, Royal Ophth. Hosp. Rep., vol. viii.
			Group VII.—*Cerebellar tumours.*		
65	M.	9	Double optic neuritis	Tubercular tumour, size of billiard ball, in middle lobe of cerebellum; distension of ventricles	H. Jackson, B. M. J., 1872, vol. ii.
66	F.	52	Double optic neuritis; blind	Tumour in right posterior cerebellar fossa, inserted between two flaps of right cerebellar lobe	H. Jackson, B. J. M., 1872, vol. ii.
67	F.	20	Sight affected early; blindness and double optic neuritis, with much swelling, on admission	Tumour starting from valve of Viessens, involving cerebellum and corpora quadrigemina	Bristowe, Brain, vol. vi.
68	M.	4	Blind; optic neuritis; "woolly discs" passing into atrophy	Tubercular mass in left lobe of cerebellum; effusion of fluid into ventricles	Bristowe, Brain, vol. vi.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
69	M.	4	Double optic neuritis; quite blind	Spherical tumour on under surface of middle of cerebellum	St. Thomas's Hosp. Rep., 1883.
70	M.	43	Blind on admission; double optic neuritis passing into atrophy	Myxo-sarcoma; tumour at base involving right side of cerebellum	Leber, Ziemssen's Cyclopædia, vol. xii.
71	F.	45	Optic neuritis in right eye; optic atrophy in left eye; blind for two months before admission	Glioma attached to anterior border of left lobe of cerebellum	Long Fox, Lancet, 1877, vol. i.
72	F.	9	Blind on admission from double optic neuritis	Tumour (glioma) in middle lobe of cerebellum	H. Jackson, M. T. & G., 1875, vol. i.
73	M.	25	No optic neuritis on admission; later it came on	Tubercular tumour, size of pigeon's egg, situated in and appearing on surface of left lobe of cerebellum; no meningitis	St. Thomas's Hosp. Rep., 1880.
74	M.	2	No neuritis; discs pale	In cerebellum and pons large tubercular masses; slight meningitis at base	St. Thomas's Hosp. Rep., 1881.
75	F.	2	No optic neuritis	Tubercular mass, size of pea, in inferior vermiform process of cerebellum	St. Thomas's Hosp. Rep., 1883.
76	?	?	Double optic neuritis	Cyst in right lobe of cerebellum	B. M. J., 1871, vol. ii.
77	M.	11	Intense double optic neuritis	Tumour in middle lobe of cerebellum; tumour sprang from under surface of dura mater	Beevor, Brain, vol. iv.
78	M.	28	Optic neuritis	Tumour, size of a walnut, on under surface of left cerebellar hemisphere	Caton, Lancet, 1875, vol. ii.
79	M.	34	Double optic neuritis	Syphilitic tumour in posterior and inferior part of middle lobe of cerebellum	H. Jackson, M. T. & G., 1874, vol. ii.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
80	F.	20	Double optic neuritis	Tumour and cyst of cerebellum	H. Jackson, M. T. & G., 1872, vol. ii.
81	M.	10	Double optic neuritis; later atrophy and blindness	Two tubercular nodules in cerebellum	St. Thomas's Hosp. Rep., 1883.
82	M.	5	Double optic neuritis; subsequently blind	Tubercular tumour, size of billiard ball, in middle lobe of cerebellum; ventricles distended	H. Jackson, B. M. J., 1871, vol. ii.
83	M.	11	Optic neuritis; left eye blind; right eye counts fingers	Tubercular tumour in cerebellum, and a second in medulla; tubercular meningitis	Gowers, Medical Ophthalmoscopy.
84	M.	14	Double optic neuritis; almost blind in left eye	Tumour in cerebellum extending to corpora quadrigemina	Ross, Brain, vol. ii.
85	M.	16	Double optic neuritis; some defect of vision	A large tumour in central lobe of cerebellum	St. Thomas's Hosp. Rep., 1883.
86	M.	18	Double optic neuritis	Degenerated cyst (or cystic degeneration) of right cerebellum	Nieden, Arch. für Augenheilk., 1881.
87	M.	23	Double optic neuritis	Tumour, 3 × 2·6 cm., on under surface of cerebellum, extending forwards on the pons	Swan, in Knapp's Arch. of Ophthalmology, vol. vi.
			GROUP VIII.—*Tumours in medulla and pons.*		
88	M.	26	Double optic neuritis ("slight")	Glio-sarcoma of right side of pons and medulla	Nieden, Arch. für Augenheilk., 1881.
89	M.	2	No optic neuritis	Tumour in medulla and pons	Hobson, Brain, vol. iv.
90	M.	16	When first seen no optic neuritis, although great impairment of sight; later neuro-retinitis	Tumour in right side of pons	King, Brain, vol. v.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
91	M.	35	Optic atrophy when first came under observation	Tumour, probably syphilitic, in pia mater, over pons	Mills, Brain, vol. ii.
92	M.	24	Commencing optic neuritis	Tumour of medulla oblongata	Immermann, in Ziemssen's Cyclop., vol. xii.
93	M.	?	Defect of sight; later, blindness for 19 days; later, hemiopia of outer halves of fields of vision; no optic neuritis	Two tumours, sarcoma; one between optic nerves in front of chiasma; a second tumour beneath pons	Saemisch, in Ziemssen's Cyclopædia, vol. xii.
94	M.	12	On admission no optic neuritis; 5 days before death optic neuritis	Medullary glioma in pons; membranes of base red and congested	H. Jackson, M. T. & G., 1874, vol. i.
95	F.	33	No optic neuritis	Tubercular tumour in pons	H. Jackson, M. T. & G., 1874, vol. i.
96	M.	46	No optic neuritis	Two small tumours, one in pons, one in medulla	Broadbent, M. T. & G., 1872, vol. i.
GROUP IX.—*Meningeal growths involving motor regions.*					
97	F.	45	Convulsions beginning in left great toe; no optic neuritis	Tumour $1\frac{1}{2} \times 1$ inch, growing from dura mater, projecting into right anterior ascending parietal convolution; other lesser changes; syphilis	H. Jackson, M. T. & G., 1873, vol. ii.
98	F.	22	Epileptiform seizures beginning in right little finger; right hemiplegia; optic atrophy, probably post-neuritic	Dura mater mater adherent to brain and bone; mass size of three walnuts growing from dura mater into brain, softening several convolutions (syphilitic)	H. Jackson, M. T. & G., 1873, vol. i.
99	M.	35	Epileptiform seizures beginning right hand; optic neuritis	Left hemisphere; dura mater much adherent; right hemisphere; tumour (? syphilitic) behind fissure of Rolando	H. Jackson, M. T. & G., 1872, vol. ii.

No.	Sex.	Age.	Optic disc.	Tumour.	Reference.
100	M.	16	Convulsions beginning in left hand; double optic neuritis	Syphilitic tumour growing from dura mater, invading right ascending parietal, ascending frontal, supra marginal, and angular convolutions	H. Jackson, M. T. & G., 1876, vol. i.
101	F.	40	Epileptiform seizures beginning in the left hand; double optic neuritis	Right side; dura mater adherent $2\frac{1}{4} \times 2\frac{1}{4}$ inches; tumour size of bean in superior frontal convolution; left side; dura mater adherent 1×1 inch above fissure of Sylvius; syphilis	H. Jackson, M. T. & G., 1873, vol. i.
			Group X.—*Other meningeal growths.*		
102	F.	22	No optic neuritis when examined	Tumour of sella turcica; bone carious; chiasma softened	E. Müller, Archiv. für Ophthalmol., vol. viii, 1861.
103	—	—	Double optic neuritis	Sarcoma of dura mater at base of cranium pressing on chiasma, &c.	Landsberg, Centr. für Pract., Augenheilk., 1878.
104	M.	30	Double optic neuritis	Gumma upper surface; left petrosal bone; basal meningitis	Hulke, R. L. O. H. Rep., vol. vi.
105	M.	20	Double optic neuritis three and a half years after first head symptoms	Tumour at base lying on sphenoid and adjacent temporal bones	Spalding, in Knapp's Arch., vol. ix.
106	F.	50	Never optic neuritis	Tumour $1\frac{1}{2} \times 1$ inch, attached by peduncle to cerebrum, lying in olfactory groove	Wood, Philad. Med. Times, 1874.
107	F.	47	Double optic neuritis; gradual hemiplegia	Tumour growing from dura mater over hemisphere, compressing brain	H. Jackson, M. T. & G., 1874, vol. i.

These figures may be tabulated thus:

Locality of tumour.	Optic neuritis.	No optic neuritis.	Total.
(1) Anterior frontal convolutions	8	2	10
(2) Motor convolutions	—	12	12
(3) Occipital lobes	5	4	9
(4) In hemispheres	6	4	10
(5) Ganglia at base	17	3	20
(6) Temporo-sphenoidal lobes	1	2	3
(7) Cerebellum	20	3	23
(8) Medulla and pons	3	6	9
(9) Meningeal growths at motor convolutions	4	1	5
(10) Meningeal growths elsewhere	4	2	6
Total	68	39	107

The two most noteworthy points of this analysis are:

(1.) The immunity from optic neuritis of the cases of tumour in the cortical motor area; cases in which paralysis of one limb occurred or convulsions starting in one part. In none of the twelve cases was there optic neuritis when first looked for. If it be thought fairer to add to these cases the five cases of Group IX in which the same area was affected secondarily by growths starting in the meninges we still have thirteen cases without optic neuritis against four with.

(2.) The severity with which optic neuritis occurred in the cerebellar tumours: out of twenty-three cases, twenty had optic neuritis when first examined, and in nine of the cases it progressed to blindness. This is even worse than the cases of tumours of the basal ganglia, Group V, for although out of twenty cases of this latter group seventeen had optic neuritis, in only five is it probable that there was blindness. The explanation of this may possibly be that cerebellar tumours are not so rapidly fatal as basal tumours, and thus allow time for the neuritis to pass on to atrophy and blindness.

If all the cases towards the convexity of the brain, that is to say the cases in Groups I, II, III, IV, and IX be added together we find that out of forty-six cases, twenty-three had optic neuritis when first examined, *i.e.* 50 per cent.

If on the other hand the cases towards the base, that

is to say, the cases in Groups V, VI, VII, VIII, and X be added together, we find that out of sixty-one cases forty-five had neuritis, *i.e.* 74 per cent.

Thus, the figures are not discordant with the view that the neuritis is due to basal meningitis.

There were only six cases of hemiopia; in three of these there was, and in three there was not optic neuritis. From this it seems that the occurrence of neuritis is not specially connected with the affection of the paths for the transmission of visual impressions, or with the visual centres themselves.

(*July 4th*, 1884.)

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2. *On cases of retro-ocular neuritis.*

By E. Nettleship.

Under this rather vague title I wish to refer to certain not very common cases in which acute inflammation seems to take place in some small part of the course of the optic nerve. These cases have been described before by more than one writer and under more than one title.* They are characterised by failure of sight

* Leber, 'Graefe u. Saemisch's Handbuch,' v, 829. Leber includes, however, under his title of "chronic retro-bulbar neuritis," the common symmetrical form due to tobacco. The morbid anatomy of the cases described in the present paper is probably often the same as that of tobacco amblyopia, but from the clinical point of view the two groups are very distinct.

Hutchinson, 'Ophth. Hosp. Reports,' vol. ix, p. 316, "Groups of Cases of Amaurosis," Group XI; I had the advantage of seeing several of these cases and assisting in the compilation of the notes. Ibid., vol. iv, p. 123 (Case 3). Ibid., vol. iv, p. 381, "Cases illustrating the occasional connection between Neuralgia of the Dental Nerves and Amaurosis;" only the third of these cases seems to bear on my present subject, and it was possibly double embolism or thrombosis.

Hock (Vienna), "Neuritis retrobulbaris peripherica (acuta et subacuta)," 'Hirschberg's Centralblatt,' April, 1884, p. 107. In this interesting paper,

limited to one eye, often accompanied by neuralgic pain about the temple and orbit and by pain in moving the eye; many recover, but permanent damage and even total blindness may ensue; there is at first little, sometimes no, ophthalmoscopic change, but the disc often becomes more or less atrophic in a few weeks, and occasionally there are slight retinal changes. There are no other symptoms; for I should, provisionally at least, exclude from the group all cases showing simultaneous paralysis of other nerves in the same orbit. In a few instances, however, paralysis of some other single nerve, usually a cranial nerve, has occurred previously, and in one case (Case 1) the patient had suffered from sciatica, probably neuritic.

In more detail the following features can generally be made out:

The failure of sight is noticed quickly and often gets to its height in two or three days, though in the worst cases it may take longer; when recovery ensues it is usually complete in a month or six weeks from the onset. The pain, which is a variable symptom, is usually circum-orbital, but often also shoots back to the occiput; there is often definite pain and uneasiness, or a feeling of "stiffness," when the eye is quickly and strongly moved, and sometimes pressing the eye back into the orbit, through the closed lids, causes pain. The pain commonly begins with, or a little before, the defect of sight, and seldom lasts many days; but in several of the cases which ended in blindness or caused great temporary damage to sight, it was very severe and lasted much longer (Cases 16 to 24).

which I had not read at the time my own was written, Hock, after mentioning as characteristic symptoms, spontaneous pain about the orbit, pain in movements of the eye, and on pressing the eye backwards, goes so far as to say that the part of the field of vision which is damaged, and, therefore, the position of the affected bundles of the optic nerve, can be inferred by noticing the *direction* in which the eye has to be moved in order to cause pain; he assumes this pain to be due to stretching of the inflamed part of the optic nerve-sheath.

The defect of vision is often described at first as a "gauze" or a "yellow mist," or a "dark patch" or "spot" which covers the object looked at and gives it an unnatural colour, the hand looking, for example, as if covered by a brownish glove (Case 17).

The state of the visual field corresponds in many cases with the above symptoms, for in at least eleven of the sixteen cases where the field was examined, a definite central defect was found, either absolute or relative (Cases 1, 2, 3, 4, 6, 7, 8, 9, 11, 13, 17). In some of these cases (2, 8, 11) there was marked contraction of the field also, whilst in the other eight the field was peripherally of full extent. In one (Case 14) the field was invaded in other ways. In Cases 5, 10, 19, 20, 22, the field was not examined; and in Cases 18, 20, 21, 23, 24, 28 the eye had no perception of light.

As to the ophthalmoscopic changes:—In several of the worse cases, with severe localised pain and ending in blindness (Nos. 17, 18, 19) the disc looked quite healthy for nearly a month; whilst in some of the milder ones (Cases 1, 6, 7, 8, 10, 11, 15) there were decided, if slight, changes much earlier, and in two (Cases 7, 8) haze of the retina near the yellow spot.

These variations in the state of the field and of the fundus show that the morbid process does not always begin at the same distance from the eyeball and does not always affect the same strands of nerve-fibres.

The cases we are considering differ clinically from embolism of the retinal artery and allied conditions, and from progressive atrophy affecting one eye before the other, in the *quick*, though not *sudden* onset, the slightness of the early ophthalmoscopic changes and often in the characters of the visual field. From uniocular neuritis due to disease of the corresponding anterior lobe of the brain, of which I have seen two cases, they are separated by the absence of vomiting, convulsions, and other cerebral symptoms.

It is not so easy to draw a good distinction, save

ophthalmoscopically, between the cases now specially referred to and those much more rarely seen, in which single, violent papillitis occurs, with severe localised pain and sometimes paralysis of other nerves in the same orbit. In these the morbid process is no doubt more widely spread and probably situated not far from the eye-ball, besides very probably attacking different structures. Cases 25, 26, and 27 illustrate this form of disease. It must be confessed, however, that a few cases (such as Nos. 12, 22, and 28) occur which seem intermediate between the two groups, so far as the ophthalmoscopic changes are concerned.

Returning to our proper subject: perhaps a very limited periostitis in the optic canal may account for such cases as Nos. 15 to 19, in which the pain was severe, the damage to vision great, and the ophthalmoscopic changes delayed. Where, however, as in certain of the milder cases, the disc shows changes, although slight ones, at an early period we cannot suppose the mischief to be seated so far back. In some we seem, for the present, driven to assume a rheumatic origin for the attack, as in certain cases of sciatica, of facial palsy, and of single oculo-motor paralysis.

The following short statement as to previous history, age, sex, and result is based on twenty-five cases (Cases 1—24 and 28). (Cases 25, 26, and 27 being a different form of disease are not counted in this total).

Of the whole number fourteen cases were in men, eleven in women; the average age was about 35, the youngest being 18, the oldest 60 when the attack occurred; nineteen of the patients were between the ages of 25 and 40. The right and left eye were not attacked with quite equal frequency (right fourteen times, left ten times).

At least five of the patients (Cases 12, 13, 14, 15, 16) had had syphilis; in one (Case 15) the interval was two years, in one (Case 16) five years, in the others from twelve to twenty years. There was much probability of syphilis in several others (Cases 5, 8, 18, 19).

A history of severe sciatica was obtained in one (Case 1), and of fever (either malarial or typhoid), in three (Cases 7, 8, and 14). (Fever had also occurred as well as syphilis in Case 26.)

Sleeping in a draught or in a damp room was blamed by three of the patients (Cases 1, 2, 21). Severe protracted toothache had occurred in Cases 20 and 22.

Result.—In six (Cases 18, 20, 21, 23, 24, 28) the sight of the affected eye was completely and permanently lost. In fourteen (Cases 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 15, 16, 22) complete or almost complete recovery of vision took place. In the remaining five more or less permanent damage to sight persisted. In those which got quite well the amblyopia seldom reached a higher grade than $\frac{20}{70}$ (V. = $\frac{1}{3}$), but in Cases 11 and 15 it was much worse for a few days.

I have said that the disease was always uniocular, but in one remarkable case (11) the patient, a young man, became almost blind, first in one eye, then in the other, complete recovery ensuing in both, and the whole attack covering scarcely three weeks.

The particulars of all the cases, including this one, are appended.

Case 1. *Failure of right eye (chiefly central amblyopia) with pain in and around eyeball. Recovery with pale disc. Previous sciatica. Gout and arthritis in several relations.* —Miss B—, æt. 34, a district visitor, working hard and going out in all weathers, was sent by Sir William MacCormac, because she had some defect of the right eye, on June 20th, 1882. She gave the following history:

A month ago she began to suffer from pain, referred at first to the right eyeball, then passing to the parts around, and finally spreading to the temples and all over the head, although always felt most on the right side. She described the pain as "neuralgic." Besides this spontaneous pain she described what she called "stiffness" in moving the right eye, and said that the act of moving the eye was painful.

The right eyelid felt "heavy," *i.e.* as she explained, she felt easier when it was closed, but there was no loss of power to raise it. There was no "inflammation" of the eye or lids. For the last few days the pains and discomfort have been decidedly less, but quick movements of the right eye towards her right still cause a little pain. The sight of the right eye became dim at the time when the pain began; the defect did not reach a high degree, and was described as a "mist."

I saw her first on June 20th, 1882.

Right eye: V. $\frac{20}{30}$, slowly and badly, Hm. 0·5 D.; reads 1 J., but it looks "misty," and she describes a "dark mark" near the centre of the visual field.

Left eye: V. $\frac{20}{20}$, well, Hm. 0·5 D.; reads 1 J. well.

Accommodation equal and of full extent in each eye.

Pupils equal and act to light, but the direct action of the right perhaps not so brisk and full as the left.

The right disc showed a uniform, yellowish, misty pallor over its whole surface, the branches of the arteria centralis were decidedly diminished in size, the veins normal, or if anything also diminished. There was no blocking of the artery, for the branches pulsated well when the globe was pressed upon by the finger. There were no changes in other parts of the fundus.

The left disc was healthy and very different in appearance from the right.

On taking the field of vision of the right it was found of full size for white, but the field for red was very much contracted, and even at the centre, where the colour was best seen, it appeared much duller than in the same part of the field in the other eye; the red spot (of 10 mm.) indeed looked "yellow" till very near the centre. I did not make out any scotoma in the field.

In the other eye the red field was of full size. She was not tested with coloured wools.

I did not think, at this examination, of trying whether pain was caused by pressing the eye back into the orbit. The treatment consisted in the use of repeated small

blisters about the temple, &c., dark glasses, and the administration of iodide of potassium.

A week later (June 27th) V. was exactly the same, but the disc decidedly clearer. Pressure into the orbit and over the supra-orbital notch caused no pain.

Next week (July 4th) V. $\frac{20}{30}$ well, and some letters of $\frac{20}{20}$. There is now no pain on movements of the eye as on admission. She has once or twice had a little neuralgic pain, once in the right ear, once in the left temple.

July 11th.—No change, except that she now does not notice the "black mark," of which she at first complained, in the visual field. Last night she was sick and slept badly.

20th.—Right can now pick out all the letters of $\frac{20}{20}$, though slowly. The disc is now quite clear, and its entire surface is very pale with a dirty yellowish tinge; the veins slightly tortuous, but both they and the arteries are now noted of normal size.

The fields were taken again for red, green, blue, and white at this date. In the R. the red had enlarged, but was still much smaller than in the other eye; the green field was also small, and perception of green was nowhere so good as in the other eye; the blue field was as large, and the colour appeared as bright, as in the other eye. The blind spot was enlarged. She was to report herself later on, but has not done so.

During the previous winter (1881-2) this lady had an attack of "sciatica" in the right lower limb. The pain went all down the back of the limb from the hip to the heel; it got better in about a fortnight, but for weeks afterwards the heel was "numbed" and she would at times have what she called a "fluttering" in the muscles, and she remained more or less lame for a couple of months, more from weakness than pain. The attack as a whole was not severe enough to prevent her from keeping at her work. She is liable to chronic pain across the loins worse on movement (? lumbago).

Miss B—'s paternal grandfather had gout, and one of her nieces, aged seventeen, is said to have had gout in a thumb. One of Miss B—'s sisters has swollen knuckles after "nearly having rheumatic fever," and another, twin sister to the patient, has had rheumatism in one knee and lumbago.

These facts in the personal and family history seem of importance in relation to the eye attack, for the only circumstance suggestive of a cause was that, for some nights before the attack began, she had been sleeping with her bedroom window open, having just then moved into a badly-ventilated room without a fireplace; she did not, however, feel the cold.

Case 2. *Acute central amblyopia of one eye without other definite symptoms; no changes; recovery.*—Mrs. X—, æt. 29 (P. 8, 6), rather delicate, very nervous. February 8th, 1883.—Ten days ago noticed a "gauze like mottled soap" over sight of right eye. Vision has remained about the same, things she looks at appearing broken or "gapped." No pain, but a "numb feeling" over outer rim of orbit "as if something had been pressed against it for a little while."

R. V. $\frac{20}{50}$ partly, F. much contracted in outer half, being in fact rudely circular and extending 40° to 50° in each direction from fixation point; not tried for scotoma; oph., normal. T. n. Colour vision slightly defective (Bull's test). Left eye normal. To take small doses of iodide of potassium and mercury.

15th.—R. $\frac{20}{50}$ slowly but well; the "gaps" in things are less evident. F. same.

22nd.—R. V. $\frac{20}{40}$ slowly, $\frac{20}{50}$ well; reads 1 J. slowly.

March 8th.—R. V. $\frac{20}{30}$.

July 26th.—R. V. $\frac{20}{20}$. L. V. $\frac{20}{20}$, each rather better with + 0·5 D. cyl. axis vertical. The eye throughout showed no definite ophthalmoscopic change.

For some time before failure of right had slept near to a draughty window. Formerly had much toothache.

Never rheumatism or sciatica. I was not able to make any inquiries as to syphilis.

Case 3. *Slight central amblyopia in one eye setting in quickly with pain on movements of eyeball. No changes; recovery.*—Miss C—, æt. about thirty-five (P. 6, 113) was sent to me by Mr. Noble Smith on March 18th, 1882, for a defect of the right eye. She said that on the 13th she began to notice shooting and aching pain at the back of the right eye and in the temple, and something amiss with sight; on closing the left, the right eye was found to be "dim," but the defect had not increased. A day or two later the pain was in the top of the head on the same side, and in the same side of the neck, as well as behind the eye, and became associated chiefly with movements of the head and eye, especially sudden lateral movements. Does not play lawn-tennis (this in reference to painful stiffness of eye-muscles from violent use). Had been unable to sing owing to "a suppressed cold in the head" for some days before the pain and dimness of sight came on. Remembers that on 3rd inst. she struck the right (affected) eye (or brow ?) against a gas-jet; the blow was, however, very slight, and the symptoms did not begin till ten days later.

March 18th.—R. V. $\frac{20}{20}$ badly and 1 J. p.p. 6″; the paper is "darker" and the print not so clear as with L., especially upper part of page. F. (hand test) of full size; a slight but decided relative scotoma (detected by red spot) just above centre of F. (very carefully and repeatedly tried). Oph., normal, P. normal and dilates well when covered. Has an uncomfortable feeling, sometimes actual pain, in moving eye to either side. Left eye normal in all respects; looks larger than right. Mother and a sister of patient very rheumatic; no history of gout. Patient formerly had bilious headaches, sometimes with dimness of sight, but these attacks have now ceased; they were not unilateral. When not feeling well she often notices that right eyelid droops a little.

I only saw this lady once more and have little doubt that she recovered perfectly.

Case 4. *Slight central amblyopia with pain in moving eye and pain on same side of head; recovery; bad health; hysteria; pelvic troubles.*—Miss B—, æt. 35, was sent to me by Mr. G. H. Makins in November, 1882 (P. 7, 125), for asthenopia. She kept a girls' school, and had been overworked from time to time for some years, and her eyes had occasionally been troublesome. She was nervous about her eyes because an aunt had gone blind from glaucoma, and I thought her somewhat hysterical. Her eyes, which were emmetropic, became much better under the use of glasses, changed two or three times at rather short intervals, and a long course of iron.

On April 17th, 1884, she came again, complaining that for the last fortnight there had been a "spot" before the right eye; it was most apparent when looking at coloured objects. Everything looked "peculiar," and white paper did not look so white as to the other eye. Thinking that she was perhaps fanciful, I simply asked, "Have you been quite well lately?" She replied that before the "spot" came, and until three days ago, she had had a good deal of "neuralgia" about the head; the pain soon settled in the right eye and was made worse by moving the eye, especially by looking strongly upwards to her right. This account was given without my putting anything like a leading question. She said the defect came on in about one day and had not got worse. She did not seem to have had neuralgia before, but had for some time past been out of health, and was under the care of a gynæcologist for pains in the back and weakness of legs.

On examining the affected eye (the right), vision was full, $\frac{20}{20}$ and 1 J. with her + 2·5 D., but the print not so black as with the left, and a large patch of "mist" seemed to lie over what she looked at. F. of full size (perimeter test), but F. for red shows considerable relative defect in some parts; the worst part is rather above and to inner side of centre, and beyond this the colour is again well seen. Oph. showed doubtful congestion of o. d.

The F. for red in left eye quite perfect. Ordered iodide of potassium and mustard leaves to the temple.

April 30th.—Almost well; colours now look quite alike to the two eyes and there is only the slightest possible difference in the clearness of print as seen by each eye.

The slightness of the symptoms and the neurotic state and antecedents of the patient almost led me to overlook the real nature of the attack in this case.

Case 5.*—William G—, æt. 33, wheelwright, tall, pale, strong. Under Dr. Greenfield's care at St. Thomas's Hospital for right facial paralysis attributed to sleeping in keen draught; recovered under galvanism. About a year later (September 26th, 1878), complained to Dr. Greenfield of "flashes" in left eye followed by pain passing to back of head. On 29th found defect of sight coming on in left eye; pain continued, especially on sudden movements of head or eye.

When Dr. Greenfield sent him to me on October 10th, I found left could only count fingers, and best at upper and lower parts of F., direct light-reflex of pupil defective; movements of eye perfect, but eyelids rather puffy; no congestion of eye; no pain on pressing eyeball backwards; oph., normal, or optic disc doubtfully redder than right. Right eye, vision and oph., normal. No symptoms of vaso-motor paralysis. Not liable to rheumatism or neuralgia, but occasional slight stiff neck. Gonorrhœa six years ago; no proof of syphilis.

On 20th vision of left began to improve.

On 31st left, vision $\frac{20}{50}$ and 4 J. Oph., as before.

On November 7th left, vision $\frac{20}{30}$ and 1 J., right $\frac{20}{20}$.

On January 2nd, 1879, still could not see quite so well with left as with right, the print of 1 J. looking "brighter" to the right than to the left. Field and colour vision never carefully tested.

Case 6.*—James G—, æt. 27, a very intelligent man of half Irish parentage, with old granular lids, had attended

* These cases were published in full in the 'Lancet,' 1880, vol. i, p. 766.

Mr. Liebreich from time to time at St. Thomas's Hospital to have his lids touched.

In April, 1878, Mr. Liebreich noted right H. As. $\frac{1}{20}=\frac{20}{30}$, left defective from old convergent squint, sees black board and 20 J. with difficulty.

On May 14th I examined again with same result.

On September 5th right began to fail, and on 9th "could not see anything."

On 10th V. = 18 J. badly, and optic disc was very hazy.

On 17th vision much better, $\frac{20}{70}$ and 8 J.; optic disc still hazy and congested, and retinal veins somewhat engorged, pupil active. Left optic disc healthy.

On 26th and again on October 3rd, right, vision $\frac{20}{40}$ and 1 J.; oph., about as at last note. F. not taken, but his description of his symptoms pointed to central scotoma.

Evening before failure began had been staring at long line of gas jets. For several days before had had pain, chiefly "dull" but sometimes "shooting" in side of head, behind ear, and down back of neck, all on right side; at same time eye was reddened and hurt him "as if strained" in looking up and to his left. Noticed that he was sweating very freely in head about the same time, but not more on one side than the other. Treated with iodide of potassium.

Married eight years. No history of paralysis of any other nerve. Not subject to stiff neck. Father for twenty years in asylum for "recurrent mania from fall on head."

Case 7. *Rapid onset of amblyopia in one eye with dense, nearly central, scotoma; some pain behind eye; localised retinal haze; "fever" four years and a half previously; liability to headaches and temporary dimness of sight (megrim); recovery.*—Mr. C. A. L—, æt. 37, watchmaker (P. 8, 10). On January 31st, 1883, a dimness came over right and has remained. Some days later some pain at back of same eye and slight pain in moving it.

First seen February 9th. Right, vision $\frac{20}{30}$ and 1 J.

slowly and rather eccentrically, best to inner side of fixation point, T. and p. n.; oph. shows central, diffuse haze of retina around yellow spot, "in distribution and appearance like embolism, but less intense than usual" and scarcely noticeable at optic disc; central arteries and veins normal in size and pulsating on pressure; no hæmorrhages; F. of full size, not tested for scotoma. Left eye normal. Ordered iodide of potassium and mercury in small doses.

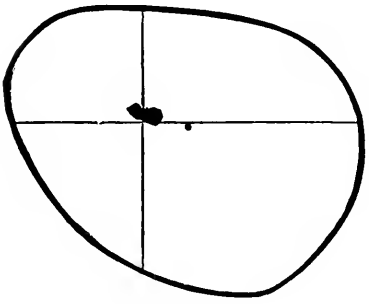


FIG. 2.

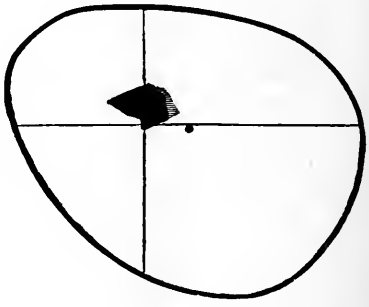


FIG. 1.

Fields of vision (left eye).—Case 7. Fig. 1, Feb. 16th; Fig. 2, May 18th.

16th.—Right, vision and oph., same; retinal haze greatest below yellow spot. F. now tested for scotoma and shows a considerable, absolutely blind, gap above fixation point (Fig. 1). Urine normal, 1023. Heart-sounds normal.

March 9th.—Right, vision $\frac{20}{20}$ and 1 J. well; still cannot see the line above the one he is looking at on the test-board.

April 6th.—Right, still some dimness, but it is now several lines above the line he looks at; describes occasional micropsia with this eye.

May 18th.—Right fundus still shows a scotoma but much smaller (Fig. 2). Vision $\frac{20}{20}$ and 1 J. well; oph., optic disc decidedly pale and hazy as compared with left; retinal haze has quite gone.

Mr. L—, had always been liable to attacks of "biliousness" with temporary loss of sight, followed after one to two hours by "return of vision from the lower side;"

no flickering or colours, but "plain dimness," though sometimes "it separates and holes come in the dimness;" these ocular symptoms had been followed by nausea and severe frontal headache. Has always located the dimness in right eye, and thought attack described above was of same kind till he found it did not, as usual, clear off. Four years and a half ago had malarious (? typhoid) fever with pains in joints, but no swelling. Not rheumatic. No history of venereal disease obtainable. Had not been exposed to cold or to specially bright light before the failure of vision.

Whilst under treatment, when eye had nearly recovered, had an attack of the old temporary dimness described this time as "golden light," and asserted that the appearance was removed by shutting right eye (?).

This case is possibly allied more with cases of repeated temporary interference with retinal blood-supply owing to some cardiac or vaso-motor disturbance than with the proper subject of this paper. There is, however, some doubt, and I have therefore retained it. I could not decide from the patient's account whether the attacks of temporary dimness or spectra were really, as he asserted, limited to the right eye and noticeable only when the eye was open, or binocular and subjective in the sense of being visible when both eyes were closed, as in ordinary cases of megrim.

Case 8. *Rapid onset of central amblyopia in one eye with some pain behind eyeball; haze of disc and retina; recovery; typhoid fever six months before.*—Mr. R—, æt. 40 (P. 6, 128), house-painter, sent by Dr. Verdon. Several weeks ago a little pricking pain in right eye, and a "heavy feeling at back of eye as if eyeball were too large;" then rapid failure of sight in the eye so that in about one day it got to its present state.

April 25th, 1882.—Right, vision $\frac{20}{70}$; "sees a haze over centre of objects," not improved by glasses; (partly under atropine); F. (hand test) shows a defect in centre and

extending more downwards than in other directions. "The haze looks yellow" when he looks at things out of doors. Tried with coloured spots, and all colours look "dull" or "pale," in centre of F. Oph., streaky haze of optic disc with some haze at region of yellow spot, and white lines along some of the central vessels, especially along one vein going inwards. Left eye, vision $\frac{20}{20}$ and 1 J. well.

May 2nd.—Right, vision $\frac{20}{50}$.

August 5th.—Right, vision $\frac{20}{30}$ partly and 1 J. fairly. Oph., much as before; optic disc not pale. F. shows slight contraction above and an enlargement of blind spot, the blind area passing *gradually* into the seeing part; no *central* defect. Pupils act fairly to light and accommodation. Patellar tendon reflex, now tested for first time, quite absent on both sides.

Dr. Verdon told me that the patient had typhoid fever, and got quite well, about six months before eye failed. No gout; no lead-poisoning; no injury. Five years before had gleet lasting three months; no history of syphilis. Married two years and has one child alive and well.

The treatment was iodide of potassium and mercury for between two or three months and a few blisters.

Case 9. *Rapid failure of one eye with slight pain; large central loss of field; atrophy of disc; question of embolism.*—Miss K—, æt. 53 (P. 9, 130), was sent to me by Mr. Alfred Ford on May 1st, 1884, about six weeks after failure of her right eye. She told me that about seven weeks ago there had been a little pain in the eye and something like "a thin crape" had come over the sight; when this had lasted a few days the sight one day very rapidly got much worse and had remained unaltered since. On the day of this occurrence she saw a well-known oculist, who told her he thought the loss of sight was caused by plugging of a vessel.

I found a band of complete blindness stretching horizontally across the right field of vision, a large oval central

scotoma in fact. The disc was pale all over and rather hazy, and the retinal arteries considerably diminished and their coats thickened; no changes at yellow spot or elsewhere. Left eye had 1 D. of My. As, vision $\frac{20}{30}$.

Miss K— is a thin, ascetic, very nervous person, of active habits; she has not had rheumatic fever and knows of no arthritic complaints in her family.

Admitting that the interpretation of this case is doubtful, I think that the history of slight mistiness for a few days before the severe failure of sight, and the character of the visual field, point more to an acute partial neuritis than to embolism or arterial thrombosis; in embolism of one or more divisions of the retinal artery the loss of field is usually sector-like, not insular or band-like as in axial neuritis.

Case 10. *Repeated, sudden, brief attacks of failure of one eye during about four months in a healthy young man; no proof of heart disease; slight inflammatory changes at disc.*—Benjamin C—, æt. 28, single, carpenter. Three months before admission, while at work one afternoon, left eye became suddenly misty. No giddiness and no pain. The mist entirely disappeared in half an hour.

During the next three months he had nearly twenty similar attacks, never lasting half an hour, and always in the same eye. They are all characterised by *suddenness* of onset without flickering or scintillation; and there is never either giddiness, headache, or vomiting. He is not "bilious." When the attack is at its height, if he closes the other eye, everything looks like white mist or ground glass to the affected eye.

Admitted at St. Thomas's Hospital November 27th, 1878 (T. 2, 99), and attended for a month. Vision with each eye $\frac{20}{20}$ and 1 J., accommodation and pupils natural. Refraction Em. to ophthalmoscope and glasses (no atropine). Colour perception normal. T. and F. not noted.

The disc in the affected eye (left) was in comparison with the other unmistakably, though slightly, hazy and of

redder colour, the haze was in the form of a delicate veiling over some of the vessels at the inner side close to the disc, and was visible by both methods of examination; no other changes.

No tenderness of orbit or supra-orbital notch. Lately some shooting pains in the eye and history of its being congested the first thing in the morning. No syphilis.

Once during attendance, whilst reading hymn-book in chapel, the mist came over the *other* eye, its first attack; had no headache; it recovered as was usual in the case of the left eye in about half an hour.

Mr. Battle, at that time house physician, examined him and found no evidence of heart disease. The urine, repeatedly examined, contained excess of lithates but no sugar or albumen.

He was seen again two years later (October, 1880); he had had no more attacks of dimness since the end of December, 1878. The haze over the vessels to inner side of left disc was still present and exactly as before.

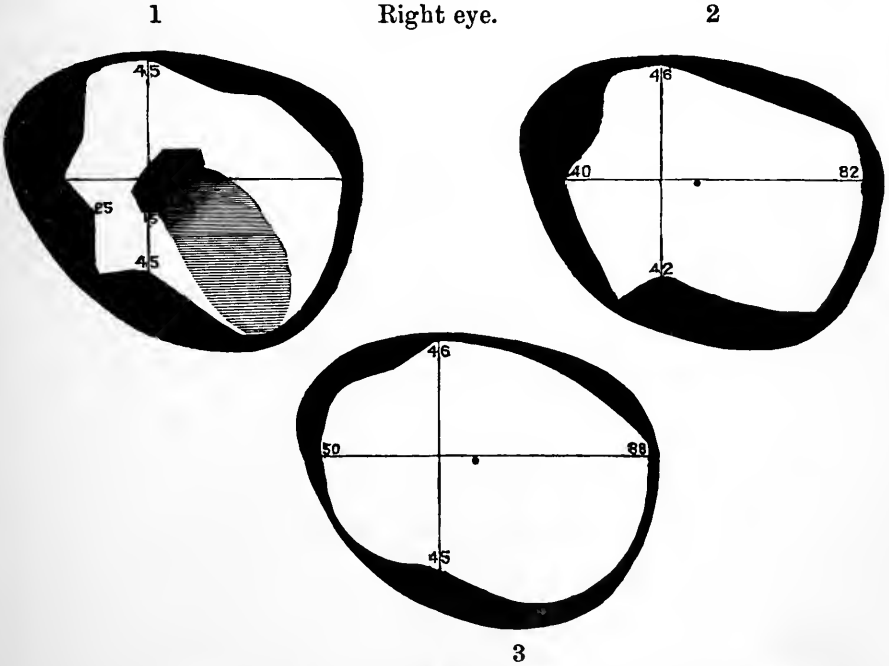
I should not have put this case in the present group had there not been unmistakable changes in the disc of the affected eye.

Case 11. *Acute, double, post-ocular neuritis with a week's interval between right and left; recovery of each in a fortnight; early but slight changes at discs; no cause found.*—Mr. John H—, æt. 23, pale, lean, very nervous, unmarried, in charge of a provincial free library, was brought to me by Mr. Frederick Mackenzie on May 17th, 1883, for recent defect of the right eye. He gave the following account:

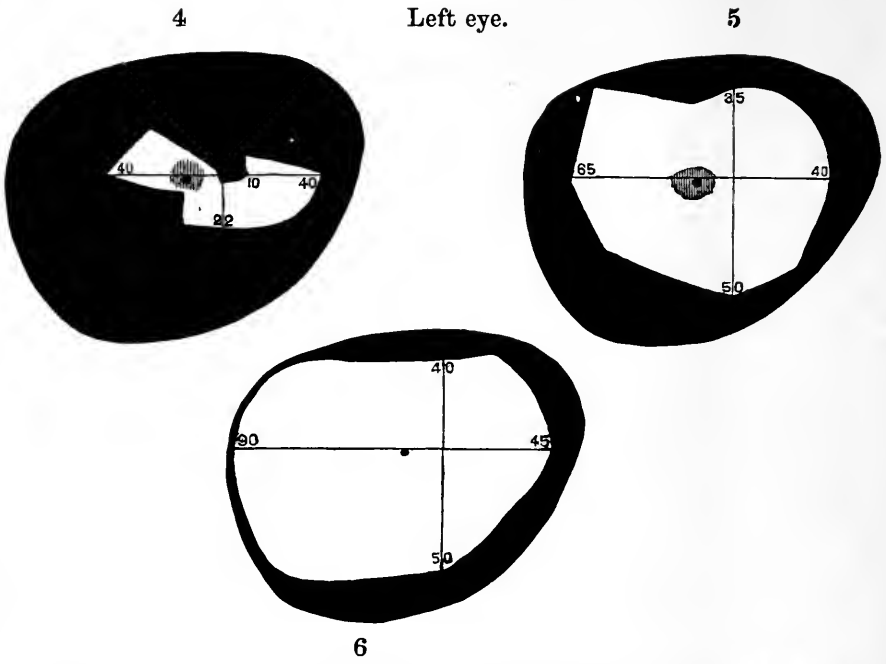
Three months ago had three attacks of "mist" in right eye; each occurred before breakfast and passed off completely in about ten minutes. On 10th inst. (May), began to have pain of an aching and shooting character over right eyebrow, and presently pain in moving the eye. On 13th (a Sunday), sight of right was found to be dim on waking and did not, as heretofore, clear off; defect has

continued without getting better or worse. For the last two days has also felt pain in the right upper jaw. Has lost almost all the molars of both jaws, and incisors also in upper jaw, and has often had neuralgia in the stumps. No rheumatism or sciatica. Scarlet fever mildly some years ago. Mr. Mackenzie reports that there is a loud mitral bruit, and that the urine is free from albumen and sugar. Has had no venereal disease and is quite continent. Has never smoked. Ten years ago crushed right index finger, and nail has several times since been grooved; had a short attack of painful cramp in this finger some months ago. No neurotic family history, except that a maternal aunt has gone blind of "disease of optic nerves from worry" (? glaucoma).

May 17th.—Right eye (under atropine) sees only 16 or 18 J. badly and best in nasal part of F.; cannot see $\frac{20}{200}$. Oph., optic disc rather pale especially on outer side, arteries decidedly too small and veins too large by comparison with other eye; arteries pulsate easily on pressure. F.



Field of vision (right eye).—Case 11. Fig. 1, May 17th; Fig. 2, May 26th; Fig. 3, June 8th.



Field of vision (left eye).—Case 11. Fig. 4, May 26th; Fig. 5, May 30th; Fig. 6, June 8th.

somewhat contracted at inner side and showing a very large scotoma of somewhat sector-shape, extending from fixation point downwards and outwards (Fig. 1).

He has pain in moving the eye, especially inwards, and quite flinches in doing so; there is also marked tenderness on pressing the eye back into the orbit; there is, however, not the slightest tenderness over the supra-orbital notch nor over any part of the wall of the orbit within reach. Left, vision $\frac{20}{20}$; oph., normal.

19th.—Right has begun to improve, but to-day left began to fail with some pain over the eye and on moving it.

25th and 26th.—Right, vision $\frac{20}{50}$ and 12 J. words. O. d. as before, but arteries and veins now of normal size; F. of same extent, but now no definite scotoma can be found (Fig. 2). Left, vision $\frac{3}{200}$ and letters of 20 J.; Oph., o. d. decidedly pale and filled in all over, arterial coats thickened and white, veins somewhat distended; F. highly contracted and very irregular, centre blotted out (Fig. 4).

30th.—Left, vision $\frac{20}{50}$; F. much larger (Fig. 5).

June 2nd and 8th.—Now sees $\frac{20}{30}$ easily, and $\frac{20}{20}$ by looking rather eccentrically with each eye separately; Hm. 0·5 D. Still has occasional shooting pains behind left ear. F. now of full extent in each (Figs. 3 and 6), but there must still be some slight lowering of visual acuteness close to fixation point in each. Both discs remain somewhat pale. No other symptoms have developed. The treatment consisted of small doses of iodide of potassium and mercury, with blisters.

August, 1884.—Has once or twice had dimness lasting a few minutes, perhaps only due to varying accommodation.

Case 12. *Rapid failure of one eye with defect of field and diplopia (?); slight papillitis; probably due to syphilitic periostitis; recovery.*—Mr. W—, æt. 44, a clerk, was seen at the South London Ophthalmic Hospital on June 12th, 1875. Ten days previously left eye had failed in sight; for a short time he saw double when looking down, but this passed off.

On admission.—Left, vision $\frac{20}{70}$ and 16 J.; with $+\frac{1}{10}$ reads 6 J. badly; F. much contracted in nasal and upper half (hand test); pupil rather larger than right, both pupils are sluggish; no visible defect of movement of eye; oph., slight and doubtful haze of o. d., arteries on o. d. pulsate normally on pressure; no other changes. Right, normal in every respect.

Had gonorrhœa twenty years ago. Gives no history of syphilitic symptoms, but has had fœtid discharge from nose for two or three years and now has sinus in floor of left nostril and another in hard palate leading to dead bone. Ordered iodide of potassium.

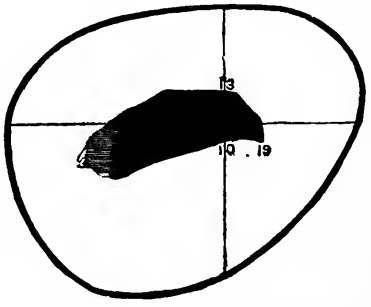
July 10th.—Left has recovered "perfectly;" vision $\frac{15}{20}$ and 2 J. unaided by lens; F. (to hand test) perfect. Iodide continued.

September 8th.—Left, vision $\frac{15}{20}$ and 2 J. p. p, 15″. Right, V. $\frac{15}{20}$ and 1 J. p. p. 15″. Dead bone in floor of

nose quite loose and a small bit removed, but he would not submit to further treatment.

In this case we may infer with much likelihood that optic neuritis was caused by very limited syphilitic periostitis at the apex of the orbit, possibly implicating in a slight degree one of the motor nerves or the attachment of a muscle.

Case 13. *Failure of sight in one eye with absolute central scotoma; no other local symptoms; changes at disc; syphilis twelve years previously.*—Mr. John R—, æt. 55 (P. 7, 140), was seen on December 2nd, 1882. He had lived much in India, China, and Japan, and had just come from the last-named country where, three months previously, he had found the sight of the left eye to be very defective. He had had no pain or discomfort about the head or eye, and the sight had, he thought, got rather better. I found that with the left eye he could only count fingers, and this best above the centre of the field; field of full size, but a large scotoma of oval shape extending horizontally from about 10° within, to about 35° degrees external to, fixation point; the greater part of this area was well defined, and a white spot of 10 mm. square was quite invisible on it, but at the temporal side the boundary between blind and



Field of vision (left eye).—Case 13.

seeing part was not abrupt (*vide* Fig.). Oph., o. d. pale with a yellowish tinge, physiological pit filled in, arterial coats thickened, no other changes. Right, vision $\frac{20}{40}$, Hm. 0·75 D. = $\frac{20}{20}$ slowly; uses + 2·5 D. for reading; o. d. natural.

A tall, thin Scotchman, sallow and extremely dyspeptic. Has not had ague, dysentery, rheumatism, or gout; no injury to head, but some years ago had a slight "sunstroke." Twelve years ago had syphilis, and has lately had some ulceration of tongue, the scars of which are visible, but has had no other manifestations. Dr. Buchanan Baxter, who examined him at my request, found no positive signs of organic disease, but suspected incipient cirrhosis of the liver; urine normal.

Though he smoked but little, and his eye failure was not likely to have been caused by tobacco, I advised him to leave it off, and he did so. When seen two months later he thought the defective eye had improved a little, but I could not satisfy myself that this was the case. He was returning to Japan, and I had no further opportunity of watching him.

No active treatment was adopted. Although the disease of optic nerve was very probably syphilitic, it seemed to have become stationary before he came to me, and the state of his health made vigorous treatment undesirable.

Case 14. *Rapid failure of one eye with loss of field, coming on soon after malarious fever in a man who had had syphilis many years before; atrophy of disc.*—Mr. John P—, æt. 38 (P. 6, A), six weeks ago when in Spain engaged as a mining engineer had an attack of fever of an irregularly intermittent type; was not laid up by it, but lost fourteen pounds in weight. A few days after the onset of the fever he found the sight of the left eye as now; there was a little pain about the eye, and especially he noticed that it was painful and stiff when he moved it. Had syphilis twenty years ago.

October 4th, 1881.—Left, vision $\frac{12}{30}$ badly; loss of nearly the entire lower half of field, the boundary between seeing and blind part not being sharply defined; the field is not like that in any of the other cases. Oph., optic disc pale and clear, central vessels rather smaller than in right. Right has a high degree of H. As., but is healthy. He

took mercury in small doses for several months, but when I saw him again in February, 1883, the eye was in just the same state.

Case 15. *Severe pain in temple for one day with rapid failure of same eye; very slight changes; complete recovery; syphilis two years and a half before; subsequently symtoms of cerebral disease.*—Henry E—, æt. 28, an attendant in an asylum, was sent by Mr. Lawford to St. Thomas's Hospital on September 26th, 1883, with the following notes:

On the 21st inst. he had severe pain in left brow and temple and the sight of the eye became dim; the pain was very bad and kept him awake that night, but ceased altogether the next day; the sight, however, got worse. No cerebral symptoms. Oph. (on 22nd), showed only doubtful enlargement of the retinal veins. Had a slight blow on the eye from a patient ten or fourteen days previously. Had a chancre two years and a half ago, followed in six months by full secondary symptoms, and has had relapses several times. Took iodide and mercury last spring (1883) for return of eruption, and again began same treatment in August and was under it when the above attack occurred.

25th.—Left, vision only 19 J. badly; pupil rather larger than other. Right, vision 1 J. well. I saw him later, on the same day, and noted by ophthalmoscope the veins rather larger, the arteries smaller and showing thicker coats, than in other eye.

27th.—Taken into the hospital. Left sees only 20 J. and best in temporal part of F.; oph., as on 25th; pupil has very little direct light-reflex. Inunction of weak mercurial ointment every night, to be washed off next morning.

29th.—Mr. Marlow notes: "Some of the retinal veins are three times as large as the corresponding arteries."

October 1st.—No effect from inunction; ointment to be left on after each inunction.

4th.—No salivation; inunction twice a day, and to take ten grains of iodide thrice daily. Sight already better; can spell 16 J.

8th.—Left pupil now acts well to direct stimulation. Oph., as before.

9th.—Left reads letters of 1 J.

11th.—Commencing salivation. Bowels confined unless he takes house medicine. Stop inunction.

19th.—Left, vision $\frac{20}{30}$ partly and 1 J. at 8." Oph., arteries relatively larger; optic disc not so transparent as in right eye; F. and colour perception normal. Discharged from ward; to continue iodide.

January 10th, 1884.—Mr. Marlow notes: "Vision of left now precisely the same as of right. Oph., arteries in left still somewhat small in comparison with veins of same eye and compared with arteries of right eye."

August 30th.—Has been under Dr. Bristowe's care, since the above date, for partial right hemiplegia with mental dulness; no aphasia. Symptoms came on gradually. The eye remains good, and there are no further oph. changes.

Case 16.—*Failure of sight and paralysis of sixth nerve on one side with severe pain in temple and forehead on the same side; late pallor of disc; recovery of sight; syphilis five years before.*—Mary C—, æt. 30, married, sent by Dr. F. W. Parsons to St. Thomas's Hospital (T. 3, 114). For the last three weeks severe pain in right temple and forehead. About a week ago noticed failure of sight of right eye and squinting. There was double vision for a short time. She said that the right eye had occasionally been "misty" for two months past.

On admission, October 5th, 1880, there was still pain in right temple and forehead. Right external rectus paralysed; convergent squint which sometimes alternates to left eye; vision very bad, can only count fingers; oph., normal; no remains of iritis. Left eye $\frac{20}{40}$, H.m. 1·5;

with + 2 D. reads 1 J., old posterior synechiæ, no disease of fundus. Pupils equal and active.

Five years ago had inflammation of both eyes, sore-throat, falling of hair, and a scaly eruption on legs and forehead. No history of rheumatism or gout in patient or her parents. Ordered ten grains of iodide of potassium and one sixteenth of a grain of bichloride of mercury three times a day.

December 7th (two months after admission).—Right, vision $\frac{20}{70}$, H.m. 1·5 D. = $\frac{20}{30}$, + 2 D., reads 2 J., F. normal; Oph., o. d. decidedly pale all over and not perfectly clear; no other changes; movements of eyeball of full extent, but sometimes sees double in sudden movements. Left, vision $\frac{20}{40}$, Hm. 1·75 = $\frac{20}{20}$ partly; + 2 D. reads 1 J.; Oph., o. d. normal. Ps. act equally, but right rather larger than left (as 4 to 3).

January 11th, 1881.—Vision as at last note in each. Right p. still larger than left. Sometimes has a stab of pain "like a knife" in right eyeball.

February 8th.—No diplopia for many weeks, but now occasional drooping of right upper lid; no limitation of movements of eye in any direction. Vision of each eye, when corrected, is $\frac{20}{20}$; acc. about normal and equal in the two eyes. Ps., right still larger than left; associated action and direct light-reflex action good and equal in each eye.

April 19th and May 24th.—Still some pain at times over right brow and occasional drooping of eyelid. Discharged.

Case 17. *Failure of one eye, with central dense scotoma, going to complete blindness, and followed by severe pain in corresponding temple and behind eye; late atrophy of disc; recovery of a little sight. Paresis of inferior rectus of same eye some months before failure of sight; no cause found.*—Mr. D—, æt. 50 (P. 6, 27), a pale dyspeptic man retired from business, of studious habits and fond of reading late into the night, was sent to me by Dr. Gandy on November

18th, 1881, for diplopia. His symptoms had begun just ten days before, on the 8th, with an indistinctness of sight, noticed when walking about; before long he found that he saw double, particularly when looking down as in going upstairs. He had a little dull pain "in the eyes," worse in the right, when the symptoms began, but no "headache."

On examination there was no visible squint or defect of ocular movements, but he had marked diplopia in the lower half of the field of fixation, the false image belonging to the right eye and appearing to him to be below and to the left of the true one. This diplopia would be accounted for by paresis of the right inferior rectus. That the affection was of the right, not of the left eye (left superior rectus, *e.g.*), was also shown by his liking to shut the right eye (not the left) when crossing the street, or otherwise especially desiring to get rid of the double vision; and by the presence of slight, though definite, giddiness when he was made to walk with the left closed (*i.e.* when compelled to guide himself with the right eye).

The vision, accommodation, pupils, and ophthalmoscopic appearances were perfectly normal in each eye. He had been taking some iodide, and this I advised should be continued, also that he should rest and avoid stooping and straining.

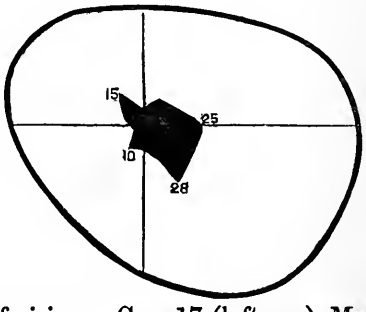
He had been married many years, his wife was living, and he entirely denied ever in his life running the risk of syphilis. There had been no brain symptoms. He was not gouty and had only once, a year ago, had trifling rheumatism (in the left arm). He had formerly been very subject to bilious headache. His mother died of apoplexy.

I saw no more of him till May 9th, 1882. He said he had lost the diplopia long ago, but as he said he had continued to like occasionally to shut the right eye, I doubt whether the muscle had perfectly recovered. Lately he had had some aching and tenderness in the same eye, and the day before (8th) he had accidentally found out that the

sight of the eye was defective. Everything looked "dark" or "brown" to this eye; the naked hand of a passenger opposite to him in the railway carriage looked, to this eye, as if gloved.

The pupil of the defective (right) eye acted to light directly and was not enlarged; vision $\frac{20}{50}$, slowly (the left being $\frac{20}{20}$); visual field, *roughly tested,* seems normal; no actual colour-blindness, all colours look dull, but he does not confuse any complementary ones. No ophthalmoscopic changes. Urine tested next day, no albumen; not tested for sugar.

May 15th.—Vision of right much worse, cannot see $\frac{20}{200}$ or 20 J.; seems to see best at periphery of field. A careful perimetric examination of the field by Dr. Gowers at this date showed a large scotoma extending from the fixation point outwards and rather downwards and including the natural blind spot (*vide* Fig.); its position and size were just such as is common in tobacco cases, but it was more intense, for on this area even a *white* spot was not seen at all. No peripheral contraction of field.



Field of vision.—Case 17 (left eye), May 15th.

Since last visit has had much pain, really severe, at the back of the bad eye and in the top of the head; no pain in the temple and none during movements of the eye. No pain or tenderness about the jaw. The pain has aroused him on two or three occasions early in the morning. No vomiting. Ophthalmoscopic appearances still quite natural; retinal arteries pulsate easily on pressure.

I sent him to Dr. Gowers in order to exclude authori-

tatively central nervous disease. He found no evidence of intracranial mischief, and agreed that the symptoms were probably caused by neuritis of the trunk of the optic nerve in some part of its course.

On May 31st I saw Mr. D— again. There was now no perception of light whatever, and he thought the eye had been as blind for some days. The pupil, previously acting directly to light, now acted only indirectly, but it was not larger than the other. The pain at the back of the eye and about the temple had become much worse and was disturbing his sleep a good deal.

He was from the first very sceptical as to treatment, and would not take medicine of any kind for more than a day or two ; iodide, he said, always upset him. He applied a blister or two to the temple after much persuasion.

At this last visit the disc was, I thought, beginning to get pale, but there were no other changes.

November 28th, 1882.—Mr. D— came in reply to my inquiry. The eye remained quite blind for a few weeks and then he began to see a little with it and gradually improved for a time ; but it has not bettered lately. He sees best in the outer part of the field, but can only see the hand moving. There is slight direct action of the pupil to light. The disc is now very pale, almost paper white, cupped in a shelving (atrophic) manner, and the lamina cribrosa exposed ; arteries normal, veins normal or rather large ; refraction at disc is myopic, 1 D.

The pain in the head continued very badly for a long time (some weeks), but has now quite ceased.

Case 18. *Failure of one eye to complete blindness after weeks of pain in corresponding temple ; late atrophy of disc ; paresis of fifth nerve on same side ; syphilis probable ; neurotic family and personal history.*—Anne F—, æt. 28, married. South London Ophthalmic Hospital, August, 1876. Is intemperate. Two years ago swelling of forehead and sides of face, said to be erysipelas ; since then has

been quite unable to smell. For last six weeks much pain in right temple and eyeball, and for about same time has occasionally had a "film" over sight of right eye. Decided failure of this eye began a few days before admission.

August 28th, 1876.—Right can only see shadows; no direct light-reflex action of pupil, but indirect action good; oph., no changes whatever; refraction H. Left eye good, but sight not noted. There was frequent twitching and doubtful weakness of right facial muscles and partial anæsthesia of right face, but no affection of fifth nerve muscles.

September 19th.—Right has no perception of light; optic disc has now become considerably paler than in left eye, where it is normal, but central vessels are not diminished. Condition of fifth and facial nerves as before. Difficulty in shutting mouth after opening widely, from a feeling of a lump in region of digastric. There is apparently slight weakness of grasp of right hand, but no dragging of foot.

The previous history was complicated and not all trustworthy, but is sufficiently important to be given in full.

Has had four pregnancies; one miscarriage, three children born alive but died at or under six months. Syphilis, therefore, is very probable. Is said to have had a fit when eleven years old, followed by drawing of face and weakness of right arm and leg; another fit after second confinement, evidenced by face being drawn to one side on waking one morning. Doubtful history of a third fit during third pregnancy. Since last confinement subject to "cramps" of right face, arm, and leg. Patient is youngest of eight: Nos. 1, 2, and 3 died in middle age, details wanting; No. 4 (f.), æt. 40, is very subject to fits, in which left arm and leg work about, married, and has four children; No. 5 (f.), æt. 37, and No. 6 (m.), æt. 34, healthy; No. 7 (f.), æt. 31, often has fits, married, and has had seven children, all are living; No. 8, the patient. Her father died, æt. 69, of "abscess of brain," having been

"silly" for years before; his sight was very defective for four years before death; one of his brothers (patient's uncle) had fits and was blind.

Case 19. *Failure of one eye ending in complete blindness after two weeks of severe pain in corresponding temple; late atrophy of disc with return of a little sight; patient under observation five years.*—John W—, a hale, muscular lighterman, æt. 43, was sent to St. Thomas's Hospital by Dr. Oswald on account of his left eye on May 12th, 1879. About three weeks previously he had begun to suffer from severe pain in the left temple; he called it "excruciating." It came on in attacks lasting about a couple of hours, beginning in the temple and passing back over the head; he said the eye watered when the pain was going to begin; the scalp did not become tender from the pain, though he said at one time there was a tender spot just above the corresponding ear. He said also that he was liable to attacks of giddiness lasting a quarter of an hour, during which he felt and walked as if drunk; this giddiness was not related to the pain. There were no other symptoms. When the pain had gone on about a fortnight, the sight of the eye on the same (left) side began to get misty; this was on May 4th. The defect increased, and by Friday, 9th, the eye was quite blind. He came to the hospital on the 12th with the following condition:—Right $\frac{20}{20}$ and 1 J., accommodation and refraction normal. Left, no perception of light; pupil acts to light indirectly but not directly; no ophthalmoscopic changes. Had a chancre about fifteen years ago and says he was "salivated" for it; no history of syphilitic symptoms then or since. He says he has been liable to headaches for many years, but evidently they have been quite different in character and intensity from the recent pain in the left head.

Ordered blisters, iodide in fifteen-grain doses, and blue pill in two-grain doses each thrice daily.

May 14th.—Pain rather better.—Movements of eye

normal; pressure on the eye through the lid causes acute pain deep in the orbit; on pressing over the supra-orbital notch on each side there is very marked comparative tenderness of the left.

23rd.—Pain worse again. No salivation. Blue pill increased to 5 gr. Now complains of defect in the lower part of the visual field of the other eye and says it was so on admission; it is not obvious on trial by finger-test. (It may be stated here that nothing more was heard of this.) Ophthalmoscope, both eyes quite normal.

27th.—No ophthalmoscopic changes.

30th.—No salivation. Ordered inunction. Bromide added to the iodide.

June 2nd.—Pain better last night than for a long time.

5th.—Salivation beginning. Free from pain.

16th.—Left optic disc now paler than right. There is some diffuse swelling over left temple.

20th.—Since yesterday has had some perception of light with the left; to-day it is quite distinct. Salivation not increased.

The treatment was continued nearly as above until July 11th, when drachm doses of Liquor Hydrargyri Perchloridi were ordered instead.

July 18th.—Left optic disc pale and arteries diminished.

August 14th.—Vision no better than on June 20th. Still some pain in head, but not nearly so bad; it is now "dull," not "sharp." Left disc now of a dirty yellowish pale colour with considerable diminution of the arteries; they all pulsate on pressure.

October 13th.—Left, vision still only shadows. Pupil acts a little directly, well indirectly; it is usually *smaller* than the other.

November, 1882.—Comes on account of muscæ in the right; no changes in it except commencing presbyopia. Left, as before, except that the direct action of the pupil to light is apparently better than it was; its comparative size was not noted. Disc in much the same state, a dirty

yellowish colour; some connective tissue about the vessels at their point of emergence.

July, 1884.—Left, as before; fancies he can see fingers in lower part of fundus rather better.

Case 20. *Blindness of one eye with atrophy of disc during pain on same side of head.*—Louisa M—, æt. 30, single, tall, pale, nervous, but not hysterical.

Six years ago had neuralgia in one temple, does not remember which; had a good many teeth drawn to cure it. Had no recurrence of pain till about three months ago, when, two or three days after bathing in the sea and staying in the water half an hour, she began to have pain at back of head. After a time it became much worse and was localised to left temple and occiput. The sight of the left eye failed during the early part of the attack and the eye became "blind" ten weeks ago. The eye used to water and could not bear the light, but was not red.

Admitted to St. Thomas's Hospital, October 4th, 1880 (T. 3, 112).—Left eye has no perception of light; indirect light-reflex of p. good, and p. slightly larger than right when both are open (as 4·5 to 4); oph., o. d. moderately pale all over, no evidence of previous papillitis, central vessels normal size, and arteries pulsate easily on pressure. No note as to syphilis. Patient only seen once.

Case 21. *Rapid and permanent blindness of one eye during severe neuralgia of same side of face; attack probably due to cold; condition fifteen years later.*—Colonel H—, æt. 41 (P. 3, 28), was sent to me by Dr. Ord, in November, 1878, for conjunctivitis apparently excited by excessive office-work in Barbadoes about two months previously. It affected only the right eye. Vision of right eye $\frac{1}{1}\frac{2}{2}$, and 1 J. p.p. 9″. Left, absolutely blind; o. d. atrophied; border rather irregular; central vessels somewhat diminished in size, but arteries pulsate readily on pressure; p. slightly smaller than right, its indirect reflex action good.

History of left eye.—Fifteen years ago sailed from West Indies, in the hot season, for Scotland, where he arrived in May, and was housed in bad barracks; almost immediately had very bad neuralgia in left face, and left eye became blind and has remained so ever since. Had skilled advice soon after the eye had become blind. Never had similar neuralgia before or since. No note as to syphilis.

Case 22. *Post-papillitic pallor of one disc with history of neuralgia confined to same side of head some months before.*—Louisa Y—, æt. 18, came for asthenopia (St. Thomas's Hospital, 2, 171) in July, 1879. During previous winter two attacks of neuralgia of right face and head, with slight swelling of face, attributed to bad teeth; the pain did not run down back of neck. Does not know whether sight of right eye failed. Health good.

On admission:

V. { Right $\frac{20}{30}$ and 2 J., + 0·75 D. sph. − 1 D., cyl. axis horizontal. } $\frac{20}{20}$ and 1 J.
{ Left $\frac{20}{30}$ and 1 J., H.m. 1 D. $\frac{20}{20}$.

On ophthalmoscopic examination, however, right o. d. pale all over, edge not quite clear, arteries decidedly diminished. "There has evidently been neuritis."

Left o. d. normal but rather congested.

Case 23. *Blindness of one eye with post-neuritic atrophy; no history; other eye healthy.*—Mrs. S—, æt. 63 (P. 7, 39). Two years ago, whilst at Brighton recruiting her health after having been overworked, she accidentally found right eye blind or very nearly so; cannot assign any cause or give any further history.

September 14th, 1882.—Right has no perception of light; indirect reflex action of p. normal; oph., o. d. very pale (yellowish tint) and hazy, but not at all swollen; veins about normal, arteries rather small and showing thickened sheath on o. d., their calibre rapidly diminishing beyond o. d. "Disc much more hazy than in atrophy after

embolism." Left H.m. 2 D, vision = $\frac{20}{30}$, + 5 D. = 1 J. at 12″.

Case 24. *Blindness of one eye with simple atrophy of disc; no history; other eye healthy.*—Mr. E—, æt. 32, a healthy farmer, was sent to me for opinion by Dr. Parsons, of Dover, in June, 1883 (P. 8, 197). Five years previously, in trying to shoot, for experiment, from the left shoulder, he found the sight of the left eye defective. History entirely negative. He had skilled advice soon after making the above discovery. Left eye diverges; no perception of light; indirect reflex action of pupil normal; oph., advanced, yellowish-white atrophy of optic disc with atrophic cupping and exposure of *lamina cribosa*, arteries considerably diminished. Right eye, vision and oph. normal.

Case 25.—*Severe acute papillitis of one eye with blindness; pain about eye and side of head; partial recovery of sight with pale disc; no cause.*—Eliza C—, æt. 22, a healthy, fair, freckled woman, suckling her first baby six months old, was admitted at St. Thomas's Hospital on August 2nd, 1881, scarcely able to count fingers with the right eye. The pupil acted both directly and indirectly, and was not larger than the other; there was well-marked papillitis, the veins large and tortuous, and the arteries partly obscured; there were no hæmorrhages; the swelling was almost limited to the area of the disc; other cranial nerves normal. Left eye normal, but slight H.

She said that three days ago, on waking in the morning, she had found the eye almost blind; it had been "weak and watery" over-night. For some days previously she had had pain over the eye and eyelid and at the top and back of the head, worse at night; it was still present on admission. A short time before the sight failed her husband told her she a "blue mark" on the upper lid. A month ago she had felt rather ill from the sun's heat, but had not been sick. No injury. No history of syphilis (direct questions). Ordered iodide and mercury.

August 6th.—There is now slight fulness of the skin and enlargement of a vein of the upper lid (doubtless the "blue mark" mentioned above). Less headache. No pain or tenderness on pressing eye back into orbit. Sight of R. is now entirely abolished, no perception to light; the venous engorgement and swelling of the disc are very intense, but the opacity not great (*i.e.* chiefly œdema). *The eye already diverges,* but there is no paralysis. No direct action of pupil. Iodide and mercury increased. Other eye normal.

8th.—R. now has good perception of light.

10th.—Same. Ophthalmoscopic appearances the same; no hæmorrhages.

12th.—Vision not better, but disc not so swollen. No pain for several days past. Breath getting mercurial.

22nd.—Counts fingers at 2′ for the first time. Not salivated.

29th.—Reads 20 J. at 12″. Outer border of disc clearly defined, but still some swelling of its inner side. No salivation.

September 21st.—Reads $\frac{20}{200}$ and 19 J. Disc now quite clear and rather pale, no trace of haze; veins still large and more tortuous than in left; some white lines; direct action of right pupil to light, slow and imperfect. Left eye normal. Omit mercury.

October 13th.—Right, reads words of 16 J.

27th.—$\frac{20}{200}$ and 14 J. words.

December 20th.—Still only words of 14 J. and veins still enlarged.

February 3rd, 1882.—Words of 10 J. by moving the book about. Disc shows a uniform greyish pallor and its tissue is opaque and filled up, but arteries of normal size; veins still much larger than in the other eye. There is evidence of collateral circulation on the disc. The visual field is of normal extent, but was not examined for scotoma. Slight defect for green (she tends to confuse greens and greys unless she compares them carefully), but she does not confuse reds and greens even in the more delicate test of

Ole Bull. Tested again in May and found to give the same answers. Unfortunately acuteness of vision was not noted at this, her last, visit, but I believe it was about the same as in February.

Case 26. *Severe acute papillitis of one eye with blindness; pain on same side of head for a few days; recovery of sight; syphilis six years before; typhoid fever (?) eighteen months before.*—H. Wm. C—, æt. 27, a very tall, rather thin man, a bricklayer, was sent by Dr. F. W. Parsons, of Wimbledon, on March 18th, 1881, for recent blindness of the left eye; Dr. Parsons had already diagnosed optic neuritis.

On admission the left eye has only bad p. l.; pupil not larger than right, acting well indirectly, but not at all directly; gross papillitis or papillo-retinitis with a high degree of steep swelling, but comparatively little opacity, so that the margin of the disc can still be made out; the swelling passes about a disc's breadth into the retina; movements of eye normal; one or two small hæmorrhages; slight tenderness on pressing the eye back into the orbit (none on the other side); no affection of other nerves. Other eye natural in all respects, but o. d. shows an unusually deep physiological cup.

Eight days before I saw him the affected eye had become suddenly dim, accompanied by aching pain over the corresponding temple and the back of the head. The pain was bad enough to make him keep his bed for two days, and he vomited once. In five days (*i.e.* three days before I saw him) the eye had become quite "blind." The pain subsided as the sight failed, and he was quite free from pain when I saw him on March 18th.

Had a chancre followed by eruption six years ago; has had no symptoms since; married a year later; wife has had two miscarriages and one child, now aged four months, but living sickly. Patient has had no injury to the head and no fits.

Eighteen months ago he had an illness after working

in the sewers, thought by Dr. Parsons to be typhoid, and has not been really well since. A few months ago his left leg became ulcerated and he now shows a large area of superficial ulceration with dusky eczema and varicose veins. Ordered iodide of potassium and perchloride of mercury.

March 31st.—Dose increased. Left can now see fingers, but not $\frac{5}{200}$ or 20 J.

April 7th.—Reads words of 20 J. badly, not 19 J. Taken in, and mercury given by mouth and skin with the intention of getting slight salivation. It caused diarrhœa, but only slightly touched the gums. Mercury was resumed in small doses on 13th, and continued with iodide, till the end of May.

April 16th.—Reads some letters of 18 J.

20th.—Field now taken, no contraction, but not tried for scotoma. Words of 16 J.

May 4th.—Left $\frac{20}{200}$ and 14 J. at 8″. The disc is now pale all over and its tissue looks opaque, but the vessels are neither obscured nor diminished in size, and the physiological pit is not filled up, though there are white lines along one (descending) artery.

May 13th.—Some words of 12 J. Discharged from ward.

27th.—Vision $\frac{20}{70}$ and words of 8 J.

He did not come again till September 22nd, though I believe he had been going on with iodide from Dr. Parsons for at least part of the time. With left he now sees $\frac{20}{30}$ and 2 J. slowly, no H.m. The veins are still too large and tortuous, and the disc whiter than the other; still white lines along the descending artery.

November 2nd, 1881.—Left $\frac{20}{30}$ and words of 1 J.

November 6th, 1882—Left $\frac{20}{30}$ partly and 1 J. slowly. "Disc nearly as good a colour as the other, and edge clearly defined, but lamina cribrosa not quite so distinct. Very marked white lines along the artery running downwards" (Mr. Lawford's note).

It should be mentioned that he was tried for colours

when vision had just begun to return (April 12th, 1881), and a considerable degree of red-green blindness was found.

Case 27.—*Post-papillitic atrophy of one disc with blindness and permanent paresis of third and fifth nerves on same side; history of severe, prolonged headache on same side with double ptosis for a time.*—Wm. C—, shoemaker, from Leicester, æt. 41, single. Syphilis possible but not proved. Comes for ulcer of left cornea.

At æt. 38½ (two years and a half ago, January, 1874), very severe right headache, lasting weeks and worst when lying down. Never before or since. Had no fits.

During this attack, right eye turned in and lid dropped; saw double for a long time, and eye was "quite fixed." Then left lid also dropped for some weeks, then it went up, and more than a year later (March, 1875) right lid also rose. Vision of right began to fail some weeks after pain had quite ceased, and was months in fading quite away.

Admitted at South London Ophthalmic Hospital September, 1876, æt. 41. Right no perception of light; glistening, white, tendinous atrophy with streaked retina (old severe papillo-retinitis); vessels much diminished, *lamina cribosa* exposed. Paresis of all third nerve muscles of same side, and of first and second divisions of fifth; other cranial nerves normal.

Probably this was a case of large node on the body of the sphenoid chiefly on the right side, but passing over when at its height to the left of the middle line.

Case 28.—*Blindness of one eye with post-papillitic atrophy of disc; previous temporary failure of same eye; attacks of neuralgia on same side of head; history of rheumatic fever; formerly subject to megrim with ocular symptoms.*—Mrs. G—, æt. 35 (P. 3, 134), was sent to me in August, 1879, for opinion by Mr. Story, of Dublin. With the right she had no perception of light; optic disc

moderately pale and showing evident traces of some previous inflammation; arteries extremely small, veins only slightly diminished; pulsation easily produced in arteries by pressure; "very like the result in many cases of embolism." Pupil same size as left and acting well to indirect stimulus of light. Left, vision and oph. normal, but liable to intolerance of light, aching, and attacks of "white mist" over nasal part of field ("hyperæsthesia retinæ"). This mist is quite different from the flickering she used to have with her sick headaches; "that was horrid, like looking through running water; this is quite different."

Formerly much sick headache with flickering before sight as above mentioned; has lately had no such headaches. Rheumatic fever ten years, and again two years, ago. Heart reported to be normal. During last two years has had three attacks of severe neuralgia of right side of head and face, independent as she believes of decayed teeth and of cold. The failure of right eye was in some relation to these attacks, and her account was as follows:—In February, 1878, had the "neuralgia" for ten days; in the summer again had it for "several weeks;" in November she suddenly found one morning that she could not see the outlines of things with her right eye; she believes the sight returned perfectly in a week, but does not supply convincing evidence of this, and it is also doubtful whether there was any neuralgia at this date, her statements on this point being confused. In March, 1879, she again had the neuralgia, and during the attack the eye again failed. On arising one Thursday she "could not see much" with it, and by the Sunday following it had become, as now, totally blind.

(*July 4th*, 1884.)

Dr. Stephen Mackenzie supposed that, owing to the defect of vision caused by the lesion, these cases only came under the notice of the ophthalmic surgeon. They did not, in his experience, occur in medical practice. He

would like to ask Mr. Nettleship whether an examination of the blood had been made in any of his cases. His reason for asking was that, in leuco-cythæmia, papillitis and a diffuse inflammation of the retina occurred, and that the latter had been ascribed to thrombosis of the orbital veins. It might be that thrombosis explained some of Mr. Nettleship's cases. Next, he would ask Mr. Nettleship as to the time that elapsed between the fever some of the patients were stated to have suffered from, and the occurrence of the ocular symptoms, as this was a point of some importance. It was known that in some fevers, especially typhoid, thrombosis was apt to occur during or immediately after the attack. He could not recognise any community of type amongst the cases described by Mr. Nettleship such as entitled them to the relationship of a natural group. Arthritic diseases were so common that it required very close evidence, in his opinion, before we could refer a diseased condition to the convenient category of an arthritic diathesis. He made these criticisms with deference, as he had no knowledge of the class of cases, and his observations were only founded on Mr. Nettleship's careful description.

Mr. NETTLESHIP said, in reply to Dr. Stephen Mackenzie: The blood was not examined in any of my cases; none of the patients, however, were conspicuously anæmic, and most of them seemed in good health. I do not, at present, attach much importance to the occurrence of typhoid, or other, fever before the eye failure. Of the four patients in whom this was noted at least two had certainly had syphilis: the interval between the fever and the eye attack, moreover, varied greatly; thus, in Case 7 typhoid fever occurred 4½ years previously, no syphilis; in Case 8, typhoid 6 months before, syphilis very probably 5 years; Case 14, intermittent fever just before the failure of the eye, syphilis 20 years; Case 26, typhoid 18 months, syphilis 6 years. It must be freely admitted, for the whole series, that we can at present do little more than

guess at the seat and nature of the changes, and that these almost certainly differ in different cases. In the cases with severe pain, great damage to sight, and late changes at the disc, periostitis of the orbital canal seems very probable; but in the milder forms, with or without slight early ophthalmoscopic changes, the seat of disease probably lies further forward, and we may conjecture that a small gumma in or upon the optic nerve may account for some of these, as it does for some cases of paralysis of oculomotor nerves. The presence of a well-defined central scotoma in many of the cases must, in the present state of our knowledge, be taken as evidence of disease limited to those bundles of nerve-fibres which lie at some distance from the eye in the centre of the optic nerve, but reach the surface of the nerve, close to the globe at the temporal side.

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3. *A case of central amblyopia and concentric contraction of fields of vision; recovery of normal acuteness of sight.*

By J. B. Lawford.

Sidney P—, æt. 18, a printer for three years, became an out-patient at the Royal London Ophthalmic Hospital on November 17th, 1883, under the care of Mr. Hulke, to whom I am indebted for permission to bring the case before you.

Family history.—Parents living. Father suffers from gout. Five years ago he had a sudden attack of blindness, from which he recovered in a short time. No further history of this attack obtainable. Mother healthy. No phthisis, no insanity or other neurosis known.

Personal history.—Patient is the only child. Two years ago was laid up for two months with "gastric fever." With this exception has had no illness since early childhood. A discharge from right ear following measles

when a child ceased some years ago. Has not had gonorrhœa or chancre. Denies masturbation. No evidence of hereditary or acquired syphilis. Does not smoke.

The history he gave of his present illness was as follows :—About the last week of June, 1883, he struck the back of his head against some machinery in the shop ; was "almost stunned." The next day when walking in the street he noticed a "numbness" of the right leg, which seems to have passed off in a short time. On July 14th he slipped and fell on the pavement, on to his left side. He did not fall heavily and thinks he did not strike his head. He slept well the following night, but the next morning on rising he was giddy and kept falling to his right side, though he was able to use his right leg. Was violently sick for three days. Noticed that his right leg felt "numbed." About a month or five weeks later his vision began to fail ; headache, chiefly in the morning, came on ; it was unilateral, right sided, "beginning behind right ear and extending to the eye." The arms became affected, he thinks, as he was unable to raise a cup to his lips without spilling the contents. Bowels were constipated.

On August 25th he was admitted into Guy's Hospital under Dr. Moxon's care. I am indebted to Dr. Carrington, Medical Registrar at Guy's, for kindly supplying me with a copy of the notes of the case when in that hospital. The history the patient gave of the beginning of the illness was identical with that which I have just read.

The following notes are copied almost *verbatim* from those taken at Guy's Hospital :

"*On admission.*—Well developed. No wasting. Muscles firm. Expression apathetic. Skin cool and dry. Appetite good. Slight thirst. No vomiting or nausea. Submaxillary glands slightly enlarged. Pupils wide, act well to light, Respiratory and circulatory systems normal. Slight pain on micturition. Urine free from albumen and sugar.

"*Nervous system.*—Memory is said to have been impaired since commencement of illness; otherwise mental faculties appear good. No hesitation or slowness of speech. Movements of upper extremities not impaired. Grasping power as good on right as left side. Dorsum of right hand not so sensitive to various stimuli as that of left. Sensation almost lost all down left leg; in left foot the loss is absolute. There is inability to move the toes of left foot and the movements of that foot are imperfect. There is also some loss of power in the left leg. Ankle-clonus well marked on right, absent on left side. Knee-jerks equal and good. Sight of left eye better than that of right; both defective.

"*Ophthalmoscopic examination.*—Both discs healthy. Ordered—

℞ Liq. Hyd. Perchlor., ♏lxxx;
Pot. Iod., gr. v;
Aq. ad ℥j. T. d. s.

"September 3rd.—Eyes slightly improved. Less headache. Numbness extending up right arm, but sensation is not abolished. Considerable loss of power in the arm. Left foot devoid of sensation, which is much impaired in the leg also, especially on the outer side, and to a slight extent on outer side of thigh. No vomiting. Urine sometimes passed involuntarily, sp. gr. 1021, alkaline in reaction, deposit of mucus and phosphatic crystals.

"6th.—Sensation much improved in right hand, being almost perfect. There is a small spot behind right ear where sensation is greatly impaired. Sensation, though still impaired, is better in left leg and foot. Patient complains of a feeling of numbness in right foot, but sensation is perfect when tested. There is a central area of darkness in each eye, larger in the right eye, this one being almost blind.

"10th.—Power in right arm much increased, almost equal to left. Patient tried to stand, but failed, saying "he could not feel the ground." Sight is better. Eccentric fixation.

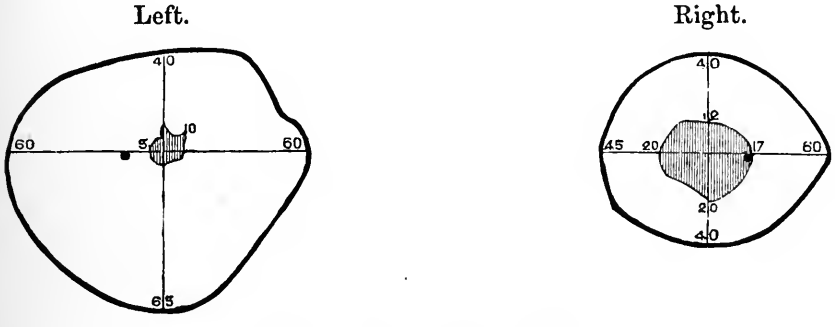
"15th.—In centre of field of vision cannot see the light of an ophthalmoscopic mirror.

"17th.—Convulsive fit lasting three minutes; all limbs convulsed. No twitching of face. Eyes deviated to the left. Pupils contracted. Conjunctivæ insensitive. Tongue bitten. Ten minutes later patient was quite sensible, with no knowledge of the attack.

"25th.—Right arm very shaky, but grasp is good. Soles of feet feel numb and cold.

"October 1st.—Patient very tremulous to-day, nearly the whole body jerking about with any attempt at movement.

"3rd.—Much less tremor, only the right arm shakes when raised. Patient can only recognise a watch at three feet. Fields of vision taken by Dr. Brailey. Right con-



Fields of vision of Sidney P.

tracted concentrically; the limits being 50° upwards and outwards, 45° downwards and inwards. There is also in this field a large central scotoma, for form, approximately circular, extending from fixation point, 15° upwards and outwards, 20° downwards and inwards. Left F. of full extent downwards and inwards, but only reaches 40° upwards and 65° outwards. There is a small central scotoma extending from fixation point 5° downwards and outwards, 10° upwards and inwards. Acuity of vision not noted; ophth., no changes.

"8th.—Temperature rose to 102°. Vertigo, vomiting, tremulousness of right arm and impairment of power.

Sight much worse, and there is little power of discriminating colours.

"9th.—No pyrexia. Movements of right leg jerky.

"22nd.—Right arm steady.

"29th.—Can read a little and walks steadily.

"November 1st.—Discharged at his own request."

No definite diagnosis was made. Dr. Carrington tells me it was thought to be probably a case of cerebral new growth. When he presented himself at Moorfields (November 17th) his condition was as follows:

Grasp of left hand stronger than that of right (is right-handed); this was not tried by dynamometer. Patient is aware of this weakness of right hand. Knee-jerks very marked, equal on both sides. No paralysis of sensation. No headache or tenderness over any part of cranium. No squint. Memory, as far as ascertainable, good. Appetite good. Sleep disturbed. Urine 1025, no albumen or sugar.

V. { R. $\frac{20}{50}$ and 1 J. } Refraction H. (low degree). No
{ L. $\frac{20}{70}$ and 6 J. } H.m.

Pupils equal, $3\frac{1}{2}$ mm., active to light and accommodation.

Visual fields considerably contracted. The limits of R. F. are 30° upwards, 55° downwards, 60° outwards, 40° inwards; those of L. F. are 20° upwards, 35° downwards, 35° outwards, 30° inwards. In each field there is a very ill-defined central scotoma for red and green, closely limited to fixation point. These scotomata could not be mapped out at all accurately.

Ophthalmoscopic examination.—Media clear. Doubtful pallor of optic discs on yellow-spot side. No other changes. No evidence of former papillitis. Movements of eyes full in all directions. No strabismus.

28th.—V. { R. $\frac{20}{70}$ and 4 J. barely.
{ L. $\frac{20}{100}$ and 10 J.

December 1st.—V. { R. $\frac{20}{70}$ and 4 J. slowly.
{ L. $\frac{20}{100}$ and 4 J. slowly.

Pupils { R. $5\frac{1}{2}$ mm. for distance, 4 mm. for 4″.
{ L. 6 mm. for distance, $4\frac{1}{2}$ mm. for 4″.

Both act well to light.

R., F. unaltered; L., F. slightly enlarged downwards and inwards.

Colour vision (each eye tried separately) is perfect. No evidence now of central scotomata.

8th.—V. { R. $\frac{20}{50}$ partly; 1 J. slowly, incorrectly.
L. $\frac{20}{50}$ partly; 1 J. slowly.

Pupils equal, rather large, act well to light. Has now been at work for a week.

15th.—V. { R. $\frac{20}{40}$ partly; 1 J. slowly.
L. $\frac{20}{50}$; 1 J. slowly.

R., F. of full extent except outwards; the limit in this direction being 70°. L., F. of same extent outwards; full in other directions.

22nd.—V. { R. $\frac{20}{40}$; reads 1 J. with each eye, prefers right eye.
L. $\frac{20}{40}$ partly.

There is now no appreciable difference in the grasp of the two hands, but there is considerable tremulousness of right hand when any complicated movements are attempted.

Jan. 5th, 1884.—V. { R. $\frac{20}{30}$ partly; 1 J. Pupils equal and normal in reaction.
L. $\frac{20}{20}$ partly; 1 J.

Visual fields. { R. slightly contracted outwards.
L. of full extent.

Improvement steadily progressed. On March 1st, 1884, V. = $\frac{20}{20}$ and 1 J. with each eye. The fields of vision were of full extent. Ophthalmoscopic examination revealed no changes. Patient said he felt well. The tremulousness of the right hand had entirely disappeared.

The only treatment was the administration of iron and nux vomica.

The chief points of interest in this case from an ophthalmic standpoint are—

1. The existence coincidently of central visual defect and peripheral contraction of fields.

2. The central scotomata, which were at first absolute scotomata for form, became in the process of recovery

scotomata for colour only, and eventually disappeared, while there was still considerable peripheral contraction of fields.

In the central defect of vision from tobacco the scotoma for colour may be absolute, but is never, so far as I know, absolute for form. It is probable that there is in these cases disease of certain bundles of fibres in the optic nerves; but in the case just read it is likely that the functions of some cerebral centre were in abeyance; that no such disease of optic nerves existed.

The exact nature of this case seems doubtful. There are several objections to its being a case of hysteria, but it is very difficult to explain all the symptoms by intracranial lesions.

(*July 4th*, 1884.)

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4. *On a case of acute optic neuritis associated with acute myelitis.*

By Seymour J. Sharkey, M.B., and J. B. Lawford.

G. T—, æt. 17, kitchen-maid, was admitted into the Royal London Ophthalmic Hospital, under the care of Mr. Streatfeild, on November 22nd, 1883.

There was nothing noteworthy in the patient's family history, except that she was one of sixteen children, seven of whom died as infants. Eight were alive and well, four of whom were younger than the patient. There were no grounds for suspecting syphilis. She had always been delicate, but never seriously ill. Menstruation was regular but profuse.

Vision began to fail on the 9th of November, about a fortnight before she came under observation, and by the 13th she was quite blind. She had had neither headache, sickness, paralysis, nor fits, nor could she suggest any cause which might have given rise to her illness.

On admission she was found to be a well-nourished girl, looking tolerably healthy, but anæmic. She had no complaint to make except of her blindness. All the functions seemed to be well performed. The thyroid gland was the seat of a simple hypertrophy, and the patient said it had been large as long as she could recollect.

On examination of the eyes the pupils were found to be unduly dilated and motionless to light, but there was no paralysis of ocular muscles. Well-marked optic neuritis was seen in both eyes, accompanied by much swelling of the discs and of the retina immediately surrounding them. The veins were very tortuous, but there were no hæmorrhages and no choroidal changes. She had no perception of light. She was given a mixture containing ten grains of iodide of potassium, and in addition two grains of grey powder, and three of Dover's powder, three times a day.

On December 6th the pupils were found to act well to accommodation, but not to light.

On the 10th it was noted that no marked salivation had been produced. Both optic discs were decidedly swollen and their outlines lost, but the veins were not so tortuous as on admission, nor did the inflammatory swelling extend so far. There were no hæmorrhages. Five grains of blue pill and a quarter of a grain of the extract of opium were now given twice a day.

On the 12th, *i.e.* thirty-three days after her vision began to fail, she complained of weakness of the left leg, though she said she had noticed it coming on four days previously. On examination she was found to be unable to walk, although she could do so the day before. The left leg was almost powerless and slightly rigid, and sensation in it was impaired. The knee-jerk was much more marked than in the right leg. She had no pain in the head or elsewhere, no paralysis except in the left leg, and no abnormal mental symptoms.

13th.—Sensation almost absent in left leg and much impaired in right. Complete paralysis of left leg, slight

loss of power in right. Plantar reflex absent on left side, fairly marked on right. Knee-jerk very marked on both sides. Slight œdema of both legs, more marked in left. No paralysis of arms or face; no headache, pain in back, or incontinence of urine.

14th.—Anæsthesia extending up the left side of the trunk, reaching as high as the nipple in front and to a finger's breadth below the spine of the scapula behind. Left leg powerless and quite anæsthetic; right partially anæsthetic and more or less paralysed. Urine passed in bed for the first time. No paralysis or anæsthesia of arms, no headache, delirium, or fits, and no paralysis of cranial nerves. In the morning, shortly after the foregoing note was made, the patient became very excited, tossing her arms and right leg about, while the left leg remained motionless. When questioned she said that she had no pain, but that she could not speak. She appeared in great mental distress, but answered questions rationally and used the proper words. Soon she had a fit, but only the right arm and leg were convulsed, and she was not unconscious. The fit lasted about ten minutes.

In the afternoon of the same day she was much quieter, but still tossed her arms and right leg about; the latter was quite anæsthetic, while the left had not only lost sensation, but was likewise completely paralysed. There was marked flushing of the face during the period of excitement; the pupils were equal and dilated. The temperature at 5.30 p.m. was 100·2° F., the pulse 96 and regular, the bowels constipated.

15th.—Quiet all night; paralytic conditition the same as yesterday. Emotional and excited at times. Evacuations passed involuntarily. No sickness, no headache; tongue coated. Pulse 106, regular; temperature 100° F. Lungs and heart normal. The patient was now admitted into St. Thomas's Hospital under the care of Dr. Bristowe.

19th.—Seventy-six ounces of urine were drawn off, and it was found to be clear and acid, but offensive and containing a trace of albumen.

22nd.—Examination showed that there was complete paralysis of both legs and loss of control over the evacuations, and, in addition, evident weakness of the left hand. Loss of sensation was found not only in the legs and over the greater part of the trunk, but likewise in the left forearm and hand on the ulnar side. There was no ankle-clonus; the knee-jerk was excessive on the left side, about natural on the right. No tendon reflexes obtained in the arms.

23rd.—Sensation impaired in right forearm and hand. Complaints made of pain in the lower part of the abdomen.

26th.—Urine muddy, offensive, alkaline, and containing triple phosphates, mucus, red blood-corpuscles, and leucocytes.

January 4th.—The condition of legs remained the same. Sensation was impaired in the forearms. The urine was offensive and contained pus. Dr. Kilner examined the muscles and nerves electrically and reported that they presented the "reaction of degeneration." The temperature, which had been only moderately raised up to December 29th, after that became very high and of an intermittent type, ranging from about 101° F. to 104° F. or 105° F. The patient also complained of pain in the epigastrium and right side.

After this but little alteration occurred except that the presence of peritonitis became evident, and slight double external strabismus was noticed. The patient died on January 10th, sixty-two days from the time when her vision first failed and twenty-nine days after the first appearance of symptoms of paralysis.

Autopsy (twenty-nine hours after death).—Body well nourished; subcutaneous fat abundant. On opening the abdominal cavity, acute peritonitis was found, though the inflammation was most intense in the pelvis. When the abdominal wall above the pubic symphysis was cut through the subperitoneal connective tissue in that region was seen to be infiltrated with pus; and this inflammation,

though external to the bladder, appeared to have been caused by the acute cystitis which was present, the inflammatory process having spread through the wall of the viscus and attacked the connective tissue around. The peritonitis too seemed to have had a similar origin.

The ovaries were swollen and hyperæmic and the mucous membrane of the uterus was intensely congested.

In addition to very acute cystitis there was inflammation of the ureters and of the pelvis of both kidneys. The latter were much enlarged, hyperæmic, soft, and juicy. Their capsules were thin and peeled off easily, and groups of suppurating points were seen in the cortex beneath them. These were the terminations of inflammatory streaks and lines of suppuration which radiated from the pelvis.

The left ventricle of the heart was slightly enlarged, but with this exception the intra-thoracic viscera were healthy.

The thyroid gland was considerably hypertrophied, but contained no cysts.

The liver was pale and soft, but otherwise normal.

The brain was in every respect normal except that the soft commissure was absent. No inflammation could be detected anywhere. The pituitary body was large, pale, and mottled.

The cerebral sinuses were natural and no abnormality of any of the cranial nerves was observed.

The spinal cord presented no abnormal appearances except over a space of two or three inches in length in the lower cervical and upper dorsal regions. Here it was intensely congested and much softened, but not diffluent. The section-surface was bright pink, and blood oozed from a great number of distended vessels. The cervical region above, and the dorsal and lumbar regions below, the softened part presented no evidences of disease. The membranes of the cord seemed healthy.

Microscopical examination of the spinal cord.—Sections of the spinal cord were cut, stained, and mounted in the usual way. Four regions were selected for this purpose:

1. The lower cervical region, where naked-eye changes due to disease were observed at the autopsy.

2. The upper cervical region, above the area of evident disease.

3. The upper lumbar region; and

4. The lumbar enlargement.

1. *Lower cervical region.*—On holding up a prepared section of this part of the cord towards the light it was seen to be almost homogeneous in appearance and to stain imperfectly. One could scarcely distinguish even the grey matter from the white. On further examination with the microscope the whole area of the section was seen to be crowded with small cells, apparently leucocytes, which stained deeply with logwood. The vessels were greatly dilated, their sheaths were occupied by leucocytes, and many of the smaller ones were filled with these cells. The white substance of the nerves themselves was granular, and the large stellate and other cells were seen with great difficulty. Those which could be made out presented no processes, and their protoplasm in many instances had lost its natural granular appearance and was transformed into a homogeneous hyaline substance. All the nerve-cells and their nuclei took the staining either imperfectly or not at all. The pia mater had shared but slightly in the general inflammation. In short, that part of the cord which was soft and hyperæmic to the naked eye was the seat of an intense inflammatory process which had not, however, gone so far as to produce gross disorganisation.

2. *Cervical region above the seat of disease.*—Although at the post-mortem examination this part of the spinal cord presented no abnormal appearances, it did so after it had been hardened, and still more clearly after it had been stained and mounted. The columns of Goll, and these columns alone, were the seat of an acute inflammatory process, which was in an earlier stage than the myelitis below. Its distribution was just that of ascending degeneration.

3. *Upper lumbar region.*—Neither with the naked eye

nor by the aid of the microscope could any disease be detected in this part of the cord, either in the lateral regions or elsewhere.

4. *The lumbar enlargement* presented morbid appearances to the naked eye (but only after the sections had been stained and mounted) in the columns of Goll. They appeared to be more transparent than the rest of the posterior columns, and resembled the central grey matter. The microscope showed that this was due to complete granular degeneration of the nerve-fibres; some of the vessels in this region were crowded with leucocytes, but otherwise there was but slight evidence of inflammation. In the anterior cornua some of the vessels contained an abnormal number of leucocytes, and some of the ganglion cells were more homogeneous than they are in health. The membranes were everywhere healthy except in the lower cervical region, where the pia mater was seen to share in the general inflammation of the spinal cord.

Microscopical examination of the under surface of the frontal lobes of the brain, of the meninges about the chiasma and optic tracts, of the chiasma and tracts, and of the right optic nerve, disc, and retina.

Under surface of frontal lobes of brain.—Slight signs of inflammation were evident in the pia mater and in the small vessels entering the cortex, but the morbid changes could not be traced deeper than the two superficial layers of the grey matter. In the first and second layers, especially in the former, there seemed to be a larger number of connective-tissue corpuscles than usual.

Meninges about chiasma and optic tracts (teased) presented evident though slight signs of inflammation.

Optic tracts (transverse section).—Changes of equal degree were seen in both tracts. There was increase in the number of staining nuclei throughout them; near their periphery these nuclei formed a border two or three deep, which encircled the tracts. The small vessels showed

distinct inflammatory changes. The larger nerve-cells in the brain substance on which the tracts rest appeared to be normal.

Chiasma (transverse section).—Marked signs of inflammation present. There was a great increase in the number of connective-tissue corpuscles throughout, and surrounding the small vessels were large accumulations of these cells. The coats of the small vessels were thickened, and studded with stained nuclei. Around most of the vessels were clear spaces, œdema spaces (?).

Right optic nerve to the naked eye appeared normal. In a transverse section, on a level with the optic foramen thickening of the sheaths, especially of the inner, was observed. In the sheath-space there was a considerable amount of recent inflammatory material, as there was also in the small vessels. The trabeculæ in general were thickened, though they appeared more so in some places than in others. They enclosed many stained nuclei. The latter were also present in largely increased numbers throughout the bundles of nerve-fibres. Alongside the trabeculæ, between them and the nerve-fibres, were spaces containing a very faintly granular material which did not stain. These, which were probably lymph-spaces, were of greater width than is usually observed.

In transverse sections close to the globe were changes similar to those just described. The increase of stained nuclei appeared to be greater in the peripheral than in the central parts of the nerve.

Right disc and retina.—The sheath-space close to the disc was very slightly distended. Swelling, considerable in degree, involved the disc and the nerve-fibre layer for some distance towards the periphery. The stained nuclei were very numerous in the disc and in the two inner layers of the retina. Inflammatory changes were present in the vessels, and a large hæmorrhage was seen in the retina close to the disc, which involved all its structures except the nerve-fibre layer.

In short, microscopical examination proved that there

was intense inflammation of the optic discs, nerves, and chiasma, and that it involved, though less severely, the optic tracts. The meninges about the chiasma and on the adjacent under surface of the frontal lobes presented slight evidences of inflammation.

The interest of the case just related lies in the association of an acute optic neuritis with acute inflammation of the spinal cord. Gowers in his work on 'Medical Ophthalmoscopy' refers to five cases recorded by Clifford Allbutt, Seguin, Noyes, Steffen, and Erb, in which spinal symptoms, apparently due to myelitis, were present in connection with changes in the optic discs. Some of these, however, appear to have been uncertain in their pathology. It has long been known that affections of sight, which are generally due to slight changes in the discs and retina, occasionally occur in cases of spinal injury, and especially in injuries of the higher parts of the spinal column. But it is not so well known that optic neuritis is sometimes associated with spinal myelitis where no injury has been sustained.

In the 'Archives of Ophthalmology,' for 1882, No. II, edited by Knapp and Schweigger, a very interesting case is recorded by Julian J. Chisholm, M.D., which appears to correspond with ours except that it was much more rapidly fatal. Unfortunately an autopsy was not obtained. The patient was a man, æt. 28, healthy and robust. Without evident cause he suddenly felt pain on movement of the eyeballs, and his vision became slightly cloudy. By the third day he was completely blind. Then loss of power and sensation in the lower extremities supervened, and paralysis advancing upwards, similar to that in our patient, proved fatal on the twelfth day from the first sign of illness. His brain remained clear until a few hours before his death.

Dr. Dreschfeld published two cases, with accounts of the post-mortem examinations, in the 'Lancet' for 1882, and these are quoted by Dr. Gowers.

Case 1 was that of a married woman, æt. 38, in whom numbness and weakness occurred in the legs after exposure to cold three weeks before she came under observation. On admission into the hospital the lower extremities were found to be completely paralysed and the upper partially so, and she had retention of the evacuations. There was marked double optic neuritis, but vision was good.

Post-mortem examination revealed congestion of the cerebral membranes and excess of fluid in the ventricles. One and a half inches of the spinal cord at the cervical enlargement were exceedingly soft and of a yellowish colour.

Case 2 was that of a man, æt. 41, who had been intemperate and had had syphilis. One month before admission his sight failed and his legs began to get weak. On October 5th (apparently about a fortnight after he was taken ill) he was examined at the Manchester Eye Hospital and found to have optic neuritis, and at that time he could walk with the aid of a stick. On 13th he was quite blind, but could still walk with support. On 22nd he was admitted into the general hospital. He was quite blind, and the optic nerves were atrophied. He had complete paraplegia with analgesia of the legs, and with anæsthesia and analgesia of the trunk as high as the fourth rib. There was no affection of the arms but he had retention of urine and involuntary action of bowels. On November 2nd the patient died in a comatose condition, the legs having become anæsthetic, the patella reflexes having disappeared, and the intercostal muscles having ceased to act.

At the autopsy the membranes of the brain were normal and the brain itself quite healthy. The membranes of the cord were also intact. There was extensive central myelitis in the middle of the dorsal and in the upper lumbar regions, extending over about one and a half inches in each situation. The cord between these spots was slightly softened. The microscope showed that the brain, the chiasma, and the proximal part of the optic

nerves were healthy; the peripheral portion of the latter contained an excess of fibrous tissue. Besides the pathological changes just mentioned there were patches of acute myelitis in the right side of the lower cervical and upper dorsal regions; a second patch just below this, and a third in the lower lumbar region affecting the posterior columns.

The conclusion which both Gowers and Dreschfeld draw with regard to these cases is that the optic neuritis and the myelitis are associated phenomena due to a common cause, but that neither depends directly on the other. Our case seems to point very strongly in this direction. For the acute optic neuritis was present certainly one month before any symptoms of disease of the spinal cord appeared. Moreover, post-mortem examination showed that the spinal cord between the lower cervical region and the lumbar region was healthy, so that these centres of disease must have originated independently one of the other. The same may probably be asserted with regard to the optic nerves and the seat of disease in the cervical region, as there was no evidence of continuity between the inflammatory processes going on in these situations. Unfortunately, absolute proof of this is not at hand as the medulla oblongata was not kept for microscopical examination. Still the case may with great probability be said to be one of acute optic neuritis associated with acute disseminated myelitis. The cause which gave rise to these morbid changes, however, remains quite obscure.

Clinically such cases as these are of considerable importance. Before attention had been called to them the association of acute optic neuritis with paralytic phenomena would have justified the diagnosis of cerebral disease. And in the present instance, although the symptoms were not very intelligible from that point of view, the case was looked upon as probably one of brain disease. Acute optic neuritis will therefore have to lose some of its significance as a sign of intracranial affection.

With reference to prognosis our data are insufficient to

allow any definite conclusions to be drawn. But as far as observations at present go, it seems that where acute disease of the optic nerves is associated with acute disease of the spinal cord the chances of a favourable termination are not great.

(*June 5th*, 1884.)

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5. *On cases of recovery from amaurosis in young children.*

By E. Nettleship.

Cases of blindness, or of very defective sight, in infants or young children, due to disease of some part of the optic nerve or of its central connections, although rather rare, are probably familiar to all the members of this Society. I am half afraid lest, in stating that some of these babies recover good, perhaps perfect sight, I may be saying what is equally familiar, but at any rate the subject, although one of considerable interest, has not hitherto been brought forward here. It may be as well to state that the following cases do not include any examples of local ocular disease, such as choroido-retinitis in the early stage of inherited syphilis, or cases of recognised papillitis.

Excluding these conditions I was not myself aware that amaurotic babies ever recovered their sight until the occurrence of Case 1 (below), which was under my care about seven years ago, and the notes of which were not very full. This child saw well till he was nine months old, then, without any other symptoms, he lost his sight. When seen, three weeks later, there were no ophthalmoscopic changes. Under two months' treatment with grey powder his sight returned. The child had had no recognised symptoms of disease of the nervous system, but he was probably syphilitic and had had hooping-cough and "inflammation of the lungs."

Case 1.—Francis M—, æt. 10 months, was brought to the South London Ophthalmic Hospital in August, 1877, his mother stating that he had not "taken notice" well for the last two or three weeks though he had previously seen quite well. A careful ophthalmoscopic examination, made under chloroform after the use of atropine, showed no changes whatever; the state of the pupils before atropine was not noted.

The child was the first born, and the mother said that when three or four weeks old he had thrush, eruption about the buttocks, and snuffles; there were, however, no signs of syphilis when he was brought. He had "inflammation of the lungs" when four months old and hooping-cough afterwards.

I ordered a grain of grey powder every night, and this he took for two months, when it was left off on account of a bad cough.

In December, four months after admission, the note is "he evidently sees much better."

The next case which I saw was about two years later (November, 1879), and was as follows:

Case 2. *Blindness at, or soon after, birth; recovery of sight at about the age of nine months; marked pallor of one disc; no cause ascertained.*—Herbert T—, was brought to St. Thomas's Hospital (T. 3, 1) in November, 1879, at the age of three months, because he had "never taken notice." The pupils did not act to light but dilated well to atropine. The right disc was very grey all over but quite clear with the exception of one or two small white spots at its centre; the vessels not diminished. The left disc was much less grey, perhaps normal; refraction H. in each eye; no nystagmus. The child was healthy and well-grown and had had no fits, but was born three weeks before time, soon after the mother had received a fright from a fire in the house. No evidence of syphilis. His hearing was good and he sucked well. The sutures were rather ridged and fontanelles small, I thought. The parents were

young, healthy, not related by blood, and gave no family history of mental or nervous diseases; they had one other child and it was in good health. A first cousin of the mother (patient's first cousin once removed) had been nearly blind since childhood from "weakness of the nerve," but I did not see him. I gave an unfavourable opinion and the parents then sought other advice. A few months later the child began to notice things, and it was observed that at first he would hold objects to one side rather than straight before him. I saw him again in July, 1880 (eight months after he was first brought to me), and it was evident that he could then see very well; there was some irregular movement of the eyes, however, and vision was therefore probably not perfect.

At the meeting of the British Medical Association at Worcester, in 1882, cases of the kind we are considering were referred to,* and more than one speaker mentioned having seen such. I have more lately learnt from Dr. David Lees and Dr. Barlow, that they have for some time been quite familiar with cases of recovery from temporary blindness in young children affected with "posterior basic meningitis." In a paper by Drs. Gee and Barlow, "On the Cervical Opisthotonos of Infants,"† a title which seems to be the clinical equivalent of "posterior basic meningitis," I do not, however, find amongst twenty-five cases any in which the sight was noticed to be defective; but in many of these cases the children were, no doubt, too ill for their sight to be examined. Leaving the pathological questions, however, to others, my present object is to ask what facts, in the history and present state of an amaurotic infant, point to the probability of his recovering his sight?

There is one group, long known but not I think yet fully examined, in which a favourable prognosis should probably never be given; in these patients the sight is

* See 'Brit. Med. Journ.,' 1882, vol. ii, p. 1081, "On the Value of Eye Symptoms in the Localisation of Cerebral Disease."

† 'St. Bartholomew's Hospital Reports,' vol. xiv, 1879.

defective or absent from birth, several children of the same parents are often affected, and there is frequently kinship between the parents. Some of the patients are quite idiotic from birth, others decidedly stupid or weak, though some are quite intelligent. The discs may be healthy or more or less atrophied. In the milder cases, when the sight is not very bad, we often find total colour-blindness, and it is probable that most cases of total congenital colour-blindness are really instances of congenital disease of the optic nerves.

Cases 17, 18, and 19 given below illustrate this irrecoverable infantile amaurosis, and I may refer to others.*

It is interesting to observe that in some of these irrecoverable cases, although the child may seem to be absolutely blind, the pupils act well to light; this was so in Case 17, a perfectly blind youth of seventeen years old and good intelligence; the same is also noted in Case 19, an idiot of twenty-one months old, apparently quite blind. In the latter case the fact might perhaps be explained by the retention intact of the reflex centre for pupillary action in or near the corpora quadrigemina, although the higher centres were wasted or atrophic. This supposition seems borne out by a case published by Dr. Walter Edmunds† of a totally blind idiot, æt. $2\frac{1}{2}$, without definite ophthalmoscopic changes, in which I had noted that the pupils acted well to light. At the post-mortem Dr. Edmunds found external hydrocephalus, the cerebral hemispheres and optic thalami very small and ill-developed, but "the corpora striata, cerebellum, and other parts of the brain were normal.†" On inspecting the specimen, which is in the museum of St. Thomas's Hospital, I find that the corpora quadrigemina are quite healthy looking and plump, contrasting most markedly with the adjacent optic thalami.

* Nettleship, 'St. Thomas's Hospital Reports,' vol. x, 1880, and references therein to Landolt and Donders.

† Walter Edmunds, 'Path. Trans.,' xxxii, p. 4, (for 1881).

Returning to the subject of the paper. We may say that recovery of sight is likely, though far from certain if we get some such history as the following:—That the child could see well till some months after birth, sometimes, indeed, for a year or more (Cases 4, 5, 6, 7), occasionally as long as three years (Case 8), and that then sight was lost during an illness with cerebral symptoms, often diagnosed as meningitis. When the child has become well enough it is brought because it cannot see; in some cases the blindness seems absolute, but in others the child follows with its eyes a bright light in a darkened room, although in ordinary light it does not notice objects. I do not think much help is to be got from the pupils; they are often rather too large, but they act more or less to light in the cases of imperfect blindness; in one (Case 9) the natural contraction during sleep was noticed to occur. In the majority the ophthalmoscope shows either no changes at all (Cases 1, 4, 5, 8, 9) or merely doubtful pallor of the discs (Cases 6, 11, 12). In two (Cases 2, 7), one disc was very pale and suspicious of previous inflammation, whilst the other was perfectly healthy; and in Cases 3 and 8 there was also some difference between the two eyes. The child when brought generally seems pretty well, though sometimes very fretful; often, however, he is unable to stand or even to sit up, though he may have learnt to run before the illness. Occasionally the blindness is the only symptom that has been noticed, and of this the two first cases, those just narrated, were examples. I could not get either a syphilitic or tubercular history in any large number of my cases.

It is impossible to say how long the blindness lasts, but so far as can be ascertained it seems usually to be from one to six months before improvement begins, and recovery takes place rather slowly. In Case 8 the whole process, however, did not take more than a month at most, though severe convulsions, &c., occurred. In Case 10, altogether anomalous, complete blindness lasted only five or six days, and there were scarcely any other

symptoms; the case is given in detail below. Recovery of sight, more or less complete, was proved in Cases 1, 2, 4, 5, 6, 7, 8, 9, 10. In two cases (Cases 11 and 12) a cerebral illness occurred without subsequent improvement of sight, and one of these (12) died shortly after she was seen, but no post-mortem could be made. In another (Case 3) the child was thought to see well till aged 5 months, when she became very nearly blind and remained so; she never learnt either to stand, sit up, or speak, and was soon evidently idiotic; later (about two to three years of age), the left arm and leg became paralysed and contracted, and the left disc, previously healthy like the right, became atrophic. In Case 8 also the damage both to limbs and eye was chiefly on one side (the left).

In regard to the local cause, we may infer that intracranial inflammation certainly takes place, and perhaps spinal mischief as well; as evidence we have the extreme weakness of the legs and back, which often remains long after recovery from the illness and after recovery of sight (Cases 5, 6, 7, 9). The arms do not seem to suffer, or if they do, they recovery quickly. But before we can explain the mechanism of the blindness, ophthalmoscopic examinations must be made in the early stage of the blindness, and microscopical examination after death in cases proving fatal while the sight is still lost. It is possible, though unlikely, that papillitis occurs and quickly passes off;* but if so there must be some other local cause for the long continuance of blindness after the discs have recovered, and perhaps this may prove to be pressure by fluid in the ventricles. Such an accumulation of fluid was found after death in several of Dr. Gee's and Dr. Barlow's cases of posterior basic meningitis before

* In a letter answering some questions about Case 12, below, Dr. David Lees writes as follows:—"In cases of posterior basic meningitis (non-tubercular), in which retraction of the head is a pathognomonic symptom, amaurosis is not unfrequently present, often with pallor of discs, whilst papillitis is exceedingly rare. In some of these cases perfect recovery of sight occurs, but I have notes of one, at all events, in which the amaurosis continued after recovery in other respects."

referred to. Mere pressure, however, does not seem to afford a satisfactory explanation when either the ophthalmoscopic change, or the recovery of sight, is unequal in the two eyes, or when hemiplegia is observed on the same side as the more affected eye (Cases 2, 3, 7, 8, 9).

The following are the cases (in addition to the two already detailed) on which the foregoing remarks have been based:

Case 3. *Failure of sight at age of five months (?); premature closure of fontanelles; no ophthalmoscopic change. Later, idiocy; paralysis of left limbs and pallor of left disc; ? improvement of sight.*—(T. 1, 210.) Frances U—, brought to St. Thomas's Hospital July 24th, 1878, æt. 16 months. Youngest of two children; the eldest is alive and well. Is believed to have seen well till age of about five months. Has had no fits; seldom cries but sometimes starts. Fontanelles are said to have closed very early. No consanguinity in parents, and no known history of idiocy in family. Patient is well grown and placid. Cranium rather small across the temples and the sutures ridged; cannot stand, sit up, or speak. It is doubtful whether she perceives light; other senses good. Pupils not noted till after atropine, when they were well dilated. Oph. quite negative.

September, 1880.—(Aged 3½). Cannot speak, feed herself, or walk, but screams when interfered with; cranium does not seem very small. Right hand strong and she kicks with right leg; but left hand is kept flexed and left leg hangs limp; she has "a sort of little fit when she opens the left hand and stretches herself." Is very constipated and lives chiefly on brown bread and butter. Oph. (examination under chloroform), both discs normal.

Another child has been born since former visit, and is healthy.

February, 1882.—(Aged 5). Quite idiotic; good tempered; hears well and makes noises, but cannot speak or stand; limbs in same state as at last note and still has

the "little fits." Now evidently has some sight for she looks promptly at the light with each eye separately. Pupils too large, but both act quite decidedly and separately to light. Oph., right optic disc quite healthy, of good colour and not too sharply defined; left disc much clearer and greyer, evidently partly atrophic.

In this case I have no note as to syphilis.

Case 4. *Failure of sight with fits and vomiting at seventeen months old; no ophthalmoscopic changes; rapid improvement of sight; no evidence of syphilis. Death of previous child from "fits."*—Joseph G—, æt. 18 months, was brought to St. Thomas's Hospital on December 18th, 1881. (T. 4, 14.) He looked healthy but was fretful; head well formed and neither large nor small; fontanelles closed. The pupils were of ordinary size and acted well to light, though the child took but imperfect notice even when bright light was suddenly thrown into his eyes. The eyes were examined after atropine and under chloroform, but no changes could be made out.

The child was suckled for fifteen months, had begun to speak and to run about, and had had no children's complaints, when, about a month before admission, he had four or five fits within a fortnight. He was ill and vomited a little between the fits; when he got better, a fortnight before admission, his mother found that he seemed blind and had become very fretful. His sight and his temper had previously been good.

A month after admission (January 17th, 1882), he evidently saw better, took notice of the light quite well, and sometimes seemed to see large objects.

The patient was the youngest of five, all born alive; the fourth died at a year old of "fits;" the third of scarlet fever at three years; the two eldest were living. There was no obvious history or evidence of syphilis. Both parents were alive and well; a sister of the father died of "consumption."

CASE 5. *Blindness during severe cerebral illness, probably meningitis, at age of fourteen months, followed by prolonged weakness of legs and irritability of temper; no ophthalmoscopic changes; recovery of sight.*—George H—, æt. 16 months, was sent to St. Thomas's Hospital by Dr. Purkiss, of Brentford, who has favoured me with the following information as to the previous part of the case:

On June 26th, 1883, Dr. Purkiss was sent for and found the child ill with constipation and frequent vomiting, but with no characteristic symptoms of meningitis.

On July 4th he was worse and emaciation well-marked. Dr. Purkiss diagnosed tubercular meningitis.

On 19th and following days he was extremely low, much emaciated, and had some slight convulsions with clenching of hands and turning of eyes. He continued in a very critical state for about a fortnight, but gradually rallied under the very frequent use of concentrated liquid food and stimulants. As soon as consciousness returned the child was found to be "blind." In reply to further inquiry, Dr. Purkiss writes that for about three weeks of the illness there was marked retraction of the head and rigidity of the muscles at the back of the neck. Temperature not recorded.

The child was brought to me on August 30th (two months from the onset of the illness), because he was believed to be blind. He had then regained his usual health, except that he was still fretful, that he could not stand, and could not see. He took no notice of ordinary things, but when the light of the lamp was thrown into his eyes by the mirror, he generally looked at it and began to cry. Pupils rather large (about 5 mm.), but contracted a little to light. Before the illness he had been good-tempered and able to run and to see well. Though so fretful I found that he was at once and perfectly quieted by the jingling of a bunch of keys; and the fundus, examined at leisure with this help, was found perfectly healthy in each eye. I have never seen a baby quieted in such a very marked way by sound, and the

fact is the more curious as the effect of the ophthalmoscopic light without the sound was to make him cry.

There was nothing particular in the appearance of the child; the head was of ordinary size, the fontanelle not quite closed. No signs or history of syphilis. No history of fits. Three weeks before the illness began he fell out of bed and hit his head, but nothing was thought of the occurrence at the time.

Ordered a grain of mercury and chalk twice a day.

September 13th.—Much better in health and temper. Sight seems unaltered.

October 8th.—Sight much improved; mother thinks he can now see as well as most children.

30th.—Seems to see quite well; pupils act well to light, but are larger than is usual at his age. Disc well seen in one eye, and is quite healthy. Is beginning to stand again, but cannot do so without being held. Has cut four double teeth since admission.

August, 1884.—I have heard since the above was written that the child remains well.

Case 6. *Blindness during severe cerebral illness, probably meningitis, at the age of twelve months; blindness and weakness of legs remaining six months later; complete recovery of sight.*—Bathsheba D—, æt. 18 months, was sent to me by my then colleague, Dr. Lubbock, at the Hospital for Sick Children (p. 62).

She was the youngest of five children, all living, and there had been one miscarriage. No history pointing to syphilis in the family. One of the other children had "consumption of the bowels," but recovered; the maternal grandfather died of "consumption" æt. 38.

The patient, who was suckled, was perfectly well till twelve months of age, and had begun to walk and talk when she was taken ill with what the medical attendant (Dr. A. F. Stevens) considered to be undoubted meningitis. According to the mother the child was "insensible" for three months, and used to lie quiet "as if dead,"

but "never lost her hearing"; there were no convulsions. Though she could hear, the mother found early in the illness that she could not see, and the blindness remained after the child had recovered in most other respects. Her speech returned early.

When Dr. Lubbock sent her to me on June 14th, 1882, she was eighteen months old, a fine, fat, good-tempered baby with sixteen teeth, and still at the breast. The mother said the child had quite regained her intelligence, but was only just beginning to get back the use of her legs. Head rounded; anterior fontanelle, situated on the top of the cranial arch, still open. Had been "blind" for six months, but as she sometimes looked at the ophthalmoscopic mirror during examination in the dark room she no doubt had some perception of light. Pupils usually got smaller when she looked at the light, but did not always dilate when covered. I could not tell satisfactorily whether their action was reflex or only associated with movements of the eyes; they dilated to 6 mm. under atropine. Oph., discs rather pale, central vessels normal, no other changes.

July 18th (five weeks later).—Mother thinks child has begun to see a little for about the last three days. She now, on trial, seems to follow objects if placed in the middle of the field of vision.

August 1st.—Seems to see better. Pupils now act well to light.

July, 1884.—Now æt. 3½; very intelligent and good-tempered, but excitable. Walks and runs well, can see perfectly so far as can be ascertained, and has been able to do so for about eighteen months; sight was very bad for about nine months, and then returned gradually and was as good as it is now about twelve months after the illness began.

Further particulars of the illness and recovery.—Illness came on suddenly with sickness one night; had no previous warning except that she had stopped growing for three months before. Was insensible for at least three months, quiet, never crying, and unable to suck because

jaw dropped. First sign of recovery was that she started at noises; next she regained speech. Was "paralysed" in legs and back for a long time; recovered very gradually and could not walk again well, until a few months ago, though she had been able to sit up for some time before. Has had measles and bronchitis since the meningitis.

Case 7. *Fits and vomiting a few weeks after scarlet fever at the age of fifteen months; blindness and prolonged weakness of legs; gradual recovery of one eye with healthy disc; blindness of other eye with atrophy of disc twelve months later.*—Charles M— had scarlet fever when fifteen months old; the other children in the house had it at the same time. He was not thought dangerously ill by the doctor. Three weeks after recovery he began to vomit, and continued to do so during the next fortnight, after which he had a number of fits during about a month; he became stiff in the fits. He became blind sometimes during the fits. The mother gave some account of swelling of the right hand and arm at about the same time.

He was brought to St. Thomas's Hospital in February, 1881 (T. 3, 153), five months after the scarlet fever. He was then twenty months old, and though looking well was very fretful. He could use his hands well, but could not stand. He did not take the slightest notice of the light from the ophthalmoscope mirror in the dark room. Pupils quite motionless and dilated (about 6 mm.). Oph., left o. d. quite healthy, central vessels normal; right o. d. rather pale, decidedly different from left, vessels normal. Before the illness he had been able to stand.

February, 1882 (twelve months later).—Can now see very well with left eye and has been able to do so for several months; can pick up small things with this eye open; o. d. normal. Right eye seems quite blind when tried with left covered; o. d. very pale and rather hazy. Pupils not noted. Is well; talks and uses his hands well, but has not regained power of standing.

Case 8. *Blindness with paralysis of left arm and leg, following convulsions, vomiting, and unconsciousness of a week's duration, at three years of age; recovery of sight first in right eye, then in left; permanent weakness of left arm; no ophthalmoscopic changes.*—Ada K—, æt. 4, was brought to St. Thomas's Hospital on May 24th, 1883, with the following history: She had had good health (with the exception of an attack of chicken-pox at the age of two) till ten months before admission, when one Saturday, as she seemed "feverish," her mother gave her a powder at bedtime. Next day (Sunday) the child vomited several times, and in the evening went off in a fit and was convulsed for ten hours. After this she was unconscious ("did not know anyone") for a week. When she came to herself again she was blind of both eyes and unable to use the left arm and leg. When there was a light in the room she would say it was dark, and when they told her there was a light she would ask where it was. The mother believes that the sight of the right eye soon returned, for before long she found out by trying one eye at a time that the child saw with the right and not with the left. Even the left (worse) eye got to see again in two or three weeks.

When I saw the child she appeared to see quite well with each eye, picking up pins readily when either eye was covered; the pupils were active to light, and the fundus (examined under atropine) showed no changes in either eye. The left arm was still weak, and it shook when she tried to use it, and she was lame of the left leg.

The child was the fourth of six; she had chicken-pox two years before, and measles several months after the attack above described. No history of characteristic syphilitic symptoms. The first child (male) died at two years of "consumption," second (male) died at eleven months, "consumption and water on the brain," third (female), æt. 10, is delicate, and has been under treatment at Brompton Hospital; fifth, miscarriage; sixth (female), æt. 2⅓, in good health. Parents living; the father had

lost two brothers, two sisters, and his own father of consumption; the mother lost a brother by the same disease.

In this case it is, of course, impossible to say that papillitis did not occur and end in rapid and perfect recovery.

Case 9. *Blindness during illness, "basic meningitis," at 10 months old; slow recovery of sight in left eye, doubtful improvement in right; wasting of right side of face; no ophthalmoscopic changes; prolonged weakness of legs and back.*—Ada Knight was well till nine months of age, then she became ill and was "insensible" for a week, and during the illness became blind. She was admitted at the Hospital for Sick Children under my then colleague Dr. Bridges, who diagnosed "basic meningitis," and after a time transferred her to me on April 5th, 1881.

My notes are substantially as follows (p. 23): She is now twelve months old, head enlarged, and fontanelles very widely open. "Has been blind about two months," no other note as to vision. Pupils are partly under atropine. Oph., right o. d. slightly pale, but quite clear, left o. d. normal; refraction H. in each. To take cod-liver oil and mercury and chalk.

May 10th.—No change.

June 14th.—Much better in health and more lively; head no larger. Pupils now act well to light when child is awake, they are small during sleep and dilate naturally as she wakes. Oph., same.

July 25th.—No change. Cannot sit up.

October 13th.—Mother says child has been able to see for a month past, but she thinks right eye does not see so well as left. On trial with both eyes open the child evidently sees an object held straight in front of her; she seems not to see it so well in the lower part of the field. Fontanelles smaller, but not closed. Can now sit up better, but cannot raise head when lying down, and has not the least power of standing.

January 10th, 1882.—Still cannot raise her head when

lying down, cannot stand, but has improved in health and general strength.

February 7th.—Sees a threepenny-bit quite well. Has begun to talk, and is stout and good-tempered. Anterior fontanelle nearly closed. Uses both hands well, but cannot stand. Right side of face is smaller than left, and right eye (thought to be the worse of the two) sometimes deviates outwards and upwards. Pupils act well to light. Oph., left o. d. (better eye) now thought to be clearer and more grey than right (note made before referring to note of former examination).

October 31st.—Still cannot walk or get up if lying down, but talks well, can repeat some verses, and is quick at imitating people. Can see to pick up a pin. She fixes with both eyes when looking attentively, but the right often deviates as at last note, when her attention is not roused. Reflex action of ps. full and brisk.

Case 10. *Rapid and complete blindness with dilated pupils in a child of three and a half years. No ophthalmoscopic changes. Complete restoration of sight in two to three weeks. No marked cerebral symptoms. Old rickets.* —Thomas B—, æt. 3½, was sent to St. Thomas's Hospital on May 18th, 1880, by Dr. Bott, and the following history was obtained:

The child has been pretty healthy except for hooping-cough and bronchitis when a year old, and occasional attacks of sore throat since. Had rickets badly, and there is still slight bowing of the tibiæ and beading of the ribs. Has had no fits.

For the last six weeks has not seemed well; has been drowsy and listless, and has ground his teeth. No history of injury to the head. On the night of Friday, May 14th, he suddenly screamed. Nothing particular was noticed on 15th, but on Sunday 16th towards midday his mother noticed that his eyes looked "peculiar," and the child said he could not see properly; by evening he was so nearly blind that he could only just tell where the window

was. The next day his parents thought he was totally blind, and the father, an intelligent man, noticed that the pupils were large and did not act when exposed to the light. He was brought to the hospital the following day.

Condition on admission 2 *p.m. on Tuesday, May* 18*th.*—An intelligent quiet child; walks well; slight bowing of tibiæ, ribs beaded; head flat and square, a depression between the frontal eminences, a ridge along the sagittal suture. He appears, on careful trial, to have no perception of light; pupils large (right 6 mm., left 5 mm.); they seem to act a little to light, but he is difficult to test. Oph., appearances normal, except doubtful haze at (real) upper border of right o. d. Ordered three grains of iodide of potassium and two grains of grey powder each thrice daily.

21st.—Oph., still normal. Temperature at 3.30 p.m. 99·6° F.

25th.—For the last three days sight has been returning, and parents have noticed that pupils have acted to light. He now evidently sees all ordinary things fairly well, and goes about the room without knocking against things; he called attention to a gaspipe on the wall. Pupils now act freely to light, but right is still rather larger than left.

28th.—Sight still imperfect; can see people, but has to be told in which direction to look for them.

June 1st.—To-day can see to pick up a pin; and sees a shilling. Oph., still normal.

15th.—On the 10th, at breakfast, he vomited, and afterwards got drowsy and slept half the day. Now, appetite bad; bowels open three times a day, stools pale. Oph., still normal. Omit the iodide, continue the grey powder.

July 23rd.—Is still "peculiar" in his manner. Continue grey powder; to take also steel wine.

October 15th.—Has attended only once since last note. Is now quite well and sees perfectly.

Family history.—The patient is the seventh of eight children; the youngest, like the patient, is rickety. The

first died at eight years old of bronchitis after hooping-cough; the second of "consumption of the bowels and bronchitis" at nine months; the third of "croup" (age not stated); he was also rickety. There has been one miscarriage. The other three children are said to be healthy. The father denies ever having had any venereal disease.

In this puzzling case I had the assistance of my colleagues Dr. Payne and Dr. Barlow, neither of whom could find in the patient any signs of brain disease. Dr. Barlow thought the head rickety. The urine unfortunately was not examined; but there was no reason for supposing it unhealthy, and certainly none whatever for ascribing the blindness to uræmia. Compression of the chiasma by rapid temporary effusion into the third ventricle seems to offer almost the only explanation of the ocular symptoms, and it might perhaps account for the drowsiness and other slight symptoms which lasted for several weeks. I do not, however, know whether we are justified by pathological knowledge in assuming that such effusion might occur, and, after remaining a few weeks, be completely removed.

August, 1884.—Child, now æt. 7, is quite well, and sees perfectly. Goes to school. Oph., o. d. very clear in each eye, almost too clear, and perhaps rather pale.

Case 11. *Blindness during acute illness, probably meningitis at 6 months old. Doubtful pallor of discs, no improvement in six months.*—Walter C—, æt. 9 months, was sent to the Hospital for Sick Children by Dr. Piggot, of Beckenham, in March, 1881 (p. 13). The child saw well till an illness which began in December, 1880. Dr. Piggot then found him extremely restless, with twitching of limbs, rolling of head from side to side, and temperature 103° F.; during January he had three severe convulsions, and at Dr. Piggot's next visit after these the child was found to be blind (took no notice of the gaslight, &c.).

On admission (March) the child seemed by the usual tests quite blind, pupils not noted, oph., o. d. pale but clear in both eyes, retinal vessels normal, no other changes. Fontanelle large.

Patient is youngest of seven living children; all are reported in good health. There were, besides one miscarriage, one child which died a few hours after birth, and one which died at five months in convulsions after three days' illness.

July 26th.—Still takes no notice. Pupils of ordinary size (action not noted). Oph., left o. d. clear, perhaps too grey; vessels normal. Right o. d. not seen. Head no larger, fontanelle still open, is very fretful. No later information obtainable.

Case 12. *Failure of sight at age of* 4 *months,* (*?*) *after a long series of fits dating almost from birth. Discs normal* (*? grey*). *Death soon after admission.*—Daisy G—, was sent to me for examination by Dr. David Lees when five months old, on July 18th, 1882. The mother thought the child had been "blind" for about a month, but admitted that she looked at the fire and the sunlight. She took no notice of objects in daylight, but in the dark room she followed the light of the mirror accurately with the left eye, but less uniformly with the right. The pupils were of ordinary size, certainly not too large, they became distinctly larger when shaded, and contracted again when exposed; under atropine they dilated to 5·5 or 6 mm. The discs were sharply defined, perfectly clear, and rather pale or grey, "as I think babies' discs often are" (note made at the time), the vessels were normal, and no changes were found in other parts of the fundus. Head of ordinary size, fontanelle perhaps too small.

The patient was the sixth child and born at full time; would not suck, and had to be brought up by bottle. When a day old she began to have very numerous fits, being especially convulsed on the left side, followed by general spasmodic twitchings.

On admission in March, Dr. Lees noted "discs normal;" later, "slight retraction of head;" at age of 11 weeks, "pupils equal; no paralysis or strabismus."

The two children before the patient died at ten and eleven months old of measles and hooping-cough. The patient was the only one who had had fits.

Early in the mother's pregnancy with the patient she was much upset by the death of the fifth child from measles, but she was not definitely ill. I could not find any other facts of importance in the history. The child died a few days after her last visit to the hospital, but the fact was not known to us till a year and a half afterwards.

Case 13. *Amaurosis from birth in an infant; post-papillitic atrophy of discs; no history of cerebral symptoms or of syphilis; no recovery of sight.*—Susan S—, æt. 14 months (Hospital for Sick Children, March, 1881 p. 20). Mother married two years, only one pregnancy. Father healthy. No consanguinity. No known neuroses.

Has never taken notice. No fits or illness. No (indirect) history of syphilis except that she had a very little thrush round anus.

March 29th, 1881.—Child is considered intelligent (?). Is pale, thin, ill-fed, fairly good-tempered. Fontanelle very little open. Pupils usually rather large (about 4 5 or mm.), apparently do not act to light, but act with movements of eyes. Oph., discs very grey and decidedly hazy, (?) swollen; retinal veins enlarged; no other changes.

February 25th, 1882.—Takes no notice; pupils 4 mm., they act irregularly, but probably only from association with the ocular movements, not from effect of light; they dilate to 6 mm. under atropine. Eyes roll about irregularly, but usually look down, and upper lids droop over them. Child is passionate but intelligent; she constantly kneads her eyes with her fists. Can talk and walk well; nothing special about the cranium. Discs (seen only for

a moment at a time), hazy and of dirty yellowish grey colour; retinal vessels seem normal; choroid surrounding discs much paler than elsewhere; rest of fundus normal so far as seen.

This case is incomplete; but it is interesting as papillitis had evidently occurred, possibly before birth.

Case 14. *Blindness with doubtful pallor of discs coming on at about three months old, during illness with convulsions; syphilis probable.*—George G—, æt. 5 months (Hospital for Sick Children, May, 1881, p. 28). Mother says he could see well till a month ago, when he had convulsions, and was ill and languid and got blind. Has had snuffles and an eruption of spots. Patient is the second born; first (born nearly five years ago) died at three months of convulsions. No history of syphilitic symptoms in either parent.

May 10th.—Takes no notice. Pupils not noted. Oph. (after atropine), o. d. rather pale and doubtfully hazy, vessels normal.

No later note; patient could not be traced.

This child was only seen once; the notes are meagre, and, especially in regard to syphilis, are inconclusive.

Case 15. *Defective sight without changes in an infant; history incomplete; result unknown; no evidence of syphilis.*—Alfred F—, æt. 8 months, was brought to the South London Ophthalmic Hospital in December, 1874. His mother said that he would not "take notice," but the notes do not state how long this symptom had been present. The pupils were of ordinary size (their activity not noted). The child looked at the lamp, but not promptly. After atropine, the discs were "perhaps pale, but perfectly clean, and the central arteries and veins normal;" no disease was made out in other parts of the fundus.

The child was the younger of two, the elder being alive and reported well. But for doubtful snuffles there were no signs of syphilis.

He was only brought twice, and there are no subsequent notes.

Case 16. *Advanced atrophy of discs in a boy of ten; history of bad sight from infancy; hereditary syphilis in an elder sister.*—Wm. W—, æt. 10, but looking only 7, the fourth of eight children, was brought to St. Thomas's Hospital in May, 1878 (T. 1, 64), almost absolutely blind of both eyes. The discs were atrophied, of a greyish-white colour, clear and sharply defined; the central veins normal, the arteries rather small. There was no proof of previous papillitis. The left pupil was the larger and quite motionless to light; the right acted a little.

The statement given was that he had always been very backward at school "because he could not see." His senses, except sight, were good; his memory was said to be good; his temper was "very uncertain." He had very bad health in infancy, but there was no history of characteristically syphilitic symptoms. Nor was there any proof in his teeth or physiognomy. But it should be mentioned that a sister three years his senior was afterwards under care with interstitial keratitis and very typically notched teeth.

Though his sight had always been thought defective it had become much worse since the previous November, *i.e.* for about six months before I saw him.

Although the origin of the blindness was not in this patient proved to date from infancy, the case may fairly for the present be placed with the others in this paper.

Case 17. *Blindness from birth; active pupils; no changes at optic disc, but peculiar superficial changes in choroid; conical cornea. Family history of bad sight; consanguinity of parents.*—Edward C— is believed to have been born blind, and is in the Southwark Blind School. He was brought from there to St. Thomas's Hospital in July, 1880

(T. 3, 100), for aching of the right eye, and on examination the cornea was found to be very conical, and its centre nebulous; these appearances had been noticed for some six months. He had been in the school a year. He was intelligent, and all the senses except sight were good; he was growing fast.

There was nystagmus, and he had no perception of light whatever so far as we could judge, yet the pupils acted pretty briskly to light and shade in the ophthalmoscope room, where the contrast was very strong; in daylight, with much less contrast between the light and shade, they acted scarcely at all; in daylight they measured about 2·5 mm. T. n. Oph., o. d. and retina normal in each eye; doubtful diminution of retinal arteries. At the periphery in each the choroid showed a number of small pale spots, a sort of "dappled" appearance. This change in the superficial choroidal structures (or retinal epithelium only?) may have been induced by retinal atrophy, itself secondary to disease of the optic nerves; or it may have indicated a congenital defect in the development of the retina and choroid. The healthy appearance of the discs does not bear out the former view.

Family history.—Is the seventh of eight children, and two others have bad sight. The parents were first cousins, father is living, mother died of "rheumatism at the heart." No history of blindness, or of nervous affections or idiocy, in other branches of the family. The family was as follows:

1. Male, æt. 29; nearly blind, but can tell colours, was born so.
2. Female, æt. 27; "near-sighted, but can see a great deal."
3. Female, died æt. 22, of "consumption."
4. Female, comes with patient; sight perfect.
5. Male, sight perfect.
6. Male, died æt. 18, of "consumption."
7. *The patient.*
8. Female, sight perfect.

Case 18. *Congenital amblyopia with doubtful changes at discs; defective intellect; family history of blindness; consanguinity of parents.*—Cyril G—, æt. 12 (St. Thomas's Hospital, September, 1881, T. 3, 190).

Has never seen better than now; had good health till mild scarlet fever at age of 8, since then has been weak. Has lately been under treatment in the surgical wards for contraction of plantar fascia of right foot which seems to have begun, or become worse, about a year ago. Is half imbecile. Constant rapid nystagmus. Pupils act moderately to light. Oph., little if any change (discs greyish?); refraction slightly M., V. 19 J. at 3″. Colour vision cannot be properly tested.

Family history.—Parents are first cousins, but see well. Mother's father had an eye removed for "tumour of the eyeball" at age of 54, and lived to be 67. Father's brothers and sisters, and their father (patient's paternal grandfather) were all "very short-sighted."

Patient is seventh of ten children, as follows:

1. Male, æt. 22; sees well; good health.
2. Female, æt. 21; sees well, but "has one eye blue, the other brown;" good health.
3. Male, died æt. 2½ of "croup;" was very nearly blind.
4. Female, died æt. 14 of typhoid fever; sight perfect.
5. Male, æt. 17; seen. Hypermetropic; left eye defective from old squint.
6. Female, æt. 14, sight and health good.
7. *The patient.*
8. Female, æt. 9, sight good.
9. Male, died æt. 6 weeks of hooping-cough.
10. Male, æt. 4, sight defective. Not seen.

Case 19. *Congenital blindness and idiocy with active pupils; fits from early infancy; contraction of feet and one hand; death.*—Jessie M—, female, was sent for opinion to me at St. Thomas's Hospital in the summer of 1881 by Dr. Chabot (T. 3, 43). She was then nearly two years

old. She was evidently idiotic, and could neither walk nor speak; she kept the fingers of the right hand in the "accoucheur's position" and the hand itself flexed on the forearms; both feet also flexed. Nothing special in appearance of head. Had never taken notice. When four months old began to have fits, and was still liable to them.

On admission, she took no notice of light or shade, and never followed even the light from the mirror in the dark room, but sometimes just when the light was flashed into her eyes she would turn her head away as if annoyed by it. Probably, therefore, there was some perception, at least in the lower optic centres; and this was confirmed by the fact that the pupils, which usually measured about 4 mm., acted well to light. Ophthalmoscopic examination, after wide dilatation of the pupils by atropine, showed no changes except a single small spot of pigment near the disc in one eye; the discs and retinal vessels were well seen and quite natural.

She was the youngest of ten children, eight of whom were living, healthy, and intelligent. Family history not fully taken.

I heard from the mother that the patient died a few weeks later without showing any peculiar symptoms.

(*June 7th*, 1884.)

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5. *Injury to the head; immediate and permanent blindness of the left eye and deafness of the right ear; subsequent atrophy of the left optic disc.*

By Waren Tay.

John P—, æt. 40, was admitted into the London Hospital, October 25th, 1883. He was standing on a ship's deck and was knocked down into the hold by a cask

which was being let down. He fell on some casks, a distance of about twelve feet. He fell on to his head. He was unconscious about three quarters of an hour. Patient was conscious on admission. Blood was oozing from the left nostril and the right ear. The left pupil was noticed to be insensitive to light. There was no facial paralysis and no other paralysis. He was sick and brought up blood-stained fluid. There was a semicircular laceration of soft parts in the left fronto-temporal region above and to the outer side of the orbit. The wound was stitched with catgut. The bone was not bare. There was a fracture of the lower jaw on the right side between the lateral incisor and the canine teeth. There was slight ecchymosis of the upper eyelid (left), but no subconjunctival ecchymosis. There was no serous discharge. The hæmorrhage from the ear soon ceased.

October 27th.—Left side of face slightly swollen. Left upper eyelid somewhat swollen. He cannot see the light of the lamp. The pupil dilates when the other eye is covered and remains fixed. It acts with the other. The fundus is normal. There is pigment at the inner margin of the disc in each eye. He is quite deaf in the right ear.

November 12th (eighteen days).—Left disc paler than right.

18th (twenty-four days).—The left disc is now certainly becoming pale, especially towards the yellow spot. There is, however, a decidedly pink tinge on the inner side. No appreciable diminution of artery. Pressure on the globe gives rise to well-marked arterial pulsation.

December 13th.—He says he can hear a watch tick when held quite close to the right ear, but without absolute contact. This, however, is not very certain.

It is now seven weeks since the accident. The disc is uniformly white. Atrophy is commencing. Both discs are pigmented at the margin; the right more than the left. These changes were noted from the first.

Leber and Deutschmann (' Graefe's Archiv,' Bd. xxvii,

Abth. 1, 1881) note the case of a lad, æt. 15, who was admitted into the Göttingen Hospital after a fall of twenty feet. He immediately became blind in the right eye, was unconscious for a short time and bled from the nose, mouth, and left ear (there was also fracture of the left radius and effusion into the left knee). Two days later, the lids of the right eye were swollen with blood effusion and the eye became slightly prominent. There was some ptosis and slight paresis of the superior rectus. The fundus of each eye appeared quite normal on ophthalmoscopic examination. After fourteen days, the first slight trace of pallor was noticed in the right optic disc. At the end of three weeks it was undoubted, though still slight. He could not hear well with the left ear (noticed at first). The right disc subsequently became markedly atrophied. He was seen five years later and the vessels still seemed normal in size. This last feature is commonly noted whenever a patient is seen after a long interval who has been the subject of simple atrophy from injury.

Loss of sight in one eye in connection with an injury to the head on the same side has become more explicable of late (as is well known), since the observations of Hölder quoted by Berlin (Graefe-Sämisch).

Fracture involving the apex of the orbit is now known to be sufficiently frequent to allow us to quote the probability of its occurrence in explaining the symptoms in any particular case. In fifty-four out of eighty-eight instances of fracture of the base of the skull there was injury to the optic foramen, and in eighty out of the eighty-eight there was fracture involving some part of the orbit. This proportion seems very much larger than would be found in any post-mortem room in London. It should be borne in mind that in forty-two instances out of the fifty-four the injury had been from gunshot, and in thirty-four the injury was inflicted through the mouth. There can be no question, however, that the explanation of immediate one-sided blindness after some injury to the skull, mostly the anterior part, on the same side is to be

found in damage to the nerve in connection with a fracture involving the apex of the orbit.

That the disc shows no change at first, but begins to be decidedly pale in about three weeks has been noted now by various observers in a number of cases.

The only special interest attaching to the patient now shown is the fact that there is probably a diagonal fracture as was surmised in Deutchmann's case, involving one orbit and the opposite petrous bone.

(*Living specimen. December 13th*, 1883).

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6. *A case of severe concussion of the brain followed by temporary blindness with papillitis and anosmia.*

By W. Spencer Watson.

Henry D—, æt. 18, a potman, after a severe drinking bout threw himself out of window and fell a distance of forty feet on to some gravel, striking his head on an iron bar in his descent. He was picked up unconscious, and when brought into the Great Northern Central Hospital was still unconscious, and I am indebted to the house surgeon of that institution for the notes of the case. He had a wound of about two inches long in a vertical direction on the forehead. This wound exposed the bone, but there was no depression. There was bleeding from the nose and mouth. The eyelids were swollen and the left eyeball seemed somewhat more prominent than the right. There were also severe bruises of both elbows and a fracture of the left clavicle.

Symptoms of concussion being present (on April 24th) he was put to bed, an ice-bag was applied to the head, the scalp wound dressed, and the fractured clavicle put up in the usual manner. Eight grains of calomel were given and a senna draught ordered to be taken in the morning.

For the next three days he was in violent delirium, sleepless in spite of the use of opiates, bromide and chloral in large doses, tearing off all his dressings and bandages, and complaining loudly of severe pain in his head.

On April 27th he seemed a little more conscious, having slept a little. The eyelids were still œdematous and some subconjunctival and subcutaneous ecchymoses were noticed at the upper parts of both orbits, the discolouration not extending into the lower eyelids.

April 30th.—Vision tested. No response to simulated aims with the fingers pointed at his eyes. He seems blind absolutely. Pupils half dilated and not responding to the stimulus of light.

May 4th.—Much more conscious this morning, complains of his head still. Has lost the power of smell. On ophthalmoscopic examination of the eyes the optic nerves showed traces of engorgement.

5th.—The sight has somewhat returned, but he cannot distinguish colours and still has a vacant stare.

18th.—The optic discs had the same appearance of engorgement, the margins being swollen and shaded off into the surrounding fundus. Has no pain in the head.

20th.—Still better; sight much improved.

24th.—Ophthalmoscopic examination revealed no abnormal condition; sight much improved. He can now read small print.

29th.—Says his sight is as good as before the accident. He feels well with the exception of the loss of smell.

June 4th.—Discharged. There is still anosmia. His sight is not quite so good as on the 29th May.

The blow on the head seems to have ruptured some vessels in the base of the cranial cavity, and judging from the ecchymosis in the upper part of the orbits it is probable that there was a fracture in the anterior or middle fossa or in both.

On account of the patient's violence and the swelling of his eyelids no attempt at an ophthalmoscopic examination was made for about ten days. At the end of that

time traces of choked disc were found indicating pressure upon the optic nerves. Both being affected at once and both recovering about the same time we may conclude that the pressure was intracranial and at or beyond the commissure. The loss of smell points to a lesion due to the same hæmorrhage and causing a separation of the olfactory filaments from the olfactory bulbs.

Anosmia from blows on the head is not very uncommon, but it has been noticed to follow blows on the occiput more frequently than blows on other parts of the head. This was pointed out by the late Mr. Hilton, and also by Dr. Wm. Ogle.

(*July 4th*, 1884.)

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7. *Cerebral hæmorrhage with passage of blood into both optic nerves.*

By Priestley Smith (Birmingham).

(With Plate IX, fig. 1.)

I am indebted to Dr. Leslie Philips, lately house physician to the Queen's Hospital, for the opportunity of recording this case; he had charge of the patient during life, and made the post-mortem examination.

A mechanic, æt. 38, was admitted into the hospital on March 20th, 1883. His wife stated that twelve days previously, during a frost, he had slipped off a step and slightly hurt his foot; the next morning he had a fit, but otherwise appeared well until the 18th, ten days after the accident, when he complained of headache for the first time. On the morning of the 20th he vomited twice, and she thought his mental faculties seemed affected; he walked to the hospital.

On admission he complained of intense pain in the

occipital region; pupils equal, diameter 2 mm.; no optic neuritis; mental impairment evidenced by moodiness and difficulty of eliciting answers; tongue white and breath foul; urine free from albumen, and radial arteries not thickened.

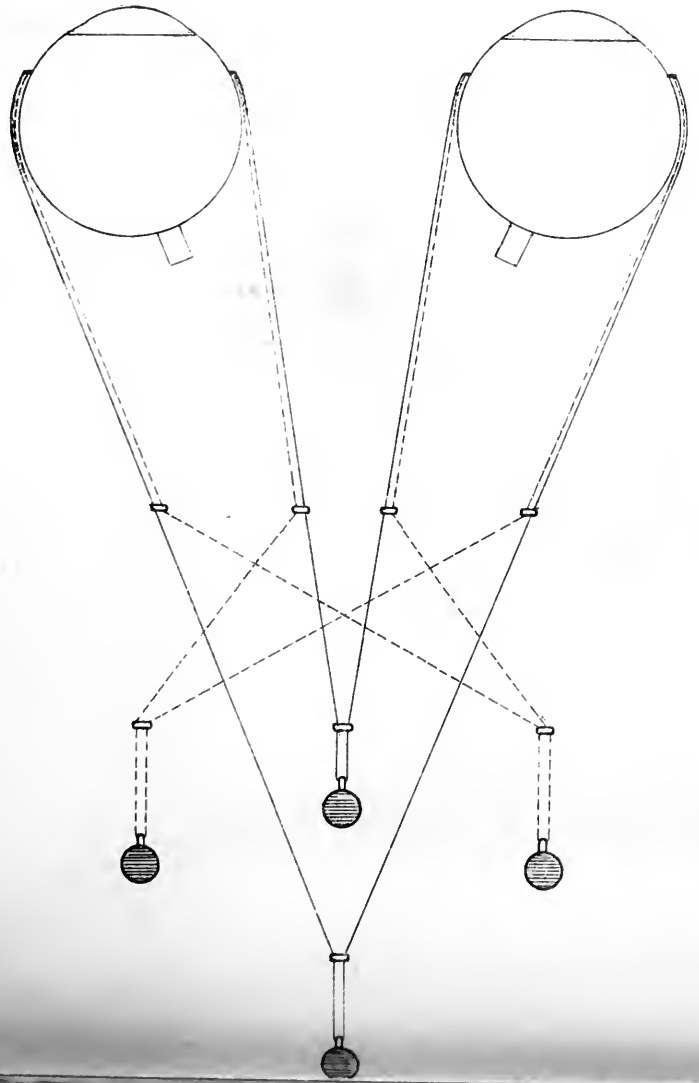
Same evening.—Temperature 100° F., pulse 48, irregular in time, respiration not hurried. Could be made to speak only with great difficulty.

On the following morning (21st) at 4 a.m. he had a fit and died in it.

Autopsy.—Trunk viscera healthy. On removal of the dura mater a large quantity of blood-clot escaped; on examination of the brain this was found to have come from a cavity in the left frontal lobe about as large as a walnut. There was no contusion of the brain-surface over the cavity, but simply a clean rupture of the cortex in the inferior frontal convolution; through this the blood-clot protruded. Subsequent examination with the microscope showed no new tissue around the cavity, which appeared to be due simply to hæmorrhage. The clot was confined to the left side of the skull, but extended backwards to the cerebellum both on the convexity and at the base. The optic nerves showed bulbar enlargements behind the globes, and appeared from their colour to contain blood. One nerve was at once opened; its anterior part contained fluid blood, which was easily washed away by a gentle stream of water. The other, together with the back of the eye, was placed in Müller's fluid.

It appears probable that the fall caused an extravasation in the substance of the frontal lobe, which at first produced no decided symptoms, and that a further hæmorrhage occurred eight days later, extending over the surface of the brain, forcing its way into the optic nerves, and quickly causing death.

The hardened optic nerve was frozen, and divided by a horizontal longitudinal section. Within the distended nerve-sheath, near to the eyeball, lies a blood-clot, and the precise relations of this are of some interest. In his



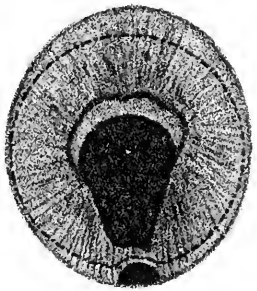
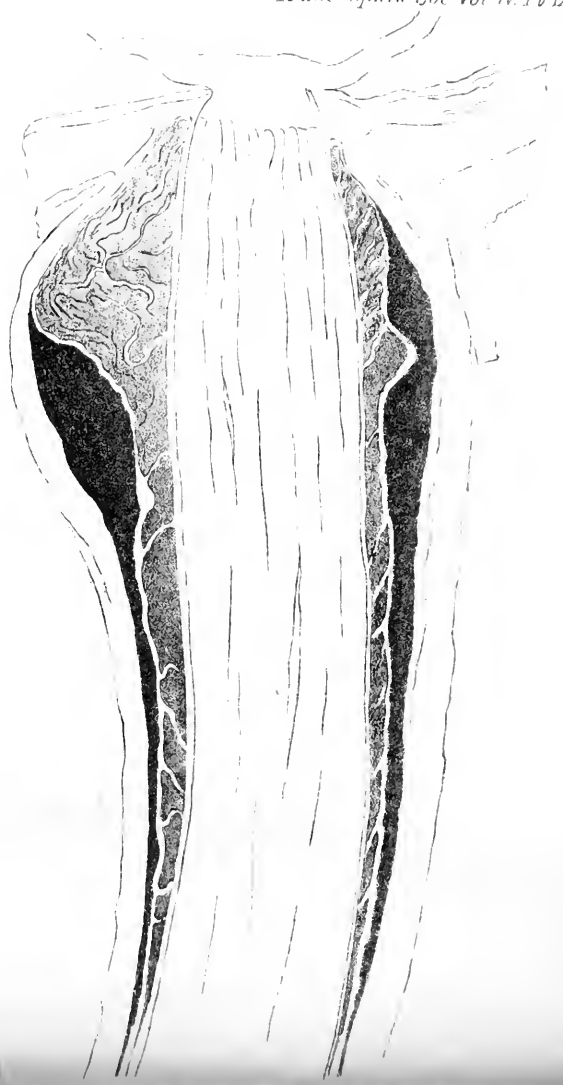


Fig 2



DESCRIPTION OF PLATE IX.

Fig. 1 illustrating Mr. Priestley Smith's case of Cerebral Hæmorrhage with Hæmorrhage into the Sheaths of the Optic Nerves (p. 273).

Shows a horizontal section of the optic nerve with blood in the subdural space. Magnified 8 diameters. From a drawing by the author.

Fig. 2 illustrates Mr. Arthur Benson's case of Coloboma of the Choroid, Iris, and Lens (p. 352).

Fig. 3. Sketch of Mr. Priestley Smith's model to illustrate the Conjugate Movements of the Eyes (p. 353).

chapter on the Microscopical Anatomy of the Optic Nerve, Retina, and Vitreous, in the 'Handbook of Graefe and Saemisch,' Schwalbe describes the optic nerve as having three distinct sheaths, viz. an external or dural sheath prolonged from the dura mater, a pial sheath prolonged from the pia mater and closely attached to the surface of the nerve, and between the two an arachnoidal sheath, corresponding to the arachnoid membrane of the brain. The latter lies usually in close apposition with the external or dural sheath; the space between the two, or sub-dural space, which is at most of capillary dimensions, is the continuation of the sub-dural or arachnoid space in the meninges. A second and larger space, corresponding to the sub-arachnoid space of the meninges, separates the arachnoidal from the pial sheath of the nerve; this space is bridged across by numerous fine trabeculæ and septa of fibrous tissue. The arachnoidal sheath consists of a fine network of fibrous tissue, the meshes of which are filled in with endothelial cells. There are thus, according to Schwalbe, two distinct tubular spaces, a sub-dural and a sub-arachnoidal, but the two are probably connected to some extent by minute apertures. By other observers the existence of two distinct spaces is denied. In the specimen before us there appears to be decisive evidence of their existence (see Plate IX, fig. 1). The blood-clot lies entirely external to the arachnoidal sheath, while the sub-arachnoidal space is nevertheless widely distended. Disease appears here to have performed a double injection; the blood passing over the surface of the brain immediately beneath the dura mater has forced its way along the sub-dural sheath of the nerve, while at the same time the sub-arachnoidal space has been injected with colourless fluid, doubtless the cerebro-spinal fluid forced into it from the sub-arachnoid space of the brain by the increased pressure within the skull.

We do not yet know to what extent a distension of the optic nerve-sheath with blood is a cause of ophthalmoscopic changes and visual impairment. Unfortunately

the present case gives no information on these points. Eighteen hours before death, at the time probably when the second and more extensive hæmorrhage was taking place, Dr. Phillips examined the discs and found them unaltered in appearance, but it is by no means certain that the blood had at this time found its way into the optic nerves.

(*December 13th*, 1883.)

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8. *Case of hæmorrhage into the sheaths of both optic nerves after a fracture of the skull.*

By A. Quarry Silcock, M.D.

The specimens exhibited were taken from a man, æt. 28, who died in St. Mary's Hospital from the effects of a fracture of the skull eight days after the infliction of the injury. Whilst in the hospital he was more or less delirious and maniacal; consequently no ophthalmoscopic examination was made. At the autopsy a fissured fracture was found traversing the posterior inferior angle of the right parietal bone and the right half of the occipital, extending from a point two inches above and four inches behind the right external auditory meatus to the jugular foramen of the same side. The middle and anterior fossæ were intact, no fracture in these regions being evident, although such was carefully sought for. In the cavity of the arachnoid was much extravasated blood, more especially over the base of the brain, about the crura cerebri, anterior perforated spot, and adjacent parts. The brain was bruised; the tip of the left temporo-sphenoidal lobe, left orbital convolutions, and the right occipital lobe in marked degree. The sheath of the left optic nerve was discoloured and considerably distended near the eyeball, evidently from effusion of blood into it. In the specimens,

the clot is seen to occupy the subdural space of the nerve, into which the blood had found its way from the arachnoid, the two spaces being continuous. The fact that the extravasation was of larger extent close to the eyeball than elsewhere, is probably to be ascribed to the greater looseness of the connections of the outer and inner sheaths at this part. The same description applies equally to the right nerve, but the sheath of the latter contained less blood-clot. Microscopical examination of the nerve shows it to be inflamed, and the disc to be swollen; the hæmorrhage is seen to be confined to the small space which exists between the sheaths of the dura mater and arachnoid.

Berlin* thinks that such an extravasation is only caused by a fracture of the base of the skull involving the optic foramen; in the present instance I could not discover any fracture of this kind; nor does he mention the fact that the extravasation may be found in and confined to the subdural space of the nerve as in this case. It seems reasonable to suppose that the blood found its way thither much in the same way that injection fluid would if artificially forced into the cavity of the arachnoid. Similarly, if the hæmorrhage in the cranial cavity be confined to the subarachnoid space, it would naturally be met with in the prolongation of that space around the optic nerves—here designated subvaginal or intervaginal—should the effusion reach so far. Probably a systematic post-mortem examination of the optic nerves would show that such an extension of the hæmorrhage, whether due to fracture of the skull or otherwise, is far more common than is generally supposed.

(*January* 10*th*, 1884.)

* Graefe and Saemisch, 'Handbuch,' article, "Vorletzungen der Orbita."

9. *A case of homonymous hemianopia probably due to a cortical lesion.*

By Seymour J. Sharkey, M.B.

S. F—, æt. 51, came under my care as an out-patient at St. Thomas's Hospital on July 5th, 1883. She said that she was a married woman, that she had enjoyed good health until the previous two and a half years, and that she had had six strong children. Her last confinement took place eight years ago, when she was delivered of a dead child. Her catamenia ceased at the age of forty-eight, and at that time she had rather profuse "flooding." About two and a half years ago she was walking across a hayfield when she was seized with a fit, and since then she has had many more of an exactly similar nature, but they ceased nine months before she came to me. The order of events in these attacks was as follows:—Suddenly there appeared "in the right eye" (probably right side of field of vision) a play of colours embracing all the tints of the rainbow "quivering" and "fluttering" before her. Then the right arm became convulsed, and the forearm and hand rotated inwards. Soon the right leg was rigidly extended backwards and outwards, then loss of consciousness supervened and she bit her tongue. She remained two or three hours unconscious of her surroundings, and when she did recover her senses she found that she had a severe pain in the top of her head and weakness of the right arm, but none of the right leg. Moreover, she could see nothing on her right side without turning her head in that direction. She had no loss of sensation or of speech.

In each of the subsequent fits the phenomena have been similar and have observed the same order, and from the first her right arm has remained weak, the defect of sight has persisted, as well as the pain in the head, and

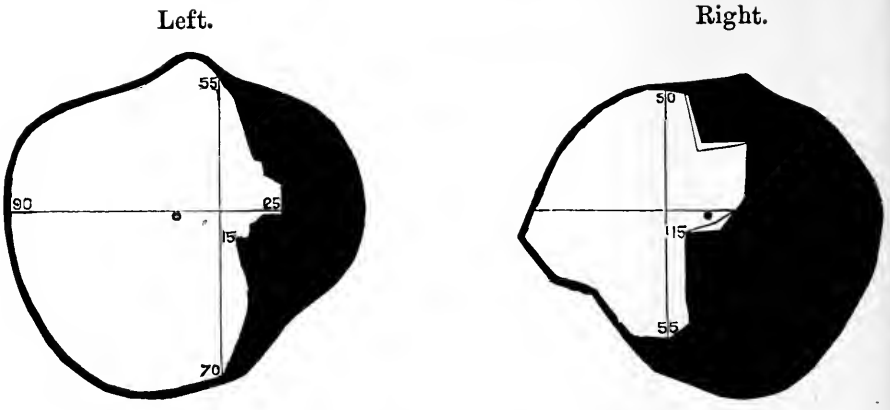
her memory has deteriorated. Her bowels have been regular, she has had no vomiting, her sleep has become very heavy, and she has not lost much weight.

On her first appearance in the out-patient room, she seemed a well-nourished woman, with grey hair, and a face free from lines and rather expressionless. She was quite intelligent, and complained considerably of pain in the head. Its seat was a circle of about two or three inches in diameter on the vertex posteriorly, and this region was tender on percussion. She walked well, and had no apparent loss of power in the leg. The patella reflex was feeble in both legs, and if anything less marked in the right than in the left. The right arm was decidedly weak, and the grasp of the right hand enfeebled. The face and tongue were free from paralysis; there was no loss of sensation. The right side of the field of vision was evidently defective, the left intact. There was no optic neuritis, and no abnormality to be detected with the ophthalmoscope. There was no defect in hearing, taste, or smell, nor did the heart or other viscera present any signs of disease.

I sent the patient to Mr. Nettleship, who confirmed my observations as to the normal condition of the fundus of the eyes, and also as to the presence of homonymous hemianopia, but in addition to this he took great trouble in the determination of the exact field of vision, and I have to thank him for the accompanying perimeter charts.

It will be seen that the right half of the field of vision in each eye is very defective, and that the defect does not reach as far as the vertical line drawn through the fixation point. There is an irregularly-shaped area of normal vision in the right half of the field of vision of the right eye, extending to a distance varying from 15° to 55° from the fixation point, and in the left eye there is a similarly situated area extending from 15° to 70° from the fixation point.

The unaltered remnant of the right half of the visual field in each eye is most extensive near the fixation point,



Fields of vision of S. F. In the right eye the results varied slightly on two different occasions, as shown by the inner line.

and gets smaller and smaller as the periphery of the visual field is approached, so that, roughly speaking, it has the shape of a triangle, the base of which is the vertical line through the fixation point, the apex being situated in the left eye on the horizontal line, drawn through the fixation point and about 25° distant from the latter; while in the right eye the apex is situated in the middle of the upper quadrant at a distance of about 45° from the fixation point.

Mr. Marlow was kind enough to test the condition of colour vision for me, and he has supplied me with perimeter charts. Both Mr. Nettleship and Mr. Marlow are of opinion that there is little to be said about this point, except that colour vision is absent in the blind area.

This case is one in which I cannot show the Society a post-mortem specimen to prove the correctness of the diagnosis, and so far the nature and position of the intracranial lesion may be considered as open to doubt. At the same time I think I am safe in saying that physicians who have paid special attention to cerebral diseases will agree with me that the diagnosis of a lesion of the left hemisphere, affecting the cortical centre for the arm and its neighbourhood, is as nearly certain as any diagnosis can be which is not subjected to the test of a post-mortem examination.

The succession of fits commencing with convulsions of

the left half of each retina, if I may so express it, and of the right arm, then extending to the right leg, finally terminating in loss of consciousness and biting of the tongue, and followed by permanent paralysis of the right arm and left side of each retina, presents a vivid and typical picture of cortical lesion.

The centre for the arm occupies probably about the middle third of the two ascending convolutions, and extends to an uncertain distance upwards in the same convolutions. Just posterior to this region are the angular gyrus and occipital lobe, both parts which are supposed to be connected with sight. It is very probable therefore that the lesion in this case is situated about the middle of the two central convolutions, and extends into the parts posterior to them. Whether this be accurately the situation of the lesion or not, the case may be considered to be one of cortical disease producing lateral homonymous hemianopia, in which the defect in the visual field is not limited by a vertical line through the fixation point, but by an irregular line passing to the right of it.

Ferrier showed by experiment years ago that injury to the angular gyrus in lower animals produced amblyopia in the opposite eye, thus establishing the fact that the cortex of each hemisphere of the brain is in some way connected with the vision of the opposite eye. Munk and others subsequently proved that each occipital lobe has definite relations to both eyes, being in connection with the lateral portions of each retina on its own side, so that lesion of the left occipital lobe, for example, produces blindness of the left side of each retina, or, in other words, right lateral hemianopia.

These physiological experiments are confirmed by pathological observations. Thus it has been proved by post-mortem examination that lesions of the posterior part of the internal capsule produce blindness of the opposite eye, indicating a crossed connection between the cerebral hemispheres and the organs of vision.

Other lesions of one hemisphere have been shown to

give rise to homonymous hemianopia. Westphal after relating some cases of hemianopia concludes that with a probability bordering on certainty disease of the posterior part of the hemispheres, and probably disease situated mainly or exclusively in the occipital lobes, can produce hemianopia.

In 'Brain' for October, 1880, Ferrier after reviewing the known facts says, "From these facts it would appear, therefore, that there is a twofold relation between the eyes and the cortical visual centres; the one mainly cross—the central portion of the retina probably bilaterally represented—by the angular gyrus; the other bilateral—the corresponding side of both retinæ being represented by the occipital lobe, not alone, however, but in conjunction with the angular gyrus."

A very interesting observation is quoted by Dr. Hermann Willbrand in his 'Monograph on Hemianopia,' which supports the view that each retina contains fibres derived from both hemispheres. A woman had been quite blind in the left eye for fifty years. After death atrophy was found in the following parts—the left optic nerve, left corpus geniculatum externum, both the corpora quadrigemina on the left, the left pulvinar, and both occipital lobes, the right being more atrophied than the left. Thus physiological experiment and pathological observation combined point decisively to the view that each hemisphere is connected with both eyes, and that there is to some extent a separation between the area in the cerebral cortex which receives the peripheral fibres of the corresponding halves of the retinæ, and the area which receives the central fibres of the opposite retina.

The question then suggests suggests itself, What is the course of the fibres which link the retinæ to the cerebral cortex? This is best answered, as far as it can be answered at present, by appealing to pathological observations.

The optic nerve on each side contains all the fibres going to the corresponding retina. As Mr. Nettleship

and others have shown by their cases pressure by a tumour on one optic tract produces homonymous hemianopia in which the dividing line passes vertically through the fixation point. That is to say, that although in the optic nerve all the fibres from the corresponding retina were present, in the optic tract both the peripheral and central nerves of the nasal half have crossed to the opposite tract. Hence each tract contains the fibres—both peripheral and central—which run to the temporal half of the eye of its own side, and to the nasal half of the opposite eye.

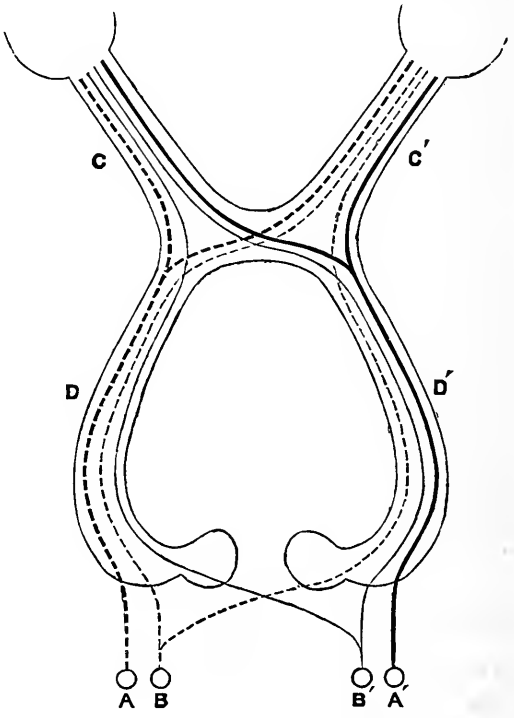
This arrangement holds as far as the corpora geniculata at any rate, as lesions in this position produce results which are similar to those produced by lesion of the optic tract.

But it has been proved by my case as well as by others that disease of some portion of the cerebral cortex produces homonymous hemianopia confined to the peripheral portions of the retinæ, their central parts retaining clear vision. Hence the fibres of the optic tracts as they pass into the hemispheres must separate in some such way that those which come from the periphery of the retinæ enter the cortex at a point which is, at least to some extent, distinct from that which receives the central fibres.

Pathological and experimental observations prove that each hemisphere has an essential and well-marked special connection with the opposite eye;* and as separate areæ in both hemispheres supply the peripheral fibres of each eye, this special connection can only take place by means of the central fibres.

* Cf. 'Med.-Chir. Trans.,' 1883, vol. lxvi, p. 293, a paper by the author entitled "A Case of Asymmetry of the Brain presenting Peculiarities which bear upon the Question of the Connection between the Optic Nerves and certain definite areas of the Cerebral Cortex." Also cf. 'Med.-Chir. Trans.,' 1884, vol. lxvii, a paper by the author entitled "Embolism of the Right Middle Cerebral Artery producing Left Hemiplegia and Hemianæsthesia. Absorption of a large portion of the Right Hemisphere. Death Seven Years later."

Now, lesions of the optic tracts, as already stated, prove that the central fibres of each retina are contained partly in the tract of the corresponding side, and partly in that of the opposite side. Therefore those in the tract of the same side must cross beyond the corpora geniculata in order to reach the cortex of the hemisphere opposite to the eye from which they come. If this reasoning is correct the state of affairs may be graphically represented by the accompanying diagram.



AA′. Cortical centres for the peripheral fibres of the retina.
BB′. Cortical centres for the central fibres.
CC′. Optic nerves.
DD′. Optic tracts.

Charcot's original diagram, of which mine is merely a modification, was constructed at a time when the crossed connection between the hemispheres and the eyes was known to exist, but the facts regarding hemianopia had not attracted the attention which they now have. His dia-

gram represented the knowledge of that time well enough, and even now it merely needs the slight alteration which is necessitated by the facts pointing to the subdivision of the cortical visual centre; without this his diagram does not explain the occurrence of hemianopia from cortical lesions.

(The diagram constructed by Munk, representing the results of his extremely able experiments on animals, was also exhibited at the meeting. However correct it might be for the latter, it was seen at a glance that it did not correspond at all with our present knowledge as regards man.)

So far back as 1880 Ferrier wrote in 'Brain' as follows: —"There are many cases of homonymous lateral hemianopia, in which, though the lateral defect has been of indefinite duration, central vision is retained in both eyes for some distance on all sides of the fixation point. This is a point of great importance and signification, and one to which I would direct special attention as likely to furnish a means of diagnosis between central and peripheral hemiopia. In cases where central vision is retained for some degrees on all sides of the point of fixation, I should regard the cause of the hemianopia as central." The case I have reported to-night supports this view.

Great variety in the shape of the visual defect will, however, probably be observed in the cases of hemianopia due to cortical or sub-cortical lesions. For one can hardly doubt that the visual centres extend over considerable areæ of the cortex, and are expansions of grey matter in which is represented every spot on the retinæ, each point of the latter being connected with a corresponding point in the cortical visual expansion; and if this be so every variety of hemianopia may be produced according to the situation of the diseased area in the visual centre. Indeed, Munk has experimentally proved this to be so in the dog, for by removing different parts of a certain area of the cortex he has succeeded in causing blindness in different regions of the retinæ.

Besides amblyopia and hemianopia, concentric contraction of the field of vision has been noticed in certain patients. The facts at present at our disposal are hardly sufficient to warrant a consideration of the pathology of such cases. They are, as far as I know, either cases of hysteria, and are then accompanied by anæsthesia of parts of the body, or else cases of hæmorrhage or other lesion in or about the central ganglia. The explanation of the hysterical cases which appears to me to be most likely is that there is a general depression of nerve power, and that this affects principally though not exclusively one hemisphere. This results in a diminution or absence of those parts of sensation for the perception of which the most vigorous action of the cerebral centres is required. Thus in these cases the sensation of pain is often absent when that of touch is retained, for the central cells require much more violent peripheral stimulation to produce pain than they do to give rise to tactile sensation. Hence when the function of these cells is abnormally depressed it may be impossible to stimulate them sufficiently to evoke pain.

Similarly in the case of the retina, the impulses from the periphery of the field of vision are much feebler than those from the central parts, and require an active condition of the cells of the visual centres to be perceived at all. Hence in such cases of nerve depression peripheral vision is the first to go.

In cases of hæmorrhage in or about the central ganglia the contraction of the field of vision may be due either to a similar depression from shock, or possibly to pressure on the optic fibres, which in that part of the brain are gathered closely together. Suggestions like these, however, are mere guesses.

In bringing this paper, already far too long, to a close, I should like to say a word about diagrams. It may by some be thought absurd to portray in straight and curved lines the course of visual impulses in so complicated an organ as the brain; and so it would be if it were meant that such diagrams were anatomically correct. They are

simply useful as representing in a concrete form present knowledge or opinions about certain points in physiology, which can then be more easily criticised, disproved, corrected, or confirmed.

(*October 11th*, 1883.)

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10. *Failure of left eye (to blindness) passing into atrophy of disc; later, paralysis of left third nerve and loss of right half of right visual field with evidence of atrophy of disc; discharge of bloody mucus from left nostril, and late appearance of tumour behind left angle of jaw. Death seven years after onset of symptoms; large tumour compressing left optic nerve, chiasma, and tract, and left third nerve.*

By E. Nettleship.

James P—, a short, stunted, round-headed man, with dark hair, a blacksmith, from near Exeter, came under my care at the South London Ophthalmic Hospital in September, 1876, for failure of his left eye. He was then 30. The sight of the left eye had been going for four months. A well-known ophthalmic surgeon told him that there was "inflammation of the nerve" at first, but at a subsequent visit said that the nerve looked healthy again.

On admission, with the affected eye he could only read 20 J. with and without lenses; the visual field and colour perception were not tested. The temporal half of the disc was pale, the nasal half of good colour, the central vessels normal; but the whole disc was less transparent than the other, as it might well have been if recently inflamed. The other (right) eye was healthy in all respects and its sight perfect.

He said that after the eye began to fail he had a good deal of pain "at the back of the eyeball" in attacks

lasting an hour or more. He had had a blow over the same eye a year before. But he stated that as long as six years before I saw him, after having measles, he had become subject to pain in the same (left) cheek; this after troubling him on and off for a couple of years, seems to have ceased. There was no history of syphilis. No enlarged glands or tumour in the neck.

During the next year or two the sight of the defective eye seems to have improved somewhat (I did not see the patient). About the middle of 1878 the left nostril began to discharge bloody fluid. He now said that he "could not bear to sneeze," and was liable, if startled, to sudden darts of pains through the head.

Early in 1879 he thought the other eye failing; Dr. Harris, of the Exeter Hospital, where the patient was attending under the care of Mr. Bankart, wrote to me that vision was $\frac{20}{20}$ and 1 J. with difficulty, and that some epileptiform attacks had lately occurred.

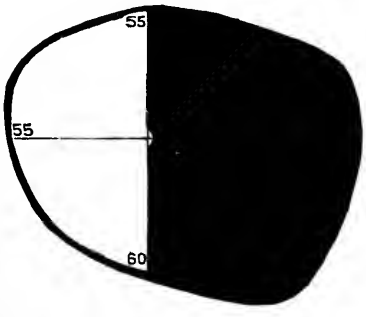
In July, 1879, I saw him again. With the right, vision was 2 J. with difficulty, no H.m.; disc now somewhat pale on the temporal side, its vessels normal; visual field not noted. The left disc now showed advanced grey-white atrophy; its central vessels slightly diminished. There was still bloody discharge from the left nostril.

I heard no more of him till September of the present year, 1883, when he wrote asking whether he might come up as he was not so well.

On readmission (at St. Thomas's Hospital) on September 14th Mr. Marlow made the following notes:—The man said that he had been getting weaker all the summer, though still able to walk four or five miles, that his head was drowsy and heavy, and that he was troubled with attacks of trembling even while sitting still; for several years he had been subject at irregular intervals to "fits," which consisted of a sudden feeling of suffocation in the nose and mouth, followed by pain in the front or back of the head but no loss of consciousness (once he "talked a lot of nonsense without knowing what he was saying").

He did not know when a "fit" was coming on. The bloody fluid from the left nostril continued, and he thought that the "fits" were worse when the discharge was less abundant. There was never any large amount of fluid from the nose. For a year or more he had not been able to open his mouth widely, and for some months the acts of mastication and yawning had given pain, especially behind the left jaw; the jaws could now only be separated half an inch, and eating was difficult. A hard, rounded, fixed tumour, as large as a walnut, could be felt behind the angle of the lower jaw, apparently touching the mastoid process; nothing could be felt behind the right jaw. Nothing abnormal could be seen in the nose, throat, or mouth. The nostrils were both pervious, but smell, especially with the left nostril, was found to be affected though not abolished. He was nervous and easily agitated; *e.g.* mere examination of the movements of the eyes would bring on spasm of the lids.

As regards the eyes.—There was almost complete paralysis of all the branches of the left third nerve, ptosis being the least marked symptom; pupil 5·5 mm. and quite fixed; he had been aware of a squint for two or three years. Vision of the right eye was $\frac{20}{20}$ fairly and 1 J. well at 10″; on examining the visual field very complete hemiopia was found, the right half of the field being lost up to within 1° or 2° of the fixation point (*see* Fig.);



Field of vision of right eye of James P.

the inner (left) half of the field was of full size. He

knew that he had been unable to see things to the right of him for a couple of years or so, and had once knocked a lady down on account of the defect. The disc of this eye was now very pale all over, vessels normal; disc substance opaque and its border softened by a little haze "as in early ataxic atrophy." Pupil 3 mm., acting to light and accommodation.

With the left eye he still had p. l., but only in a small part of the temporal half of the field; the disc was highly atrophic and quite clear and clean cut.

There were no other nervous complications and no evidence of any visceral disease.

Up to this date I had not attempted any accurate diagnosis of the cause of the optic nerve atrophy. It was now clear that there was a tumour at the base of the skull chiefly on the left side. The order in which the symptoms had developed (progressive disease of left optic nerve, paralysis of left third nerve and loss of the right half of the right field of vision) made it probable that the growth had begun a little in front and to the left of the chiasma, had destroyed the corresponding optic nerve, and had then implicated the left side of the chiasma and left optic tract causing loss of the right half of the remaining (right) field of vision. And, so far, the case seemed to confirm Dr. Ferrier's suggestion that in hemianopia due to lesion of the optic tract the boundary of the blind half might be expected to run straight through the fixation point, whilst if the lesion occurred at the visual centre an area of central vision would probably remain and the hemianopia be thus less complete.

As the patient when readmitted had no urgent symptoms I did not expect to get a post-mortem examination. A few days after admission (September 21st) he had a slight shiver (thought he had caught cold in having a bath), his temperature went up to 103°, and he brought up a quantity of aërated blood-stained sputum resembling that of pneumonia. But there were not then or afterwards any symptoms or physical signs of pneumonia, and the

patient's own idea that the stuff came from the back of his nose was no doubt correct.

On the 23rd he was better, and temperature was normal.

24th.—Temp. 103·2°, pulse 120 ; darting pains in left upper jaw.

25th.—Complained of numbness of upper and lower lips, and of right half of tongue, but no anæsthesia was proved on testing.

26th.—In the afternoon began to mutter and wander in his mind, and complained much of pain at back of head ; brought up larger quantities of bloody sputum all day. Urine, no albumen or sugar. Evening : Left eye seems more prominent and ptosis complete.

27th.—Morning : Semi-comatose and muttering ; seems quite blind of right eye. Left eye decidedly more prominent, right slightly so ; both eyes fixed. No evident loss of power in limbs, but much twitching of hands. He became steadily more comatose, and died quietly in the evening. At the time of death the left pupil had become smaller than the right ; immediately after death the temp. was 107° F.

The body was examined the next day by Dr. Sharkey. There were no changes of importance except within the skull.

A large, soft, excessively vascular tumour was found attached to the base of the brain occupying the interpeduncular space, and involving the subjacent bones. There was meningitis all around the tumour, but nowhere at all intense. The vessels both of dura and pia mater were generally congested, and the upper surface of the brain was rather dry ; but there was no meningitis of the convexity.

The tumour had pushed its way more to the left than the right, the optic nerves, tracts, and chiasma being displaced towards the right. The left optic nerve was flattened out into a thin band on the antero-inferior surface of the front of the tumour, and the chiasma, or its anterior part, the only part visible, was similarly pressed upon. The

right tract was also pressed upon by the growth, but the right optic nerve looked natural and was quite free. The tumour had eaten away the whole body of the sphenoid, the apices of the petrosal bones, especially the left, and the neighbouring part of the occipital. Small offsets of growth were found in each orbit amongst the fat.

After hardening Mr. Fell made for me a sketch of the base of the brain,* from which and from subsequent dissection it appears that the cerebral part of the tumour consists of three chief portions; one, continuous with the main growth from the bones, obscures the greater part of the chiasma, left tract and crus, and extends back to and presses upon the pons; a second small, well-defined nodule projects from the front of this mass and compresses the hinder end of the left olfactory nerve; a third rounded mass, probably a blood-cyst, covered by a firm fibrous capsule, projects from the left (outer) side of the main mass upwards against the lower surface of the middle lobe of the brain, from which, however, it is quite separate. On the upper and hinder part of the last-named lobe of the tumour the posterior part of the optic tract is found running as a flattened band, but anteriorly the tract cannot be followed so far as the situation of the chiasma, being lost on or in the growth. The growth had thus intruded itself between the left crus and optic tract. The two left corpora quadrigemina are considerably smaller than those on the right side. The left third nerve is seen as a thin band running across the upper surface of the third lobe of the growth. The left fifth was just touched by the growth, but not adherent or flattened.

No section has been made to ascertain the state of the crus and other parts above the most central part of the tumour, but they appear to be merely compressed, not invaded, by the growth.

(*October* 11*th*, 1883.)

* This sketch was shown at the meeting.

11. *Fundus oculi from case of cerebral tumour; appearances like those of retinitis albuminurica.*

By Walter Edmunds.

(With Plate VII, fig. 2.)

The drawing represents the fundus of the right eye of Mrs. Eliza C—, æt. 40. Patient was suffering from severe headache, vomiting independent of food, and epileptiform fits; no albuminuria, no history of syphilis.

Well-marked double optic neuritis. Right eye (Plate VII, fig. 2): Great swelling of optic disc; all round edge of swelling numerous radiating hæmorrhages; large vessels on disc altogether obscured, large veins on retina not tortuous; bright radiating lines at yellow spot on the side towards the optic disc; macula red. Left eye: Changes similar, but fewer hæmorrhages; no peripheral changes in either eye; media clear.

Vision { R. eye reads 4 N.
L. eye rends 2 N.

There is contraction of the outer part of the field of the right eye.

(*July 4th*, 1884.)

XI.—FUNCTIONAL DISEASES.

1. *A case of nerve disease with ocular symptoms, including alleged uniocular diplopia.*

By R. Marcus Gunn and James Anderson, M.D.

We venture to bring this case before the Society mainly because of the occurrence of the unusual symptom, uniocular diplopia. This symptom being purely subjective ought to be received with caution, even if it were readily explicable. But if difficult to substantiate, the symptom is still more difficult to explain, and therefore, as may be supposed, we have throughout investigated the case with a considerable amount of scepticism.

The patient, William D—, æt. 34, a painter, came to Moorfields Eye Hospital on the 20th of October last complaining of seeing several images of an object, especially when he looked to his left.

On examination it was seen that his left external rectus was deficient in abducting power by about an eighth of an inch, allowing therefore a slight convergent strabismus of the left eye. He had the usual homonymous diplopia of abducens paralysis, but with the right eye shut he asserted that he still saw things double. The tension of both globes was normal. The pupils were unequal, R. = 3½ mm., L. = 4½ mm.; both acted to light and with accommodation. With the exception of the paralysis of the left external rectus already noted, the movements of the globes were fairly normal. On looking upwards the right globe made a slight excursion inward on its way, and when he looked to the left his right eye

was directed very slightly upward as well as to the left. There was no nystagmus. He had $\frac{20}{20}$, and 1 J. with each eye separately, the reading with the left eye not being quite so ready as with the right. There was no Hm. The cornea, media, and fundus of each eye were healthy, no abnormality being present except a small crescent down and out from the disc. There was no irregularity in cornea or iris, no opacity or dislocation of either lens. Testing him now with both eyes open, an object appeared single in the right half of his field, occasionally double in the middle line, and constantly double in the left half of his field. The diplopia, as stated, was homonymous, the right image clear, the left dim, parallel, and on the same level. The object being still held to the patient's left and the right eye closed, he asserted that he still saw two images, nearer together than before, the right clear and the left dim, as with binocular vision. Tested with the perimeter the field of vision of the left eye was fairly normal, and the uniocular diplopia was found to extend over the left half of the field, and also over the upper part of the right half. The images got farther apart as the object neared the periphery, and he said very distinctly that it was not a mere blurring at the edges, that he really saw two separate objects. By the use of a prism we sought to separate the images given by the two eyes, and so to ascertain if he saw three images with the two eyes, but he never did so. He was repeatedly examined with prisms and coloured glasses, and in our examination we had the benefit of Mr. Nettleship's experience, but his answers, although varying on such matters as apparent distance, were substantially consistent. He is a fairly intelligent man, answered with the manner of perfect *bona fides*, and so far as we could discover had no interest whatever in deceiving us.

As to the patient's previous history we may simply state that he has been married eleven years, has three children alive, and five have died of "convulsions" within three months of birth. He had gonorrhœa sixteen years ago, denies having had a chancre or any symptom of

secondary syphilis. He has been a painter for seven years, and was in the London Hospital in 1879 and again in 1882, believed to be suffering from lead-poisoning or progressive muscular atrophy. In 1882 he had wasting of the right upper limb and the left lower limb with loss of left knee-jerk. The wasting of the right upper limb is now but little manifest except in the muscles of the scapula and of the thenar eminence. The quadriceps muscle of the left thigh is greatly atrophied, and the left knee-jerk is completely absent, the right being prompt and vigorous. The cremasteric reflex is present on both sides, the plantar reflex absent on both sides; there is no ankle-clonus. Notwithstanding that he says the left leg feels weak, there is nothing noticeably abnormal in his gait. Sensation in the upper and lower limbs is equal and apparently normal. He has no blue line, has not for the last ten years had anything like colic, the extensors of the forearms are perfect, and there is no atrophy of the interosseous muscles of either hand. He has now, however, developed well-marked wasting in the left temporal and zygomatic fossæ. The temporal muscle can scarcely be felt, the masseter is fairly good. The facial muscles act well, but when he opens his mouth or raises his upper lip to show his teeth, the left corner of his mouth is drawn down, giving his mouth the lop-sided appearance characteristic of paralysis of the trigeminus. Sensation on the right side of the face is normal, that on the left side is extremely imperfect, the points of a pair of compasses feeling like the point of the finger. All three divisions of the fifth are affected. Since he was in the London Hospital taste and smell have become very defective, and the hearing distance of the left ear, with a fairly normal, perhaps slightly too concave membrana tympani, is $2\frac{1}{2}$ feet as compared with 4 feet for the right ear. The right cornea and conjunctiva are normally sensitive, the left are quite insensitive. Dr. de Watteville kindly examined the electrical reactions of the muscles. The results were negative, that is the reactions were simply diminished (or absent as

in the case of the temporal muscle) with no qualitative changes.

From the multiformity of the lesions and the affection of the trigeminus, the diagnosis was made of syphilitic nervous disease and the patient was put upon iodide of potassium. The paralysis of the sixth nerve gradually disappeared, and as it did so, the diplopia, both binocular and uniocular, got less and less marked. Three weeks after the commencement of treatment, when the paralysis of the sixth was *just* observable, he still saw two images at the left side with his left eye alone, but the images were not perfectly distinct from one another, the flame of the candle being "fringed at the left side." He ceased to attend at Moorfields in the middle of December, when there was neither paralysis nor diplopia. He was seen again in February, when he said he had had several "fits" within the previous three weeks, similar to one he had had in the London Hospital. The exact nature of these fits could not be ascertained. He falls down suddenly without warning, is quite unconscious, and believes he remains so for about ten minutes, but has been told nothing of what happens meanwhile.

Three cases of uniocular diplopia have been recorded in the Society's 'Transactions' for 1882 (pp. 201 *et seq.*), in addition to two mentioned by Mr. Adams, both of which he believed to be spurious. Considerable doubt is thrown upon the first of Dr. Ord's cases by the facts recorded of it by Dr. Hughlings Jackson, and we shall therefore for the present refer only to Dr. Ord's second case and to Dr. Abercrombie's, in both of which there was an autopsy.

Dr. Ord's case was that of a boy, æt. 13 years, suffering from mitral disease and admitted into St. Thomas's Hospital after an epileptic fit affecting the left arm and left side of the face. Mr. Nettleship, who examined the case, found optic neuritis, rather more marked in the right, complete paralysis of the left and incomplete of the right external rectus, the pupils large and the left acting

scarcely at all. There was binocular diplopia with lateral and some vertical separation of the images, also uniocular diplopia with each eye separately. In the progress of the case the right external rectus recovered power, and with this recovery the uniocular diplopia of the right eye disappeared, persisting, however, in the left eye in which the abducens paralysis persisted. His vision was $\frac{20}{30}$, and he read 1 J. with each eye throughout the period of observation. He died suddenly a year later, and at the post-mortem examination was found to have an old cerebral hæmorrhage external to the right lateral ventricle proceeding from a small aneurysm.

In Dr. Abercrombie's case, a girl, æt. 10, admitted into Great Ormond Street Hospital with loss of power on the right side and impairment of speech, there was also paralysis of the right external rectus with slight obscuration of the edges of the discs and turgidity of the retinal veins. There was binocular diplopia and also uniocular diplopia with the right eye alone, the false image being always (*i.e.* always in the uniocular diplopia, as Dr. Abercrombie informs us privately) above and to the left of the true one. The autopsy showed an abscess lying external to and communicating with the descending horn of the right lateral ventricle.

In will be seen that the present case agrees with both those summarised in the occurrence of paralysis of the external rectus, and it is specially interesting to note that in this case, as in Mr. Nettleship's, the uniocular diplopia disappeared with the disappearance of the abducens paralysis. In another important point also, this case resembles Mr. Nettleship's, namely, the dilated condition of the pupil of the affected eye, a condition frequently but by no means invariably present in abducens paralysis, as we have recently had opportunities of observing at Moorfields. As in Mr. Nettleship's case, this dilatation of the pupil persisted in our patient after all diplopia, both binocular and uniocular, had disappeared. In both the recorded cases there was coarse cerebral disease. In our case there

was at the time no optic neuritis and there almost certainly had been none. The evidence of coarse central nervous disease afforded by the epileptic seizures and the affection of the fifth and sixth nerves is not decisive.

The cases recorded are too few for generalisation, and we shall, therefore, without occupying the time of the Society with theories, simply emphasise the three following points:

1. The occurrence as a concomitant in Dr. Ord's two cases, in Dr. Abercrombie's, and also in the present case, of abducens paralysis, accompanied, in the two cases where the pupil condition is noted, by a dilated pupil.

2. The disappearance of the uniocular diplopia in two of the cases *pari passu* with the disappearance of the abducens paralysis—a concomitant variation which tempts to the generalisation that either abducens paralysis and uniocular diplopia are cause and effect, or that both phenomena are due to a common central cause.

3. The presence of coarse cerebral disease in the two cases where there has been a post-mortem examination, and the occurrence in the other two of nervous symptoms consistent with, although not decisive of, coarse cerebral lesion—the lesions in the two cases recorded being of such a nature and extent as to be unavailable for localisation, while our own case, as we have said, furnishes no assistance on this head.

Dr. Brailey remarked that he had under his care in Guy's Hospital at that present moment a case with a history of uniocular diplopia, in association with which were found all the other eye symptoms to which the authors had called attention, viz. paralysis of right rectus and slight dilatation of the pupil. But there were also some general ataxic symptoms. He would show the case at the next meeting of the Society.

Mr. Juler stated that a similar case to that mentioned by Dr. Brailey had recently come under his care at the Westminster Ophthalmic Hospital. It occurred in a

woman about forty years of age. She had paresis of the left external rectus with double vision. The interesting point of the case was that when the patient's right eye was covered she positively and persistently stated that she saw two images with the left eye.

Mr. Nettleship had lately seen another case (under the care of Dr. Gulliver), in which the patient (a young man) alleged that he had uniocular diplopia. Like all the cases hitherto brought before the Society, this patient had paresis of the external rectus, accompanied by symptoms of cerebral disease, and, as in Dr. Anderson's case, the uniocular diplopia was present chiefly, if not only when great effort was made by the paralysed muscle. Referring to Dr. Anderson's observation of an enlargement of the pupil in paralysis of the sixth nerve, he said he had observed a slight degree of such dilatation in a large number, though not in all, of his cases of this affection.

(*May 8th*, 1884.)

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2. *Case of paralysis of external rectus and mydriasis with a recent history of uniocular diplopia.*

By W. A. Brailey, M.D.

David P—, æt. 42, admitted to Guy's Hospital on April 25th, 1884.

He says he has had right internal strabismus since boyhood, but that he had fair sight in this eye on covering the left till one year ago. Then it began to fail, and he noticed, when testing it thus, that he saw two images always, both being in the same horizontal plane and only visible in the outer part of the field. This eye has now only perception of light, and its optic disc is white with its lamina cribrosa unduly apparent; also its blood-vessels are smallish. The pupil is rather dilated and quite

immoveable. There is almost total paralysis of the external rectus. Myopia = about 7 D. There are some small opacities in the posterior lens capsule.

The left eye has about the same degree of myopia. When corrected, V = fingers at three feet. The optic disc is white with lamina cribrosa too visible and vessels too small. The pupil is smaller than the other, but like it is also inactive both to light and accommodation. There is no diplopia with this eye. He says that this eye has only failed during the last six weeks.

His field for form in both eyes seems of about normal size. He has total loss of vision for green, which he calls dark red. His field for red appears to be of the usual size.

His lungs, heart, urine, and superficial reflexes are normal. There is a very distinct difference now in his knee-jerks, the left being perhaps stronger than normal, whereas the right is almost absent. There is no ankle-clonus. With feet together and eyes closed he is a little unsteady. His muscles show normal electrical reactions. Those round the mouth are decidedly unsteady always. He has occasional pains in his temples and also nocturnal pains in his bones. He appears to have had syphilis twenty years ago, and has till recently been a heavy smoker and drinker. For the last three years he has had occasional incontinence of urine at night. This has been relieved by taking alcohol before going to bed.

(*June 5th*, 1884.)

XII.—AFFECTIONS OF MUSCULAR AND NERVOUS SYSTEMS.

1. *Case of complete paralysis of accommodation and convergence, persisting for ten months, in a girl aged thirteen years, who presented no other evidence of disease.*

By Henry Eales (Birmingham).

My excuse for bringing the following case before this Society is that, so far as my own experience and researches go, it is unique. It is that of a little girl, æt. 13, who has been for ten months past afflicted with complete paralysis of accommodation in both eyes, together with absolute loss of power to converge the eyes; the pupils also remaining motionless on any attempt at near vision though they respond well to the stimulus of light.

The patient, the daughter of a well-to-do gentleman, consulted me first on June 1st last, by the advice of the family medical attendant, in consequence of having become rapidly afflicted as it was thought with short-sight, a supposition supported by the fact that her father was short-sighted, while she herself during the previous three months had taken to putting her books very close to her eyes, and had suffered during the same period from aching about the eyes after any attempt to read.

As regards her family history, the medical attendant writes: "Her mother died of tubercular phthisis of four years' duration; phthisis is on both sides of the family. She has three brothers and one sister, all alive and all delicate and strumous. Patient has had no special illness, enteric fever slightly, no relapses and no sequelæ.

She is not strong, and suffers slightly from lateral curvature. Gout is on the father's side, but no syphilis."

On inquiry I ascertained that she had suffered from measles, chicken-pox, scarlet fever, and hooping cough, but none of these about the time of the onset of her eye troubles; nor could I get any history of sore throat about this time to lead to the suspicion of her having had diphtheria, indeed, for the twelve months previous to her eye trouble, her general health had been better than usual.

A cousin of her mother is "insane with general nervous disease." There was no blood relationship between her parents.

Her father (who has consulted me on account of myopia with astigmatism) I found subject to gout. Her paternal grandfather has recently been under my care in consequence of retinal hæmorrhages in each eye. He, however, presented no evidence of cardiac disease or granular kidney, but is very subject to gout, being in other respects hale and hearty, though aged seventy-four years.

Her eye troubles set in three months previous to her first visit to me, and two months previous to her mother's death. At the onset her father noticed that "her eyes were all pupil unless opposite the light."

She has never menstruated. Her bowels are habitually regular, she does not suffer from dyspepsia, sickness, or headache except slightly of late after reading. Once or twice she has felt "a thumping in the head and confused feeling" on being hurried in walking, and under these circumstances her father has noticed her to stagger a little, each time forwards.

Her governess wrote to me in September, 1883: "She is always full of life and spirits, and her appetite never fails. She is perfectly unreserved with me, and I should certainly know if she were suffering in any way."

State on examination.—She is a slight, spare, but healthy-looking child, remarkably intelligent, of a cheerful disposition, and presents no evidence of anæmia or of hereditary syphilis. Both pupils, in a dull light, are un-

usually large, the right pupil being smaller than the left; both pupils contract fairly well to light, though perhaps a little slowly. The right eye is emmetropic, the left eye presents slight myopia (M. = $\frac{1}{42}$). Her central vision is normal in acuteness in each eye. V. = $\frac{15}{xij}$ with either eye.

With + 12″ glass the near and far points are both at ten inches, apparently with the right eye as well as the left. There is no range of accommodation apparently in either eye.

Without the aid of + glasses she cannot read No. $1\frac{1}{2}$ Snellen at all, and only $2\frac{1}{2}$ Snellen with great difficulty on bringing the type up to about five inches from her eye, and even then it is very pale and indistinct she says.

Whether with or without glasses the pupils do not contract on looking at near objects, and under both conditions she "sees double," no convergence of the eyeballs whatever taking place.

So absolute is the loss of power to converge that objects even six feet distant appear double, but at ten feet and beyond there is no obvious double vision.

The bilateral movements of the eyes upwards, to either side and downwards (and, indeed, in all directions except convergence), were normal in kind and extent. The field of vision was normal in extent (hand test). Vision for colours was normal.

On ophthalmoscopic examination the fundus of each eye was normal. There was not even a suspicion of previous papillitis. Patellar tendon-reflex was normal.

Treatment.—Iodide of Potassium with strychnia and cod-liver oil had produced no effect on the eye condition, which was in all respects precisely the same when last seen on January 3rd, 1884. Eserine drops enabled her to read for about ten minutes without glasses shortly after they were instilled.

Dr. Gowers, who has seen the patient, wrote to me on November 1st last: "I failed as you did to find any other indication of organic brain disease than the singular ocular loss;" and further on, "I think it most improbable

that the symptom is due to any gross disease. The prognosis is certainly unfavorable. In a case so unusual, as it certainly is, one can be guided only by analogy and the fact that a somewhat similar paralysis may occur in diphtheria and be recovered from, renders the prognosis not altogether hopeless. Nevertheless, I confess the duration of the case renders it unwise to place much reliance in this analogy."

On November 28th Dr. Gowers wrote: "There is no change in her condition, and I feel confident that there is no organic brain disease, such as tumours or the like. It must be a degenerative change in the special part of the nucleus of the third nerve. Although such a case may never have been seen before, we must remember that some other degenerative diseases, such as disseminated sclerosis, muscular atrophy, and even locomotor ataxy, have been known in extremely rare instances to occur in childhood. I can find no indication of any extension of the disease beyond its original limits, and think that the probability is that it will remain limited. Certainly we are justified in assuring the friends that there is no indication that the function of the optic nerve is likely to suffer. I hope you will publish the case."

So much discussion has taken place at this Society since its foundation as to the probable seat of disease in cases of intra-ocular palsy that it is not desirable that I should go into the question at any length.

Mr. Hutchinson's suggestion of disease in the lenticular ganglion would hardly seem a satisfactory explanation of the phenomena present in this case, for, apart from the improbability of symmetrical degeneration taking place in each ganglion, it seems difficult to believe that the ganglion is so differentiated anatomically or functionally that disease in it could cause loss of accommodation with so slight impairment of the function of the iris, while it is impossible to see how disease so situated could cause loss of convergent power.

Mr. Hulke's theory of disease in the intra-ocular nerve-

ganglia is for similar reasons not applicable to this case, though, like Mr. Hutchinson's, a sufficient explanation of the symptoms in some cases of intra-ocular palsy which occur; but as I understand the views of both Mr. Hutchinson and Mr. Hulke, they would not apply them to a case in which the palsy is so partial, or of such a kind, as is found in this case. I feel therefore compelled to seek the cause in the central nervous system at the centre for accommodation, which has been shown by Hensen and Völckers to be situated in the posterior part of the floor of the third ventricle.

Physiological observations and clinical experience both tend to indicate that these centres are probably double, each eye having its own centre, but the centres for the two eyes being closely associated in action.

The inequality of the pupils in this case is slight evidence in favour of the centre for each eye being distinct from its fellow.

The fact that both her far and near points appeared to be at ten inches with + 12″ glasses with each eye is satisfactorily explained as regards her left eye by the presence of myopia $\frac{1}{42}$, but it seems to suggest slight power of accommodation in the right eye, which is emmetropic. Though it is possible, bearing in mind the age of the patient, that the observations as to the far and near points in this eye were slightly wanting in accuracy, the fact of the pupil of this eye being less dilated coincides with the view that the affection is less complete on this side.

A case of uniocular reflex iridoplegia with double optic neuritis, without loss of accommodation, published by me in the 'Ophthalmic Review' for August, 1883, and similar cases published by others, seem to indicate that the centres for each eye are distinct.

Probably the centre for convergence is distinct from, though closely associated with, the centre for accommodation, for it is known that either function can be used to a limited extent without the other, and clinical experience shows that one may be lost without the other.

In diphtheritic paralysis of accommodation, speaking from my own experience of several cases, I should say that convergence is seldom or never lost.

That the pupil is not more affected in this case would seem to indicate that the centre for convergence in man is near the centre for accommodation, and not near the centre for the other movements of the eyeballs, which have been shown by Hensen and Völckers to be most posterior, in the aqueduct of Sylvius, the centre for the movements of the iris being placed between them and the centre for accommodation.

The limited loss of function present in this case, implying as it does only a limited area of disease, the fact of its remaining absolutely *in statu quo* for ten months, the absence of cerebral vomiting, severe headache, and of optic neuritis, make it difficult to accept the view that tumour or any coarse central disease is present. I am therefore compelled, like Dr. Gowers, to consider the cause to be a local degenerative change. The long and absolute persistence of the loss of function, and its complete limitation, together with the entire absence of any history of diphtheria, are against the view of its being caused by that disease; while the age and sex of the patient, and the absence of any other symptoms of disease of the nervous system, make it impossible for me to place this case with certainty under any of the classes of central nervous disease with which we are familiar.

Future experience of this case can alone determine under what category of disease it should be placed, and with the assistance of the family practitioner I hope some day to be able to do this.

Does not this case in which the pupil contracts to light, but not on looking at a near object (I cannot say during accommodation and convergence, for both were absent in this case), and its counterpart cases in which the pupil contracts in accommodation and convergence but not to the light, justify us in thinking that in man there are two centres for the contraction of the pupil, in spite of the

assumption of Hensen and Völckers, founded on experiments on animals, that there is only one centre for the contraction of the pupil?

I cannot conclude without expressing my thanks to Dr. Gowers for his letters referring to this case, and for his permission to publish them.

(*January* 10*th*, 1884.)

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2. *On certain forms of spasm of the ocular muscles.*

By W. R. Gowers, M.D.

I propose to ask attention to three forms of spasm of the ocular muscles, viz.: the occurrence of such spasm in chorea; partial convulsion affecting a single ocular muscle; and a singular case of convulsive nystagmus.

1. *Spasm of the ocular muscles in chorea.*—In chorea the head and eyes may participate in the irregular movements, being moved to one side by consentaneous spasm of the quick jerky form characteristic of chorea. But the point to which I would especially call attention is that this spasm may be so unequal in the two eyes as to cause brief diplopia, although it is insufficient to produce a visible variance of the ocular axes. The point is chiefly of diagnostic importance, as was well illustrated by the case that first directed my attention to the symptom. The patient was suffering from choreic movements, and also from optic neuritis and headache. The two latter symptoms suggested that the movements might be symptomatic of organic brain disease, and therefore not true chorea. The doubt was increased when the patient shortly afterwards complained of occasional double vision, although no defective movement of the eyes could be detected. The case ran the ordinary course of chorea, and the patient made a good recovery. Hence I was constrained to regard the diplopia as the result of irregular

spasm of the ocular muscles. The patient has since verified the diagnosis by having a second severe attack of very characteristic chorea, for which she is still under treatment, and her sister was brought to me yesterday with distinct choreic movements. I have since inquired for diplopia of patients suffering from chorea, and find that it is by no means infrequent, although, not being constant, little attention is paid to it, and it is rarely if ever mentioned spontaneously.

2. *Partial convulsion of the ocular muscles.*—Partial convulsions may, as is well known, affect only the side of the face, the arm, or the leg. The two cases that I am about to mention show that an ocular muscle may be affected in a similar manner. This is not surprising when we consider that the ocular muscles participate almost uniformly in unilateral convulsion.

The first case was that of a man, æt. 36, without neurotic heredity, without any personal history of syphilis or other predisposing disease. He had suffered for six months from attacks of the following character. Two of them I saw. Each began by a hot rushing sensation, commencing at the inner canthus of the left eye, and extending over the eye and adjacent parts to the temple. As this spread, the sight of both eyes became dim, the degree of defect of sight varying in different attacks from slight dimness to absolute loss. Very rarely there was a moment's loss of consciousness. During the attack the left eye moved outwards about half way to the outer canthus, the right eye remaining still. The pupils were of medium size; during one attack they dilated slightly, during another they remained unchanged. The duration of the attack was only a few seconds, too short to permit the action of the pupil to light to be tested. At other times this was normal. If walking he always deviated to the left during the attack, perhaps from erroneous projection of the left field, since he was unconscious of vertigo, and we cannot regard a lateral movement of one eye only as the effect of vertigo. Such attacks occurred

many times daily. In the intervals no defective power in any ocular muscle could be discovered. Vision was reduced in the left eye to $\frac{1}{5}$th without any defect of refraction, field, or colour vision. The attacks gradually ceased under treatment by tonics.

The second case was that of a man, æt. 47, also without neurotic heredity or syphilitic history. He complained only of occasional double vision. There was, however, some permanent weakness of the ocular muscles —of the left external rectus and right internal rectus, and also slighter weakness of the left internal rectus. The paroxysmal diplopia of which he complained was due to brief attacks, one of which I witnessed. Each commenced with an epigastric sensation like that so common in epilepsy. Then the left eye moved outwards nearly to the external canthus, the right remaining still. At the same time there was blinking of both eyes. This he said was voluntary "to try and get the eye right," but nevertheless he could not help doing it. The attack lasted only a few seconds, and when it was over the left eyelid fell about a twelfth of an inch lower than the other, and remained so for about a minute, and then became normal. Vision was unaffected, and a careful search revealed no other nervous symptom. Such attacks occurred almost every day, and were sometimes brought on by excitement. Iodide and bromide of potassium and tonics were given, and the attacks became less frequent, but did not cease. It is probable that the seat of the disease in this case was the centres for the movements of the eyes, in the pons, or beneath the corpora quadrigemina, but its exact seat and nature are uncertain.

3. *Convulsive nystagmus.*—A man suffering from advanced Bright's disease was seized with symptoms indicating a lesion of the pons, loss of consciousness, general paralysis with relaxation of muscles, and hyperpyrexia which increased up to death, twelve hours after the onset. In addition there was a singular condition of spasm of the eyeballs. Both eyes deviated strongly to the left. From

time to time they were turned still farther to the left, and at the same time were agitated by violent nystagmus, in which the quick movement was to the left, the slow return to the right. In some of the attacks there was quick clonic spasm of the eyelids, in others, of the corrugators. After death the only lesion was a well-marked anæmic area on the right side of the pons, extending above the nucleus of the sixth nerve for about half an inch, from near the floor of the fourth ventricle behind, to the fillet in front, and from the middle line through about half the lateral extent of the pons. It was apparently an area from which the blood supply had been cut off, but death had followed too soon for the occurrence of softening. The area affected was in the position in which a lesion commonly causes loss of movement towards the side affected and deviation of the eyes from the side of the lesion, paralysis of the external rectus of the same side, and internal rectus of the opposite side. But the deviation could not be regarded as simply paralytic, because it was increased during the convulsive nystagmus, in which the quick movement was in the direction of deviation—*i.e.* to the left. We must regard the increased paroxysmal movement to the left, and therefore also the quick movement of the nystagmus, as liberated from the unaffected left side of the pons under the influence of the lesion of the right side. No doubt the centres for the lateral movements are intimately connected, and mutually influenced each other. This case shows first that we cannot always regard conjugate deviation as purely paralytic, even when it corresponds in direction to a paralytic deviation, since it may be in part due to irritation exerted by a lesion of one side on the corresponding centre on the other side. Secondly, it shows the significance of the direction of the quick movement of nystagmus. This point is too often neglected, if we may judge by recorded cases, but it must be carefully observed, if nystagmus is to acquire a higher localising value than it at present possesses.

(*March* 13*th*, 1884.)

3. *A case of paresis of upward movement of eyes.*

By J. A. Ormerod, M.D.

Patient is a gardener, æt. 44. The upward movement of the eyes is impaired; they rise but little above the horizontal plane. It is most impaired in the right eye, and that more particularly when he looks to the right (affection of right superior rectus ?); so that on moving the eyes horizontally to the right, the right eye sinks below the horizontal plane. There is vertical nystagmus as he tries to look upwards, and the same to a less extent as he looks downwards. Downward and lateral movements, and movements of convergence in other respects normal.

He has some drooping of the eyelids and difficulty in opening them when closed; he sometimes has had to open them with his finger. The forehead is constantly wrinkled, and the eyes, especially the right, screwed up. The lower part of the face is rather expressionless. He complains also of difficulty in speech; it is rather slurring and hesitating. There is sometimes tremor of the tongue and lips. He has also had some difficulty in walking. Patellar tendon reflexes present; pupils rather small, contracting under light. A largish white patch (choroidal atrophy ?) above right optic disc; edges of discs a little indistinct, but no definite neuritis.

Was under Dr. Reynolds and Dr. Bastian at University College some fifteen years ago with the same symptoms; but he states that this is a second attack, which came on about ten months ago.

(*Living specimen. March 13th*, 1884.)

4. *Acute spasm of the accommodation.*

By C. E. Fitzgerald, M.D. (Dublin).

The following cases are good examples of this somewhat rare affection :

Case 1.—Mr. H— came to me in July, 1873, complaining of a dimness in the right eye which he had first noticed ten months previously. Two months prior to his consulting me he had gone out shooting, when to his surprise he found that on closing his left eye he was unable to see some rabbits at a distance of about fifty yards. He did not think the dimness had increased much since. He had always enjoyed excellent health, had never to his knowledge received any injury in the eye, and had never contracted venereal disease.

On testing his acuteness of vision I found he could read CC (Sn.) at the length of my consulting room, which at that time was not twenty feet. With 3 D. he could read the XX. $1\frac{1}{2}$ (Sn.) he read at 8″. The left eye was emmetropic.

On examining the eye with the ophthalmoscope I thought there was a slight haziness of the fundus, and quite close to the margin of the lens I detected some small, opaque specks evidently situated on the posterior capsule. In order to examine these more particularly, I dropped in a solution of atropine, and to my no small surprise when this had acted he could read the XX just as well as he had previously done with the lens. Direct illumination with the ophthalmoscope now showed that the specks above alluded to formed a sort of circlet at the margins of the lens. They could also be well seen with the oblique illumination and presented a slightly brownish colour closely resembling the small pigment masses seen on the anterior capsule in cases of iritic adhesions which have been broken up. I could not find any trace of them in

the other eye. I have frequently seen this appearance since, as I suppose have many others, and I presume it has no pathological significance.

The case was clearly one of spasm of the accommodation, and consequently the eye was kept for some days under the influence of atropine. When the effects of the latter had passed off the spasm returned. Again the atropine was resorted to, but with a similar result on its being discontinued. Thinking that possibly the resistance to the treatment might be due to both eyes not being completely at rest, I desired the patient to desist from all work for a fortnight, during which time he was to keep the eye thoroughly under the influence of atropine. This proved equally unsuccessful after it was discontinued. The artificial leech was also applied, but with no good effect. I have since seen this gentleman on various occasions and he reports that the eye is in exactly the same condition, and the last time I had an opportunity of testing his vision I found it to be so.

Case 2.—Miss W—, æt. 18, consulted me on the 19th of last February; she stated that for a fortnight previous to her visit she had not been able to read except by bringing the book up very close to her eyes. Up to this time she had always had long sight. Just before she noticed the change in her sight she had suffered from an attack of facial neuralgia.

With each eye V. = $\frac{6}{60}$; and 0·5 (Sn.) at 10 cm., but with − 2·25 D., V. rose to $\frac{6}{6}$. An ophthalmoscopic examination showed the refraction was hypermetropic and that H. = + 2· D.

I prescribed two drops of Liq. Atropiæ Sulph. to be put into each eye three times daily.

March 4th.—Under the influence of atropine. Right, V. without lens = $\frac{6}{12}$ some letters, but with + 1·25 D. = $\frac{6}{6}$; left, V. without lens = $\frac{6}{12}$ some letters, but with + 0·75 D. = $\frac{6}{6}$. Ophthalmoscope H. = 2·5 D.

Spasm of the accommodation in connection with H. and M. is a matter of daily observation; in fact in young

persons who are affected with either of these anomalies it is, I fancy, almost invariably present to a greater or less extent. This, however, is a condition which in these cases may be considered as chronic, and in hypermetropic patients, whose visual acuteness for distance is greatly reduced, but on the addition of a very low lens is at once raised to the normal standard, is quickly recognised.

The sudden accession of apparent myopia dependent on on acute spasm of the accommodation is, however, so far as I am aware, extremely rare, and very little information on the subject can be gleaned from the ordinary ophthalmological text-books. Professor Donders in his immortal treatise devotes a section to it, but expresses considerable scepticism regarding some cases recorded by earlier writers and collected by Ruete. He says: "Acute spasm of accommodation, such as, for example, is produced by calabar, is undoubtedly very rare. I myself have never met with a clear case of it, and this may excuse my scepticism. My task is confined to quoting those few cases which afford satisfactory evidence."* He gives three cases, two reported by Von Graefe† and one by Liebreich.‡

The first is that of a man who had received an injury of the cornea of the right eye. When the irritation from this had quite subsided the patient saw indistinctly with the eye. Accommodation was almost entirely lost, and the eye at the same time was myopic. The left eye was almost emmetropic. The patient had often previously satisfied himself that both eyes were equal. A rapid cure ensued after a few applications of the artificial leech.

Von Graefe regarded the condition in this case as a reflex neurosis and analogous to the tonic spasm sometimes excited in ordinary voluntary muscles by injury of sensory nerves.

* Donders, 'Accommodation and Refraction of the Eye,' New Sydenham Society, p. 622, 1864.

† Graefe, 'Archiv für Ophthalmologie,' B. ii, H. 2, p. 304.

‡ Liebreich, 'Archiv für Ophthalmologie,' B. viii, H. 2, p. 259.

The second case is that of a girl, æt. 18, affected with painful spasm of the orbicular muscle of the right side, which on tension of the eyelids, and also sometimes spontaneously, became more violent. Slight pressure on the facial nerve increased the pain and spasm, strong pressure lessened both. Leeches were applied with brief improvement, followed by aggravation of the symptoms. Refraction appeared to be increased with diminution of the accommodation. The right pupil was somewhat narrower than the left with slight reflex, and without any accommodation movement. Left eye normal. Sulphate of atropia was employed endermically behind the ear, and then the left eye exhibited the same conditions in every respect. Belladonna symptoms presented themselves on the third day, with diminution of the spasm and pain, and on increase of the intoxication the accommodation was almost restored. The symptoms returned when the drug was suspended, and the final result is not recorded.

Von Graefe looked upon this case as a combination of spasm of the muscles of accommodation with neurosis of the facial nerve.

In Liebreich's case, that of a young lady æt. 21, fatigue on exertion and near-sightedness had set in a year before she consulted him after constant work. There was an apparent M. equal to about $-$ 1·D.; atropine was put in and the M. gave way to H. $=$ $+$ 1·5 D.

In the Italian 'Annals of Ophthalmology' for 1879, a case of acute spasm of the accommodation is reported by Professor Ravà.* It occurred in the right eye of a man, æt. 30, after a very severe attack of neuralgia of the fifth nerve on the right side, and after eight days' use of atropine completely subsided.

The two cases of high degree of spasm reported by Mr. Adams to the Society in 1882 are, I presume, fresh in the minds of most of the members present. The first of these cases is, I take it, an example of this acute form of

* *Vide* 'Centralblatt für Augenheilkunde,' Marz, 1880, p. 98.

spasm, but the second could hardly be considered so. These are the only cases I have been able to collect.

As I before remarked the ordinary text-books devote little or no attention to the subject, in fact the only work that I am acquainted with that deals at all fully with it, is the admirable monograph of Professor Nagel on the 'Anomalies of Refraction and Accommodation,' and which was published in 1866.* In speaking of this form of spasm he states that it is rare, and that few well-recorded observations of it are to be found in ophthalmic literature. Closely allied to it is a form of clonic spasm of the ciliary muscles, lasting for a moment or so, which he states he has sometimes noticed in the prodromal stage of glaucoma. He looks upon it as due to an irritation of the ciliary nerves caused by increased tension. The observation is an interesting one, and so far as I am aware, has not been alluded to by any author.

(*May 8th*, 1884.)

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5. *Observations on miners' nystagmus and its cause.*

By Simeon Snell (Sheffield).

(With Plate X, figs. 1, 2.)

Within comparatively recent years, the nystagmus, found in the workers in coal mines, and commonly called miners' nystagmus, has received a good deal of attention. The experience of most observers indicates the peculiarities of pit life and the mode of employment of the miner, as the direction in which the cause of the affection is to be sought.

At the meeting of this Society, however, in July, 1882,

* Nagel, 'Die Refractions und Accommodations Anomalien des Auges 1866, p. 202.

my friend, the late Mr. Oglesby, advanced the theory that the disease was of central origin, and partook of an epileptiform character. A perusal of his paper, published in the 'Transactions,' vol. ii, p. 243, will, I believe, be found not to support the theory indicated, and in the discussion which ensued after it was read, I intimated my dissent from the author's conclusions, and briefly stated my conviction that the affection depended for its causation on the position the miner assumed whilst at work. This opinion I have long held, and it is the object of this paper to more unfold the manner in which, I believe, the nystagmus is occasioned.

The peculiar characteristics of the affection have been so often well described that I need only make reference briefly to them. The oscillations are of two kinds, to and fro and rotatory, round the antero-posterior axis; the rapidity of the movements varies much in different cases. A miner coming under treatment for this affection will mention that for a varying time he has suffered from the lights and other objects dancing before him, and may complain of giddiness. Many of the patients are able to bring the oscillatory movements to a standstill by looking fixedly, generally in front or below the horizontal line, and this even in moderately bad cases. On the other hand, any movement above the horizontal line will increase the rapidity and distinctness of the movements, and particularly if the eyes are turned obliquely upwards to the right or left. Movements of the patient's body, running or walking quickly, will also bring on or aggravate the condition, as will also bending low the head and raising it rapidly. Cases vary much in severity, some there are in which the movements apparently never cease, and then again, there are others in which the disease may be called latent. It is not evident to casual observation; the patient complains of objects dancing before him, but still there is no apparent nystagmus, and it is only after pursuing the methods already mentioned to induce the oscillations that any movements are to be detected.

Whilst, moreover, these may suffer a good deal of discomfort, occasionally others are met with who have been the subjects of the disease, it may be for many years, who think little of the inconveniences it occasions.

Many have been the causes assigned for the production of this kind of nystagmus. The impurities in the atmosphere of the pit have been credited with occasioning it, and so has the employment of "safety" lamps, but to this further reference will be made.

My residence in a district where collieries abound, first in Leeds, and for the last ten years in Sheffield, has afforded me excellent opportunities of becoming conversant with the affection of which we are speaking. A varying number of such cases are always under treatment. I have seen nothing to lead to a supposition that the affection was dependent upon central disease. I have never seen a case which raised such a question. There has never been any optic neuritis, and the nervous symptoms when present, such as vertigo, are readily enough explained by the ocular condition. The fundus oculi has not shown abnormal changes. The disease may be found, moreover, in the emmetropic, the myopic, and hypermetropic. Thus one case had a myopia of 5 D. and another a hypermetropia of 7 D.

My experience has led me always to regard the mode of working of the miner as directly causing the nystagmus whatever subsidiary parts other influences may play in its production.

It will be readily understood that the men engaged in a coal pit are of various classes, and the kind of work performed by each class is very different. Thus there are labourers and trammers, the former occupied in the different cuttings in clearing them, &c., and the latter in attending to the cars on the tram lines, these are not employed in coal getting, and do not, I believe, suffer from nystagmus, or at least I have not met with cases among men so occupied. Then there are coal-getters, some of these are employed "cutting to make the headings,"

and they work directly forwards with the pickaxe; others are employed a good deal at what is called "holing." This consists in driving a cutting underneath the seam of coal which is afterwards brought down by wedges. Work of this kind necessitates the men lying on their sides, as the "hole" they make may only be about eighteen inches to two feet high, and may reach inwards for a yard or more underneath the coal. In this "hole" the miner will lie at work on one or other of his sides. There are many men whose principal or entire work consists in "holing;" other men work at this as well as other ways of coal getting. There are some men, again, probably also some from both classes I have already mentioned, who work in parts which are more "open" on what is called the "bank."

It is with the coal-getters, whose work necessitates their lying on their sides, that in my experience the nystagmus is associated. Later on I shall explain the manner in which, I believe, the position assumed tends to produce the oscillation of the eyeballs.

Observation of cases of nystagmus soon taught me that the patients so suffering had worked on their sides, and I believe that of all the many instances at different times which have come under my notice, without exception, as far as my memory and records go, the miners attacked have been those whose work has been done on their sides more or less. The evidence in support of this contention may be thus detailed:

1. In a letter of mine to the 'Lancet,' 1875, vol. ii, p. 81, the following sentence occurs:—"Four cases of miners' nystagmus have come under my observation during the last few months, and from these and other cases previously noticed, it seems to me that the disease occurs chiefly, if not entirely, in those colliers who are compelled to do their work whilst lying on one of their sides."

My further experience corroborates the opinion thus expressed in 1875, and I recollect no case of nystagmus

occurring in a miner whose work was not of this character.

2. I felt tolerably certain that if I had an opportunity of seeing miners at work in the pit, I should find the ones suffering were those already alluded to. Accordingly, last June (1883), I went down a coal pit in the neighbourhood of Sheffield to test the opinion I had formed. The pit, I may say, was a well ventilated one; several hundreds of hands were employed; Davy's safety lamps were used and no naked lights. My guide, a former patient, at first took me to the "coal-getters." Three sets of these men were examined who were engaged in "cutting the headings," working with the pick directly forwards in the manner I have already described. In none of these men was any nystagmus discovered. Then I was taken to the men engaged in "holing," and four of the six men working at the situations I went to, suffered from nystagmus; the two who were not affected were young men. It was this class of miners, who had to work whilst lying on their sides, often creeping underneath the coal; these were the men I expected to find affected. Trammers, and men otherwise engaged in the pit were examined, and nystagmus was not found among them.

It cannot be asserted that my examination of the workers in this pit was a thoroughly exhaustive one. The time at my disposal did not admit of it, and it will readily be understood, by those in any way familiar with a coal pit, that a regular and systematic examination of the miners at their work in a fair sized colliery, means an immense expenditure of time, and a long distance to be travelled. My observations are, however, of value, as they distinctly confirmed the impressions gleaned from clinical experience as to the men I should find affected. An overlooker, a very intelligent man who accompanied me, wrote subsequently saying "that I am nearly of the same opinion as yourself that the men who suffer most are those you spoke of." Other men have also given

confirmatory opinions, and this, in spite of the deeply-rooted conviction that nearly all colliers have, as to the malady being caused by the "safety lamps." Another miner, himself a sufferer from nystagmus,* recently expressed himself in the following manner:—"I think you are right," he said, "about the position causing it (nystagmus) and I will tell you why. A young man suffered like me from his eyes, but for the last year he has given up working on his side, and he has been getting coal by digging straightforwards "ribbing and packing" all leg work, ribbing down to make the roads, and he has got considerably better."

3. The cases referred to by Mr. Oglesby in his paper, though recorded with a different intention, afford, I believe, confirmatory evidence as to the class of miners who suffer from nystagmus. In the first case he states "that it would appear that when the head and neck were bent on the right shoulder,† the discharging lesion, so to speak, was at full pressure; but when the head and neck were flexed on the left shoulder, the nystagmus ceased altogether. Then comes a time when the left shoulder flexion was useless." Respecting his second case, he says "A peculiarity in this case is that the man is left-handed, and when getting coal the head and neck are flexed on the left shoulder. At the present time he had much difficulty in getting coal when in that position, but by flexing the head and neck on the right shoulder he can still do a fair amount of work."

4. Dransart, whose painstaking observations on the affection we are discussing are well known, alludes in a footnote, attached to his paper in the 'Annales d'Oculistique,' 1877, vol. ii, p. 121, to the men working in the

* He has done nothing but "holing;" his eyes have become affected, especially lately, since he has made a change in his mode of work. He still "holes but where he had nine inches, he now has two feet to get out and clear down, which necessitates a good deal of turning of the head when he is on his side.

† It is presumed the right was the side he was most accustomed to work upon.

shallow "inclines" constantly lying, and adds,* "We ought to note this fact, that all our workers attacked with nystagmus worked in these inclined bearings."

5. The following very complete report by my friend, Mr. C. S. Kilham, is valuable, as testifying to the absence of nystagmus, in a colliery district where the conditions I have before described were wanting. As formerly a resident in the Sheffield Infirmary, and assisting me with the ophthalmic patients, he was very familiar with miners' nystagmus, and was thus well suited for the work he kindly performed. I wish to record my appreciation of the readiness with which, at my suggestion, he undertook a by no means slight task. In reply to my inquiry as to the frequency of nystagmus among the miners in the district in which he was then residing (County of Durham), he immediately stated that the percentage must be very small, as he must have seen cases if there had been any, but he had noticed none; and referring to their mode of work, he said that they did not work on their sides but sat on a low stool instead. The other medical men in the district had never seen anything of the disease, and a like answer came to his inquiries of several managers, viewers, and others.

The following is Mr. Kilham's detailed report. He examined only men engaged in the pit and not those employed at the mouth of it or on the pit bank.

"I have examined the men of four pits in this district, more than 500 in number, made up as follows:

a. Coal-hewers . . .	324
b. Putters and drivers .	149
c. Labourers	33
	506

"I have examined those men and boys who work down the pit (*i.e.* excluding those engaged up the mine, at the

* Nous devons noter ce fait que tous nos ouvriers atteints de nystagmus travaillant dans des gisements inclinés.

bank, &c., in daylight), and I examined them as they came out from work. The seams in these pits average from two feet ten inches to six feet or so. Naked lights (candles) are used excepting in a very few places in one pit where Davy's lamps are employed. The miners as a rule are very healthy, though rather anæmic, and many of the hewers are flat-backed. They work eleven shifts of six hours every fortnight.

"*a. Coal-hewers.*—In the large seams they stand at work, in the smaller ones even (2 ft. 10 in. to 3 ft.) they sit on crackets or small stools bent forward, hewing from above downwards in front of them, with their eyes directed forwards and up or down as may be necessary. They place their candles in lumps of clay on one side of them so that the light is steady. In these pits they never work on their sides.

"*b. Putters* are strong youths up to eighteen or twenty years old, who push the tubs (little waggons containing the coal) from the hewers to the larger workings, where ponies are fastened to them. The drivers are lads who look after the ponies.

"*c. Labourers* or off-hand men.—They are men who are unable to hew from age or infirmity, and they go down the pits generally during the night, and make all the workings safe for the others, and clear up generally. I was not able to examine all the labourers employed, as they mostly come up at 4 a.m. or irregular hours.

"I have not seen a single case of nystagmus among the men examined; in fact it seems to be an unknown thing in this immediate district, as many of the oldest men have never heard of it, or seen any cases."

He closes his report by remarking that the results of his examination are entirely negative, and, he thinks, prove that in pits where the men can sit or stand to hew and the light is good enough to prevent great straining of the eyes, nystagmus is very rare indeed.

I have said enough, I conceive, to support my conten-

tion that the miners who suffer from nystagmus are those "whose work necessitates their lying on their sides." Before, however, considering how this position occasions the nystagmus, let us say a few words as to influences assigned by others for its causation.

A great deal has been said by some writers as to the unhealthy condition of the miners, and it cannot be denied that their occupation is prejudicial to health, and that a large number suffer from anæmia. But the patients who come for treatment for nystagmus are, in my experience, by no means an unhealthy looking lot of men. On the other hand it is not unusual for them to express their opinion as to their health being good. Thus the most recent case I have treated has more than once alluded to his robust state of health.

Neiden ('Transactions of International Congress,' London), who has extensively studied this disease, has come to the conclusion that its cause is to be found in the employment of the "safety lamps."* Anyone familiar with a coalpit well knows, of course, the poor illumination given by these lamps. Neiden states that an examination with Bunsen's photometer displayed the differences between the light from an open lamp, a freshly-lighted safety (Davy) lamp, and one in use in the coal-dusty air as 10·0 : 4·0 : 3·0. It is possible that the effect the feeble light has in the accommodation, as Neiden suggests, may have an influence in occasioning the disorder; but I believe it cannot but be a very secondary one. Otherwise why should the disease be confined to the hewers of the coal, and not be found among the trammers and labourers, considering that all workers in the pit employ equally the safety lamp? Certainly if this were the prime cause the disease should be more equally diffused amongst the various classes of miners. The fact of the sufferers from this disorder being, as I have stated, found in one particular kind of workmen, ought of itself to

* Nystagmus has been found to exist amongst workers in mines where safety lamps were not employed.

indicate, as the cause of the nystagmus, some peculiarity in their work.

Dransart,* to whom allusion has previously been made, has most fully and ably studied this disease. He has expressed his belief that the disorder is due to the fatigue induced in the elevator muscles in consequence of the cramped position of the miner producing strain and a constant upward movement of the eyes. "The myopathy," he says, "will have its principal seat in the superior rectus and inferior oblique; alone it occasions a weakness in the organs. The pair of elevators having a feebleness cannot overcome its antagonist; it is obliged to attempt it several times by means of a series of little successive and rapid contractions. It then produces nystagmus, or rather gives occasion to the vertical oscillations. To explain the horizontal oscillations which are noticed in miners' nystagmus we have recourse to the paresis of the internal recti and the accommodation. The importance of the internal recti may suffice to explain the horizontal oscillations; they are produced by the above-mentioned mechanism. But the accommodation contributes to increase the muscular disorders by virtue of the relations which exist between convergence and accommodation, or, in other words, between the ciliary muscle and the internal rectus."

Now, if the miners suffering from nystagmus are those employed in the position mentioned by me, the "constant upward movement of the eyes" is not, as I shall show, the direction in which the eyes move and is not therefore the cause of the nystagmus. A miner lying on his side, engaged in "holing," either whilst making the "hole" or whilst continuing his work in it, will of course fix his gaze at different parts according as it is necessary to strike, but the tendency will be for the eyes to assume a direction obliquely upwards. This is rendered evident to anyone seeing a man assume on the floor the position occupied in the pit. The engraving (Plate X, fig. 3) illustrates this. A man in this

* 'Annales d'Oculistique,' 1877, vol. ii, p. 128; ib., 1882, vol. ii, p. 150.

position cannot well look directly upwards; he may look to a point in front of him as he strikes, but not so well beyond the vertex of his head. The miner, therefore, occupied in "holing" will lie on his side, sometimes the left and sometimes the right, as is most convenient; his legs will be crooked up, his head thrown back, and the eyes will have the tendency to look in a direction obliquely upwards. Simply looking upwards may be tiring, but it may be safely asserted we are more accustomed to fix our gaze in that direction than in an oblique one. Most persons will, I conceive, feel the strain greater of looking obliquely than if they merely gaze directly upwards, and the difference will be evident if the eyes are turned for a little time in the direction indicated.

Dransart, as has been pointed out, assigns the muscles suffering and occasioning nystagmus, as the elevator, the superior rectus, inferior oblique, and internal rectus, but of course it would chiefly be the first-named, aided by the inferior oblique and in a less degree by the internal rectus. Now, if the position—obliquely upwards—be correct, it follows that the muscles suffering from chronic fatigue will be somewhat different to those indicated by Dransart. Thus, if a miner be working on his left side, and fixing his gaze upwards and to the right, he will be using in the left eye the superior rectus, inferior oblique, and internal rectus; in the right the same two first-mentioned muscles, and substituting the external for the internal rectus. If he lie on his opposite side of course the arrangement would be reversed. Besides the more complete employment of the internal recti than the mode of Dransart allows for, we have, in addition, the external recti at work, and it need hardly be said that the inferior obliques are much more used than in the arrangement he suggests. The to and fro movement is thus accounted for by the weariness of the outer and inner recti; the rotatory oscillations by the inferior oblique, and the superior rectus aids here, or in occasioning the vertical movements.

A point worthy of remark is the ready manner in which the nystagmus is occasioned by placing the eyes in the obliquely upward direction. The miner whose position is represented in Plate X, figs. 2, 3, was for several months previous to his picture being taken "cured," and after leaving the pit followed another occupation, gardening, without discomfort. When he placed himself in "position" for the photograph he felt discomfort in his eyes and could not bear it long.

The cause I have mentioned is, I conceive, the main one acting in the production of nystagmus. Dransart refers to paresis of accommodation and other points which I must now leave without further reference.

Writers who have not assigned the affection to the attitude of the miner, but rather to the effect of the insufficient light on the accommodation, have, as well as Dransart, thought the consequent strain on the ocular muscles induced a weariness in them similar to that known as writers' cramp. This seems to me the correct pathology. The muscles of the eye are employed in keeping the globe in an unusual position for many hours together. There is thus prolonged strain, chronic fatigue results, and, atony of the muscles being induced, oscillation of the globes is caused.

A few words as to treatment. It has been my practice to advise the discontinuance of pit life, and their finding some other employment, and after a variable time, according to the severity of the case and the length of its duration, recovery has ensued. Strychnia has been my favourite internal remedy. An important point is, however—and Dransart discusses it—whether as nystagmus is infrequent or, in my experience unknown, in other miners than coal-getters, whether it is not possibly sufficient for the miner to change his mode of work, but still be employed underground.

And, moreover, if the manner of work discussed in this paper is the prime factor in the causation of this disease it may be possible to hereafter encourage managers of

DESCRIPTION OF PLATE X.

Fig. 1 illustrates Mr. Snell's case of Congenital Cyst of the (Left) Lower Eyelid (p. 334). From a photograph of the baby.

Figs. 2 and 3 illustrate Mr. Snell's paper on Miner's Nystagmus (p. 325). Both are taken from photographs of the miner.

FIG. 3 shows the coal miner lying on his left side in position for work.

FIG. 2 shows, on a larger scale, the position of the head and eyes only.

Fig. 1.

Fig. 2.

Fig. 3.

From Photographs

West, Newman & Co. lith.

collieries to attain by other means the ends they have in view. Comparatively, many miners suffer from nystagmus, and if a relinquishment of the manner of employment spoken of, stamped out the disease or lessened its frequency it would be a matter of great thankfulness to many workers in the pit.

Mr. Priestley Smith (Birmingham) said that in Birmingham a good many cases of miners' nystagmus came under notice from the mines of South Staffordshire. In looking for the causes we should not, he thought, entirely dissociate this form of nystagmus from those which arise under other circumstances. Nystagmus, however arising, must, in his opinion, be regarded as a sign of disturbance of function in the centres which governed the combined movements of the two eyes, for the oscillations were bilateral and synchronous, and, though not always of equal extent on the two sides, were clearly due to efforts acting bilaterally. They were sometimes horizontal, sometimes vertical, and sometimes rotatory around the antero-posterior axes, but in all cases expressed, not the failure of an individual muscle, but a disturbance of the co-ordinated action of certain pairs or groups of muscles. The functional activity and nutrition of the co-ordinating centres appeared to depend largely upon the stimulus supplied by retinal impressions. This stimulus was certainly essential to the normal development of these centres in early life, for children born with diseased optic nerves or with opaque lenses became nystagmic; if vision were not early improved by operation the nystagmus became confirmed and irremediable, while on the other hand, it disappeared if the opaque lenses were removed at a very early age. This fact proved, the speaker thought, that the nystagmus was essentially dependent in such cases upon the absence of retinal pictures. He had himself noticed that it was difficult to maintain a steady prolonged fixation of a "luminous matchbox" in a perfectly dark

room. In the case of the coal miner the same essential cause was, he thought, in operation. The miner worked by a very feeble light surrounded by "black walls," conditions in which the stimulus to fixation must be very feeble. The facts with regard to the horizontal position during work, so well illustrated by Mr. Snell, would explain how it was that certain men acquired nystagmus while the large majority escaped. The strain involved in looking obliquely upwards was greater than in other positions, hence the energy available would be sooner exhausted.

In reply to a question by Mr. Nettleship as to how the occurrence of nystagmus in one eye only could be reconciled with the theory of central exhaustion, Mr. Priestley Smith said that when we spoke of a bilateral ocular movement being governed by a single centre, we probably meant two centres, one on each side of the brain, connected by commissural fibres, and ordinarily incapable of separate action. It was not unlikely that in exceptional cases one half of such a compound centre might undergo atrophy while the other remained intact; such cases of unilateral nystagmus were, however, extremely uncommon.

Dr. Stephen Mackenzie said the President had appealed to the experience of physicians as to the nature of "writers' cramp" and similar disorders, and whether they were or were not to be regarded as of central origin. His own belief was that "writers' cramp" and other "fatigue paralyses" were of central origin. He thought that the physiological action of the muscles could not be dissociated from the energising centres. He instanced holding out the arm at right angles from the body; after a time, in the strongest person, tremor took place, but this could be controlled for a time by a stronger effort of the will. In ordinary circumstances there was a balance of antagonism between groups of muscles physiologically associated, and when one group was overworked this balance was disturbed and the antagonists came into action, often in a fitful and

irregular manner. All influences that led to exhaustion of the nervous centres tended to produce tremor and other uniocular disturbances, and thus excessive sexual intercourse, as had been alluded to in one case, chronic alcoholism, febrile and protracted diseases, &c., tended to bring about these motor disturbances.

As regarded the particular condition that had been so carefully described by Mr. Simeon Snell that evening, he thought Mr. Priestley Smith had advanced conclusive arguments as to its dependence on central disturbance. He thought that Mr. Snell had established that it was the oblique position of the head and neck that led to the nystagmus of miners. But the element of imperfect illumination perhaps contributed to the result, and from Mr. Snell's description it appeared to him that miners who were engaged in "holing" had to concentrate their gaze more accurately and adjust their movements more exactly, and thus the imperfect light might contribute in producing the nystagmus. He further pointed out that in insular sclerosis and other nervous diseases nystagmus was clearly dependent on localised disease of the central nervous system.

Mr. Eales (Birmingham) had seen many cases of miners' nystagmus, and while willing to concede a due share in the causation of this affection to faulty position causing unusual strain on the ocular muscles, attached much more importance than Mr. Snell did to the visual conditions under which the miners worked. He had recently seen a case in which a miner, who had worked for many years with a naked light, at once became affected with nystagmus on having to work with a Davy lamp, and many of these patients immediately became nystagmic on the light failing, as in walking home in the twilight. Moreover, some complained that they were practically blind for some moments on passing from a lighted room into the dull light. He thought that the black character of the object looked at, the bad illumination, and probably

a failure in retinal sensibility were the the most important factors in the causation.

If mere muscular strain would cause nystagmus, why did not many other classes of persons who put great strain on their ocular muscles get nystagmus? Moreover, all other forms of nystagmus (except certain rare cases due to central nerve lesion) were associated with faulty perception from some cause. He thought the chief cause was loss of sufficient retinal stimulus to fixation, necessitating greater strain on the nerve-centres controlling the muscular movements resulting in their exhaustion, and consequent loss of co-ordination. This view was further supported by the conjugate character of the affection. When once induced, any attempt to direct the eyes as when at work, at once caused nystagmus by calling on the particular nerve-centres affected, and so faulty position became a common excitant of the nystagmus.

Mr. W. Adams Frost suggested that possibly in those mines in which the Davy lamp was not used "holing" was not practised. In the collieries of North Staffordshire "holing" was practised and nystagmus occurred. The position of the miner during the operation was very faithfully depicted in the photographs exhibited.

Mr. Snell, in replying, said that he should himself have discussed in his paper many of the subjects which had been raised had he not felt that he had trespassed as it was sufficiently on their patience. He could hardly agree with Mr. Priestley Smith in his statement that both eyes were invariably equally affected, for Dransart found in some of his cases that the nystagmus was well marked in one eye and less so in the other. The effect of the darkness of the pit and the black walls must have a very secondary influence in causing nystagmus, to the "position" indicated, for the miner "holing" worked, he thought, in no worse light than the coal-getter in other ways. As to any marked loss of power of muscles, Mr. Snell stated that

Dransart believed there was paresis of the internal recti, but he had not himself sought particularly for any such condition. He was pleased to have Dr. Brailey's support to his proposition, that it was the position assumed by the miner that occasioned the nystagmus, as well as his corroboration of his belief that when the eyes were fixed in an oblique position for any time they became "jerky." He gathered, moreover, from the statements of Messrs. Priestley Smith and Eales that "safety" lamps were not employed much in the neighbourhood of Birmingham, and yet as they saw instances of the disease, it followed that the importance of this imperfect illumination as a cause was discounted. It was possible that the man Mr. Eales mentioned as not suffering whilst working with naked lights and becoming affected when he used "safety" lamps, might on inquiry be found to depend in reality on a change in his mode of work. For instance, Mr. Snell, referred to the case of a miner who did not suffer whilst coal getting, until his work compelled him to assume the position, on his side, described. It was then that he complained of his eyes and suffered from nystagmus. He imagined, though his knowledge of the working of other mines did not yet allow him to speak with perfect confidence, that it would be found that the manner of work he had described, as undertaken by miners, "holing," was peculiar to collieries. It would appear to be less necessary in other mines where there were not the same objections to boring that there were in a coalpit, and, moreover, the hard metals could not perhaps be got down with a wedge like coal. If this were so it would account for the absence of nystagmus amongst the workers in other mines.

(*July 4th*, 1884.)

6. *Concomitant squint following severe scalp wound, complicated by slight paralysis of the right external rectus.*

By Anderson Critchett and Henry Juler.

Samuel D—, æt. 14, healthy boy, sustained a severe scalp wound on February 7th of the present year, for which he was under the care of Mr. Norton at St. Mary's Hospital. Four days after the accident the eyes became convergent, and he suffered from double vision. There was no loss of consciousness at any time. He made an excellent recovery from the severe scalp injury, but the squint still remained. He first came under our notice about three weeks ago, and his condition then was much the same as at the present time, viz. marked convergent strabismus and slight paralysis of the right external rectus. Both the primary and secondary deviations are excessive (over 45°) ; they are also apparently equal.

In each eye there is hypermetropia to the extent of 5 D.

The vision when corrected by convex glasses is $\frac{6}{9}$ in the right and $\frac{6}{12}$ in the left eye.

On testing the muscular power by means of the perimeter we find the *field of fixation* in the left eye to be good, whilst that of the right shows a deficiency in the power of the external rectus.

Our first impulse was to attribute the convergence to paralysis of the sixth nerve as the result of the head injury ; indeed there is evidently some deficiency of the right external rectus. Taking into account, however, the high degree of hypermetropia, the equality of the primary and secondary deviations, and the shock he must have received from the severe scalp-wound, we consider the squint to be chiefly due to the hypermetropia.

P.S.—Tenotomy of the internal rectus of each eye was performed on June 6th, and the patient was exhibited at the meeting of the Society on July 4th, the eyes being then parallel. (*Living specimen. June 5th,* 1884.)

XIII. CONGENITAL DEFECTS.

1. *Congenital cysts in the lower eyelids in one case with (apparent) anophthalmos, and in the other with microphthalmos; a case also of coloboma of optic nerve sheath, with other cases of congenital defects.*

By Simeon Snell (Sheffield).

(With Plate X, fig. 1.)

1. *Congenital cysts in the lower eyelids with apparent anophthalmos.*—On the 7th of May (1883), a child was brought to me at the Sheffield Infirmary, by its mother in consequence of its not having looked about like other children, nor indeed did the eyes appear like those of others. Fearing something was wrong she sought advice. The baby was just a month old, having been born on April 11th.

Attention was at once attracted to a swelling in the left lower eyelid. Beyond this the appearance and formation of the eyelids were normal, as was also the palpebral fissure. The upper eyelids seemed to fall in as if wanting support from within. A similar swelling, only very small, existed also in the right lower eyelid; except this the eyelids, &c., were normal on this side. On separating the lids there seemed an entire absence of anything resembling an eyeball in either orbit. Chloroform was, however, administered to enable one to make a full and satisfactory examination. The orbital cavities and their bony walls were properly formed, but nothing like an eyeball was discovered. Towards the back part (cone) of each orbit a feeling of resistance was noticed. The conjunctiva lined the entire

cavities. In the left lower eyelid, as before mentioned, was a distinct swelling, about as large as a bantam's egg. It occupied the whole breadth of the eyelid, being continued into the inner corner of the orbit. Its appearance was bluish, and the integument covering it seemed thinned. It was distinctly fluctuating. In the front at its middle it appeared to be a trifle constricted and bulged more on either side. With the infant under chloroform this cyst, as it seemed to be, was found to be well confined within the orbit, not reaching beyond its lower margin, but passing to the posterior part of the cavity. It was traced along the floor of the orbit beneath the conjunctiva by its bluish colour and the swelling it occasioned. The engraving (Plate X, fig. 1) is from a photograph taken shortly after the child was first seen and well exhibits the appearance of the left side. On the right side there was some ectropion, and the cyst in the lower eyelid was considerably smaller than the one on the other side.

The infant was a healthy, well-developed child, its head and limbs were well formed, and there was an absence of any deformity beyond the ones described. The mother of the child was aged twenty-six, and the father, a farm labourer, twenty-seven. Both were stated to be free from deformities. They had been married two years, and there have been two children; the eldest, born not long after marriage at full time, was eighteen months old and was healthy and strong. The mother was the second child of a family of twelve; six of these were dead (four being premature and two dying early); none were, it was said, malformed in any way. The father was the second child of a family of five, all being healthy, and none deformed.

The diagnosis made in this case at the outset was that the congenital tumours were serous cysts, and were associated with absence of the eyeball. To verify the opinion formed as to the nature of the cysts it was decided to puncture the one in the left orbit, and examine the fluid removed in the manner mentioned by Wecker and Van Duyse.

On July 2nd ether was administered, and the cyst in

the left orbit was tapped with a small aspirator. The quantity withdrawn was about two teaspoonsful, but some of it was lost, and the quantity was too small to permit me to ascertain the specific gravity. The cyst was not completely emptied. The fluid corresponded closely, according to the chemical examination to the analysis by De Wecker and Van Duyse (page 344) of the contents of the cysts in their cases and confirmed the diagnosis already made. The fluid was, however, redder than mentioned in other cases, and this is accounted for, I fancy, by the admixture of blood at the time of puncture, as the aspirator was in reality at work before the needle had actually penetrated the cyst. Blood-cells were plentiful under the microscope. The fluid contained albumen, and chlorides, but no sugar.

23rd.—The cyst has refilled, and it was now opened and the wall partially dissected out. A very small rounded body was detected at the back part of the orbit, and was presumed to be a rudimentary eye, but it was not thought advisable to prolong the dissection to render this opinion positive. Nothing was done to the small cyst in the right lower eyelid. I can find no note of the fact, but my recollection is that at the emptying of the left cyst the second time it was of decidedly lighter colour than on the previous occasion.

The child has thriven well, and when seen a short time after the last note the left orbit was still free from the cyst, and that on the right side had not become larger.

June 23rd, 1884.—The child was seen to-day. There is a little fluid in the cyst in the left lower eyelid at its inner part, and it is still bluish on its surface; it is very insignificant to what it formerly was. A small trocar was passed into it, and a small quantity of straw-coloured fluid escaped.

The appearance of what was thought to be a very small cyst in the right lower eyelid (it was never tapped) has just gone. There is, however, at the lower part of the orbit a rounded swelling, not distinctly fluctuating; it is

deep under the conjunctiva; this may be the cyst or a rudimentary globe. No dissection to solve the point could be made.

The child is in the enjoyment of perfect health.

Congenital orbital cyst with microphthalmos.—My friend, Mr. W. Mackerg Jones, of Wath, near Rotherham, has kindly given me particulars of this case, which he permitted me to see with him on one occasion. It is of particular interest in connection with the one already related. I give the case in Mr. Jones's words:

"During the latter end of May, 1883, a child, six weeks old, was brought to me to see if anything could be done for its left eye, which was reported to be absent.

"The parents had a large family of healthy children, and there was no history of congenital deformities.

"On examination the child was apparently healthy and well developed, with the following exception. The left lower eyelid was the seat of a firm dense swelling, with indistinct fluctuation, more prominent on its conjunctival aspect and bulging out between the eyelids. It so completely filled the orbit that I was unable to introduce a retractor between it and the upper lid, which I attempted to do, thinking that perhaps the eye might be found compressed behind it. The conjunctiva over it was in two places slightly raised into blue-looking protuberances.

"Never having seen anything like it before, I concluded it was either a displaced disorganized eyeball, or some sort of tumour growing in the lower lid pressing back the eye. Whatever it was I advised it should be removed and so lessen the deformity. The child was brought again in a few days, and as the swelling had considerably increased the parents wished for something to be done.

"On June 1st, 1883, I dissected back the conjunctiva, causing the tumour to appear as a tense cyst, which I attempted to extract whole, but accidentally pricking it with the knife, it discharged a considerable quantity of clear straw-coloured fluid and then collapsed. Following

back the cyst wall I found it was attached deep down in the orbit, and fearing it was a meningocele I cut it off with a pair of scissors as far back as I could reach. On replacing the conjunctiva I then found deep down in the orbit an exceedingly small eye, having an inferior coloboma of the iris. With the exception of this and its size it appeared quite normal. Cold-water dressings were applied and the orbit was ordered to be syringed out regularly with warm water. In about a week the wound had quite healed and the eye could be seen deep down when the child opened the lids.

"On June 16th the child opened the lids freely, and the eye was not nearly so deep down. The conjunctiva on the upper side appeared very tight, pulling the eye forwards.

"In August the eye had grown considerably and had come forward to its proper place.

"In October Mr. Snell came over to see the child, whom we found in the last stage of tubercular peritonitis; the eye had grown since I last saw it, but it was still much smaller than the other. The child could move it about freely in any direction and could evidently see with it."

Any examination with the ophthalmoscope at the time of my visit was attended with the greatest difficulty. The child was nearly moribund and died a few days later. The coloboma in the lower part of the iris, mentioned by Mr. Jones, was well marked, and with the ophthalmoscope it was ascertained to extend into the choroid, but I am not certain whether or not it reached the optic disc. The media were perfectly clear. The eyeball had all the appearances of a normal globe, except for its small size and the coloboma. Perhaps it was about a third the size of the normal eye.

We were unable to obtain the eye for examination.

The cases I have just related are among the rarer ocular anomalies. Others, in many respects similar, are on record, and various suggestions have been made to

account for these congenital cysts. They have been found associated with cases either of microphthalmos or anophthalmos, but in this latter condition careful examination after emptying the cyst has often disclosed the presence of a rudimentary organ. Mr. Jones's case is of interest on account of the discovery under these circumstances of a comparatively good eye. Without emptying the cyst it would have passed as a case of anophthalmos.

I propose to add here some particulars of other cases which have been recorded.

Wicherkiewicz* has related a case of double anophthalmos, with cysts in the lids, in a child of eight weeks. Apparently the cysts were situated between the conjunctiva and external layers of the palpebral tissues. The orbit was lined with conjunctiva and had a normal depth. The upper lids and lacrimal puncta were normal. There was complete absence of the rudiments of eyes. The cystic fluid was not able to be collected.

He explains the origin of these palpebral cysts in the following manner:—As a consequence of the void occasioned in the pre-formed orbits by the total absence, little development, or intra-uterine resorption of the globes the eyelids yield to the external pressure and turn themselves into the empty cavities. As they do not fill the void there is formed in the cellular tissue of the lower eyelids a serous transudation to fill the void in question. The liquid encysts itself in a membrane formed from the connective tissue in its own immediate neighbourhood. Subsequently the cysts, partly by their weight, and partly by the dragging of the orbicular muscle, detach themselves from the internal wall of the orbit. He gives no opinion in this as to the anophthalmos.

De Wecker† has also recorded a case of anophthalmos with congenital serous cysts in each orbit. The tumours

* Zehender's 'Monatsb. f. Augenheilkunde,' Oct., 1880. Analysed in 'Annales d'Oculistique,' 1881, vol. i, p. 69.

† "Cas d'Anophthalmos avec Kystes Congénitaux des Paupières inférieures simulant une ectopie des Yeux." 'Annales d'Oculistique,' 1877, vol. i, p. 151.

were situated in the lower eyelids, and had a bluish tint. The cysts were tapped and the fluid examined chemically and found to correspond with the usual contents of these cysts, to be mentioned further on, when treating of the diagnosis of these tumours. Microscopically they did not exhibit any histological element. Examination did not discover anything corresponding to an ocular globe. The article is accompanied by an engraving of the case described.

Streibitzy* met with a case of anophthalmos with congenital cyst developed in the lower eyelids. The patient was a girl, aged six months. There was ectropion of the lower eyelids and the conjunctiva was raised by two tumours of the size of normal eyes, which were prominent in front, fluctuating and moveable to a limited extent, and through the thinned skin exhibited a bluish tint. No examination of the liquid was made, and the absence of a rudimentary globe does not appear to be proved.

A case by Michel,† of bilateral anophthalmos differs materially from the foregoing ones. There was an absence of both optic nerves and both olfactory lobes; a little cartilaginous *cul-de-sac* was present into which were inserted numerous muscular striæ; lids sufficiently developed; arrest of development of half the cranium—orbits very small. The author believes that the non-development of the brain was the primary anomaly.

Talko has recorded no less than seven cases of palpebral cyst associated with microphthalmos or anophthalmos.

I cannot here give a *résumé* of each of the cases. They are briefly analysed by Van Duyse in his very valuable article entitled "Le Colobome de l'Œil et le Kyste Séreux Congénital de l'Orbite,"‡ and in which he deals very thoroughly with the subject.

* Zehender's 'Monatsb. f. Augenheilkunde,' Nov., 1881. Analysed in 'Annales d'Oculistique,' 1881, vol. ii, p. 267.

† Graefe's 'Archiv,' vol. xxiv, 2. Analysed in 'Annales d'Oculistique,' 1879, vol. i, p. 78.

‡ 'Annales d'Oculistique,' 1881, vol. ii, p. 144.

Talko draws the following conclusions from his cases :

1. The serous intra-orbital cysts of the newborn are ordinarily complicated with faulty development of the eyeball.

2. They are localised always between the globe and the lower, or lower and internal wall. They are ordinarily covered by the conjunctiva ; they pass in the direction of the lower eyelid, which they push in front of them, and give rise to the bluish grey colour of the cyst.

3. They are ordinarily filled with a yellowish serosity, which contains much albumen.

4. They are not ordinarily in connection with the conjunctival sac, nor with the bulb when one exists.

5. They can be punctured or excised.

6. Their size is variable. They produce generally ectropion of the lower eyelid, and hinder the development of the eye, which is very little, and which lies deeply in the orbit. These cysts are not produced after birth, but during intra-uterine life.

Talko, moreover, expresses his opinion that these vesicles have nothing in common with the ocular globe (les vesicles n'ont rien de commun avec le globe oculaire). Formed during intra-uterine life, these cysts place an obstacle to a complete development of the eye (microphthalmos), or hinder entirely its evolution (anophthalmos). Talko would, moreover, appear to admit, on the hypothesis of Hoyer, that these cysts arise in the fœtus by the entanglement of the upper part of the lacrimal sac during the process of welding the lacrimal fork, and are cysts by retention.

Vernueil has also described these cysts as occasioned by an ectasia of the lacrimal sac.

Van Duyse in the article to which reference has already been made, together with notices of other cases, reports one by Chlapowsky. The patient, a boy of 16 years, presented on the left side an intra-orbital fluctuating cyst, the movements of which coincided with those of the fellow-eye. Provided in front with a swelling corresponding to the cornea, and behind a pedicle representing the optic

nerve, the tumour, rounded, smooth, and colourless filled the whole orbit. Extirpation demonstrated the adherence to the cyst of muscular fibres, and at the bottom of the orbit a white lenticular body, representing the rudimentary eye. The cystic liquid was not examined, but Biesiadecki found in the walls of the cyst some epidermic elements and fatty tissue which made him diagnose "atheroma."

Sogliano has also reported a case which would seem to have been one of a high degree of congenital hydrophthalmos.

Manz* has recorded the two following cases. The first in a young man, aged 16 years, the other eye was normal. The congenital cyst filled the entire orbit, and was in relation by its inner wall with a rudimentary ocular globe rich in connective-tissue vessels and had a pigmented choroid; there was a sclerotic also and a pedicle (optic nerve without nervous tissue). The internal surface presented a thick epidermic covering and some down. In the second the eyeball was reduced in all directions, with ciliary body and retina very rudimentary. A cyst was situated at the lower part and extended just to the optic nerve, of which the sheaths were hypertrophied. The cyst developing in the sclerotic had induced atrophy of the globe.

Van Duyse relates in the paper I have before referred to the following interesting case of his own, which he details at length: The patient was 22 years of age; others in his family had suffered from harelip, cleft palate, &c.

The *left* globe was diminished in size ($\frac{1}{5}$); coloboma of iris below. He gives a detailed account of the appearances of the fundus and the following results of his examination: There existed on this (left) side a certain degree of microphthalmos and a markedly staphylomatous coloboma of the inferior posterior wall; the eye appeared to have compensated, by the development of its posterior half, the

* "Deux cas de Microphthalmos Congénital et Considérations sur la dégénérescence cystoide du Bulbe Fœtal.' Graefe's Archiv,' xxxvi, i. Analysed in 'Annales d'Oculistique,' 1881, vol. i, p. 259.

volume which was wanting in its anterior region. The coloboma affected specially the choroid, the sheath of the optic nerve, and at least the pigmentary layer of the retina.

Right eye.—Elastic fluctuating tumour in lower lid not adherent to skin. The eyelid normal as its fellow; the upper eyelid was rudimentary. The cyst extended into the orbit, was covered by the conjunctiva, and had a bluish tint. Eyeball was thought to be absent, and diagnosis made was "serous cyst of orbit with anophthalmos." The fluid was withdrawn from the cyst; it was like ascitic fluid, the colour of urine. Microscopical examination, negative. The cyst was subsequently opened and a rudimentary globe discovered which was separated with difficulty from the cyst; traction on the cyst occasioned movements of the globe, showing a very intimate connection between the congenital cyst and the eye. The latter followed all the movements of the fellow-eye.

From a consideration of recorded cases, and his own case, Van Duyse considers that the cysts have a diverse origin, and may be divided into three classes:

1. Cysts corresponding to hydrophthalmos, to a high degree of fœtal cystic degeneration of the bulb, very probably due to an intra-uterine chronic inflammatory process of the uveal tract.

2. Dermoid cysts, arising from an invagination of the external germinal vesicle, in connection with the eye (Manz, Chlapowski).

3. Subpalpebral serous cysts with microphthalmos or anophthalmos, such as Talko, De Wecker, Wicherkiewicz have described, which appeared to be derived from an encysted coloboma.

Respecting his own case, Van Duyse came to the conclusion that the left eye (slight microphthalmos) presented a sclerectasia, caused by the expansion of a coloboma of the choroid of the optic nerve sheath, itself staphylomatous. The right eye constitutes a degree more pronounced of the same anomaly. It has remained rudi-

mentary (microphthalmos) as a result of the extraordinary development of the coloboma. The latter, encysted itself, and filled the orbit, pushing before it the conjunctiva and lower eyelid.

Of the different theories advanced by various observers, and referred to in the foregoing summary, to account for the origin of these interesting and peculiar congenital cysts, the one which Van Duyse has suggested appears to me to be based on the firmest grounds. The frequent, almost constant association of these cysts with a rudimentary or ill-formed eyeball of itself suggests some causal relationship between that condition of globe and the cyst pressing forward the eyelid. Another point that may be mentioned is the presence of these cysts in the inferior part of the orbit, and the ordinary position for colobomata of the eyeball is at the lower side. Mr. Jones's case is of particular interest from the discovery of such a comparatively speaking well-formed eyeball in the orbit. It is instructive also as demonstrating the possibility of overlooking, an eyeball, and much more so, a very rudimentary globe, if the cyst be not tapped or dissected out, before a final conclusion is arrived at. It is possible that in this way cases described under the heading of " serous cysts with anophthalmos " might have been ascertained not to be so, if the cystic tumour had been treated in the manner indicated, and an eyeball as good as in Mr. Jones's case or merely rudimentary might have been discovered.

Another important question arises in any case in which a fluctuating tumour in the orbit is diagnosed. I refer to its nature. The wiser plan would seem to be to puncture the cyst in the first instance, and then analyse the fluid removed. This was the procedure adopted in my case, and Wecker and Van Duyse have acted in like manner, and urged the importance of doing so.

If the tumour should chance to be a meningocele an incision would be clearly not advisable, for as Van Duyse mentions, " In the first stages of development the connection

between the sac and the cranial cavity is direct, it ceases in a manner sometimes when it exists as an extracranial cyst." A tumour situated at the inner side of the orbit would always lead one to consider the possibility of having to deal with a meningocele. This is the situation where such a tumour would seem to be apt to occur.

A high degree of congenital hydrophthalmos is mentioned as being a condition which it is possible to confound with a palpebral serous cyst. If the general characteristics did not suffice, a chemical analysis of the fluid removed would enable a correct diagnosis to be made.

Dermoid cysts have a varied situation in the orbit. A microscopical examination and the general features of the growth would point out its nature.

Hydatid tumours occur in all parts of the orbit, and are generally attended with pain. If the tumour were tapped, the microscopical and a chemical examination of the fluid would remove any doubt.

Annexed is a table of the various contents of tumours from which it is essential to be able to distinguish the serous cysts. I take it from Van Duyse's article. The fluid in my case corresponded to the features mentioned by Van Duyse as pertaining to the liquid of these congenital cysts.

Fluid of cyst (encysted coloboma).	Aqueous humour.	Cerebro-spinal fluid	Hydatids.	Contents of dermoid cysts.
No formed elements. Colour lemon yellow. Very slightly oily	—	—	Little crowns of hooklets; little sacs	Fatty crystals, notably plates of cholesterine; fatty globules; epidermic elements; soft hair
Feebly alkaline reaction	Alkaline reaction	Alkaline reaction	—	—
By heat the fluid thickens, becomes	—	—	—	—

Fluid of cyst (encysted coloboma).	Aqueous humour.	Cerebro-spinal fluid.	Hydatids.	Contents of dermoid cysts.
gelatinous and milky, and the condition does not disappear with nitric acid				
White precipitate very abundant with nitric acid, increased by boiling (albumen)	Albuminoid matters (fibrine, &c.) very feebly precipitated by acids	Not coagulable (according to G. Gautier)	Absence of albumen	—
White precipitate very abundant with chlorhydric acid; application of heat causes then the coagulation of all the liquid	—	—	—	—
No effervescence with acids	No effervescence with acids	Slight effervescence with acids (carbonates)	—	—
The addition of a solution of nitrate of silver, 1%, produces a white precipitate, soluble in ammonia, insoluble in nitric acid	Contains 7% of chlorides	Chlorides absent	Contains chiefly chloride of sodium	—
No deposit with Fehling's solution	No effect on cupro-potassic reagent	The alcapton (Bodiker) or glucose (Cl. Bernard) contained in this fluid throws down Fehling's solution	Often grape sugar; sometimes succinic acid (Heintz. Honij, &c.), inosite (Wijss)	—

Congenital absence of one eyeball.—Several years ago a little baby was brought to me on account of one eye only being visible. On separating the eyelids no globe could be found. The conjunctiva lined the orbit. The palpebral fissure appeared narrower than on the other side; the lids

were well formed. There was a thin muco-purulent discharge. The other eye was normal. The baby has since grown to a girl of seven or eight, and is strong and quite intelligent. The narrowing of the palpebral fissure now is most decided; and the eyelids are less developed than those on the other side, where the eye and its surroundings are in every way normal.

Coloboma of optic nerve-sheath with microphthalmos (left); coloboma of choroid (right).—Ellen G—, æt. 7, was brought to me at the Sheffield Infirmary in July, 1882, in consequence of the left eye being so much smaller than the right. This condition had existed since birth, the mother stating that at first the eye "was so small one could scarce see it, but that it had since grown."

The eyelids were well formed on both sides, but the great disparity in size between the two eyes was most distinct. The left, which was the smaller one, presented no abnormal appearances of its structures. The cornea and sclerotic were healthy, and though the eyeball retained its rounded form yet the front of the eye had the appearance of being somewhat flattened. The cornea measured only about 6 mm. across, but the measurement was difficult in consequence of the nystagmus which existed in both eyes. The iris was a lighter-coloured hazel than in the well-formed, right, eye. Generally speaking, the left eye presented the appearance of being diminutive, but not otherwise ill formed.

The pupil dilated well to atropine. With the ophthalmoscope one noticed a large white mark at the fundus. Careful examination showed it to be of the following description (inverted image):—A portion only of the optic disc was apparently seen, the upper part merging into a large white surface above. This was equal in size to six or eight times that of the optic disc. Its broader part was above and it was somewhat heart shaped. At points it was brilliantly (pearly) white, at others more grey. Its surface was apparently undulating, and the course of the

vessels indicated that it was situated at a lower level than the surrounding tissues. Numerous vessels ramified over it, some passed beyond it and rose over the edges; and whilst some were traced to the optic disc, others were lost on the white surface; some appeared to run to its edges and then disappeared. Over its expanse were seen several little corkscrew vessels. The margins were well defined and more or less pigmented, but particularly so on the inner side.

In the right eye, some little distance above the disc, about midway between the optic nerve entrance and the periphery, was observed a large, rather oval-shaped patch. It was pearly white, but towards the centre it was less pearly; it corresponded to quite three optic discs in size. With a little care vessels were traced over it, one (artery) ran its whole length, coming from the optic disc, and another vessel, also from the papilla, skirted its border, at one point making a bend over the white surface, and giving one or more small branches which coursed over it. The borders were well defined and pigmented, especially the right.

The refraction in both eyes was hypermetropic. With the left vision = fingers, and perhaps more; with the right $\frac{10}{50}$ was made out with the aid of + glasses. In the left eye there was convergent squint.

The case I have just related presents in the left eye an example, I believe, of that rare mal-development described as coloboma of the optic nerve-sheaths. Until quite recently very few cases of the kind were placed on record, and now their number is very limited. Neiden, writing in Knapp's 'American Archives of Ophthalmology' for 1879, was thus enabled to say in publishing the four instances of the defect which had come under his observation, "the number of cases hitherto reported is increased more than twofold." The cases published previously to the date of Neiden's paper were by Ammon, Liebreich, and Wecker. Other cases, however, since then have been recorded by Galezowski, Pooley, and A. H.

Benson, and, moreover, in the 'Annales d'Oculistique' for the present year,* Van Duyse had added another to the list. In Benson's and Van Duyse's cases both eyes were affected, and the same was the case in one of Neiden's. In one eye of the case reported by Benson, the size of the coloboma is given as being equal at least to six times the size of the papilla; in mine I believe it was larger. In the cases reported by Neiden and Van Duyse it was much smaller. The latter observer mentions the size of the coloboma as being at least equal to three disc diameters in the right, and in the left to two. In Neiden's first case, in the right and left eye respectively the size is given as twice and two and a half to three times, and in another it is two to three times the diameter of the papilla. One of Neiden's cases occurred, like mine, in a microphthalmic eye.

The condition observed in the right eye must also, I believe, be considered to be congenital, and to be occasioned by arrest of development. Coloboma of the choroid, without accompanying cleft in the iris and ciliary body, has been described, among others, by Benson. The condition in this instance is interesting in connection with the coloboma of the optic nerve-sheath in the opposite eye.

Coloboma of upper eyelid.—The subject of this defect is a young woman, æt. 26 (June, 1883). She is an only child. Enjoys good health, and has no other deformities; the same remark applies to her father and mother. She is married, and has given birth to three healthy, well-formed children.

The "cleft" is in the left upper eyelid, and is situated at the junction of the inner with the middle third. It hardly extends to as much as a third of the depth of the eyelid; it is particularly noticeable when the eye is closed, as a distinct notch is then left. From the termination of the "cleft" a well-marked ridge (raphé) extends upwards in the eyelid almost to the orbital margin. The eyeball is

* Mars and Avril, 1884, p. 117.

normal looking, beyond a nebulous condition of the cornea at its outer side. Underneath the conjunctiva, also, at the outer part is an aggregation of fat (lipoma).

Ophthalmoscopically the eye appears normal, but there is a degree of amblyopia; the refraction is hypermetropic, V. + 4 D. = $\frac{15}{200}$. The other organ is normal.

I would merely remark respecting this case the absence of any other abnormality. Harelip or other deformity is often associated with coloboma of the eyelids. Van Duyse* has tabulated the cases recorded, in all about twenty-six, by twenty-three different observers, and he appends remarks as to the causation of the cleft.

Remains of hyaloid artery.—Charles K. S—, æt. 11, was brought to me in September, 1883, on account of defective sight in the right eye. Beyond some divergence the external appearances were normal. Vision = fingers at one foot. There was myopia of about 8 D. With the naked eye, an opacity in the posterior pole of the lens was noticed. After dilating the pupil with atropine, it was ascertained, with the aid of focal illumination, that the opacity was situated in the posterior capsule, and was made up of fine striæ. It was also discovered that running backwards from the opacity was a light grey translucent cord, and it was noticed to change sides as the eye was turned. With the mirror this band appeared dark, and gave a peculiar appearance, from its darting about, sometimes to one place and sometimes to another (all radiating from the opacity in lens capsule), accordingly as the eye was moved. With the direct method it was seen as a hollow cord. It reached from the lens to the optic disc, and its connection with a vessel in the centre of the papilla was clearly made out. At this point also it somewhat widened out like a funnel. Between these points of attachment it was a little wavy. It did not appear to contain blood.

Dr. E. J. Gardiner, in Knapp's 'American Archives' for 1880, p. 473, relates a most interesting case of per-

* 'Annales d'Oculistique,' 1882, vol. ii, p. 101.

sistent hyaloid artery. Its attachment at the disc, and anteriorily at the lens were made out, as well as a translucent sheath (Cloquet's canal) around the artery. It spread out in many minute branches on the posterior surface of the lens, and contained blood. The drawing illustrating the case will explain also the kind of fine striated opacity found in my own case.

Gardiner remarks on his inability to find a similar case on record to his own. It is rare also to find the attachment of an impervious cord to the optic disc and to the lens capsule.

(*July 4th*, 1884.)

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2. *Congenital unilateral absence of lacrimation.*

By A. Stanford Morton.

Bertie L—, æt. 6, has been noticed by his parents never to shed tears from the right eye. On several occasions I have seen him crying, and though the tears flowed copiously from the left eye, they never came from the right. That they were not secreted was demonstrated by drawing away the lower lid from the globe, when there was not any accumulation of tears in the *cul-de-sac* thus formed. In the left eye the vision is normal, but in the right, even with the necessary correction of + 0·5 D. sph. + 2 D. cyl., it was not more than $\frac{20}{50}$. The pupils act well and equally and there is not any impairment of colour vision or of the senses of touch, taste, or smell on the right side. The boy's face is somewhat flatter and the external orbital angle and malar bone less developed on the right side than on the left. The right eye also appears smaller than the other. The right ear is slightly "lopped," and the upper part of the cartilage is thinner than on the left side. The mother has "harelip" on the right side, but

there is no other history of deformity, and there are two younger children quite healthy. The lacrimal gland cannot be felt on either side, but it seems a reasonable assumption that it is congenitally absent on the right side.

(*January 10th*, 1884.)

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3. *A case of uniocular coloboma of the choroid, iris, and lens, with a bridge of iris tissue over the coloboma.*

By Arthur Benson (Dublin).

(With Plate IX, fig. 2.)

J. J—, æt. 12, was sent up to me through the kindness of my friend Dr. Piggott.

Iris.—The right eye shows an imperfect coloboma of the iris, a bridge of normal-looking iris tissue connecting the sides of the coloboma about half way down, leaving a short coloboma above it and a second pupil below it.

Lens.—The lens border is pretty deeply notched, corresponding with the position of the iris coloboma. It is, however, transparent up to the border, but a linear opacity exists near the posterior pole.

Choroid.—The choroid shows a large oval white area, corresponding with the position of the fœtal fissure in the retina. It comes to within about half a disc's breadth of the disc and extends into the ciliary region, but there is not apparently a coloboma of the ciliary body. The border of the coloboma is darkly pigmented, especially below. Large veins and other vessels ramify over the whole surface of the coloboma. Two remarkable flat red bands of choroidal tissue run out into the coloboma at opposite sides below.

The *refraction* of the eye is myopic in all parts, at the disc − 4 D., on the coloboma − 8 D.

Field.—The field is contracted everywhere, but especially above, as seen in the perimeter chart (exhibited at the meeting).

The area of the coloboma does not seem to possess vision, though a thin pencil of light projected on it is perceived with readiness, probably in consequence of being reflected from the white surface of the colobomatous area.

The other eye is hypermetropic, but without a coloboma.

(*March* 13*th*, 1884.)

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4. *Persistent hyaloid vessel and choroido-retinal changes.*

By M. M. McHardy.

Persistent hyaloid vessel, extending as a continuous opaque filament from the posterior pole of the lens to the optic disc, fine at its attached extremities, thicker near its middle, which may be seen floating or waving about during movements of the globe. There are well-marked patches of advanced disseminated choroido-retinal change. The above-mentioned ophthalmoscopic appearances are confined to the right eye.

The patient came under treatment on account of recent retinitis in the left eye, which is making favourable progress under antispecific treatment.

The ophthalmoscopic morbid appearances, other than the fœtal relic, are judged to be attributable to an inherited specific taint.

(*Living specimen. March* 13*th*, 1884.)

XIV.—NEW INSTRUMENTS.

1. *Model illustrating conjugate movements of the eyes.*

By Priestley Smith (Birmingham).

(With Plate IX, fig. 3.)

The eyes are represented by two discs of wood covered with paper, and painted so as to represent horizontal sections of the globe; these rotate about their centres upon screws fixed into a black board.

The motor apparatus, so far as horizontal movements of the eyes are concerned, is represented by silk threads attached to the sides of the wooden discs like the tendons of the recti to the eyeballs; these pass backwards, as the nerves pass to the brain, each of the four nerve-trunks being represented by a double thread. Each thread then separates from the other thread of its own nerve, and joins a thread from another nerve, so as to represent the combination in the brain by means of which all motor impulses to the eyes are made bilateral. The brain-centres are represented by four brass weights hung upon the threads. One of these combines the threads coming from the two third nerves, and produces movements of convergence; another combines the threads coming from the two sixth nerves, and produces movements of divergence, or rather of diminished convergence. Each of the others combines a thread from the third nerve of its own side with a thread from the sixth nerve of the other side and produces movements of both eyes towards the opposite side.

The model has been found useful for class demonstra-

tion. It serves to explain the production of any compound movement of the eyes in the horizontal plane.

The phenomena of ordinary convergent strabismus may be imitated by pressing first upon the weight for convergence, then upon one of the weights for conjugate lateral movements, or upon these two weights simultaneously. This illustrates the mode in which strabismus, though really a bilateral affection, is transferred entirely to one or other eye, or to each in turn, but is never manifested in both eyes at once.

Paralytic deviation due to central lesions may be represented by supposing one of the weights to be in abeyance, and causing its antagonist to act as though through loss of opposition. Thus if one centre for lateral movement be paralysed the other will draw both eyes towards the side of the lesion, as in some cases of hemiplegia. Both eyes being drawn to one side in this manner, the movements of convergence and divergence may still be imitated by acting on the weights which produce those movements; this shows how a muscle (the internal rectus, for example) may, at one and the same time, be paralysed for one form of combined movement and active for another. Cases illustrating these forms of paralysis of ocular movements are recorded in the 'Royal London Ophthalmic Hospital Reports,' vol. ix, pages 22 and 428.

(*Note.*—The model exhibited has been placed in the hands of Messrs. Pickard and Curry, who have made others like it.)

(*December* 13*th*, 1884.)

2. *A large apparatus for demonstrating some of the principal operations on the eye.*

By J. F. Streatfeild.

It is a part of my duty not only to operate on the eye but also to show and explain to many others what is done in eye operations and also how it is done. But the eye is altogether so small an organ and deep-set in the orbit, and the parts of the eye concerned are therefore even smaller, and partly hidden by the coats of the eye or obscured by the manipulative processes, that it has been constantly in my mind that students interested in an operation, except a few who are assisting me, or who are specially privileged in standing near the couch, cannot possibly see what I am doing. If the patient is under the influence of an anæsthetic one can "think aloud," and describe the various stages of the operation whilst it is being done, but actually to see the performance of eye operations is not possible to the majority of students. They crowd around one in order to see the operation, and go away disappointed.

Looking at the matter in another light, one may desire to demonstrate all the operations, or any one of them, when very likely it may happen that no patient or patients requiring these operations have presented themselves at the time required for the demonstration. It has occurred to me that what was wanting was a gigantic eye on which to imitate the various processes of the principal eye operations. No such model on a very large scale, nor indeed any mechanical apparatus, could *exactly* resemble the living eye of real operating, but I thought that, in a general way and in an elementary manner, some mechanical contrivances and arrangements might be made to imitate the *modus operandi* so well as, at least, to teach the students in a large lecture-room much that is done, what is to be

done, and what is not to be done, in our operations, although nothing of course can perfectly educate and complete the eye-surgeon but actual surgical practice. If for convenience sake we constantly vary the scale of diagrams, &c., for lecture and educational purposes—*e.g.* in our old friend 'Gray's Anatomy,' the femur is well represented of a size to go into his page, and in smaller anatomy books it is also shown well enough to be understood; and, on the other hand, we have illustrations of microscopic objects, and enlarged diagrams and models, for the better information of students, of small parts of the body; thus Gray has enlarged figures of the ossicles of the ear—why should we not have for elementary educational purposes a gigantic eye model on which to demonstrate to students, mechanically, the minute eye operation processes? The obstetricians, I believe, use life-sized dummies, and art students study the human figure, and those of horses and other animals from well-shaped jointed models of various small sizes. It is quite feasible so to demonstrate eye operations, if we do not expect to imitate these processes exactly in every respect.

The model of an eye, which I have here, in every part, and in all its dimensions, is *exactly* ten times the scale of that which it actually represents. The models of the eye instruments which are here are also made in like proportion, viz. enlarged ten times; this scale has been adhered to throughout, as regards all the parts concerned in the operations, but the *handles* of the instruments have been altered and shortened for the sake of convenience in manipulating such weapons. The large apparatus of course is intended to represent the *human* eye, it has motion of rotation in every direction, and may be fixed in any desired position. The front hemisphere only of the eye is thus represented as no more than this is generally seen in eye operations. The sclerotic and the eyelids also are constructed of thick and thin, hard and soft, white felt. The eyelids have their own proper motion of sliding over the eyeball. The cornea is made of stout glass of the

right curvature (as the felt sclerotic also was made, on a mould of the exact curvature of the natural coat of the eye). Through the cornea may be seen the iris, and behind the pupil a white opaque lens ; the iris is imitated in thin sheet india rubber, with a round hole for the pupil —it might be coloured grey if it were desirable ; the lens (cataract) is made of xylonite (a white, hard, and light material), and is made hollow for the convenience of less weight ; it is made of the normal shape, and of exactly the right curvatures of the natural lens. The internal and external rectus muscles of the eye, with which we have only to do in squint operations, are represented by pieces of linen bandage of the actual width in proportion, and they are, as it were, inserted in their right places into the sclerotic.

So far I can represent the *modus operandi* of peripheral section of the cornea, of iridectomy, of extraction of cataract, and of squint ; I shall be able to do more than these. As to the details of the apparatus, which has been made for me by Mr. Hawksley, of Oxford Street, no doubt they are quite capable of modification and improvement.

The whole apparatus, as you see, is mounted on a thick, oblong piece of wood as a base, which is clamped to make it firm and to steady it on a table. In the centre is a strong iron upright with a ball at its upper end. The hemisphere of thick felt is attached to a strong equator of brass. Two plates of steel cross its diameter at a short distance apart, and between these two the ball which I have mentioned fits, so as to make a ball-and-socket joint, which is capable of being clamped by two winged nuts. Another upright at the back part of the apparatus, behind the central upright and in the same axis as the ball-and-socket joint, is attached to the equator, so as to permit the eye to move in lateral directions only, or with a milled-head screw to fix it and restrain it in all its movements. This screw must be removed altogether to get the free movements of the eye in all directions. Two supports from the upper diametral bar carry the wire cradle and

guides, which carry and direct the exit of the lens, and two other supports on the same bar carry the double ring (made like the "drum" with which we test the cutting edges and points of our cataract-knives and needles) on which the rubber iris is stretched; it is easily removed from behind and a fresh "iris" put in its place. On a line with the horizontal diameter of the cornea are the two uprights on which the glass cornea is hinged, and to the axis of which are attached the counter-balance weights which bring the cornea back into its right position after it has been temporarily displaced by the introduction of instruments, or by the exit of the lens. Three brackets from the lower part of the equator before referred to support the simple lever and the compound levers, five pairs, in parallel series (as a "lazy-tongs") which extrude the lens; to the upper ends of these lazy-tongs are attached a pair of wire forks which are made so that when the lens is *in situ*, just behind the plane of the iris it rests on the guides, and its lower edge touches the upper ends of the forks, but as (by the action of the levers) it is made to travel outwards upon the guides the lower edge of the lens is tilted gradually more and more backwards, and made to fall into the bottom of the forks, and so the lens is carried upwards and forwards as well as outwards. To the simple lever is attached a loosely-hinged plate, which, being depressed, through the sclerotic below the cornea from the outside, by manipulation with the model curette, moves the whole series of levers, and thus the lens is moved along the guides in the forks to the aperture between the cornea and sclerotic, and ultimately through the aperture, which then closes itself. By the relation of these levers to each other the motion of the whole is reduplicated five times, a movement of half an inch, at the plate, giving as much as two and a half inches movement to the lens. On either side, external to the eyeball and quite independent of it, are two iron uprights upon which the eyelids are hinged. In the hem of the folded felt (eyelid) is a spiral spring. Within these two uprights, on each side, a hori-

zontal bar is hinged to the base of the apparatus, to which bar on the outer side (external rectus) are attached two spiral springs below the broad strip of bandage, which is sewn at the place of insertion of the muscle to the sclerotic. To represent the other muscle (internal rectus) which is to be cut through (as in the common squint operation), a broad curved plate of brass, attached to the equator, external to the sclerotic of course, is made to project forwards in contact (at the place of insertion of this muscle) with the sclerotic; over this plate is folded the piece of linen bandage to represent the muscle to be cut through, and this bandage is again folded over the horizontal bar below, and then being made tight, so as to draw the eyeball inwards, the bandage is secured with an ordinary buckle to secure the double (folded) material for the temporary purpose of the demonstration. The anterior chamber in this apparatus can only be entered for iridectomy, cataract extraction, &c., in the usual place, at the sclerotico-corneal junction. Here at any part of the upper half circumference, even so as to make a semicircular flap, if it were desired to show the manner of doing the old-fashioned extraction operation, the knife, forceps, pricker, curette, &c., can be entered between the felt sclerotic and the glass cornea, which gives way for their admission and resumes its natural position when nothing is in the way intervening (like the natural cornea, but not quite in the way in which the natural cornea does so). The place of the imitation iris is a little behind the level of the sclerotico-corneal junction, and of somewhat larger diameter, as in the natural eye. The sheet india rubber of which this imitation iris is made may be seized with the (model) iris forceps at any part, drawn out of the eye, more or less, and so much is cut off as may be desired in the demonstration. (There is never any prolapse of iris.) In imitating the extraction operation in this apparatus, the section being made at the margin of the cornea, an iridectomy must always be made to give exit to the lens, but I suppose that in describing (and demonstrating) ope-

rations we should, most of us, recommend an iridectomy before extracting the cataractous lens, so the apparatus is right in this particular.

The instruments here which I have already had made, chiefly of wood, of the ten times magnified scale, are a spring speculum, forceps, strabismus hook, cataract knife, pricker, curette, iris forceps and scissors.

I may add the remark that I think, with this large apparatus, I can see my way to demonstrating other matters besides the operations only, *e.g.* I could show how one judges of the comparative depth at which anything, perhaps a foreign body, is situated in the eye, by looking sideways, *e.g.* is it on the front or at the back of the transparent cornea? I could represent anterior and posterior synechiæ very fairly by making the elastic imitation iris to be partly adherent to the cornea or lens, and then, surgically by the way, I could detach these posterior synechiæ in my own way of operating.

(*July 4th*, 1884.)

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3. *An improved microtome (made by Katsch, of Munich), and a new method of mounting eyes in celloidin.*

By W. Jennings Milles.

Method of embedding eyes in celloidin.—Celloidin is obtained in cakes or shavings from Zimmermann & Co., chemists, Maiden Lane, E.C.

A *saturated solution of celloidin* is made by dissolving celloidin in absolute alcohol, methyl. ether, āā to the consistence of treacle.

1. The eye is to be hardened (unopened) in Muller's fluid for about a month.

2. Freeze the eye and make (usually) an antero-posterior section to one side of the optic disc.

3. Extract the Muller's fluid by a solution of chloral hydrate (gr. xl and ℥j), with frequent changes of the solution.

4. Place in methylated spirit for three or four days.

5. Then in a rather weak solution of celloidin for another three or four days.

6. Place the eye in a paper box and pour the concentrated solution of celloidin over it; leave it exposed for about fifteen minutes, till a film forms on the surface of the solution.

7. Place the box containing the eye in methylated spirit, sp. gr. ·82. The spirit hardens the celloidin to the required consistence. The embedded eye can be kept for an indefinite period in this spirit.

This method of embedding was, I believe, first used by Otto Becker and his assistants in the laboratory at Heidelberg.

The only modification in staining and mounting the specimens for microscopical examination, consists in substituting oil of bergamot for oil of cloves, as the latter dissolves the celloidin out of the section. This, however, is sometimes desirable; it is then preferable to dissolve the celloidin out by a mixture of equal parts of absolute alcohol and methylated ether. Methylated spirit, and not absolute alcohol, should be used for getting rid of the water, if it is desired to retain the celloidin.

The advantage that is gained by combining the use of Katsch's microtome with the above-described method of embedding in celloidin is especially applicable to the eye. By this means thin sections of the whole eye can be made without disturbance of the mutual relations of its various structures.

(*December* 13*th*, 1883.)

ACCOUNT OF RECEIPTS AND PAYMENTS

OF THE

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Receipts.	£	s.	d.
Balance from 1883 . . .	201	15	10
Subscriptions . . .	164	2	1
Composition Fees . . .	106	1	0
Admission Fees . . .	27	6	0
Sir Wm. Bowman, Bart. . .	50	0	0
By Sale of 'Transactions' . .	12	5	0
Sir Wm. Bowman, Bart. (for Library fittings, &c.) . . .	100	0	0
	£661	9	11

Payments.	£	s.	d.
Bankers' Charges . . .	0	2	11
Mr. Adlard, for Printing Vol. III of 'Transactions' &c. . .	116	11	1
Illustrations for Vol. III . .	41	16	0
Rent	21	0	0
Refreshments	7	17	0
Secretaries' Expenses . . .	12	16	4
Balance . . .	461	6	7
	£661	9	11

J. F. STREATFEILD, *Treasurer.*

Audited and found correct, June 27th, 1884. { WALTER EDMUNDS, HENRY JULER, } *Auditors.*

REPORT OF THE COUNCIL.

The Council are able to congratulate the members upon the continued prosperity of the Society. During the Session that is now closing 21 new members have been elected, so that the total number of members is now 190, including 23 non-residents.

Since the last annual meeting the Society has last one member by death, Dr. Hudson, of Redruth, and three by resignation; four members who had not paid their subscription for last year have been struck off the list in accordance with the rules.

Owing to the generosity of Sir William Bowman the financial position of the Society is most satisfactory, and the Council have been enabled to make arrangements with the Medical Society by which the Society can have accommodation for a small library, the members having the right to use the reading room of the Medical Society at such times as it is open to the Fellows of that Society.

A handsome bookcase has been provided by Sir William Bowman, and a cabinet is in course of construction also at his expense, and the Council would remind members that any presents of books or drawings relating to ophthalmology, or any instruments or apparatus that have been used in ophthalmic practice, would be gladly received.

Last autumn the Council decided to establish a Bowman Lectureship to commemorate the Presidency of Sir William (then Mr.) Bowman. Such lecture to be delivered

annually or from time to time at the discretion of the Council, the lecturer being nominated by the Council. The Council have great pleasure in announcing that at their special request the first lecture will be delivered in November by Mr. Jonathan Hutchinson.

During the past session a large number of papers have been communicated, and the meetings have been well attended. Two Committees have been appointed, one on the prevention of blindness from ophthalmia neonatorum, the report of which was read at the June meeting of the Society; the other appointed to investigate some points in connection with sympathetic ophthalmia is still at work, but hopes to have its report ready by October.

APPENDIX.

The following list of abbreviations, drawn up by a committee* at the request of the Council, is recommended for use in communications to the Society.

The list is not intended as final, and the Council will be glad to receive suggestions for its improvement or extension.

It will be noticed that the same abbreviation is never used for more than one term; that abbreviations have not been introduced for terms which are but seldom used, although abbreviations for many such terms are to be found in literature; and that whilst abbreviations have been introduced for the names of such of the more important parts of the eye as could be readily shortened, no contractions are suggested for the names of diseases or morbid states.

ABBREVIATIONS.

Acc. Accommodation.
Aq. Aqueous humour.
As. Astigmatism.
A. C. Anterior chamber.
C. Cornea.
Ch. Choroid.
cm. Centimetre.
Cyl. Cylindrical lens.

* Consisting of Mr. Cowell, Dr. Gowers, Mr. Frederick Mason, and Mr. Nettleship.

D. Dioptre or Dioptric; a lens of one metre focal length. (See *Note f.*)
E. Emmetropia.
F. Field of Vision.
H. Hypermetropia.
H. l. Latent hypermetropia.
H. m. Manifest hypermetropia.
I. Iris.
L. Left eye (and R., right eye). (See *Note a.*)
m. Metre.
mm. Millimetre.
My. Myopia.
M. L. Macula lutea (and Y. S., yellow spot).
Oph. Ophthalmoscope, ophthalmoscopical examination, ophthalmoscopical appearances. (See *Note b.*)
O. D. Optic disc
O. P. Optic papilla } (See *Note c.*)
P. Pupil. (See *Note d.*)
Pr. Presbyopia.
P. L. Perception of light; vision equal only to perception of light.
p. p. Punctum proximum; nearest point of distinct vision.
p. r. Punctum remotissimum; furthest point of distinct vision.
R. Right eye (and L., left eye). (See *Note a.*)
Ret. Retina.
Scl. Sclerotic.
Sph. Spherical lens.
T. Tension of the eyeball. T. n., tension normal.
T. + 1, T. + 2, T. + 3 } Degrees of increase and decrease of
T. − 1, T. − 2, T. − 3 } tension. (See *Note e.*)
Vit. Vitreous humour.
Y. S. Yellow spot (and M. L., macula lutea).
V. Visus, acuteness of sight, power of distinguishing form.

SYMBOLS.

\+ Symbol for a convex lens.
− Symbol for a concave lens.
′ Foot.
″ Inch.
‴ Line.

NOTES.

Note a.—R. and L., not R. E. and L. E. "E." might be taken for "Emmetropia," and at best it is unnecessary. The abbreviations O. D. and O. S., for the Latin Oculus dexter and Oculus sinister, are also less convenient than R. and L.

Note b.—"Oph." is more explicit than Bowman's abbreviation "O.S." The context will prevent "oph." from being taken as short for "ophthalmic" or "ophthalmia."

Note c.—"O. D." (or "O. P.") applies only to the part we can see, and is therefore better than O. N. (optic nerve), which refers to a part the state of which we can only infer.

Note d.—The various modes of activity of the pupil to light (direct and indirect, or crossed, light reflex; associated action; skin reflex) should be specified; the use of contractions for these states would probably lead to confusion.

The size of the pupil when stated should be given in millimetres.

Note e.—In the notation originally proposed by Bowman the – sign was placed before the sign for "tension," to indicate lowered tension, and the + sign was not used at all (— T1, — T2, &c.; T1, T2, &c.). The contractions now suggested are more explicit; they also seem more natural, because agreeing with the order in which the terms would be spoken, thus Bowman's "T1" (our T. + 1) is usually spoken "tension plus one;" Bowman's "– T1" (our "T. – 1") is spoken "tension minus one."

Note f.—It is desirable that the metrical system of notation be always used. Decimals, when not following a whole number, should be preceded by "0," in order to prevent mistakes ("0·5 D.," not "·5 D.").

It is intended that the abbreviations should be written either in capitals or small letters, with the exception of "punctum proximum" and "punctum remotissimum," "metre," "centimetre" and "millimetre," which never need be indicated by capitals. When the contraction indicates two words (as for "anterior chamber") both letters should be of the same kind, capital or small (A. C. or a. c. not A. c.); but the combination of capital and small letters for manifest and latent hypermetropia (H. m. and H. l.) is so generally known and adopted that it has been retained. When a single word is indicated by more than one letter, the final letter or letters should always be small (Acc., Ch., or acc., ch., not ACC. or CH.).

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