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THE
BRITISH AND FOREIGN
MEDICO-CHIRURGICAL
REVIEW

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111

CONTENTS OF NO. CI.

BRITISH AND FOREIGN

MEDICO-CHIRURGICAL REVIEW.

JANUARY, 1873.

Analytical and Critical Reviews.

	PAGE
REV. I.—The Public Health Act, 1872	1
REV. II.—1. Injuries and Diseases of the Jaws. Jacksonian Prize Essay of the College of Surgeons of England. Second Edition. By CHRISTOPHER HEATH, F.R.C.S.	29
2. Tumours of the Jaw. Article in 'Holmes's System of Surgery.' Second Edition. By G. D. POLLOCK, F.R.C.S.	ib.
3. Surgical Diseases connected with the Teeth. Article in 'Holmes's System of Surgery.' Second Edition. By JAMES A. SALTER, M.B.	ib.
4. On some of the Difficulties and Accidents which happen in the Practice of Dental Surgery. 'Transactions of Odontological Society,' April 3rd, 1871. By W. A. N. CATTLIN, F.R.C.S.	ib.
5. Cystic Tumour of the Jaws. 'St. Bartholomew's Hospital Reports,' 1871. By A. COLEMAN, F.R.C.S.	ib.
REV. III.—Handbook of Law and Lunacy; or, the Medical Practitioner's Complete Guide in all Matters relating to Lunacy Practice. By J. T. SABBEN, M.D., and J. H. BALFOUR BROWNE, Barrister-at-Law. London, 1872, pp. 138	41
REV. IV.—1. A Treatise on Gout, Rheumatism and the Allied Affections. By PETER HOOD, M.D. London, pp. 417	46
2. On Gout: Lectures on Clinical Medicine. By A. TROUSSEAU, translated by J. R. CORMACK, M.D. New Sydenham Society, 1871	ib.
3. Lecture on Gout. By W. CHARCOT. 'Med. Times and Gazette,' 1867	ib.
REV. V.—1. Manual of Human and Comparative Histology. Edited by S. STRICKER, translated by HENRY POWER, M.B. Lond. (New Sydenham Society, 1870 and 1872, 2 vols.)	59
A. General Characters of the Nervous Tissue. By MAX SCHULTZE.	
B. The Spinal Cord. By J. GERLACH, of Erlangen.	
C. The Brain of Mammals. By PH. MEYNER, of Vienna.	
D. The Sympathetic System of Nerves. By SIGISMUND MAYER.	
2. Handbuch der Systematischen Anatomie der Menschen. Von Dr. J. HENLE, Braunschweig, 1871. Dritter Band—Nervenlehre	ib.
REV. VI.—A Practical Treatise on the Diseases of Women. By T. GAILLARD THOMAS, M.D. Third edition, pp. 784. London and Philadelphia	78
REV. VII.—1. First Report of the Local Government Board, 1871-72	100
2. Annual Report of the Commissioners for Administering the Laws for Relief of the Poor in Ireland, including the Twenty-fifth Report under the 10 & 11 Vic., c. 90, and the Twentieth Report, under the 14 & 15 Vic. c. 68; with Appendices, 1872	ib.
3. Reports of the English Poor Law Medical Officers' Association, and of the Irish Poor Law Medical Officers' Association for 1871	ib.

REV. VIII.—1. The Heart and its Diseases, with their Treatment. By J. MILNER FOTHERGILL, M.D., M.R.C.P. Pp. 377. London, 1872	108
2. A Treatise on the Causes of Heart Disease, with a Chapter on the Reason of its Prevalence in the Army. By FRANCIS W. MOINET, M.D., F.R.C.P.E. Pp. 112. Edinburgh, 1872	ib.
3. Percussione del Cuore (Percussion of the Heart). By Professor BURRESI, of Siena	ib.
REV. IX.—1. Arsenal de la Chirurgie Contemporaine, description, mode d'emploi et appréciation des appareils et instruments en usage pour le diagnostic et le traitement des maladies chirurgicales, l'orthopédie, la prothèse, les opérations simples, générales, spéciales et obstétricales. Par G. GAUJOT, Médecin-major, Professeur agrégé à l'École Impériale de Médecine Militaire du Val-de-Grâce. Paris, 1867	123
— Tome II. Par E. SPILLMAN, Médecin-major de 1re classe, Professeur agrégé à l'école d'application de Médecine Militaire du Val-de-Grâce. Paris, 1872	ib.
2. Orthopraxy, the Mechanical Treatment of Deformities, Debilities, and Deficiencies of the Human Frame. By H. HEATHER BIGG, Assoc. Inst., C.E. London, 1869	ib.
3. A Catalogue of Surgical Instruments, Apparatus, Appliances, &c. manufactured and sold by JOHN WEISS and SON, 62, Strand, London, 1863	ib.
4. Book of Illustrations. S. MAW, SON, and THOMPSON'S 'Quarterly Price Current.' London, 1870	ib.
5. A Catalogue of Surgical Instruments and Apparatus. By JAS. COXETER and SON. London, 1870	ib.
6. Salt and Co.'s New Illustrated Catalogue of Surgical Instruments, &c. Birmingham, 1872	ib.
REV. X.—1. The Science and Art of Surgery. By JOHN ERIC ERICHSEN, Senior Surgeon to University College Hospital, &c. London. Sixth edition, 2 vols. 1872	138
2. A System of Surgery; Pathological, Diagnostic, Therapeutic and Operative. By SAMUEL GROSS, M.D., D.C.L. Oxon., Professor in Jefferson Medical College, Philadelphia, &c. &c. Fifth edition, 2 vols. Philadelphia, 1872	ib.
REV. XI.—Cancer; its Varieties, their Histology and Diagnosis. By HENRY ARNOTT, F.R.C.S., Assistant-Surgeon to St. Thomas's Hospital, and Joint Lecturer on Morbid Anatomy in the Medical College. Illustrated by lithographic and wood engravings by the author from nature. London, 1872, 8vo, pp. 86	142
REV. XII.—A Treatise on Hæmophilia, sometimes called the Hereditary Hæmorrhagic Diathesis. By J. WICKHAM LEGG, M.D., Casualty Physician to St. Bartholomew's Hospital. London, 1872	146
REV. XIII.—1. Louise Lateau, the Ecstatica of Bois d'Haine. By Dr. LEFEBVRE. Translated by J. S. SHEPARD. London, 1872	149
2. Voix Prophétiques. Par M. L'ABBÉ CURICQUE. 2 vols. Brussels, 1872	ib.

Bibliographical Record.

ART. I.—Anleitung zur [Untersuchung des Harnes, mit besonderer Berücksichtigung der Erkrankungen des Harn-Apparatus. Von Dr. ROBERT ULTZMANN, Em. Assistent der Pathol. Chemie in Wien, unter Mitwirkung von Dr. KARL BERTHOLD HOFMANN, Docent an der K. K. Universität in Wien. Vienna, 1871. Pp. 133	155
--	-----

ART. II.—Qualitative Chemical Analysis. By Dr. C. R. FRESSENIUS. Eighth Edition, translated from the Thirtieth German Edition, by A. VACHER. Pp. xv and 400. London, 1872	157
ART. III.—The Elements of Inorganic Chemistry. By J. C. BUCKMASTER, revised by G. JARMAN. Eighth Edition. Pp. 346. London, 1870	ib.
ART. IV.—Cooley's Cyclopædia of Practical Receipts. Edited by R. V. TUSON, Pp. 1201. London, 1872	158
ART. V.—Botany for Beginners: an Introduction to the Study of Plants. By MAXWELL T. MASTERS, M.D., F.R.S. London, 1872	159
ART. VI.—Dr. Pereira's Elements of Materia Medica and Therapeutics; abridged and adapted for the use of Medical and Pharmaceutical Practitioners and Students. Edited by ROBERT BENTLEY, F.L.S., and THEOPHILUS REDWOOD, Ph.D., F.C.S., &c. London, 1872. Pp. 1093	ib.
ART. VII.—On Diet and Regimen in Sickness and Health, and on the Interdependence and Prevention of Diseases and the Diminution of their Fatality. By HORACE DOBELL, M.D. Fifth and revised Edition. London, 1872	160
ART. VIII.—Oppolzer's Vorlesungen über Specielle Pathologie und Therapie Zweite Band. Erste Lieferung. Erlangen, 1872	161
ART. IX.—The Science and Practice of Medicine. By WILLIAM AITKEN, M.D. Sixth edition, greatly enlarged, remodelled, carefully revised and many portions rewritten. In two volumes, with illustrations. London, 1872	162
ART. X.—Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques. Illustré de figures intercalées dans la texte. Tome xv, Pœt.—Général. Paris, 1872. Pp. 785	164
ART. XI.—On Croup and Diphtheria. By ROBERT HUNTER SEMPLE, M.D., M.R.C.P. Lond., Physician to the Hospital for Diseases of the Throat. Reprinted from the 'Transactions of the St. Andrew's Medical Graduates' Association.' London, 1872	165
ART. XII.—Outlines of Surgery and Surgical Pathology, including the Diagnosis and Treatment of Obscure and Urgent Cases, and the Surgical Anatomy of some Important Structures and Regions. By F. LE GROS CLARK, F.R.S., Senior Surgeon of St. Thomas's Hospital. Second Edition, revised and expanded by the Author, assisted by W. W. WAGSTAFFE, F.R.C.S., Resident Assistant-Surgeon to, and Joint-Lecturer on Anatomy at, St. Thomas's Hospital. London, 1872. Pp. 350	166
ART. XIII.—A Treatise on the Diseases of Infancy and Childhood. By J. LEWIS SMITH, M.D. Second Edition, enlarged and thoroughly revised. Philadelphia, 1872	ib.
ART. XIV.—The Pathology, Diagnosis, and Treatment of Diseases of Women. By GRALY HEWITT, M.D., F.R.C.P., &c. Third Edition, revised and enlarged	ib.
ART. XV.—Des Grossesses Extra-Uterines et plus Specialement de leur Traitement par la Gastrotomie, &c. Par THEODORE KELLER, Docteur en Médecine. Paris, 1872. Pp. 94	169
ART. XVI.—A Manual for Hospital Nurses and others engaged in attending on the Sick. By EDWARD J. DOMVILLE. London, 1872	171
ART. XVII.—The Affinity of the Hebrew Language with the Celtic. By THOMAS STRATTON, M.D., &c. Edinburgh, 1872	ib.
ART. XVIII.—Description of the O'Neal Family. London, 8vo, 1872	172
ART. XIX.—Note sur le Développement de la Peste Bubonique dans le Kurdistan en 1871. Par le Docteur THOLOZAN	173
Note on the Development of the Boil-plague in Kurdistan in 1871	ib.
ART. XX.—A Treatise on Human Physiology; designed for the use of Students and Practitioners of Medicine. By JOHN C. DALTON, M.D., &c. Fifth edition, revised and enlarged. With 284 Illustrations. Philadelphia, 1871, H. C. LEE. London, TRUBNER and Co. Pp. 728	174

	PAGE
ART. XXI.—Report of the Boston City Hospital	177

Original Communications.

ART. I.—Observations on Smallpox. By ALEX. OGSTON, M.D. Aberdeen	177
ART. II.—The Public Health Aspects of the Adulteration of Food Act and the Mines Regulation Acts. By HENRY W. RUMSEY, M.D.	190
ART. III.—Tabular Report and Remarks on Two Hundred Cases of Extraction of Cataract by Graefe's Modified Linear Section. By DAVID LITTLE, M.D., Surgeon to the Royal Eye Hospital, Manchester	196
ART. IV.—The Morphology of Vaccine Lymph. By P. M. BRAIDWOOD, M.D., &c.	214

Chronicle of Medical Science.

(CHIEFLY FOREIGN AND CONTEMPORARY.)

Report on Obstetrics, Gynæcology, and the Diseases of Children. By W. S. PLAYFAIR, M.D., F.R.C.P., Professor of Obstetric Medicine in King's College, Physician for the Diseases of Women and Children to King's College Hospital, Examiner in Midwifery, &c., to the Royal College of Physicians	225
Report on Toxicology, Forensic Medicine, and Hygiene. By BENJAMIN W. RICHARDSON, M.D., F.R.S.	241
Report on Surgery. By HENRY A. REEVES	255
NOTE TO A RECLAMATION BY DR. THOMAS HAYDEN	265
BOOKS RECEIVED FOR REVIEW	266

211

CONTENTS OF NO. CII.

BRITISH AND FOREIGN
MEDICO-CHIRURGICAL REVIEW.

APRIL, 1873.

Analytical and Critical Reviews.

	PAGE
REV. I.—1. Diseases of the Ovaries; their Diagnosis and Treatment. By T. SPENCER WELLS, F.R.C.S. London, 1872	269
2. General and Differential Diagnosis of Ovarian Tumours. By WASHINGTON S. ATLEE, M.D. Philadelphia, 1873	ib.
3. Ovarian Tumours; their Pathology, Diagnosis, and Treatment, especially by Ovariectomy. By E. RANDOLPH PEASLEE, M.D., LL.D. New York, 1872	ib.
REV. II.—1. Fourteenth Annual Report of the Provincial Hospital for the Insane, Halifax, Nova Scotia, 1872. By Dr. DE WOLF, Medical Superintendent	299
2. Seventeenth Annual Report of the Glamorgan County Lunatic Asylum, 1871. By Dr. YELLOWLEES, Medical Superintendent	ib.
REV. III.—Traité de Chirurgie d'Armée. Par L. LEGUEST, Inspecteur du Service de Santé de l'Armée. Deuxième Édition. Paris, 1872. Pp. 793	315
REV. IV.—The West Riding Lunatic Asylum Medical Reports. Edited by J. CRICHTON BROWNE, M.D., &c. Vol. ii. London, 1872. Pp. 306	337
REV. V.—Cancerous and other Intra-thoracic Growths, their Natural History and Diagnosis: being the substance of the Lumleian Lectures delivered before the Royal College of Physicians of London. By JAMES RISDON BENNETT, M.D., Senior Censor. With five plates. London, 1872. Pp. 189	344
REV. VI.—1. On the Pathology and Treatment of some of the Diseases of the Liver: being the Lettsomian Lectures for 1872. By S. O. HABERSHON, M.D., &c. London, 1872. Pp. 91	361
2. On some Affections of the Liver and Intestinal Canal, &c. By STEPHEN H. WARD, M.D. London, 1872. Pp. 260	ib.

REV. VII.—1. Untersuchungen über der Normale und Pathologische Anatomie der Rückenmarks. Von Dr. C. FROMMANN, in Wiemar. Jena, 1867	370
2. Lehrbuch der Pathologischen Gewebelehre. Von Dr. ED. RIND- FLEISCH. Leipzig, 1870	ib.
3. Archives de Physiologie Normale et Pathologique. Par MM. BROWN- SÉQUARD, CHARCOT, et VULPIAN. Paris, 1871-73	ib.
4. Archives Générales de Médecine. Paris, 1872	ib.
5. Sixth Annual Report of the Fife and Kinross District Board of Lunacy. 1872	ib.
6. West Riding Lunatic Asylum Reports. Edited by J. CRICHTON BROWNE, M.D. 1872	ib.
7. St. Bartholomew's Hospital Reports. 1872. 8. St. Thomas's Hos- pital Reports. 1872. 9. Guy's Hospital Reports. 1861 et seq.	ib.
10. On the Pathology of Cerebral Hæmorrhage. By M. BOUCHARD. Translated by T. J. MACLAGAN. 1872. Pp. 31	ib.
REV. VIII.—1. First Annual Report of the Board of Health of the Health Department of the City of New York. April 11th, 1870, to April 10th, 1871. New York, 1871. Pp. 628	393
2. Tenth Annual Report of the Commissioners of Public Charities and Correction. New York. For the year 1869. Albany, 1871. Pp. 560	ib.
3. Third Annual Report of the State Board of Health of Massachusetts. January, 1872. Boston, 1872. Pp. 329	ib.
REV. IX.—The Practice of Surgery: a Manual. By THOMAS BRYANT, F.R.C.S., Surgeon to Guy's Hospital. London, 1872	409

Bibliographical Record.

ART. I.—Lessons in Elementary Anatomy. By ST. GEORGE MIVART, F.R.S., Lecturer on Comparative Anatomy at St. Mary's Hospital. London, 1873	421
ART. II.—On a Hæmatozoon Inhabiting Human Blood; its Relation to Chyluria and other Diseases. By T. R. LEWIS, M.B. Calcutta, 1872. Pp. 50	424
ART. III.—A Manual of Microscopic Mounting, with Notes on the Collection and Examination of Objects. By JOHN H. MARTIN. London, 1872	425
ART. IV.—The Causation of Sleep. A Physiological Essay. By JAMES CAPPIE, M.D. Edinburgh, 1872. Pp. 76	428
ART. V.—Researches on the Action and Sounds of the Heart. By GEORGE PATON, M.D. London, 1873	430
ART. VI.—A Handbook of Chemical Technology. By R. WAGNER. Trans- lated by W. CROOKES, F.R.S. London, 1872. Pp. xxxii and 745	431
ART. VII.—Michael Faraday. By Dr. GLADSTONE, F.R.S. Second Edition. London, 1873. Pp. 179	ib.

ART. VIII.—Junior Course of Practical Chemistry. By Prof. ROSCOE and Dr. JONES. London, 1872. Pp. 171	432
ART. IX.—Aids to the Diagnosis of Diseases of the Kidneys. By W. R. BASHAM, M.D. 1872. Pp. 48	ib.
ART. X.—The Chronic Diseases of Women, with special regard to their Treatment in Creuznach. By LOUIS MICHELS, M.D., &c. London, 1872	433
ART. XI.—1. Transactions of the Obstetrical Society of London. Vols. xiii and xiv, for the years 1871 and 1872	434
2. The Transactions of the Edinburgh Obstetrical Society. Sessions 1869, 1870, 1871. Edinburgh	ib.
ART. XII.—1. English Midwives, their History and Prospects. By J. H. AVELING, M.D. London, 1872	435
2. The Handbook for Midwives. By HENRY FLY SMITH, B.A., M.B. Oxon. London, 1872	ib.
3. Hints for Obstetric Clerks, with Aids for Diagnosis. By ALBERT F. FIELD. London, 1872	ib.
ART. XIII.—Our Lord's Miracles of Healing considered in relation to some Modern Objections and to Medical Science. By T. W. BELCHER, M.D., M.A., Dublin; Fellow, and sometime Censor, Examiner, and Chief Librarian, Royal College of Physicians of Ireland; Curate in Charge of the Mission Church and District of Saint Faith, Stoke Newington. Oxford and London, 1872	436
ART. XIV.—Thermic Fever, or Sunstroke. By H. C. WOOD, jun., M.D., Physician to the Philadelphia Hospital. Boylston Prize Essay. Philadelphia, 1872. Pp. 128	440
ART. XV.—A Treatise on Gout, Rheumatism, and Rheumatic Gout. By AUSTIN MELDON, L.K.Q.C.P. and L.R.C.S.I., Surgeon to Jervis Street Hospital, Dublin, &c. London, 1872. Pp. 46	441
ART. XVI.—A Year-Book of Therapeutics, Pharmacy, and Allied Sciences Edited by HORATIO C. WOOD, jun., M.D., Physician to the Philadelphia Hospital, &c. New York, 1872. Pp. 360	444
ART. XVII.—On Conia, and its Use in Subcutaneous Injection. By J. WILKIE BURMAN, M.D. 1872. Pp. 40	ib.
ART. XVIII.—Aide-Mémoire de Pharmacie, Vade-mecum du Pharmacien à l'Officine et au Laboratoire. Par EUSÈBE FERRAND. Paris, 1873. Pp. 687	445
ART. XIX.—Leçons de Clinique Médicale. Par T. GALLARD, Médecin de la Pitié. Paris, 1872	446
ART. XX.—The Urine and its Derangements, with the application of Physiological Chemistry to the Diagnosis and Treatment of Constitutional as well as Local Diseases. By GEORGE HARLEY, M.D., F.R.S., &c. London, 1872	447
ART. XXI.—The Institutes of Medicine. By MARTYN PAINE, M.D., &c. Ninth Edition. 1870. New York and London. Pp. 1151	448

Original Communications.

ART. I.—On the Morbid Histology of the Brain and Spinal Cord as observed in the Insane. By J. BATTY TUKE, M.D., F.R.C.P.E., Medical Superintendent of the Fife and Kinross District Asylum	450
ART. II.—The Pathology of the Pneumonic Lung. By OCTAVIUS STURGES, M.D. Cantab., Assistant-Physician to the Westminster Hospital	461

Chronicle of Medical Science.

(CHIEFLY FOREIGN AND CONTEMPORARY.)

Report on Otology. By J. HINTON, F.R.C.S.	477
Report on Materia Medica and Therapeutics. By ROBERT HUNTER SEMPLE, M.D.	492
Report on Physiological and Pathological Chemistry. By A. H. CHURCH, M.A.	504
Report on Physiology and Histology. By HENRY POWER, F.R.C.S., M.B. Lond.	512
Memorandum	525
BOOKS RECEIVED FOR REVIEW	526

TITLE, CONTENTS, INDEX.

THE
BRITISH AND FOREIGN
MEDICO-CHIRURGICAL REVIEW.

JANUARY, 1873.

Analytical and Critical Reviews.

I.—The Public Health Act, 1872.

THE statutory result of recent discussions on sanitary legislation is wholly incommensurate with the zeal and ability displayed by the controversialists. Foregone conclusions have been accepted instead of inductions from facts; and facts have been recklessly denied, because there has been no thorough sifting of statements. On either side of this controversy a large scheme has been rejected because a part of it was open to question, and an instalment has been declined because it was an incomplete measure.

Our last article on the subject (January, 1872) was written in a hopeful strain. Mr. Stansfeld's Bill had not then appeared. We had some reason to suppose that, uncommitted as he was to any official project, his acute and independent though somewhat crotchety mind might have discarded the fundamental errors which we pointed out in the scheme of the Sanitary Commission, and in Sir C. B. Adderley's Bill founded thereon; and we hoped that the Government measure, however limited in scope, would have enacted nothing to impede more precise and comprehensive legislation hereafter. For it would be absurd to expect that a single act, or even several acts in a single session, could meet all the requirements of a complete code of public health; and it must be confessed that Mr. Stansfeld's original measure, imperfect as it confessedly was, showed an advance, a decided amendment, upon that of the Chairman of the Royal Commission, as regards local authorities. For it did not, as that did, propose to perpetuate all the small and troublesome areas of representative management which have been so unwisely created under former sanitary acts. The "Special Drainage Districts," each governed by its petty elective board, are now to be dissolved, absorbed in larger districts, and converted into

“contributory places.” This is as it should be. If the same bold sweep had been made of half the local board districts, the benefit to social progress and to the public health would probably have been doubled.

Nearly a fourth of the existing local board districts contain less than 3000 inhabitants. Scarcely more than a fourth contain 10,000 and upwards. Yet the weight of evidence before the Commission went to show that no place with a population of less than 10,000 or 12,000 ought to be isolated from the general management of the country for the purpose of separate health administration. Mr. Thring, the eminent counsel at the Home Office, whose knowledge of sanitary law was probably greater than that of any member of the Commission, and whose authoritative statements and forcible arguments in favour of county sanitary administration were lost upon the prejudiced minds to whom they were addressed, advised (358-9) that only very large towns (100,000 or 200,000 population) would require special legislation; and again (378), that a town with 200,000 or 300,000 inhabitants might be treated as a county. These important recommendations were made nearly four years ago. How little fruit have they borne! How long and apparently hopeless the task of educating the legislative mind!

One remarkable fallacy in the work of the Commission has been their assumption that every small body, constituted for local government, must be empowered to execute, not only the common functions of keeping order and promoting decency and cleanliness, but also the higher functions of sanitary administration. Here, as elsewhere—*latet dolus in generalibus*. The inefficiency of the smaller local boards having been proved, Mr. Stansfeld at first proposed to take power to dissolve districts with less than 3000 population in default of duty. He would have done more wisely if, without actually dissolving the lesser local governments, he had included them all by representation in a County Board, or at least in a Council managing an entire Registration District. Incapable, as it appears, of appreciating the difference between *ordinary* local government and *sanitary* local management, he has retained unlimited power to form for sanitary purposes, districts without restriction as to size, and local boards without regard to competency. On the whole, it is clear that, while the new Act favours the multiplication of these minute and often mischievous urban isolations of authority, it contains no adequate powers to merge them, for health objects, in wider and more suitable districts.

Another strange error in this new constitution of local sanitary authorities is, that no provision has been made for the combination, or at least compulsory co-operation, of the esta-

blished destitution authorities which cover the whole face of the country, with the town councils and local boards, which affect only isolated patches of territory. Yet the boards of guardians, whether rightly or wrongly, have been invested for nearly forty years with the power of appointing medical officers, who already perform several functions of preventive medicine. For thirty-five years the same authorities have been empowered to organize the registration districts, to appoint the registrars of births and deaths, and by their clerks to superintend the functions of those officers. The same authorities have also been utilized for the Vaccination Acts, and are still the authorities in the provinces for administering the Diseases Prevention Acts. These several powers constitute the very basis of sanitary action. Yet now, in urban districts, the guardians are excluded from any participation in other measures for the public health, just as the so-called urban authorities are excluded from any share in the health functions of the boards of guardians. What is still more absurd—the officers of the unions may be converted into town officers without taking the guardians into consultation! The advocates of a more rational system were quite justified in saying—“Either relieve the destitution authorities from all medical and preventive and statistical duties, or else take them fairly into the local councils.” But this logical and truly practical conclusion found no favour with the Royal Sanitary Commission, and Mr. Stansfeld merely “followed suit” in rejecting it. The blame lies with the authors of the error.

We heard at first much about a main principle of the measure, viz. that the parochial union or registration district was to be the unit of local sanitary administration. This, however, proves to be the case only in the purely rural districts, and the principle is not, as it should have been, applied universally, especially in the *mixed* districts, which form the majority,—neither interfering with the ordinary functions of the guardians, nor superseding the ordinary local government of towns, nor in any way trenching upon the sanitary administration of the largest towns. Moreover, as to the rural authorities, Mr. Stansfeld has not adopted that reform in the mode of election of guardians which the Sanitary Commission and Sir C. B. Adderley proposed in order to qualify them better for sanitary duties.

The absurdity of the division of local authorities into “rural” and “urban” becomes more glaring when one sees that all the common objects of sanitary administration could have been effected by a Joint Council or Committee of the two kinds of authority in each union. By this method every unit of area would enjoy real unity of administration; and every sanitary district would exhibit the same principle of consolidation which

has placed Mr. Stansfeld at the head of a single board comprising the functions of poor-law management, local government, and Privy Council inquiry. Those first-class towns that include more than one union would then take rank with counties, each under a single board, for public health, containing representatives of the guardians and the municipal authorities.

The great defect in local organization which we have just noticed is exemplified remarkably in the new Port Authorities. By Section 20 of the Act *any* sanitary authority whose district forms a part of or abuts on any part of a port, or *any* Conservators, &c., may be constituted by the Central Board as the sanitary authority over the whole port.

The necessary combination of authorities is here evidently wanting. What is required for ports is, that all the health authorities connected locally with each port should be brought to act together. Thus, every authority which appoints medical officers and registrars, and *every* sanitary authority whose district abuts on the port, as well as adjacent districts, called "riparian" in the Act, should be combined in some way for the purposes of a port authority.¹ The difficulty which will thus be generally created by the Act has been already experienced in the port of London. Dr. Letheby, in his recent most important inaugural address on the sanitary legislation of 1872, informs us that, before the Act passed, there were thirteen nuisance authorities whose districts abutted on the river, each of whom had port jurisdiction half across the river. The necessity which was felt on the approach of cholera, for co-operation between those authorities and the Conservators of the Thames and the Commissioners of Customs and other bodies, led to a spontaneous effort to establish joint action. But, from the first, the legal difficulties of the position—*i. e.* the want of power to enforce combination and to regulate action—checked the effort (though well directed by Dr. Buchanan and aided by the mayor of Gravesend) and led to the enactment of the present very imperfect substitute for a consolidated authority. One of the bodies (the wealthiest of those concerned) is the corporation of the City of London, and this was accordingly selected by the Public Health Act as the sole authority of the port. Beside the performance of duties under the Diseases Prevention Act there are now committed to the present port authority all the duties, powers, and liabilities of twenty-six sanitary Acts, with a jurisdiction on the Thames from the Nore Light to Teddington, a distance of ninety-one miles, including all streams, channels, and creeks into which the tide flows, and a strip of land on each side of the river. In

¹ See the evidence of Mr. Carr of Newcastle (San. Com. Rep., Evid., 2853).

fact, this port authority becomes almost the river-basin authority of the lower Thames, according to Mr. Thring's suggestion (Evid., 510).

Dr. Letheby was right in saying that this is almost an impossible district. We learn that the port authority has had to appoint a doctor at Gravesend, provisionally, to visit vessels reported by the Customs to contain infectious cases. The several authorities on each side of the river, with their medical officers, are deprived of all legal power to act; although Dr. Letheby continues his inspection on the north bank of the river in his old district, pending the legal controversy which has already arisen out of this blundering enactment. It seems obvious that all the districts adjoining the port, with the Conservators and the Customs department, ought to be legally united, at least by representation, in a single supreme authority, for so great a port. The Medical Officer of Health of such a district should be of superintending rank, devoting his whole time to the office, having many local deputies and aided by the whole medical relief staffs of the adjacent districts.¹

In the debate on the second reading of the Bill, Dr. Lush was the only member who pointed out one serious practical objection to the division into urban and rural; thus:

“The two sets of authorities frequently come into collision, especially in the outskirts of boroughs, and the Bill contained no provision by which their respective powers could be blended in such cases. In a city or borough under municipal control the sanitary arrangements might be excellent, yet around it there might be a district built over or partially built over, with hardly any sanitary provision.”

The rapid increase of suburban populations, the formation of new townships in manufacturing or mining districts, and the extension of the towns themselves, render the drawing of any hard and fast line between municipal and rural administrations next to impossible. Experienced men of business examined by the Sanitary Commission showed that such demarcations were impracticable, and that the object of applying the same principles, if not the same details, of law to the country as to the town, was “to prevent in the early history of a town the bringing into existence those objectionable constructions” which are afterwards so difficult to remove (Evid., 2376, 2762). The adoption of these wise suggestions is practically impossible under an incisive division of districts, authorities, and regulations into urban and rural.

¹ In the provinces, the question of combination for port purposes is being agitated. It appears that at Newport the clerks of the Board of Health and the Board of Guardians were engaged last year in a correspondence about *joint* measures to prevent the importation of smallpox from the shipping, ('Lancet,' Oct. 5, 1872.)

The proposal to combine the local boards or town councils with the boards of guardians, or rather to compel them to elect jointly a Sanitary Committee in each Union—originally made by the Joint Committee of the associations—has been subjected, whether wilfully or from misconception it matters not, to every conceivable misrepresentation. For instance, it was asserted that the plan, if adopted, would abolish the self-government of municipalities. Yet we are not aware that any objectors to the scheme of the Commission proposed that the *ordinary* functions of town management should be committed to any but the urban authority. No one could ever have seriously thought of removing from town councils and local boards the scavenging, cleansing, lighting, paving, and watching of their streets, or the regulation of their markets or their public improvements. If the inspection of their lodging- and tenement-houses, slaughter-houses, and offensive trades, were to form part of a larger system of district superintendence, the duty of carrying into effect the required measure would still remain with them; and if the district drainage were necessarily included in more extensive structural works and wider plans of sewage utilization, the town authorities would have their proper share in the execution of these works. But the Sanitary Commission and their allies never saw, or at least never confessed, that in all local administrations there are *agenda*—not exclusively belonging to towns—in which the surrounding population has an equal and mutual interest, and that many of these *agenda* are now in the hands of the boards of guardians. It has been shown, again and again, how perplexing and inconvenient in every way it will be to leave the appointment of the medical attendants of the poor (exercising many preventive functions especially under the Diseases Prevention Act) in the power of one local authority, while the other board in the same town appoints the Officer of Health, who may or may not be one of the medical-relief staff. The framers of the Act have been repeatedly urged to provide at least some statutory co-operation between these two bodies and their officers; but these appeals have been met by an obstinate indifference which in a better cause might be called firmness. The only reply ever vouchsafed was to the effect that more power had been or would be taken to meet such difficulties than appeared on the face of the Bill: in other words, that the minister would take care to supply the deficiencies of the Act as he pleased, when he pleased, and where he pleased. If this is to be the new principle of sanitary administration, the country will soon repent the enactment which constituted this Local Government Board, and may ultimately demand the repeal of

that Act, for better reasons than those which led in 1858 to the abolition of the central authority created in 1848.

In time, we believe, there must be established by law some sort of administrative committee or district council, acting for and by authority of every board, urban and rural, within the territorial unit,—much in the same way as the Metropolitan Asylums Board acts for the several vestries which constitute it.

The division of authority, as to these medico-sanitary matters, which will now be rife in every urban district, has been very fairly called a duplication of authority; for in the above respects there will undoubtedly remain, contrary to the professions of the Royal Commission, two sanitary authorities in almost every town. Yet the official misrepresentation has been repeated, even by journalists who ought to know better. For instance, after the passing of the Act an article appeared in the *Saturday Review* containing the following incorrect statement:—"There will be but one sanitary authority in each district, whether in town or country, and the powers of these authorities, will, subject to the division into urban and rural, be in all respects identical." The only explanation of such an obvious perversion of facts is to be found in a subsequent sentence of the same article:—"There are many persons who seem to labour under a congenital inability to understand an Act of Parliament."

That the present division of medico-sanitary management between two bodies in each town was not the intention of all the members of the Sanitary Commission appears plain from the following passage in Dr. Stokes's admirable address in April last:¹—"That in each district the local administration for public health and for poor-law relief should be in the hands of the same authority" (p. 11). On finding that this was not really intended by his colleagues to be the case in town districts, that distinguished commissioner is said to have remarked with characteristic humour, that he hoped that in Ireland, at all events, the towns would be made into rural districts!

Had Mr. Stansfeld's Bill remained in its original form, the duplication of sanitary authority in towns would have been very awkwardly felt in the provision of hospital accommodation; and, as the hospital clauses may be again brought forward, it is important to show that under them the Board of Guardians would continue to govern its workhouse infirmary, and to provide its district dispensaries (if these are established) for the treatment of sick paupers by the Union Medical Officers. On the other hand, the urban authority would have to provide hos-

¹ 'State Medicine: a Discourse delivered before the University of Dublin, April 6th, 1872,' by William Stokes, M.D., D.C.L., F.R.S., Regius Professor of Physic. Dublin, 1872.

pital accommodation in epidemic diseases for persons who must not be called paupers, although they will be poor. Of course, it would be impossible in the terror of a raging epidemic, and not easy at any time, to maintain rigorously the distinction between pauperism and poverty; and unless the central Board should compel the two local authorities to co-operate, there may be two hospitals supported at the public expense, with two medical staffs acting independently of each other; an arrangement liable to all those misunderstandings of duty and repudiations of responsibility which are incident to a divided administration. The muddle would be completed by ignoring the distinction between paupers and poor persons in *out-door* medical relief during epidemics; for then, according to the late hospital clauses, the Board of Guardians and not the urban authority would be empowered to provide medical attendance and medicines for "persons other than paupers." So that the latter class would depend on the urban authority for hospital accommodation and on the destitution authority for domiciliary attendance!

It becomes also a matter of anxious concern to inquire into the probable effect of such irregular arrangements upon existing Medical Charities, Cottage Hospitals, Convalescent Homes, and the better kind of Provident Dispensaries. How readily might all this confusion, present and prospective, have been obviated, and the whole medico-sanitary machinery of each union simplified, by a clause compelling the joint formation of a dispensary committee or district council,—so that in every union, whether urban or rural or mixed, there would be the same medical system at work, the same principle of hospital accommodation, the same recognition of provident efforts, the same health officers of the first instance, and the same superintendence by a principal health officer of a more extensive jurisdiction, who would complete the organization by undertaking duties for which the union staff and other medical men engaged in private practice are obviously unfitted.

We are convinced that any attempt to separate the medical care of the sick poor from the local execution of sanitary measures will not only fail to secure the proper working of both departments, but will also materially increase the cost, and diminish the efficiency, of public health administration. Nor do we share in the objection felt by many excellent sanitary reformers to the union being taken as the unit of area for administration. Provided (1) that a larger area, the county, is secured for objects which require wider management, (2) that the union boundaries are revised, and (3) that local committees, such as Mr. Stausfeld has adopted in section 13, are formed in

parishes and "contributory places" for the more minute attention to details,—we believe that the union will be found practically the *juste milieu* for ordinary purposes, besides its obvious advantage as the area for registration of sanitary statistics.

Perhaps there was no speech on the second reading of the Bill which pointed out with neater and more telling criticism its main defects than that of one of its most determined supporters, Dr. Lyon Playfair, who by his recent efforts in the cause of public health has greatly added to the parliamentary reputation he had already achieved. The defects he referred to were, (1) the absence of any superior authority in a large area for objects of wider jurisdiction, and (2) the consequent want of any provision for the appointment of superior medical officers of health in country districts. With respect to the first, he admitted that counties were neither natural areas, as regarded (land) drainage, nor were they co-extensive with areas of poor-law administration. But, on the other hand, they were, he said, popular divisions, and as such had been recognized in Mr. Goschen's Bill. Counties also might be left to adjust drainage areas, just as sanitary districts were allowed to combine under this Bill. The main advantage, he thought, of such an enlarged intermediate authority would be that it would secure a much higher class of officers of health and engineers than the smaller districts could do. On the second objection taken his remarks are too weighty to be given in any but his own words, as reported in the *Times* :—

"These medical officers had most important functions to perform, requiring much special knowledge, much firmness, and thorough independence. They had to inspect the sanitary conditions of streets and thoroughfares, of schools and factories, and of the dwellings and lodging-houses of the labouring classes. They had to keep a watchful eye on the working of the main and house sewerage. They had to look after nuisances likely to affect health. They must attack the wealthy manufacturer when he polluted the river with the refuse of his works; and they must equally remonstrate with their own masters, the civic authorities, when they poured the sewage of the town into the stream, regardless of those who live lower down in its course. They had also to search out nuisances in dwellings, from the defective drain in the palace, which breeds fever, to the accumulations in the dustbin of the cottage, which poisoned the air around it. They had to watch the markets, from the shambles of the wealthy butcher to the stalls of the humble costermonger. They had to track out disease, associate it with its causes, and watch the progress not only of death rates but of variations of sickness among the population. The medical officer was, in fact, a public inquisitor, requiring much knowledge and tact in the performance of his public duties. But who were the sinners to be delivered over to this public

inquisitor? Chiefly the local authorities in whose hands rested the appointment and dismissal of their inquisitor. The vestryman butcher who sold diseased meat on his shambles; the vestryman cottage-owner who let houses; the town councillor who had his mills on the streams—these were the men who sinned against health, and who appointed, paid, and dismissed the inquisitor of their sins. And to what class of medical men did the Bill look for so much knowledge and independence? To the poor law medical officers. That was a meritorious, hard-worked, and poorly-paid class of medical men; but they were already borne down by the extent of their curative duties. If extensive preventive duties were added to those, and if even the new work were to be well paid for, though the Bill is by no means explicit as to the payment, what chance is there that both the curative and the preventive functions would be efficiently executed? It would have been possible, by uniting local districts into a country area, to have secured the services of a medical man who relinquished the cure of disease in order to have no conflict between the interests of his patients and those of the public. For a medical man must be well paid to secure independence of action, when he devoted his whole time to the health of communities instead of to the health of individuals. But the Bill made no provision for such officers.” * * * * *

“The knowledge requisite to elicit the action of individuals upon communities, and the reflex action of communities upon individuals, formed the subject of hygiene, which required long study, as it was altogether outside, and was rarely embraced in, the training of a medical man for the curative art. If he had made himself intelligible, it followed that three conditions were required for the efficient performance of the duty of a medical officer of health—first, knowledge of public health; second, experience in the application of that knowledge; and third, independence of all vested interests. He hoped, at least, that the amendments of the Bill would offer a better position and pay to such poor law medical officers as studied and passed examinations in the subject of hygiene. Unless that were done it did not require a prophet to foretell the failure of this important section of the Bill.”

Now, we have repeatedly shown that these conditions, so essential to the efficiency and value of the office, have been practically ignored by the Commission, Sir C. B. Adderley, and Mr. Stansfeld. And yet we are told by gentlemen whose forwardness in support of the Bill has led them into indiscriminate adulation of its authors, that the project is “statesmanlike.” If by statesmanship is understood the political adaptation of means to an end, the selection of the best available machinery for securing the desired results, then the Public Health Bills of the last session certainly afford no evidence of such, for the local machinery selected has been tried for years and found wanting,—while the central pressure to be put upon it in order to compel action is unconstitutional in kind and degree, and

applied in a form most discouraging to local science, and therefore likely to stifle the spontaneous, internal, and permanent amendment of local administration.

No doubt it is wise to make use of existing agencies as far as reason and fact justify their use. It is, moreover, unwise to censure or ridicule these agencies on account of temporary and exceptional failures; but it is, on the other hand, dishonest to credit them with all the talents and all the cardinal virtues, in order to catch their suffrages. This trout-tickling process is unworthy of any high-minded, straightforward statesman.

The claims of the old English shire to be recognised, generally, as the larger area of sanitary administration, and its authorities as a superior order of local administrators, are quite compatible with what has been termed the "intensely local" nature of certain sanitary work, just as the county police are "intensely local" in their prompt detection of crime and arrest of offenders. These claims were almost from the first acknowledged by the Joint Committee. Indeed, it is surprising how any one well acquainted with provincial administration in this kingdom could have overlooked the county, or have admitted the demand of a central authority to supersede that ancient and popular institution by an itinerant inspectorate. All parties testify to the general excellence of county rule, to the disinterestedness, justice, economy, and freedom from party or political bias, of the magistracy. Scarce a complaint has been heard against their management of asylums, reformatories, and prisons, their vigorous action in epizootics, or their appointment of analysts, which should be compulsory on all counties.

The reasons why county jurisdiction was disregarded in the so-called Public Health or Sanitary Acts of the last twenty-five years are obvious enough. The Poor Law Commissioners of 1834 erroneously set aside the county and formed unions which ignored and practically effaced its boundaries. The Registration system first, and then the Vaccination Acts, confirmed the usurpation of the poor-law divisions. So that a hazy notion, arising out of ignorance and misconception, has of late years prevailed that the county is unfitted for dealing with the higher responsibilities and wider objects of health administration.

Mr. Goschen rejected that popular fallacy, and Mr. Stansfeld has also disowned it, though he has not, like his predecessor, resolved to utilize counties at once. If, as he intimates, he is prepared, when the Ministry has decided on a reform in the areas and incidence of local taxation, to constitute a partially elective County Board—which, by-the-bye, may not be more truly representative than the present authority—for certain objects which are quite beyond the scope and capacity of local

boards,—why not include among those objects the appointment of chief health officers, as well as of county analysts? No reason can be given against such an extension of power, except one based on the bureaucratic assumption that all skilled inspection must emanate from a department in London. So galling a mistrust and disparagement of provincial science and ability would not be tolerated under a better informed state of public opinion. Whether the future County Board, which Mr. Stansfeld leads us to expect, may be called “intermediate” or not, is a matter of little moment. Once obtain such an authority, and it is morally certain that reforms, which the smaller boards cannot or will not execute, must devolve on the larger, which in self-defence will have to recover its costs from the constituent districts, and thus become in time an actually superintending authority.

Reviewing the several objects of local management which are now brought under the direction of the new central authority, it is difficult to escape the conclusion that the county might relieve the central department of many burdensome responsibilities which ought not to fall on the latter, meet many obvious requirements for which there is at present no proper machinery, and supply many defects of local action. For instance—as regards the Poor Law, the in-door paupers need classifying,—a single workhouse being appropriated to a single class, and certain charges being distributed over the whole county, as they are now over the metropolis; hospitals and asylums have to be provided, inspected and managed; the roads and the rivers stand in great need of improved and consolidated management; works of land-drainage, with measures for protecting the sources of water supply and storing it for the needs of growing or newly forming masses of town population; all these matters require authorities of a very different kind from the minor local bodies constituted by recent acts.

If Mr. Stansfeld does not previously spoil the prospect of a reformed and extended county jurisdiction by a capricious grouping of districts, without regard to county boundaries, we may yet realize a better system of “home rule” than this country has ever enjoyed. Whatever may be the traditions of Gwydyr House on the subject, those independent inquirers who have taken the trouble to work out the problem on the borders of counties assure us that the present discrepancy between union and shire boundaries, which prevents the co-operation of their respective authorities, might be mutually adjusted on equitable terms by the existing authorities, if legally empowered and fairly aided by the central board.

Mr. G. W. Hastings, in his remarkable address at Leeds in

1871, showed how essential to the reality of local self-government is the revival of the ancient powers of the shire. He argued that the scheme of the Royal Commission, based on the machinery of the former Sanitary Acts—

“could never work except on one condition; viz. that local government should be granted in form and denied in reality; that the central office should interfere in every detail and be absolute over all authority. If such be the object, the plan is logical enough; small areas can be easily managed and small men readily coerced: important bodies, on the other hand, are apt to hold their own.”

A remarkable letter by Lord Fortescue, which appeared in the *Pall Mall Gazette* of July 1, enforces very strongly the same doctrine. He says—

“I am more and more convinced that the county affords for most purposes the best basis of supervising and controlling ‘provincial’ administration, with an action intermediate between that of the Central Government or Parliament, on the one hand, and merely executive local administration on the spot on the other hand. It would be difficult to exaggerate the mischief and confusion, the waste of time and labour, of the Imperial Parliament, of money and trouble to local bodies and individuals arising from the utter absence in England of any such intermediate superintendence and control as that which a partially elective county board would afford. Such a board would represent the interests both of the owners and of the occupiers of real property, neither centralised and bureaucratic in spirit as Whitehall offices, nor subject to all petty personal jealousies and narrow views too often prevailing in a small provincial municipality or in a purely rural administrative area, such as an ordinary poor-law union or highway district. The county seems, unquestionably, best to afford the basis of such an intermediate administration as I have indicated in sanitary matters, and as it has been recognised by the Legislature in the case of roads, following the precedent, I suppose, of bridges, which, except when specially otherwise allotted by statute to turnpike trustees or other local bodies, have for centuries been built and repaired by the counties. * * *

“The union, with its boundaries adjusted to those of the county, which would generally not be very difficult (those of the county being in a few cases adjusted to those of the parish or union), ought to be, in my view, the new unit of English primary administration for almost all purposes, while the county should be that of secondary or intermediate controlling administration; the comparatively light duty of enforcing general unity, though by no means uniformity, of administration being alone left to the Central Government and the Legislature.”

We have now to notice the action taken by associated bodies with respect to this measure.

The main demand of the Poor Law Medical Officers' Association, under the able presidency of Dr. Rogers, has been the general adoption of that part of the Irish system of sick poor relief which provides for the establishment and maintenance of dispensaries—that is, the separation of the drug provision from the duties of the medical officer—the introduction of which into the metropolis, under the Metropolitan Poor Act, we owe to Mr. Gathorne Hardy. In this demand, as in that for more equitable remuneration, they have been cordially supported, as was right, by the whole profession. They also judiciously co-operated with the Joint Committee in asking Government for a Registration of Sickness. The proposal to employ them as *sole* health officers in their respective districts seemed at first likely, as it was doubtless intended, to stimulate them to support the Bill. But after conferences with the Joint Committee, and a decided expression of hostile opinion by numerous provincial branches of their society, it appeared as though they had finally determined to reject the suspicious offer of the Government, and were proof against the blandishments of the Commission. Nevertheless a sharp opposition to the general sentiments of the body was declared towards the close of the session by a few of its metropolitan members, who held the vantage ground of personal access to the minister. But this attempt (of what turned out to be an insignificant faction) to involve the whole Poor Law medical corps in support of the official project seems to have failed. From the reported result of a direct appeal to these medical officers, through the journals, we learn that an “overwhelming majority” of those who replied to that appeal distrust the Government measure, and would prefer being constituted, in town and country alike, deputies under a county or principal medical officer debarred from private practice, who would be ready at all times to support them when in the right, and to relieve them from the hazardous necessity of initiating proceedings against infractions of sanitary law by their private patients, and who, in the case of a vacancy, would be selected for good service from their own ranks, if in all respects qualified.

This plan has become the more necessary now that additional inspectors, required to carry out the Public Health Act, have been appointed, who possess no medical or scientific qualifications, and whose sole recommendations consist in their personal claims on ministers, poor-law chiefs, or Sanitary Commissioners. These recent appointments show that, contrary to the professions of the authors and supporters of the Act, the claims of science and preventive medicine are to be kicked aside, if conflicting with the exigencies of patronage. The triumph of

nepotism is complete when under the mask of enlightened central action.

We are glad to observe that, at an important meeting of the Union Medical Officers on October 1st, they resumed their proper line of action. Whether we look at the resolutions passed,¹ or at the speeches made, especially those of Dr. Rogers, Dr. Lush, M.P., and Mr. Albert Napper; the founder of cottage hospitals, or at the letters read, among which that from Mr. Ceely, our great authority in vaccination, deserves particular attention, it is evident that the cause we have advocated is that of the whole educated community, of the learned professions, and of a suffering people.

It was not to be expected that so influential a body as the Metropolitan Officers of Health would remain silent at this juncture, although the Bill plainly excluded the metropolis from the operation of the tenth clause. Nevertheless, the able officer of health who brought the question before his colleagues is reported² to have confined his remarks chiefly to those portions of the Bill which affected medical men in the provinces, and of which these might without offence claim to be the better judges. On the whole, he is said to have supported the government measure, as respects districts, authorities, and officers. His audience, however, seem to have treated the Bill with but scant favour, criticising freely its defects in practical matters, while urging the extension of its better provisions to the metropolis. The Committee which they appointed to consider the Bill wisely restricted their recommendations to those practical reforms which do not touch questions of organization.

Among the medical proceedings of the last year concerning this measure we feel bound to notice the curious *fiasco* at the Royal College of Physicians of London. It was not at all surprising that that corporation should appoint a special Committee to watch the progress of sanitary legislation; and when it was known that men so well informed on the subject as Drs. Sibson, Blakiston, King Chambers, Barclay, Stewart, and Pitman were on this Committee, it was natural to expect that their report on the Bill would embody sound suggestions and carry great weight. Though marked "private," like some other singular college documents, this report was published in the *Lancet* and we are therefore able to say that, while moderate in its tone, it was, in substance, strongly confirmatory of the report of the joint committee. The chief suggestions were—the employment of the union surgeons as assistants under chief officers, not engaged in private practice, and acting as the responsible

¹ These resolutions are published in the weekly medical journals of Oct. 5.

² See 'Lancet,' March 23rd, 1872, p. 412.

advisers of the local authorities ; and these again under *medical* inspectors ; two or three eminent men being also attached to the central authority and associated with the medical adviser of the government.

The manner in which this report was received by the college was truly remarkable. That the *comitia* should have submitted to the dictation of a few Fellows, pledged either by their past action or by their existing relations, personal or official, to support anything and everything which the Royal Sanitary Commission and the Local Government Board might propose, is not to be easily explained. But that the majority of those present should have confessed that they were so imperfectly informed on the question as not to be in a position to deal satisfactorily with it, is really an astounding confession either of incompetence or of indifference to the honorable and useful exercise of public medicine. After this abnegation of corporate duty, the rank and file of the profession may be excused for not expecting anything from the college beyond its traditional regard to the exclusive interests of its Fellows. Dr. Rolleston was quite justified on that occasion in remarking on the want of courtesy shown by the college to their own committee in dismissing the report without even discussing it. Henceforth no independent Fellow will care to be named on a committee liable to such treatment.

Happily, a large proportion of the provincial Fellows regards this question very differently from the party assembled in Pall Mall. For instance, we call particular attention to an earnest appeal to the Peers¹ by Dr. Child, just before the Bill left the Commons—an appeal which ought to have settled the fate of the measure, at least as regards the appointment of health officers. Among those who backed Dr. Child in his previous address to Mr. Stansfeld may be found the names of several provincial fellows of the college, specially distinguished for scientific work in matters of preventive medicine. Nevertheless, the majority of those who signed that letter did well to explain publicly that they by no means intended their remarks to apply to the employment of the poor-law medical *corps* as deputy or assistant health officers with proper remuneration. They only objected to those officers being employed as the sole sanitary advisers in their respective districts. It would have been well had Dr. Child's first letter been more explicitly worded on this point. He is particularly happy in his comments on the parliamentary history of this Act during the last session. While noticing the objections raised to the Bill on its second reading (April 5th),

¹ 'A Letter to the Marquis of Salisbury, on the "Public Health Bill," by Gilbert W. Child, M.A., M.D., of Exeter College, Oxford, &c., &c.

he reminds us that there was an absence of all serious opposition,—that considerable amendments were expected in committee, if not a withdrawal of the Bill at the last,—that not until the end of July did Mr. Stansfeld reproduce this measure, having then “with an astuteness worthy of all admiration” dropped every provision alarming to powerful interests,—that the House then showed unmistakable signs of exhaustion,—that ministers hoped at the eleventh hour to redeem the credit of another wasted session, and that the opposition desired to avert the hostile charge of obstructing every useful reform. So the Bill passed. We commend this spirited pamphlet to the perusal of sanitary reformers.

Something must be said as to the changes which the measure underwent, or which were urged unsuccessfully, in committee. The provisions relating to the pollution of rivers, as they stood at first, were simply impracticable; but Dr. Lyon Playfair would have greatly improved them had not they, with all other useful clauses of the Bill—such as those relating to nuisances, ventilation of sewers and drains, cleansing of closets, &c., adulteration of food, sale of unsound food, closing of foul pumps and wells, powers to improve water supply and gas-lighting, to purchase water mills, and to close buildings unfit for human habitation—been thrown out as a tub to the parliamentary whale. Important amendments to these and other clauses, suggested by the metropolitan officers of health and others, were, therefore, rendered useless. The hospital clauses were bad, as we have shown, and were, therefore, deservedly abandoned. The original dispensary clauses, utterly inadequate, were also struck out, but they would have been considerably improved by Mr. Corrance had the House permitted.

Sir Selwyn Ibbetson practically carried his useful project for parochial committees, but they are unwisely limited to rural authorities, although many large towns stand in need of the same treatment. It is not made clear whether committees for parishes or “contributory places” are necessarily to contain *ex officio* members, according to Colonel Barttelot’s valuable amendment relating to *general* Sanitary Committees; but practically this will be the case, as to our knowledge it has been already adopted in some places.

Lord Robert Montagu’s speech on intermediate authorities shows that he has thoroughly mastered the river-pollution question. His decided action on this point against his more facile colleagues entitles him to the respect of all independent reformers. His forcible reasons in favour of watershed authorities are not really irreconcilable with those for county boards; and we regret that he does not see, as most of his friends see, that in

cases where the river runs between or through several counties, river-basin authorities might be more readily and effectively constituted by the co-operation of counties than by the union of minor sanitary districts. The county question was well handled by Mr. Goldney, Mr. Ward Hunt (late Chancellor of the Exchequer), and especially by Sir Michael Hicks Beach, whose practical and clearly expressed views on the whole question mark him as a future leader in this department of legislation. The arguments of these gentlemen have certainly never been answered. If the chiefs of the Conservative party had supported their more enlightened adherents, the Act would have emerged from the committee in a very superior form.

A series of county-board clauses prepared by Mr. Michael and adopted by Mr. Dalrymple were somewhat ignominiously abandoned by the latter, whose allegiance to the Government overcame his desire to help the Joint Committee. The main principle was vigorously pressed by Mr. Corrance, who with more courage than discretion faced a division at the dinner-hour. The smallness of his minority must by no means be taken as a test of the strength of the county administration party in the House.

The only other amendment in the Bill which need be noticed was that by Mr. Kay Shuttleworth. Acting on the principle laid down by the Joint Committee, he carried a proposition that the powers of the Board of Trade, as regards metropolitan water-supply and the administration of the Alkali Act, should be transferred to the Local Government Board. The same principle of consolidation has been applied to duties under all Acts relating to highways, turnpikes, roads, and bridges, so that these matters are transferred from the Home Secretary to the new Board, and the present county authorities are thus brought into official relation with that Board.

Such, then, was the action of the House of Commons. The Bill was passed under the pressure of an imaginary undefined necessity, and without any intelligent comprehension of the nature and capabilities of the machinery employed.

One can hardly understand the influence which could have led so sensible a man as Mr. F. S. Powell to believe that the immediate passing of a Bill, which did absolutely nothing more than establish a number of incompetent authorities and compel them to appoint a number of doubtfully qualified officers, under central dictation unaided by skilled inspection, "would save many lives during the autumn." (!) Yet on such a ridiculous assumption was the Bill forced through the lower House and thrust upon the Lords, who allowed it to slip through in three days "without even a pretence at discussion," encumbered as it was with that most obnoxious clause, the 10th, which, it seems,

Mr. Stansfeld would have been glad to throw overboard if pressed by others. Brief, however, as was the time which that august assembly allowed itself for a hasty consideration of this measure, it may repent at leisure, for the obstacles now raised to an efficient organization are not likely to be removed until after years of struggle and disappointment.

Since the Act passed it has been discussed at the annual congresses of the two great associations which have devoted so much attention to this question. But no fresh light seems to have been thrown upon it at either meeting. The general tone of the several discussions was adverse to the machinery adopted by Parliament; but some speakers amiably expressed a hope that the measure may be found to work better in practice than it promised in theory.

The most important utterances were those of Dr. Acland,¹ Mr. Bulteel, and Mr. Michael, at Plymouth; the first, of course, in favour, the other two in severe criticism, of the ministerial plan. It is to be regretted that the able president of the health department of the Social Science Association should have employed his oratorical powers—not in endeavouring to refute objections which had been repeatedly urged by many eminent sanitary authorities, but—in putting forth commonplace fallacies about the competency of the people to take charge of their own health,—in lauding the genius of the English nation and the ability of the present Government,—in defending the extraordinary and unconstitutional powers which the central authority had “quietly” obtained for forcing its conclusions upon the public, and for arbitrarily making new areas of administration throughout the country. The logical conclusion from Dr. Acland’s address would be that, under the present wise and powerful Government, no further sanitary legislation is necessary, and that this magnificent common people, with Mr. Stansfeld at their head, might do very well without the inferior officers of health whom the Government were pressing on the communities in disregard of a general remonstrance.

It is remarkable that Mr. Stansfeld had hardly entered upon his present office, and had certainly done in it nothing to deserve praise or blame, when it was thought advisable to flatter him. At a meeting on Charity Organization in December, 1871, the *Times* reported that “he declined to accept the eulogium

¹ “Address on Health,” by Dr. Acland, F.R.S., D.C.L., at the Plymouth Congress. *Western Daily Mercury*, Sept. 17, 1872.

Postscript.—Since this article was printed, Dr. Acland has republished, as a pamphlet [Parker, Oxford and London], his Address, judiciously corrected, with important additions and omissions, and he has thus greatly improved it. Our criticisms obviously apply to the original version.

which Dr. Acland had been pleased to pass upon him." And it might have astonished Mr. Stansfeld, as it did ourselves, to hear lately that he possessed "a rare combination of sagacity, determination, and modesty," in pressing forward a measure which few experienced sanitarians (beside Dr. Acland himself) approved. The flourish at Plymouth about the Public Health Act has been only equalled by Jupiter's announcement of it as "the crowning achievement of the century"!

In the long list of subjects, not one of which, according to Dr. Acland, could be removed from the charge of the President of the Local Government Board, we are surprised to find the following (now marked in italics), on each of which we have to say something. 11. *Registration of sickness*:—not at present provided for by law. 13. *Superintendence of epizootic epidemics* (sic):—still administered by county authorities under the Privy Council. 14. *Inspection of hospitals*:—if more is meant than workhouse infirmaries and institutions under the Metropolitan Asylums Act, this is not an accomplished fact. Hospitals for the insane are under the Lunacy Commissioners. 15. *Inspection of penitentiaries and prisons*:—under county management, subject to the Home Secretary. 16. *Inspection of dispensaries*:—only of a few established under the Poor Law. There is no inspection of charitable hospitals and dispensaries. 17. *Inspection of druggists' establishments*:—nothing of the kind. 18. *Inspection of factories*:—a special department under the Home Secretary. 19. *Inspection of agricultural labourers(!)*:—we never heard of such inspection, unless they enlist as soldiers. 21. *Education and registration of medical practitioners*:—under the General Medical Council, subject to the Privy Council. True, the Medical Council is not in a comfortable position. It has had to endure many hard rubs on all sides; but it would be the "last straw" to put it together with the education and legal *status* of the whole profession under the Local Government Board. 22. *Education, &c., of national health experts*:—no legal provision has been made for the qualification of health officers, nor has it been even proposed by either Sir C. B. Adderley or by Mr. Stansfeld. 23. *Education, &c., of nurses and midwives*:—no legal provision at all for it. 24. *Control of intoxicating liquors*:—under the magistracy and the police. 27. *Coroners*; and 29. *Organization of charities*:—neither of these is under the Local Government Board, nor does the latter exist.

A fertile imagination may no doubt supply statutory deficiencies; and Mr. Stansfeld may have an eye to many outlying territories of administration. But, with regard to most of those objects just mentioned, we will venture to predict his failure if he should attempt to grasp them.

The theory of this school of politicians is that everything may be accomplished by central inspection and dictation. Hence Dr. Acland's proposal to supersede the necessity for permanently appointed scientific officers, under provincial authorities, by creating a staff of Government-selected "experts," to be employed and paid only when required. We cannot too strongly reprobate this proposal. Such an engine of central interference would altogether discourage the advance of local scientific inquiry and research. It would make governmental opinion all powerful, and tend to fix the stamp of heresy upon any independent investigators who might decline to accept official conclusions. It would make the "Local" Government Board virtually the sole machine of local government. Notwithstanding many proofs of the deterioration of local administration, we can hardly conceive that it has sunk so low as to render such an usurpation of its functions possible.

Dr. Acland has imagined a class of sanitary reformers who blame him and his ministerial friends because they "did not at once jump at a large, comprehensive, and complete measure." He expressed his charity towards persons "in that unhappy position." Now, we should like to know where he has found such men. We are not aware that any writer of authority on public health has urged the sudden adoption of a large and complete measure. But we know of several who have recommended "step by step" legislation, "only with care that no step shall be taken which may embarrass the future consideration or prevent the adoption of any correct principles of administration."¹ The public-health legislation of 1872 is criticized, not because it has made only one step, but because that step is a false one, creating obstacles to future progress in the right direction, and increasing the difficulties of subsequent legislation.

Mr. Michael, the legal secretary of the Joint Committee, at the request of the Social Science Association, prepared a paper² on this subject. In his description of a thoroughly comprehensive project he was far from advocating the immediate adoption of all needful sanitary improvements. He would lay a safe foundation for the future by establishing a uniform authority, judiciously constituted, in every district, extending over such an area as would secure the greatest efficiency of action. This would, he admitted, "necessitate the recasting of existing institutions." We think that the same object might be as well attained by combining present authorities as by superseding them. Like every other judicious reformer, Mr. Michael de-

¹ 'A Summary of the Principles of a Comprehensive Measure for the Improvement of the Sanitary Laws.' By H. W. Rumsey, M.D. Ridgway, 1872.

² See 'Transactions of Soc. Sci. Assoc.—Plymouth Congress, 1872.

precated the division of authorities into urban and rural as wholly unnecessary, contrary to poor-law and registration precedents, and tending to failures in local action.

He showed the importance of including the management of roads and rivers, and advocated the appointment of three first-class officials by each district authority,—viz., a clerk and legal adviser, acting also as public prosecutor (a most necessary reform); a skilled surveyor of roads, acting also as engineer, with a scientific qualification, and carrying out all structural works; and a superior medical officer of health, “relieved from the restraints and competitions of private practice.” His views respecting the central department and its head are precisely those which have been advocated in this Review as to both functions and jurisdiction, and as to the aid to be afforded by a permanent Council of Health. This paper was well supported by Mr. Jenkins, the author of ‘Ginx’s Baby,’ who said that “the manner in which Government was approaching the matter was not calculated to bring about either a speedy or a happy solution of the difficulty.” He urged the necessity for a reconstitution of the unit, for an intervention of the county power, and *then* for the consolidation of the whole of the statutes. Neither of these eminent barristers supposed that the whole work of sanitary legislation could be accomplished in a single Act; but as they objected to the ministerial scheme, they would probably be included by a Devonshire baronet among those “disappointed agitators” whom, with singularly bad taste, he accused in Parliament of opposing the Commission and the Government, because they had failed to secure their own interested objects.

The most attractive paper on this subject at Plymouth was that by Mr. Bulteel,¹ and it led to an animated discussion. He also suggested “an order of sequence” in sanitary legislation, and approved of the limitation of the recent Act to the formation of areas and authorities. He dwelt on the necessity for an intermediate authority, for, said he,—

“Local government, especially in rural districts, is left in anything but desirable hands, unless the local authority is efficiently controlled by a superior authority nearer home than the Local Government Board; while the central power cannot but become most unpopular, because it will have to poke its fingers into every little parish pie, and cannot fail to raise the cry, and very properly too, against over-centralization.”

Like other accurate observers, he asserts, as an unquestionable fact, that of late years the materials of which Town Councils and Boards of Guardians consist have sadly deteriorated, and

¹ ‘The Public Health Act, 1872, with reference to Plymouth, Stonehouse, and Devonport.’ By Christopher Bulteel, F.R.C.S. Churchill, London.

that, amidst the storms and personalities and jobberies of local bodies, it is with the greatest difficulty that a gentleman or first-class tradesman can be persuaded to offer himself as a candidate for municipal or guardian honours. His main objection to the Board of Guardians as the sanitary authority in rural districts is that it is occupied with the relief of the poor, which he holds to be irreconcilable with sanitary work. He does not say how *medical* poor relief, hospital accommodation in epidemics, and district dispensary management are to be separated from the general control of pauperism; but such a division of labour is quite possible, and we are sure for reasons before given that these medical matters are practically inseparable from local sanitary management. His views respecting the appointment of Medical Officers of Health are almost identical with those of the Joint Committee, except that he does not acknowledge the advantage—we say the necessity—of employing the Union Medical Officers as deputies or assistants. He demands a special education and examination in all branches of public hygiene, &c., and a class of officers “well versed in the department of State Medicine.” He also urges the desirableness of combining the office of public analyst with that of health officer throughout the country, “except in the largest districts and towns.” But Mr. Bulteel’s great point was the application of his principles to his own locality, so that Plymouth, Devonport, and Stonehouse, which happen to be exactly included in two registration districts, might combine to appoint one officer of health, acting also as analyst. His arguments for only one such officer, supervising the three towns, are unanswerable, and would justify the addition of at least two adjacent riparian districts to the health officer’s jurisdiction. It appears that no one has objected to Mr. Bulteel’s very rational and practical suggestions, except certain local defenders of municipal jobbery, under the name of municipal patronage, and some narrow-minded devotees of the “practitioner” interest in our own profession. On the whole, the cause of good sanitary organization was promoted by the discussions at the Plymouth Congress.

With a view to future progress it remains to take a brief retrospect of the singular course which the Government has pursued for twenty-five years with regard to that most important of all sanitary questions—the appointment and functions of the health officer.

The General Board of Health, established in 1848, lost no time in obtaining and circulating proper information on the subject. The previous suggestions of Dr. Southwood Smith and Dr. Strange were admirably formulated in two Minutes of that Board, dated Feb. 12th, 1851,—one on the appointment of

Officer of Health, the other on his duties. The latter was quoted by the Joint Committee in their report of 1871. The former has only recently been recalled to public notice, as showing the view *then* taken by the central authority about the combination of this office with private practice. This document is so convincing and unanswerable that it has been resolved to reprint it for general use, in the pamphlet hereafter referred to; and it is therefore needless to quote those portions of it to which we earnestly request our readers' attention.

In the Order concerning the duties of the officer of health which accompanied this minute, those functions are fully described under thirty heads. No doubt the style is verbose and Chadwickian, but the matter is invaluable, and should form the groundwork of any general instructions now to be issued. It is a memorable fact, that the then Home Secretary, Sir George Grey, declined to sanction the combination of private practice with preventive duties, in the justly celebrated Liverpool appointment, which ought to have been taken as the model for national imitation.

In 1855, however, the Government began to waver. Sir Benjamin Hall (afterwards Lord Llanover) overcame the objections of his colleague, Lord Ebrington (now Earl Fortescue), and the Metropolis Local Management Act, for the first time, compelled each of the numerous local boards and vestries of the London district to appoint one or more "Medical Officers of Health," without any conditions as to special qualification, or tenure of office, or private practice.¹

The result is that, instead of *ten* or *twelve* superior officers, devoting their whole time and energies to their public duties, and methodically assisted by all the Union Medical Officers of the metropolis, there are now some forty-five practitioners acting without that important aid and often in official rivalry with the Medical Relief Officers, from whom they ought to have been empowered to obtain all requisite information. Sir B. Hall's measure was fairly described by Charles Dickens as "An Act for the more complete Vestrylization of the Metropolis." Its immediate result was to lower the intended *status* of the Health Office, and to impair its efficiency.

As if to counteract this result of the metropolitan system, the General Board of Health, at the close of the same year, circulated for the use of provincial authorities their last "Instructional Minute," a document so weighty and convincing that one wonders how, in the face of it, any Government could have ventured to enact the farcical scheme recommended by the

¹ See some remarks on the medical bearings of that Act, in Rumsey's 'Essays on State Medicine,' pp. 314—316.

Sanitary Commission. We must refer our readers to the original Minute, merely remarking that both the Joint Committee in their Report of 1871, and Mr. Hastings at the Leeds Congress, quoted with great effect a most striking passage relating to the occupation of the health officer in other professional pursuits.

The third section of this Instructional Minute, relating to the special and scientific qualifications of the officer, in "Pathology, including Vital Statistics, and in Chemistry with Natural Philosophy," show how high was the standard of excellence which the distinguished medical adviser of the Board *then* deemed necessary for the due execution of the office. It might have been this section which suggested the scheme for a special qualification in State Medicine, proposed first, we believe, by Dr. Rumsey, afterwards sanctioned by the Medical Council, and recently carried into effect by the University of Dublin, after being recommended by that of Cambridge. But the condemnation which this Minute indirectly pronounces against the system now in political favour was too manifest. The very existence of the document could no longer be tolerated. And—will it be credited by those who charitably retain their confidence in the central authority and its officers?—in 1868, before the appointment of the Sanitary Commission, official instructions were given that all remaining copies of this Minute should be destroyed! Such is the discreditable fact, and its discovery has led to the republication of all these, with an admirable introduction by Mr. Ceely, of Aylesbury,¹ which should be in the hands of every member of the profession. There can, indeed, no longer be any doubt as to the intention of the ruling powers to degrade the local office of State Medicine; and here we have the true explanation of recent measures, acts, and utterances.

It is particularly disheartening to see the cause of medical independence and sanitary science betrayed by those of whom the profession had a right to expect better things,—men whose principle is political expediency, whose first care is to swim with the stream, who count heads and then form opinions. Such men, however able in debate or persuasive in speech, are not to be trusted in the preparation for action in any great cause, for they will surely leave the originators of the movement to bear the brunt of opposition, and to fail under the pressure of obstructive interests, while they themselves secure certain fruits of the enterprise by negotiations with the enemy.

Not that every medical member of the Sanitary Commission really held the governmental view of this office. Sir Thomas

¹ 'Officers of Health; their Appointment, Duties, and Qualifications.' By Robert Ceely, F.R.C.S., Surgeon to the Bucks Infirmary, &c. &c. London, 1872

Watson's examination of Mr. Simon shows clearly enough what that "Nestor" of medicine personally thought of the matter.

"1889. Is not the department of knowledge which relates to public health a branch of medical science quite distinct from that which relates to the cure of disease? Yes.

"1891. And it is with this public health, or as it is sometimes called State Medicine, or *hygiène publique* in France, and with this alone, that the Privy Council concerns itself? Exactly.

"1899. Supposing that an office of so much trust and importance were allotted to a properly qualified man generally throughout the country, should he not be relieved by a suitable remuneration for his services, from the necessity of providing for the exigencies of his daily life by the exercise of his ordinary profession; rather should he not be precluded from any distraction from his official duties, and be bound to devote himself entirely to those duties?"

We prefer not to comment on an answer which evades the real point of this question. A direct reply would have been difficult with the Minute of 1855 in the respondent's memory.

The health-officer system adopted by Mr. Stansfeld has been so often shown to be a practical blunder, as well as erroneous in theory, that one is surprised, not so much at his obstinate persistence after warning, as at the counsel tendered him by those who know well enough the necessity of high qualifications, scientific acquirements and special training for this office, as well as the advantage of a comparatively independent position for the officer, and who have supported these principles in public documents. It seems as though political pretences and appeals to the lower motives of human nature were inseparable from any great social movement in this country, and that the only chance of procuring even a nominal reform is to saddle it with corrupting conditions.

Even in the metropolis, where many men of superior merit, distinguished for their labours in the cause of sanitary science, have held and now hold these appointments, the conditions of obtaining and working the office are found to be almost intolerable. The baneful influence of vestry patronage has irretrievably vitiated the system. Take, for instance, the history of the health office in the parish of Marylebone. It is well known that the selection of so admirable a specimen of official excellence as the late lamented Dr. R. Dundas Thomson, who first held the appointment and was chosen President of the Association of those officers, was not due to the vestry. Wise for the time or doubting their own competence, they delegated their powers on that occasion to a scientific commission. The result was all that could be desired. But this act of self-denial was too severe to be repeated. Hunger had increased by ab-

stinence; and when the sad vacancy occurred in 1864—*nay, before it*—the demon of jobbery had regained possession of the vestry in seven-fold force. While the good Thomson was yet alive, a majority of the vestry had pledged themselves to another candidate—one of their own body—a medical vestryman! regardless alike of the possible candidature of eminent men when the vacancy was declared, and of the protest of 200 leading gentlemen, medical and other, of the parish, who were anxious for the appointment of some one of high scientific standing. The *Lancet* then said—“It is a matter of grave moment that appointments of this character should be permitted to rest in the hands of the Vestry.” That Dr. Whitmore may have proved an able and zealous officer by no means justifies the intrigue by which he was chosen.

The metropolitan officers have collectively expressed their sense of the expediency of great reforms in this department of sanitary management, and they demand, “by right, free access to all records and books kept by the Poor Law Officers;”¹ in other words, they require official co-operation with the medical relief staff—the very reform which the Joint Committee laboured in vain to introduce into the Public Health Act.

If the opinion of a distinguished outsider is needed to confirm our verdict, no stronger condemnation of the present system could be found than that pronounced by Dr. Alfred Taylor, our highest authority in Medical Jurisprudence. He said²—“The present mode of appointing Medical Officers of Health is a sheer absurdity.” This absurdity Parliament has now established, and made compulsory upon every district in England.³

¹ ‘Seventh Annual Report of Medical Officer of Privy Council,’ p. 532.

² See ‘Report on State Medicine, Gen. Med. Council,’ 1869, p. 12.

³ As these pages were passing through the press the Local Government Board has issued to urban authorities an “Order” respecting medical officers of health, which confirms all that we have predicated as to the views and intentions of the central authority. This Order is a mere technical expression of such administrative details relating to the qualification, appointment, duties, salary, and tenure of office, as necessarily follow from the words of the Act itself. As to qualification, it requires nothing more of the candidate than his being registered under the Medical Act. Any student who can manage by the age of twenty-one to get his name inscribed on the Medical Register, with a single licence, may thus be legally qualified for this important office, although his medical education, training and examination, may have barely touched on the special studies and pursuits which ought to prepare him for preventive and inspecting duties. To make matters as easy as possible for the ignorant, the Local Government Board takes power to dispense with one of the licenses if the candidate possesses the other part of the double qualification demanded of poor-law medical officers. No directions are given or data supplied as to the extent of area or rate of medical remuneration. No conditions are specified as necessary to secure the approval of the Central Board, which approval alone is required to make valid every absurd proceeding of local authorities within the terms of the Act. The duties mentioned are such as have been always understood to belong to a town officer of

The estimate of this measure taken by leaders of opinion in the literary and scientific world show that this is not merely a doctor's question. When independent journalists of acknowledged repute and representing the higher class of publicists, architects, engineers, chemists, physiologists, and biologists,¹ agree in denouncing the machinery employed under the Act, it is a matter for regret that the weekly medical press did not use the power it undoubtedly possessed, had it been unanimous, to prevent an enactment which does nothing more than establish an ineffective and delusive system of authorities and officers. Decoyed by the vision of a few medical inspectorships, and influenced probably by metropolitan connections and aspirations, more than one organ of medical opinion defended this farce of legislation, and attacked those who, indifferent to place, were by their opposition endangering, as it appeared, the success of the Bill and the projects of medical place-hunters. Then, on finding that the inspectorships had been otherwise disposed of, these writers turned suddenly round upon Mr. Stansfeld—who was not more to blame than his medical advisers—and censured him in terms and on grounds which can bring only discredit and ridicule on the profession. The question so much misrepresented is not whether medical men should supplant lawyers and civil engineers in the service of the Central Board—for *all* are required—but whether Preventive Medicine, in its higher offices, should take its proper place on equal and honorable terms in the local administration of health laws. The opportunity for forming a good sanitary organization is lost for the present. A safe foundation for it might have been laid in 1872. It will now be the work of other men and other times.²

health. Yet most of them would be more readily performed by the poor-law district medical officer, as a deputy. Higher functions of inspection and supervision are noticed only in the most general terms. On many points the new officer will not be supplied with the facts and materials on which he is expected to report, nor will he be in a position to report freely on them if procured.

The letter of advice which accompanies the Order reads very much like an apology for the errors and defects of the Act, a justification for the main objections which have been raised against it, and an appeal to the local boards to help the non-medical inspectors to avert the dreaded results of strict adherence to the letter of the law. In this document the central authority recommends the voluntary, and therefore unsystematic, adoption of principles which are virtually discouraged by the Act. Yet it can hardly be expected that the petty authorities, now compelled to appoint health officers, will in general surrender into the hands of a higher and more competent authority their right to coerce these officers, for the sake of the very questionable assistance offered by the Government. When you have "set a beggar on horseback" it is too late to advise him *not* to "ride to the devil."

¹ See a letter on the "Working of the Public Health Act," in the *British Medical Journal*, Nov. 9th, 1872.

² We desire to call the attention of the reader of the foregoing article to the excellent Original Communication from Dr. Rumsey on the Food and Mining Acts, printed in this present number.—Ed.

II.—The Surgery of the Jaws.¹

INJURIES and diseases of the jaws and contiguous structures must always be subjects of important consideration to the surgeon, from the trouble and inconvenience they cause to those who suffer from them. A limb injured or diseased may be kept in a state of almost perfect rest, but a jaw (especially if the lower) so affected for the time deprives the patient of the pleasures of conversation, and renders the process of sustentation positively painful. Moreover, the difficulty of maintaining a condition to which motion is injurious to the process of repair or healing greatly complicates a case, and renders the work of the surgeon arduous and too often very discouraging. A second edition of Mr. Heath's work following so closely upon the first proves that the subject receives more than ordinary attention, and the author has endeavoured to show his appreciation of the interest thus manifested by making his book more complete, bringing its information down to the most recent date. By so doing much new matter has been added to the work. We think it would have been further improved had the writer in some cases departed from his plan of treating separately many of the diseases common to each jaw, for although he has done his best to avoid repetition, the same ground is often traversed again.

For instance, Mr. Heath first directs our attention to fractures of the lower jaw, which, as they with but one exception named—viz., a rare case of fracture by muscular action—are stated to arise from the same causes, might, we consider, have been treated in connection with the same injuries of the upper jaw.

Fractures in both jaws, though seldom extending beyond the alveolar portions, are not very uncommon occurrences in the hands of skilful as well as in the hands of the unskilful dentist, though not, of course, in the same proportion. Since the abandonment of the key they are less common and less severe than formerly. The enormous power given by such an instrument to the operator, combined with the fact that the force, as applied, could not be varied in direction, whatever the

¹ *1 Injuries and Diseases of the Jaws.* Jacksonian Prize Essay of the College of Surgeons of England. Second Edition. By CHRISTOPHER HEATH, F.R.C.S.

2. Tumours of the Jaw. Article in 'Holmes's System of Surgery.' Second Edition. By G. D. POLLOCK, F.R.C.S.

3. Surgical Diseases connected with the Teeth. Article in 'Holmes's System of Surgery.' Second Edition. By JAMES A. SALTER, M.B., F.R.S.

4. On some of the Difficulties and Accidents which Happen in the Practice of Dental Surgery. 'Transactions of Odontological Society,' April 3rd, 1871. By W. A. N. CATLIN, F.R.C.S.

5. Cystic Tumour of the Jaws. 'St. Bartholomew's Hospital Reports,' 1871. By A. COLEMAN, F.R.C.S.

resistance, often led to disastrous consequences. The forceps cannot be wielded with such power as the key, and as the force applied can be varied the resistance is overcome in its weakest direction; still incautious use of these may be attended with unpleasant consequences, even in skilful hands, and where every precaution is used, the form of the tooth may be such as to baffle removal without fracture of the alveolar process. The plates illustrating Mr. Cattlin's paper "on some of the difficulties and accidents which happen in the practice of dental surgery" show how impossible it would be to remove some of the teeth therein figured without such a result. "By hook and by crook," says this writer, "nature has entered strong protests against the unsurgical practice of dislocating one osseous organ from another."

Many cases of fracture of the tuberosity of the superior maxilla have occurred in attempting to remove wisdom teeth or roots by the elevator; the force thus applied is directed backwards in the weakest direction of the bone. Mr. Cattlin mentions one case where a portion of the internal pterygoid plate was removed, including the hamular process, causing deafness on the injured side supporting the recent view given of the true office of the constrictor palati muscles.

Fractures of the lower jaw in the body of the bone, at least, are, owing to the thinness of its internal covering, almost always compound; the ramus, being more protected by muscles and other structures, is less frequently so. This form of injury in the mouth is not so serious in its consequences as are the compound fractures of limbs, notwithstanding the complication of the almost impossibility of keeping the parts in a perfect state of rest. The smaller exposure to air in the case of the mouth, with probably some protective influence derived from the saliva, may be the explanation of the fact.

Necrosis, to some extent, is not, however, an uncommon result of such injuries. Owing to the direction of the muscles which are attached to and act upon the lower jaw, considerable displacement of the fragments is apt to take place, and no small amount of ingenuity has been exhibited in devising means for keeping them *in situ*, from the simple four-tail bandage to the drilling and insertion of wire ligatures into the bone itself. This latter proceeding can now be more generally dispensed with, as the application of inter-dental splints where the teeth are present and firm is better understood and more effectually carried out. To these latter may also be connected appliances which obtain a purchase on other portions of the head and chin. These, with the mode of their application, are clearly figured and described by Mr. Heath.

Fracture of the coronoid process is a rare accident, and is said never to unite (Sansom). A case once came under our notice where such a fracture, including a small portion of the body of the bone containing the wisdom tooth, had resulted from a blow. The patient, a female, was in the act of alighting from an omnibus, when her dress (crinoline) got entangled in the step; the vehicle being in motion, she fell, striking that side of her face with violence against the kerb-stone. Her impression was that she had only loosened one of her teeth, and this appeared to be the case until upon moving it the coronoid process was seen to move with it. The fragment was much displaced by the action of the temporal muscle, and attempts to bring it into position proved unavailing. After the lapse of some weeks the fragment was found to be getting much more into place, and when the patient was last seen but little displacement or movement could be detected. The most severe forms of fracture of the lower jaw occur from gunshot wounds, wheels of vehicles passing over the face, and kicks from horses, in all which there is frequently the complication of external wounds as well.

In the upper jaw fractures are less common than in the lower, and when severe other contiguous bones are commonly involved. Mr. Heath points out, and this fully accords with our experience, that it is inadvisable to remove fragments of the upper jaw when loose, as union in this bone takes place with wonderful facility. We recently met with a case in which a large fragment, which had been fractured and misplaced for several weeks, was forced some distance with the teeth it contained into its proper position, and there soon formed a good union.

Gunshot injuries of the jaws are among the most formidable that can occur to this region of the body, and the hideous deformities they leave are such as must stimulate the surgeon to unwonted efforts for their relief. Where much injury has occurred to the cheeks and lips, one of the most distressing symptoms is that of the continual flow of saliva from the mouth. In such cases plastic surgery may often do much to relieve; for the deformities too little, we think, has been accomplished. The various masks and appliances we have seen fall far short, in our opinion, of what might be accomplished; the difficulties are, we know, very great, even in so simple a case as a false nose, to accurately represent the colour of the skin by art was a work of great labour at the hands of an experienced artist, and when fair success had been attained any flushing, or the reverse, upon the part of the individual caused a perceptible contrast in colour with the appliance.

In speaking of inflammation of the lower jaw, in connection

with unsound teeth, Mr. Heath has been led to believe that the swelling often seen on the outer surface of the bone, in front of the tooth, is caused by the distension of the thinner outer plate, consequent upon effusion into the cancellous structure of the tissue. That such may rarely be the case we are not prepared to deny, but we cannot admit that the swellings, so common in the practice of the dentist, are of this character; not unfrequently they make their appearance in the course of a few hours, commonly they are longer in formation, frequently even in the rapid cases they occur without pain. On making a free incision into them they give evidence that they are not osseous enlargements, but most probably subperiosteal effusions. Distension of the bone by pressure, as described by Mr. Heath, could only be attended with most acute pain, whereas abundant observation has led us to know that these affections are as commonly painless as painful in their development. That this effusion should become organised into fibrous tissue and be the common cause for the formation of fibrous tumour of the jaw is wholly at variance with our experience in the matter; we make no exaggeration when we say we have seen thousands of cases such as Mr. Heath describes, but have never seen one which, in our opinion, has proved the origin of fibrous tumour of the jaws: the majority of them, if not interfered with, result in, not fibrous tumour, but alveolar abscess, the subject next spoken of by this writer, and which we may here consider.

Alveolar abscess, Mr. Salter tells us, has not been, especially in its commonest form of gumboil, generally understood; and then, in terms hardly in accordance with that employed by most of the writers in 'Holmes's System of Surgery,' speaks of its development, first consisting of a deposit of organisable lymph around the extremity of the fang or fangs of the tooth, which is soon differentiated into obscure fibrous tissue; coincident with which development corresponding absorption of the jaw ensues. "Thus far the change is simply one of plastic inflammation. When suppuration ensues it is found in immediate contact with the fang of the tooth—the bare naked *crusta petrosa*, and surrounded by the half organised lymph as a sac." The forms the sac may assume are minutely described. The rapid distension of the sac is accompanied by absorption of the surrounding bone until "the periosteum, with the organised lymph that has been the seat of the suppuration, alone remaining as the membranous sac of the abscess." We do not think that a special pathology is necessary to account for or explain the nature of alveolar abscess. We should feel inclined to regard it as similar in origin and progress to any case in which irritating matter or material is introduced into or amongst the

tissues of the body. A necrosed or partially necrosed tooth may readily become such a source of irritation; it is more difficult to understand why in all cases it does not become so, and thereby cause a stasis in the blood-vessels of the periosteum or other contiguous tissues, the result of which will be exudation of liquor sanguinis with migration of the white blood-corpuscles, which, with perhaps the surrounding connective tissue cells, proliferate into pus-cells or develop imperfectly into a tissue more remote from the centre of suppuration, forming a sort of boundary,—*the sac* to the abscess. Occasionally, when small and existing wholly in the periosteum of a tooth, the abscess may be removed with the tooth, but many of the cases shown to us as abscesses removed with teeth have proved to be small cysts common in connection with diseased teeth.

For the treatment of alveolar abscess we would rather refer the inquirer to Mr. Heath than to the writer last named. The advice of the former is very sound, and better cannot be suggested.

Necrosis of the jaws, as a result of alveolar abscess, considering the frequency of the latter, is rare. With respect to its production from phosphorus and eruptive fevers some original views are put forth by Mr. Salter. He believes that both these agencies bring about their result in much the same way. In the case of phosphorus—

“It is the poisoning of the tooth-pulp that is the essence of the disease; the severe combinations of bone affection which give all the importance to the malady are but contingent and secondary consequences. It is this fact in the essential nature of the disease that links it (as I think) to that other form of maxillary necrosis which occurs in children after attacks of the eruptive fevers, only that whereas in the phosphorus disease the poison is applied to the tooth from an extraneous source—from without—in the jaw-necrosis of eruptive fevers the poison is generated within, and alights upon the teeth and tooth-pulps by virtue of their being dermal organs, members of the tegumentary system, upon which system generally the eruptive fever-poisons spend their chief destructive force.”

When speaking of exanthematous jaw-necrosis,—a form of necrosis which Mr. Salter believes he was the first to recognise,—reference is made to the fact that it usually occurs with most severity at the period of life when the jaw-bones are the seat of intense developmental nutrition in the formation of the teeth, and are amongst the most vascular parts of the body; also when the permanent teeth are not by any means in a low state of vitality; and that when the sequestrum separates it almost always includes that portion of the bone containing the

developing permanent teeth, but rarely other portions. The view of the connection of the two diseases is, of course, based upon the presumption that phosphorus disease must occur through the medium of a carious tooth. Should that disease have really occurred in a child of only six weeks of age, the views put forward can hardly be maintained. In his (Mr. Salter's) experience scarlatina is the most potent cause of this form of necrosis, next measles, and then smallpox. In speaking of the repair to the lower jaw after exfoliation the same writer points out the interesting but not encouraging fact that it is but temporary, becoming after a time absorbed, and he raises the important question how far this may be due to want of use, and what might be the effect of supplying it with a function through the means of artificial teeth.

Suppuration in the antrum is not a very frequent disease. Its causes are necrosis of some portion of its walls, irritation produced by diseased teeth, and probably, though rarely, a diseased condition of its lining membrane. Some have attributed its cause to food finding its way into that cavity through openings existing between it and the mouth, but we have seen several such openings without any suppuration as a consequence. Many cases presumed to be abscess of the antrum are, in reality, cysts of the jaw, which have evacuated their serous contents and have then suppurated, an error into which, we cannot help thinking, Mr. Salter has fallen when treating of this complaint. We have seen many cases of cystic tumour which, after more than one evacuation of serous fluid, have increased rapidly in size, and upon a fresh puncture have evacuated a large quantity of well-formed pus. This seems to us a more probable explanation of those cases where it has been presumed that the opening into the middle meatus nasi has become closed in consequence of the swelling and turgescence of the mucous membrane, and has resisted a force which has distended the walls of the antrum in every direction. In all the cases of abscess or empyema of the antrum which we could directly trace to the causes we have enumerated there was no closing up of the antrum, but pus flowed freely into the nostril.

Cystic tumour of the upper jaw is a more common disease than is usually supposed, and is, in the large majority of cases, dependent upon diseased teeth. Mr. Heath gives illustrations of small cysts which have been removed attached to the fangs or the periosteum of teeth, and which, as we have before remarked, were generally regarded by dentists as small abscesses. These may increase in size until they greatly distend their bony surroundings, causing much deformity to the face, closure of the nostril of that side, depression of the palate, and uplifting

of the floor of the orbit; but commonly before such serious conditions are arrived at they have so distended their outer wall that they effect spontaneous evacuation. Such was, no doubt, the true nature of a disease long described as *hydrops antrii*, and supposed to arise from occlusion of the foramen Hymori with collection of fluid secreted by the walls of the antrum. Giraldès, in 1853, first pointed out the true nature of this affection, and his paper, the Montyon Prize of that year, has apparently been overlooked by Mr. Coleman, who is under the impression that he first showed in 1862 that *hydrops antrii* was really cystic disease of the upper jaw. Mr. Coleman, however, differs from Giraldès in attributing more generally the cause of the disease to defective teeth, and points to the fact, noticed by Paget and others, that the cysts do not generally occupy the antrum, but a distinct space caused by distension of its outer wall—enlargement he believes of the small bony canals through which the nerves and blood-vessels make their way to the alveoli of the upper jaws. The treatment laid down by this writer is simpler than that generally insisted upon. After describing three typical cases, he sums up thus:

“I need not comment further upon the treatment of these three typical cases than to observe that the following rules may be adopted. If the disease be traced to a tooth, if that tooth, though diseased, be capable of being saved, we should open the tumour above it, and by suitable means promote suppuration of the cyst, which will end in a cure. If the disease be connected with a useless tooth or root, we should remove either and cause the tumour to suppurate through the alveolus. Should the cyst come away with the tooth we may congratulate ourselves and the patient that the best thing for the credit of the former and the best thing for the comfort of the latter has happened.”

The cysts described by Mr. Coleman are always, we believe, unilocular, but multilocular cysts do occur in the actual cavity of the antrum, and are then never, we believe, connected with diseased teeth, but have their origin, as Giraldès supposes, in the mucous glands of its lining membrane. Cysts of the lower jaw, though less frequent in occurrence than in the upper jaw, are generally more formidable in character; they have often, though perhaps less frequently, a dental origin.

Dentigerous cysts, or cysts having their origin in connection with undeveloped teeth, have long been recognised as a class of tumours difficult of diagnosis. The explanation given by Mr. Tomes and accepted by Mr. Heath and Mr. Salter is, no doubt, the most satisfactory. When a tooth is about to be erupted, if a probe be passed through an opening leading to its crown, it

will be found that the enamel is quite free from its surrounding covering. Occasionally, when a tooth is so misplaced or otherwise obstructed that it cannot be erupted, serous fluid is, from some cause at present unknown, secreted into this space; a cystic tumour is thus formed into which the tooth sometimes falls, or at other times is found with its crown projecting. Tumours from misplaced teeth are not unfrequently overlooked; we have heard of cases where long-standing supposed jaw disease was found to be due to an impacted dens sapientis, the removal of which effected a cure. Animals occasionally suffer from dentigerous cysts, as do they likewise from the rare but interesting tumours now termed odontomes. These are divided by M. Broca, who has recently studied and described them, into several classes. Some present the form of outgrowths from the pulps or fangs of teeth, whilst others consist of shapeless masses, which occupy in the jaws, usually the lower, the place of one or more teeth. Sections of these tumours reveal their true dentinal nature, being composed of the tissues which enter into the structure of the teeth, at least the last named, which contain as well as dentine and cementum, found in the former, also enamel. These structures are not arranged with any apparent uniformity, but are mixed together in confusion. Their origin is, doubtless, from abnormal conditions in a developing tooth germ or tooth germs, and their existence is less difficult to understand upon the modern researches of Kölliker and Waldeyer on the development of the teeth, than it would be upon those of Arnold and Goodsir.

We now pass on to the consideration of diseases of the gums, and are somewhat surprised to find no mention made by Mr. Heath of one which, though of an undoubtedly constitutional origin, almost invariably first shows itself in this structure. Ulcerative stomatitis is by no means an insignificant complaint whether we regard the trouble it produces at the time, or its consequences; necrosis with exfoliation of considerable portions of the jaw may be the result of the disease when left unchecked by remedies; and as it usually makes its appearance at an age when the permanent teeth are developing, they not unfrequently come away in the sequestrum. Another disastrous consequence of the disease is the formation of cicatrices which bind the cheek to the jaw, but seldom to the same extent as occurs after the exanthematous fevers as described by Mr. Salter. Chlorate of potash is, as is generally known, an unfailing remedy in the early stage of the disease, yet it cannot prevent necrosis if it have much advanced.

Hypertrophy of the gum is treated of both by Mr. Heath and Mr. Salter. It is not a common affection. When it consists of

hypertrophy of all the tissues which enter into the structure of this portion of body and likewise of the alveolar process, excision is the remedy, and it appears to be free from liability to any return of the disease. When the hypertrophy consists chiefly of the vascular and epithelial portions of the mucous membrane it constitutes that hyperæmic condition formerly called scurvy of the gums; irritation from salivary calculus, and the absence of a proper stimulus, from want of healthy friction, are the causes which produce it. A somewhat similar condition is produced by the irritation of the ragged edge of a carious tooth in contact with the gums, though here it generally assumes the character of a small tumour of polypoid form; the removal of the source of irritation followed by the use of strong astringents, may be found at once successful, but sometimes the disease proves very intractable.

Vascular tumours of the gums are rare. Mr. Salter describes one apparently arterial in character, which after failure in attempts at removal by ligature was finally excised together with some portion of the subjacent bone, after which it did not return. We once saw a case which had been excised three times before it was operated on by the late Sir W. Lawrence. It consisted chiefly of a mass of dilated veins supported by a loose connective tissue. It occupied the region where such growths are according to Mr. Salter, most commonly found, viz. the front of the upper jaw, but it also encroached somewhat upon the palatal portion, having pressed the incisors apart from each other. The tumour when removed by the knife, presented, as is usual with such growths, little distinctive of itself. After the excision Sir W. Lawrence thoroughly cauterised the surface of the bone with the actual cautery. The front teeth were preserved, and no return of the disease was perceptible some months afterwards.

Papillary tumour of the gum is a rare form of tumour, having almost hair-like processes developed from it, composed of the mucous membrane; they have been fully described by Mr. Salter in the 'Guy's Hospital Reports.'

Fibrous tumours occurring in the region we are now considering are by no means uncommon, and have received the ill-defined name of epulis. They appear to arise undoubtedly from the periosteum of the jaw or that of a tooth—the periodontal membrane,—and to be consequent upon irritation of some kind, that of a diseased tooth or fang being very common. They differ little in structure from fibrous tumours found in other parts of the body. In speaking of myeloid tumours occupying the same region both Mr. Heath and Mr. Salter adopt the view that they are simply a variety of the above. Mr. Heath looks upon them as the softer and more vascular form.

Mr. Salter goes somewhat farther and believes that all the former will yield upon careful examination the cells which are characteristic of, and have given name to the latter. Without venturing to dispute the fact that many, perhaps most of the fibrous form of epulis, may give origin to brood-cells, yet we think there are some which will not be found to do so. These would have a distinctly periosteal origin, whilst the others would have a mixed origin, *i. e.* endosteal and periosteal. Some, again, probably have a purely endosteal origin; in such the fibrous element may be said to be entirely absent, a loose connective tissue supporting the vessels, cells, and osteoblasts. Ossification of some portions of each of the varieties do occur, but, as we should expect, it is found more commonly in the latter variety.

Free excision of these growths is the treatment laid down by all surgeons who have had experience in the matter. Yet this treatment cannot be known amongst the profession at large, for of those who present themselves at hospitals for relief most, we find, have had their removal attempted by astringent lotions or escharotics. When their removal by the knife has been attempted, this too has been done too sparingly in many cases, and the result has been a return of the disease, always alarming to a patient, and rendering a second operation more difficult and more severe. The rules laid down by Mr. Heath cannot be improved upon. Free excision of the growth, with careful scraping of the subjacent bone, or, at all events, destruction of its surface by the actual cautery or the strongest escharotics, is the proper treatment. Should the growth be of the myeloid variety. We would recommend dealing with it still more freely, as having probably a deeper origin of growth, and the bone forceps, seldom necessary in the fibrous variety, may be here employed with advantage. We have reason to believe that some of the myeloid tumours classed as malignant have owed their return to an imperfectly performed operation in the first instance. Mr. Salter thinks that when teeth are in close proximity to the tumour attempts may be made to preserve them; but as he admits the great prospect of the growth returning, we think that, under the circumstances, the general rule of removing them had best be carried out in the first instance.

Tumours of the jaw proper, in contradistinction to those we have already noticed, occupy a very considerable portion of Mr. Heath's work, and as they are described separately in each jaw unnecessary space has, as we have before hinted, been sacrificed. A large number of very interesting cases occurring in the practice of this writer together with many copied from the works of others are introduced, but we think the one hundred pages thus occupied might have been reduced, without any detriment

to the work, to nearly half that number, as but little fresh light is thrown either upon the origin of their growth, their nature, or their treatment. A useful table, showing the relative frequency of these diseases, collected by O. Webber, is introduced, in which, as pointed out by Mr. Heath, the number of carcinomatous tumours enumerated are probably in excess of what they ought to be; an opinion we believe and trust is correct, as they occupy more than one third of the whole.

In speaking of fibrous tumours of the upper jaw Mr. Heath introduces the views of M. Broca, contained in his 'Traité des Tumeurs,' viz. that many of the cases of fibrous and fibro-cellular tumour depend upon the growth of a tooth-germ. Such are his—Broca's—*odontomes embro-plastiques*, which resemble in every respect ordinary fibrous tumours, but are always encysted, and occur only in young subjects and before the last tooth is formed. Mr. Heath mentions a case which he thinks bears upon the subject, but with the exception of the tumour being readily enucleated the facts mentioned cannot be said to support the views of M. Broca. Mr. Heath's patient was a young married lady, and must have been a very young married one if the last of her teeth had not been formed.

In treating upon the same subject Mr. Pollock points out that, whilst in the lower jaw the diagnosis of the origin of fibrous tumour is very easy, the tumour being usually a globular mass and circumscribed, this is not so in the upper, owing to a more lobulated form and tendency of the morbid growth to insinuate itself into the various cavities at the base of the skull. He recommends early removal, but points out that in some cases a return will occur.

Cancerous diseases of the jaws, more common in the upper than in the lower, are by far most frequently of the medullary form. In looking through the information and cases given by Mr. Heath we find little to encourage us to hope that we are at present at all nearer to the solution of the question as to whether such diseases will ever be treated successfully. Moreover there is little to support the views recently brought under our notice by Mr. De Morgan, that carcinoma is less of a constitutional disease than has hitherto been supposed, and that very early operation may be attended with permanent success. In the lower jaw, from its isolated position, we might have hoped for some encouragement for such views, and here, perhaps, we do meet with a little, as operations appear to have been attended with rather more success in this region than in many other parts of the body. Mr. Heath seems in favour of operating generally in cases of malignant disease of the jaw. Mr. Pollock, speaking very doubtfully upon the subject, says—

“ After all, it will be found that much discrimination is required on the part of the surgeon who has to decide upon the removal of a cancerous growth of the jaws, and so much depends upon the individual features of each case that it would be entirely out of the question to attempt a strict code of directions relative to treatment. At best, however, interference by operation is, in the large number of cases, most unsatisfactory ; in the few we hope some benefit is conferred.”

Closure of the jaw from cicatrices is commonly the result of exanthematous disease, which also produces the necrosis to which Mr. Salter believes he first directed attention. In some cases it is caused by a simple binding of the cheek to the jaw, mucous membrane to mucous membrane, caused by ulceration resulting from a fang of a temporary tooth projecting into the cheek ; such cases are slight and never call for operative interference. Ulcerative stomatitis produces a more severe form, not only binding the cheek to the jaw, but often uniting the two jaws by a band of unyielding fibrous tissue ; but even these cases do not often call for surgical interference. After the exanthemata and especially when the patient has survived that severe disease, cancrum oris, when exfoliation of bone has taken place, the jaws and cheeks often become bound together either by strong cicatrices of a cartilaginous firmness or by actual ridges of bone. The operations for their relief are difficult and not often very satisfactory ; simple removal of the cicatrix gives but temporary relief, its place being supplied by another equally unyielding. When bony union occurs it is often impossible to remove it, and here Esmarck's operation, *i. e.* section of the lower jaw in front of the bony union and formation of a false joint, has proved of service. When the union is not osseous and the cicatrices can be freely divided from their attachments to the upper and lower jaws, the most promising method consists in adapting to the jaws thus freed metal plates, as first attempted by Mr. Clendon, which cap the teeth and have shields covering the gum to an extent to prevent union between the gum and cheeks taking place. Between the capped surface of the plates wedges of wood or vulcanized rubber can be introduced to separate the jaws. The process is a very painful one to the patient, but, perhaps, is not much more severe than in cases we have frequently seen, where the sharp edge of a plate carrying artificial teeth has cut into the mucous membrane to the depth of a quarter or even the third of an inch, and which has eventually formed a sulcus of mucous membrane. A practical dentist such as the late Mr. Clendon, was no doubt led from a consideration of such cases to devise the useful appliances he introduced in Mr. Holt's case.

III.—*Handbook of Law and Lunacy.*¹

REGARDING the legal aspects of insanity, and the laws and regulations laid down to guide medical men in their relations with lunatics and receptacles for lunatics, there has certainly been, in past time, much deficient information; and in consequence thereof pains and penalties, abuse and satire, have been, ever and anon, launched against the members of our profession, and not without indications of much concurrence on the part of the public. However, within a very recent period several authors have been stirred up to write on the subject of the laws relating to medicine and medical men, amongst which the lunacy laws and the regulations of public boards relative to lunatics have had their place.

In recent numbers of this Review we have had occasion to call attention to the appearance of two very complete manuals of the laws affecting medical men, by Mr. Weightman and Mr. Glenn, both barristers of experience, well versed in law. In each of these works the lunacy laws received a very large share of attention, and in Mr. Weightman's book the text of the several Acts of Parliament was duly set forth. Moreover, in our number for April last we reviewed a treatise on the 'Jurisprudence of Insanity,' by Mr. Balfour Browne, one of the joint authors of the volume now before us, in which some of the same topics were treated as enter in the subject-matter of this new production.

With this amount of recent literature within their reach, it may be presumed that medical men are now thoroughly furnished against all the embarrassing contingencies which may befall them in any dealings they may have with lunatics, lunatic asylums, or lunacy trials and commissions.

We have said that, with regard to the present treatise, Mr. Browne is a joint author, being associated with Dr. Sabben, who is one of the craft of the now euphoniously (?) called psychiatrists,—the mad-doctors of olden time. This association of law and physic bodes well in the production of a 'Handbook of Law and Lunacy,' for the lawyer must be supposed to be learned in the law, and the doctor cognisant of the sort of legal and other information wanted by medical men. We particularly look for such a qualification from Dr. Sabben, since he is connected with the management of an asylum, and conversant with the circumstances surrounding lunatics in all their legal and medico-legal relations.

¹ *Handbook of Law and Lunacy; or, the Medical Practitioner's Complete Guide in all Matters relating to Lunacy Practice.* By J. T. SABBEN, M.D., and J. H. BALFOUR BROWNE, Barrister-at-Law. London, 1872, pp. 138.

The result of the joint labours of these two gentlemen is a book of no great dimensions, but well filled with most useful instructions and advice. We cannot, indeed, say that it comes up to the standard we might expect, nor can we commend all its teachings in all points, or its writing in matter of style. With reference to the last, there is too much of what the Americans call "tall" writing and an affectation of learning. Chapter II contains much of this sort of thing in the description of the course to be taken in examining an alleged lunatic. The directions about testing the memory, to note its "conservative faculty," its "reproductive energy," and its "elaborative faculty," will to many a plain practitioner read very elaborate, but unnecessarily magniloquent. Nor to such a one will the phrases "appetite for muscular activity," "appetite for light and heat," "denudification," "prescient and prophetic dreams," "æsthetical imaginations," &c., be felt to convey more clear notions than the commonplace English phrases and words that could well replace them.

The chapter on the "Removal of Insane Persons to Asylums" is replete with useful hints and directions, which, if attended to, will save the reader many annoyances, particularly in giving certificates of lunacy, a matter in which there is too often an immense amount of bungling. Examples are given of certificates filled up, and illustrative of the sort of statements required for each leading variety of insanity. It may be noted that in every case it is assumed that the alleged lunatic is communicative, and replies to questions addressed to him. This, however, is not the case, for now and then a patient remains doggedly silent, and it is impossible to convict him out of his own mouth of harbouring delusions. In such instances the obstinate taciturnity is rightly adjudged as evidence of unsound mind, to be confirmed by the testimony of others as to facts observed or remarks heard.

In the course of the next chapter, on "Commissions in Lunacy," when commenting on the differences obtaining between an affidavit and a certificate of lunacy, it is laid down as the law of the case that the information sworn to in the former document may have been "obtained at any number of previous interviews or gathered from an intercourse extending over years, . . . while all the facts that are stated in a certificate must have been observed, and all information quoted must have been obtained, upon the same day upon which the certificate is signed." This rigid ruling is new to us, and seems to strain unnecessarily the intent of the law. For, surely, the history of a case from personal observation, the narration of facts known to the individual certifying occurring at a period more or less

antecedent, but constituting part of the selfsame malady as that still existing, are as essential ingredients in the elaboration of a certificate of lunacy as are the results of observations made during the short interview immediately upon or after which such a certificate is written out. We fear that many a certificate would have to be rejected as unsatisfactory were this rigid rule enforced—that all the facts stated in them must be observed on the selfsame day as they are written—for in not a few cases facts of the sort needed are not obtainable at a single interview.

The “Visitation of Lunatics by Medical Men” forms the topic of the fifth chapter. We do not observe that the orders at times given by the Lord Chancellor to visit houses where one or more lunatics are reported to be confined are mentioned. This is a small matter, but allusion to it would seem necessary in a chapter setting forth the occasions for visitation and the authorities by whom such visitation can be ordered. We have more fault to find with some of the hints given to guide medical men in determining on the propriety of the removal of insane people to asylums. They are too sweeping and general, and if acted up to would at times inflict injury upon patients, and cause unnecessary trouble, anxiety, and cost to their relatives. They savour too much of the leaven of asylum proprietorship, keep out of view the many objections to asylum detention, and in no adequate manner recognise the possibility of good supervision and treatment outside the walls of special institutions. We cannot subscribe to the statement “that there are comparatively few lunatics who are suitable either for detention in a private house, not an asylum, or a workhouse. Great caution must be observed in detaining in such residences even cases which are deemed chronic and harmless, because the experience of asylums constantly shows that altogether unprecedented acts of violence or self-mutilation are not unfrequently committed by such patients.” If such be the experience of asylums it is certainly not an argument in favour of their great comparative advantage to such cases. It rather shows how ineffective those institutions are when difficulties arise. Moreover, as far as experience can be appealed to, and in the absence of authorised returns, disagreeable and painful casualties are rarely heard of in the case of the very many single lunatics boarded in private houses. On the contrary, the question may be started if accidents and misfortunes are as common, proportionately, in private dwellings as in licensed houses and lunatic asylums. Judging from the ‘Reports of the Scottish Commissioners in Lunacy,’ no small number of insane people may, with advantage to themselves and others, be placed in

private houses. And it may be propounded, as a problem yet to be solved, whether the prevalent segregation of the insane in specially built and organized edifices is not, to a greater or less extent, a mistake. We, at least, hold it to be so in regard to many lunatics for whom we would claim the solace and benefits of "family life."

The authors, again, not only indicate the class of insane to be secluded in asylums, but also lay down some structural and other conditions to be looked for in those establishments; and, speaking of workhouses, they, to our astonishment, put down as a requisite "500 cubic feet of space by night, and 40 superficial feet of floor space by day," for each inmate. This latter demand certainly seems extravagant, if it is intended to apply to sitting or day rooms, for it would involve the construction of a room 20 feet by 16 feet for every eight patients. We observe that the same requirement is advanced with reference to licensed houses, but apprehend that few such houses possess such spacious lodging.

There are some minor points in this chapter relating to internal organization and management which we proposed to have criticised, but we feel called upon to spare our pages and to restrict our remarks to the contents of the concluding chapter, entitled "Medical Men in Court." This is intended to instruct medical men how to comport themselves as witnesses, and so far as its instructions go they are, in general, useful; at the same time, we regard the chapter as superficial, and in parts open to objection. The system that "encourages barristers to baffle and confuse medical witnesses" is apologetically spoken of as one calculated to enable "a counsel to become possessed of the best knowledge of a subject which it is in his power to secure." To secure the acquisition of such knowledge is assuredly a right object, but to baffle and confuse a witness is not the road to attain it, but the reverse; and the fact is sufficiently notorious that a counsel is content to play the part of an advocate on one side or other, to bring prominently out points that may suit his purpose, to slur or to keep back others that militate against it, and to secure the ear of the jury by any little manœuvre that can be practised at the cost of the witness.

In our conception, likewise, of a medical witness's duty an erroneous and mischievous lesson lurks in the following paragraph:—"Their own ability and the acumen of the counsel will enable them to make the best of the circumstances of any case." What has a medical witness to do with making the best of a case? He is engaged and sworn to testify to facts, and not to act as an advocate. He may be asked for an opinion, but such opinion is presumably based on scientific observation and ex-

perience, and knows nothing of gain or loss to any party seeking it. Indeed, we are pleased to read further on teaching to this effect, but if we rightly interpret the paragraph quoted, such teaching is hardly in unison with it.

The authors rightly caution medical men against the use of technical words.

“Such words (they write) as dementia, monomania, puerperal insanity, are of the greatest use in medical practice, and among medical men their use is understood and appreciated. In courts of law, however, it is well to avoid the use of all such words, and if it is necessary to refer to the kind of disease to do so by a description.”

As a general rule, we are prepared to accept this advice, but sorry should we be to employ the periphrasis suggested, and, above all, that for dementia, which we are instructed to say is “a kind of disease which is characterised by a deterioration of mental power incidental to old age, and distinguished from dotage by the fact of diseased changes in the structure, which medical men call dementia.” We would not like to be called upon to unfold the grammatical construction of this paragraph, but if we might escape this difficulty, what would be our lot under the “baffling and confusing” cross-examination of some such an expert in the art as Mr. Huddleston, to define and limit the condition of dotage, to prove the absence of diseased changes therein, and the presence and sort of changes in what medical men call dementia, and to define accurately what we meant by “diseased changes in the structure.” If counsel only could be baffled and confused by definition, the one referred to is excellently calculated to secure that end; but barristers, unluckily, are not prone to such weakness. We commend the subject to the reconsideration of the joint authors.

We might here have appropriately closed our critique of this volume, but some comments it contains on the merits of modern treatises on insanity are sufficiently remarkable, by their freedom of criticism, to call for notice. At p. 91 the authors write, in Scottish idiom—

“We would feel that we would do a service to all classes of medical men, if we could recommend a work upon insanity and its treatment to supply that information which the purpose of this work prevents us supplying in this place. But the recent works which have dealt with the treatment of insanity have been so eminently unsatisfactory, have been so markedly characterised by ignorance and febleness, that we refrain from misleading our readers by the mention of works which could do nothing to assist them in any difficulty, and which would inevitably cause difficulty and uncertainty where none existed in fact.”

We have not the remotest interest in any work on the treatment of insanity, but we marvel at such wide-reaching, rash criticism on the part of two young and, as yet, little-known writers; and we regret the bad taste and self-satisfaction betrayed by the remark that only by reason of the character of their present work are they prevented supplying the public with that valuable instruction which some hitherto considered great psychiatrists, having a world-wide reputation, have sought to impart—but, as our authors assert, in vain, ignorantly and feebly—to the confusion of their readers. It will be to the credit of Mr. Browne and Dr. Sabben to cancel the page as it stands, and to content themselves with a milder measure of censure upon the imperfections of writers on the treatment of insanity.

IV.—Pathology of Gout.¹

“NOTWITHSTANDING the pretensions of modern medicine,” says Trousseau, “we have made no advances, since the time of Sydenham, in our knowledge of the treatment, phenomena, and special nature of gout.” Paradoxical as this affirmation seems, we suspect that the number of physicians who would acquiesce in it with but small reservation is on the increase. There are signs that the simple and restricted uric-acid theory of gout is losing its hold on medical opinion, and if we cease to regard it as a satisfactory explanation of all the phenomena of the disease, we have little in the way of hypothesis intervening between us and the “weakened concoction both of the solids and fluids,” “weakness of the spirits,” and “peccant matter,” of Sydenham. Indeed, if for “weakened concoction” we read “imperfect digestion and assimilation,” for “weakness of the spirits” “deficient innervation,” and for “peccant matter”—which, it must be remembered, Sydenham surmises is the same morbid material which forms the stone in the kidneys—we read “urate of soda,” and thus, in fact, as Trousseau suggests, translate the opinions of the English Hippocrates into modern scientific language, we shall be forced to confess that the last two hundred years have seen but little advance in our acquaintance with one of the earliest recognised and most clearly diagnosed of the diseases which afflict humanity.

¹ 1. *A Treatise on Gout, Rheumatism and the Allied Affections.* By PETER HOOD, M.D. London, pp. 417.

2. *On Gout: Lectures on Clinical Medicine.* By A. TROUSSEAU, translated by J. R. CORMACK, M.D. New Sydenham Society, 1871.

3. *Lecture on Gout.* By W. CHARCOT. ‘Med. Times and Gazette,’ 1867.

Gout, familiar as it appears to be to English physician, is by no means so widely spread a disease as formerly. On the Continent of Europe, as was pointed out a few years ago by M. Charcot, it seems to be disappearing. It still lingers, he says, in the British islands, but principally in England, and especially in the British metropolis. Gout is a disease of civilisation, but of imperfect civilisation. No reader of the classics will doubt that it was much more commonly observed in ancient Rome than in modern London, and many of the seniors of the present generation even will tell us that in their early days they were witnesses of more instances of martyrdoms to gout in a twelve-month than they now see in a decenniad.

In the present day, says M. Charcot, gout is seldom met with in Rome or in Constantinople. Contrast this fact with the indications of its universal prevalence in the older eastern and western civilisations of Europe, indications which are to be found, not merely in the writings of physicians, but in what we may call the current literature of classic Rome, in satires and poems, and more convincingly still in legal enactments. That disease must have been a prevalent one of which the frequent occurrence induced the Emperor Diocletian in the third century to publish an edict releasing all his gouty subjects from public offices when their joints had become so deformed as to render them incapable of performing ordinary duties. In the earlier ages of Greek and Roman civilisation it is evident that, as amongst ourselves, before the era of great brewers, gout was the disease of the high-born and luxurious male population. No observation has been more frequently quoted than the Hippocratic, that women and eunuchs, who were, as a rule, slaves, are not subject to gout. But Seneca cites it as a proof of the monstrous depravity of his age that the women, by the luxury and excess of their lives, had become subject to the disease, and Galen, in his 'Commentary on Hippocrates,' states that in his time the statement with regard to eunuchs was no longer true. Whether or not the ancients, like some modern sufferers, found consolation in the reflection that gout was associated with wit and wealth it may not be easy to determine, but it is a curious fact that gout amongst the Greeks was considered to be specially bred in the highest seat of intellectual development and refinement—Attica.

"*Atthide tentatur gressus.*"

A good history of gout in Europe would be a very valuable contribution to historical medicine. The limits of a review would not suffice to trace it, but we may remark that the light which the history and geographical distribution of gout are capable of

throwing upon its etiology and pathology has been hitherto quite neglected by English writers. The influence of the adoption of a great preponderance of meat, to the comparative exclusion of fish, in the diet of the higher and middle classes in this country, after the Protestant reformation, not only upon the prevalence of gout, but upon the public health generally, is a subject well worthy investigation did the necessary materials exist. The effect also of the invention of porter, in 1722, upon the health of the artisan classes of London, and the presumed consequent development of a gouty diathesis amongst them, with which metropolitan practitioners are now familiar, is a matter which might repay examination. Again, the influence of lead in the causation of gout amongst London plumbers is a subject which has been worked out with great zeal by Dr. Garrod. It would be interesting to know in what proportion of cases of lead poisoning amongst the Devonshire and Herefordshire peasantry, arising from contaminated cider, gouty symptoms were observed. The Devonshire peasant does not eat meat frequently, and drinks no porter or ale; the occurrence of gout, as a sequela of lead poisoning, under such a regimen, would carry greater conviction of their alliance, as cause and effect, than the appearance of the disease in a London plumber, who, besides the lead he absorbs, probably eats a pound and a half of beefsteak and drinks a gallon of porter in a day. The fact, however, is worth notice that long before Dr. Garrod's observations several writers, Dr. Mason Good amongst others, had noticed that towards the close of an 'attack of colica pictonum' there is generally pain round the edges of the feet and at the extremities of the toes, which are often red and swollen and to appearance gouty. Dr. Fothergill, in his paper on some diseases to which painters in water-colours are subject, in the fifth volume of the 'Medical Observations and Inquiries,' directs attention to the violent pains in the feet which accompany saturnine poisoning. It is also not a little curious that an anonymous French author of the eighteenth century, writing of one of the epidemic colics of Amsterdam—that of 1730—outbreaks now known to have depended upon the impregnation of drinking water with lead derived from the lead used in the roofs of the houses,—endeavours to prove that the epidemic depended on a gouty humour.

If we were called on to receive and arrange all the theories of the cause of gout which have been promulgated we should find that they would generally and naturally fall under two heads, the clinical and the chemical. We mean by this that all original observers have either started in the investigations which have resulted in their adopting or excogitating a theory

from a study of the patient as a whole, or from an experimental examination in the laboratory of the tangible, ponderable, and visible results of his disease. It is a good feature in the book, the title of which is placed at the head of this article, that the author has endeavoured to reconcile the results of these methods of observation, and that his views of the intimate nature of gout, without, perhaps, having much pretension to originality, are novel in their grouping and combination.

Of purely clinical observers, unassisted by the help of the sciences collateral to medicine, some of the early Greek, Roman, and Arabian physicians are amongst the best examples, and it is marvellous in this disease—gout—how closely and well they noticed and inferred, comparatively, of course, with their imperfect attainments in biology. They knew perfectly well that gout is caused by excesses, by imperfect digestion, by indolence, and by retention of the natural secretions. They found in certain excrementitious humours, and the collection of these humours in the affected parts, a main link, but not the sole link, in the causation of the disease. They were familiar with the fact that these excrementitious humours concreted into tophi, and when this had taken place the cure of the disease was not to be hoped for. But, besides the excrementitious humour, they maintained there must be a local condition which predisposed to the attack. This they termed a weakness of the parts, a weakness which they believed to be dependent on imperfect nutrition, and that predisposed the joint to the reception of all the superfluities of the system. The joint might be in a state of sanguineous plethora from a defluxion of blood to the part, or the defluxion might be one of a bilious humour, or the attack might be accompanied by an effusion of phlegm, or, in modern language, of serum. These conditions would require appropriate treatment. Sanguineous defluxion, or, as we should term it, congestion, was to be met with depletion, a bilious type of attack was to be combated with purgatives and œdema, by mild evacuants. The early physicians were perfectly aware of the hereditary character of the disease. As we have before remarked in the case of Sydenham, it is surprising, when one endeavours to represent the ideas, inferences, and observations of such old writers as Paulus, Alexander, and Pëpagonenon, on the subject of gout, in modern medical language, how short a distance seems to separate us from them.²

We have hinted a suspicion that the simple and restricted uric-acid theory of gout is losing its hold on medical opinion. Not that any theory so complete in itself, so definite, or so attractive, has been offered in its place. But there is a growing belief that the uric-acid theory, although it accounts for

many, does not account for all the phenomena of the disease, that it is not in complete accord with clinical observations, and that it is of too mechanical a character to satisfy the judgment of those who have studied the disease, not merely in its ordinary and regular manifestations, but in its erratic and irregular forms. No one would for a moment doubt that an intimate relation subsists between an excess of urate of soda in the blood, a deposit of urate of soda in the joints and elsewhere, and a gouty paroxysm. But the question which we have to discuss is not one of connection, but of essence. Is the superabundance of uric acid in the blood, and its deposition as urate of soda in the parts attacked by gout, the whole sum of the disease? Does it constitute gout? Several distinguished writers before Dr. Garrod have held the affirmative answer to these questions, with greater or less clearness, but Dr. Garrod has done far more than any other writer by chemical experiment, clinical and pathological observation, and acute reasoning, to place it on a better foundation. Dr. Garrod's theory is founded on the position that in gout uric acid, in the form of urate of soda, exists in excess in the blood, both prior to and at the period of the seizure, and is essential to its production, but, as this acid does occasionally exist in large quantities in the blood without gout supervening, he admits that its presence in that fluid, although necessary to, does not explain the gouty paroxysm. The excess of uric acid in the blood he believes to depend on deficiency in the uric-acid excreting function of the kidney, and he draws an analogy between albuminuria and gout. In the former the urea-excreting function is interfered with and urea appears in the serous effusions; in the latter the uric-acid excreting function is temporarily or permanently impaired, and urate of soda is deposited in the joints. The gouty paroxysm is caused by the interstitial and crystalline deposit of urate of soda in the structures of the joint. This is the cause of the gouty inflammation and not its effect, but the inflammation of gout tends to the destruction of the urate of soda in the blood of the part, and, consequently, of the system generally. The gouty fit—in other words, the interstitial deposit and crystallisation of urate of soda—is favoured by causes which induce a less alkaline condition of blood, or which augment the uric acid, or which check the power of the kidneys to excrete it.

Now, in examining this theory of Dr. Garrod's it will strike every thinker that the diminished uric-acid excreting function of the kidney, as the first link in the chain of causation, is a pure hypothesis. On what change of structure does this diminution of function depend? It is perfectly true that gouty

kidneys are pathological entities, but kidneys which cause gout are not described by any writer on pathological anatomy with whom we are acquainted. The urea excreting function of the kidney is diminished when the structure of the gland is altered, but what is the hereditary alteration of the structure of the kidney which gives rise, at a variable period of life, to such a diminution of the uric-acid excreting function as will produce the first attack of gout? Then, again, uric acid is an excrementitious product common to the whole animal kingdom. It is produced by vertebrates and invertebrates; and urate of ammonia is the chief nitrogenous excretion of reptiles and birds. How is it that in man alone—and by no means constantly in man—an excess of a natural constituent both of the blood and urine should be capable of setting up so remarkable a series of pathological changes which have no counterpart elsewhere in the animal kingdom? Then, again, if the deposition of urate of soda be the cause, and not the effect, of the paroxysm of gouty inflammation, how is it that the inflammation ceases in a few days, for the cause is shown by Dr. Garrod's own observations to be remarkably persistent, the deposited urate of soda not being readily absorbed? How, again, on this hypothesis, are we to explain the occasional metastasis of gouty inflammation? Surely the deposit cannot be removed at a moment's notice, and laid down in another organ or joint.

It is not alone in the blood of gouty persons that uric acid is in excess. Dr. Garrod allows that it is present in superabundant quantity in febrile and inflammatory affections, especially when the liver or spleen, or any organ connected with the portal circulation, is implicated. The excess of uric acid in the blood, therefore, does not solely characterise the gouty type of inflammation to the exclusion of all others. This is a fact which cannot be too strongly insisted on, and it is the basis of the most cogent arguments against the uric-acid theory. Dr. Hood, following a hint thrown out by Trousseau, goes so far as to suggest that the presence of an excess of uric acid in the blood may only be a pathological fact, to be classed in the same category as that condition of the blood which produces the buffy coat, a condition common to acute gout, acute rheumatism, and, in fact, to all acute inflammations.

On this point Trousseau writes:—

“The results, then, of chemical analysis cannot be accepted as proving the identity of the gouty and uric diathesis, because the latter is a diathesis common to different diseases which have nothing else in common. We have what may be called the diathesis of *fibrination* and *defibrination*. All the diseases termed inflammatory

are characterised chemically by an excess in the quantity of fibrin found in the blood, while in other diseases, in the eruptive fevers, for example, there is a diminution in the proportion of fibrin. Though they present the one characteristic in common, they are not the less, on that account, essentially different diseases. It is neither the excess nor the deficiency in the proportion of fibrin, but the specific cause which dominates the alteration in the blood, as it dominates the other morbid phenomena, which makes them what they are. So it is in gout: the production in excess of uric acid and urates is a pathological phenomenon, inherent, like all others, in the disease; and, like all the others, it is dominated by a specific cause, which we know only by its effects, and which we term the *gouty diathesis*" (p. 395).

Dr. Hood has seized the same fact and draws the conclusion we have indicated:

"Now, admitting," he writes, "that gouty blood invariably possesses an abundant quantity of urate of soda, I cannot coincide with Dr. Garrod's opinion that the specific inflammation is solely due to the excess of this material, or that the material itself is destroyed by the inflammation. If the presence of an excess of urate of soda were the only evidence of derangement in the blood during an attack of gout, it might be possible to receive Dr. Garrod's explanation without any dissent; but as we know that blood drawn during a gouty paroxysm invariably presents the two well-marked characters of a buffy coat on the coagulum, and a more or less yellow hue of the serum, it is difficult to divest our minds of the belief that these abnormal conditions must also in some manner be associated with the occurrence of the malady. The first of them, the buffy coat, is a sign of the presence of inflammation; and in proportion to the severity of the inflammation, so will the buffy coat be, more or less, pronounced. It is also found on the blood of persons suffering from acute rheumatism, in which the surface of the clot may be both buffed and cupped" (p. 102).

Difficult, however, as it is to believe that there is no closer relation between the presence of urate of soda in the blood and its depositions in the affected structures and gout than there is between the buffy coat or the condition of blood which gives rise to it and the same malady, yet the occurrence of an excess of uric acid in the blood in other inflammatory conditions, in the early stages of intermittent fevers, and, in a high degree, in persons who have been kept for a long time on low diet lends colour to the inference. Nay, uric acid exists in the blood of healthy persons in quantities varying with the time which has elapsed since the last meal, and it is more than probable that its excess may be supported for a long time without any deviation from perfect health. It would, seem, therefore, that some other fact is necessary, plus the excess of uric-acid, or the uric-acid diathesis. Trousseau cuts rather than unties the knot when he

boldly invents a gouty diathesis, which he maintains is essentially distinct from the uric diathesis in order to meet the difficulty.

Before pursuing the argument further it is only fair that we should notice the ingenious expansion given to the uric-acid theory by Dr. Bence Jones. Dr. Bence Jones's view of the chemical and mechanical causation of gout appears in no degree to answer the arguments urged by the opponents of a purely chemical theory. But it has a claim to consideration, not merely on account of the justly high reputation of the author, but also because it possesses all the attraction of a brilliant generalisation.

According to Dr. Bence Jones the gouty diathesis consists in an excess of urate of soda in the serum of the blood, and in the fluid that diffuses from the blood into all the textures—vascular and non-vascular :

“An attack of gout is a chemical process of oxidation set up in the part where the urates are most able or liable to accumulate. By the oxidising action the urates are wholly or partly changed into urea and carbonates, which can more readily pass from the textures into the blood and be excreted by the kidneys, skin, and lungs. The oxidation, even in the bloodless textures, causes increased flow of blood and mechanical pressure in the vessels nearest to the inflamed part, and hence pain and redness and then swelling and œdema proceed. Though the gouty diathesis is a disease of the textures as well as of the blood, yet, in its origin and situation, an attack of gout is even more a disease of the tissues than a disease of the blood.”¹

It will be seen that this is an extension to gout of the theory which makes inflammation consist in peroxidation, the disease being simply the result of the chemical process set up to get rid of the uric acid, by oxidising it, and thus rendering it more readily excreted. Of course to this view the same objection applies—that in other persons who have an excess of uric-acid in their blood no such process of oxidation is set up, and, therefore, there must be something beside the uric acid to account for it. Besides, the morbid anatomy of gout proves that whatever urate of soda may be got rid of by oxidation, at all events a large quantity is deposited, and, even admitting that Dr. Garrod is mistaken in maintaining that the deposition of urate of soda is of the essence of the disease, at least there is no doubt that the diminution of the symptoms is often contemporaneous with such deposit. Dr. Bence Jones maintains that the excess of uric acid, giving rise to gout, is the result of an excess of animal or vegetable albuminous food entering the system, or of deficient oxidation, or of both. He writes :—

¹ ‘On Pathology and Therapeutics,’ p. 25.

“Of course the greatest accumulation of uric acid will occur when the albuminous food is excessive, and when at the same time the oxidation is least. Even if no excess of albuminous food is taken, yet if the oxidising action is deficient, uric acid may accumulate in the serum, and it will immediately diffuse even with the bloodless textures. On the other hand, an excess of albuminous food may be taken, accumulation of uric acid or blood in the textures may occur. It is therefore evident there are two modes of preventing the gouty diathesis; first by diminishing the amount of vegetable and animal albuminous food; and second by promoting oxidation. In other words, the smallest amount of food and the greatest amount of air are antidotes for the gouty diathesis.”

This reasoning may be chemically perfect, but practical and clinical observation proves that it is not “the truth, the whole truth, and nothing but the truth.” It is not true that the largest consumers of animal and vegetable albuminous food are most liable to gout. It is not amongst the greatest eaters with whom one meets in society, neither is it amongst the tradesmen—such as butchers—who consume the largest amount of animal food that gout is especially rife, but it is amongst the dyspeptic who supplement a meal moderate in quantity but unsuitable in quality with a large amount of beer or wine that we meet with the disease. Hereditary predisposition and sex, which are matters outside any tangible chemistry, play a larger part in the production of gout than excesses of the table or deprivation of fresh air. The women of the working classes in London breathe far less fresh air than the men, but they do not suffer from gout in anything like the same proportion. The fact is that the butler is more liable to gout than the cook, and Squire Western, who comes of a stock “*feras consumere nati*,” who has hunted and shot ever since he left school, inherits his love of sport, his periodic attack of gout, and his cellar of wine from his jovial forefathers.

Another class of arguments against the purely chemical theory of gout is the one based on the fact that it does not account for all the phenomena of the disease. This is a position insisted on by Dr. Hood. He maintains that the condition which precedes gout is one of abdominal plethora, in which the function of the liver is at fault, and that to this the failing action of the kidneys is secondary. The yellow colour of the blood serum, and the altered colour of the skin at the commencement of the attack, recognisable especially in the yellow tinge about the angles of the mouth and at the chin, are evidence of the defective action of the liver. Of course these observations are not new; they have been made long ago by Scudamore and others. But we are indebted to Dr. Hood for

recalling our attention to these facts, plain to unbiassed observers, but which are likely to be lost sight of amidst the brilliant corruscations of modern chemical theory.

“It may be quite true (Dr. Hood writes), as Dr. Garrod observes, that no hepatic enlargement or engorgement is discoverable in certain cases, but it is more than probable, judging from the operation of medicines, that in these cases the gall bladder has been distended, and is in a state of occlusion. We have no means of ascertaining this directly; but it may be regarded as a fair induction from the fact that one of the chief culminating causes of an attack of gout is a partial or entire cessation of the flow of bile into the intestines; since we find that immediate relief is afforded to the more serious symptoms when this flow is re-established, and the bowels are fairly acted upon, more especially when symptoms are present which involve the integrity of the cerebral functions or the action of the heart. The bile that is passed under these circumstances is sometimes so acrid and corrosive that the patient likens it to scalding pitch; and there is no doubt that this vitiated secretion produces spasm of the neck of the gall-bladder, and for a time prevents the escape of its contents into the intestines. Dr. Garrod contends, equally with Dr. Gairdner, that defective action of the kidneys is one of the chief causes that induces gout, but neither of these authors has attributed this defective action to primary disorder existing in the liver, which when it has been rendered incapable, from long-continued congestion or enlargement, of exercising its proper eliminating functions, throws a task upon the kidneys which their peculiar organisation is not calculated to perform without injury to their structure. The passage of bile pigment, taurine, leucine, &c., through these delicate organs proves most inimical to their integrity. From attentive and careful observation of diseases affecting the kidneys, I have repeatedly noticed that such diseases have been preceded by symptoms of derangement of the liver; and that when renal mischief has once become established, the symptoms of hepatic disorder often disappear.” Pp. 98, 99.

We have before observed that the uric-acid theory of gout as developed by Dr. Garrod seems to us incompatible with the facts of gouty metastasis and irregular gout. As Trousseau observes, it is the fashion in the present day to deny the fact of gouty metastasis, but it nevertheless is no fable. He himself relates a case which occurred in the practice of his friend Dr. Demarquay, and which seems simply inexplicable on the hypothesis that the gouty paroxysm depends on the deposition by infiltration and crystallisation of urate of soda in the affected part. Dr. Demarquay's case was that of a man who was attacked in the foot by very acute regular gout, and applied cold water compresses to the affected part in order to relieve

pain. The remedy was effectual as far as the pain was concerned, but Dr. Demarquay was soon after sent for in haste. He found the patient in a state of apoplectic semi-stupor. "He spoke with embarrassed voice, and sputtered out the few words which he attempted to pronounce." Fortunately the application of mustard poultices to the feet restored the gouty inflammation and the cerebral symptoms at once disappeared. Did the cold compresses arrest the deposition by infiltration and crystallisation of urate of soda in the joints, and transfer the process to the brain, and did the mustard poultice restore the chemical operation to its original laboratory?

There is yet another cogent set of arguments against a purely chemical or mechanical theory of gout derivable from the fixed and certain character of chemical and mechanical operations. Chemistry and mechanics are sciences based on natural laws which work in a definite and unalterable manner. Given the same physical or chemical conditions and the same results will certainly ensue. We see nothing of this kind in the etiology of this disease. Gout does not follow fixed and certain laws; at least if it does they are laws which no acquaintance with the chemistry or physics of the day will enable us to decipher:—

"Let us grant for a moment," says Trousseau, "that the presence of uric acid is the essential cause of the disease; how can we explain why it should happen that out of a hundred individuals placed in the same hygienical condition, living in precisely the same manner, eating precisely similar food, one person only should have gout? How is it that the mode of life, the alimentation favorable to the excessive production of uric acid and the urates, and their accumulation in certain parts of the organism, should only produce the uric-acid diathesis in ninety-nine cases in a hundred? How are we to explain the fact that, in a number of individuals leading a life of indolence, addicted to the pleasures of the table, sinning against all the laws of hygiene, not one should be gouty, while we see others become martyrs to gout, although they have always led a most active and abstemious life? How are we to explain these differences unless it be, I repeat, by admitting the existence of an idiosyncrasy, an individual organic predisposition of an altogether peculiar character? It is this predisposition which we call the gouty diathesis."

The assumption of a gouty diathesis, although it probably expresses a fact which, in the present state of our knowledge, must be regarded as ultimate, from another point of view may be considered rather as the acknowledgment of a hopeless difficulty than an attempt at solving it. After all, to say that a man is gouty because he inherits a gouty diathesis from his forefathers is only to reassert the hereditary nature of the

disease, a fact known to the Greeks. It expresses no theory and affords no explanation.

Before quitting the subject of the objections to the uric acid theory of gout we would remind our readers that some years ago a small work on the subject was published by Dr. Barclay, of St. George's, who, we believe, was the first English author since the ascendancy of that theory, to call it in question. We confess that at the time of the appearance of Dr. Barclay's work his arguments, although weighty, did not seem to us conclusive. They acquire, however, additional force when they are considered together with those which we have just reviewed. Dr. Barclay urges that the hereditary transmission of gout is inexplicable on a chemical theory; that, in health, the kidneys get rid of uric-acid in large quantities without any accumulation taking place, whereas the excretion is arrested in gout, although there is no appreciable change in the kidney to account for the arrest. Again, that the effects of treatment do not support the uric-acid theory. If this view were tenable the alkalies, which are the best solvents of uric acid, should speedily cure gout, but observation shows that this is not the case, and that in relieving the patient from his more urgent symptoms they are far inferior to specifics, and, *par excellence*, to colchicum. We confess that the action of lithia has disappointed us much in the treatment of the gout, neither have we seen much benefit from a purely alkaline treatment. But, if the uric-acid theory be true, all that is necessary to prevent the disease is to render the blood and urine permanently alkaline.

Dr. Barclay surmises that some change in the blood corpuscles is the cause of gout, but, as far as we are aware, there is a dearth of facts and observations to prove or disprove the supposition. In fact, whilst medical criticism and thought are gradually disintegrating the uric-acid theory, we have already confessed there is no hypothesis so attractive, simple, and, on a superficial observation, so satisfactory, to replace it. Dr. Hood's conclusions occupy too wide a platform to merit the name of a theory, although they probably express in general terms as much as may be safely asserted:—

“I cannot assent to the proposition that gout is either a consequence of congestion, or a consequence of the retention of urate of soda in the system, or a consequence of hepatic derangement. All these conditions may concur in its production, but no one of them singly is sufficient to constitute the disease. I regard gout as being essentially a result of the imperfect elimination of excrementitious matter from the blood; and this imperfect elimination as being due to a variety of causes, among which the chief would be impaired nervous action, congestion of blood, due to local causes,

and congestion of blood, due to imperfect performance of the function of the heart. . . . Impaired digestion, a troubled heart, congested liver and kidneys, a blood that is loaded with effete matter, nervous centres to which this blood brings no healthy stimulus, and a general nutrition that is enfeebled by its influence, such, in short, is the aggregate that we describe as gout."

If we place by the side of this very general account the following passage from Sydenham's 'Treatise on Gout,' we shall find how much reason there is in Trousseau's assertion with which we commenced this article:—

"Now, the spirits, which are the instruments of concoction, being weakened, and the blood over-burthened with juices, at one and the same time, all the concoctions must needs be depraved, whilst all the viscera are so oppressed; whence the spirits that have long been in a declining state are now quite exhausted. For if this disease proceeded only from the weakness of the spirits it would equally affect children, women, and persons debilitated by a tedious illness; whereas the strongest and most robust constitutions are chiefly subject to it, but not before abundance of humours are collected in the body through the decay and waste of the natural heat and spirits, which, in conjunction, destroy the vitiated concoctions."

We have left ourselves but little space to notice many other subjects in connection with the disease of which we are treating. The treatment of gout does not seem to make much greater advances than theory. The present generation of the upper ten thousand has learned that prevention is better than cure, and old port wine and chalk stones are not so frequently seen in conjunction as formerly. But the treatment has received no new light from recent writers, unless we except the introduction of lithia and ash-leaves by Dr. Garrod, neither of which remedies seem likely to become widely used. Trousseau, following Sydenham and his own experience, boldly advocates a masterly inaction during the paroxysm of regular gout. Dr. Hood has a wholesome dread of the indiscriminate use of colchicum, and advocates a treatment on general principles in which calomel, in combination with other purgatives, and morphia, subcutaneously injected, play a chief part. Dr. Hood thinks that colchicum relieves gouty inflammation by its peculiar property of modifying the red corpuscles, and of rendering the blood more fluid and less adhesive, so that its passage through the distended capillaries is promoted, and the mechanical pressure that was productive of pain is removed. Long continued use of colchicum, he believes, tends to destroy the integrity and vitality of the blood, and renders the attacks of gout not only more frequent, but more difficult of cure. Undoubtedly, colchicum is used more sparingly than formerly, but its specific

influence is indisputable, and is never better illustrated than when it is prescribed for skin affections of a gouty origin. But relief from gout may be purchased too dearly. Whatever the true theory of gout may be there can be no doubt that an attack of regular gout, if not rudely interfered with, often leaves the patient in a better condition than that in which it found him, and a principle is contained in the late Lord Derby's celebrated answer to some wine merchants who sent him a sample of anti-podagric sherry—that he was much obliged to them, but he preferred the gout—which might have a wide application with no small benefit to the gouty.

V.—Some Recent Researches into the Histology of the Nervous Centres.¹

THE works which we here bring under the notice of our readers contain the results of the latest researches into the minute structure of the nervous centres;—more particularly those of German histologists.

The investigations of Schultze into the structure of nerve-tissue have now been some time before the profession and their value has been duly appreciated; we have here especially to point out the more recent labours detailed in the various essays enumerated below.

Gérlach gives us the result of his investigations into the microscopical elements of structure of the spinal cord, its white and gray substance, its nerve-cells, fibres, and roots. Meynert contributes a general survey of the structure of the brain; discusses the morphology of its several parts, and enters fully into the details of the tissues composing its various ganglionic centres, the cells and fibres of the corpus striatum, optic thalamus, commissures, optic tracts, and nuclei of the cerebral nerves, as traced through the pons and medulla oblongata, and concludes with an account of the histology of the cerebellum. Dr. Sigismund Mayer treats of the sympathetic system of nerves,

¹ 1. *Manual of Human and Comparative Histology.* Edited by S. STRICKER, translated by HENEY POWER, M.B. Lond. (New Sydenham Society, 1870 and 1872, 2 vols.), containing:—

A. *General Characters of the Nervous Tissue.* By MAX SCHULTZE.

B. *The Spinal Cord.* By J. GERLACH, of Erlangen.

C. *The Brain of Mammals.* By PH. MEYNERT, of Vienna.

D. *The Sympathetic System of Nerves.* By SIGISMUND MAYER.

2. *Handbuch der Systematischen Anatomie des Menschen.* Von Dr. J. HENLE, Braunschweig, 1871. Dritter Band—Nervenlehre.

under the several headings of cells, nuclei, nucleoli, processes, and general distribution.

A bibliography of their respective subjects is added by Dr. Meynert and Dr. Mayer; but the latter has, however, omitted reference to the very important paper "On the Nerves of the Capillary Vessels," read by Dr. Beale before the London Microscopical Society in December, 1871.¹

In Henle's volume, which is a portion only of an extended work upon human anatomy, we have an elaborate treatise describing the spinal cord, brain, cerebellum, and their membranes.

Without attempting to follow these authors in their anatomical details we shall endeavour, by a general survey, to present to our readers some of the leading points of the minute structure of the nervous centres contained in their pages, comparing from time to time the statements therein advanced with those of some of our own latest and most trustworthy observers. It will, we think, become apparent that British anatomical science has not followed with halting steps the advances of continental research, but, on the contrary, has in many points led the van. A glance over the bibliographies which accompany the essays would lead rather to an opposite inference, unless allowance were made for national preferences. Thus, we find that Meynert enumerates thirty-five German, three French, one American, and one English author;—Dr. Mayer cites only one English and fifteen German writers;—Gerlach does not supply a bibliography, but he has references to one English and eight German authors. The same predominance of German references is observable throughout the pages of Henle's *Handbuch*. It is almost needless to add that the British histologists referred to are Drs. Lockhart-Clarke and Lionel Beale. The American authority is Dr. Dean, of Boston, U.S. Doubtless this list might have been considerably extended.

We would take leave here to suggest a doubt whether a collection of essays, such as constitute Stricker's manual, valuable as it is in itself, is the best form in which to present a text-book for students. It is impossible to check efficiently the contribution of a writer upon a favorite topic, hence the appearance of inequality in the several parts of the work before us. Dr. Meynert's is an example of diffuseness, arising, no doubt, from the partiality of the author for his subject, and the absolutely large amount of information possessed by himself on the matter in hand, and which, possibly, he found

¹ See 'Monthly Microscopical Journal,' Jan., 1872.

it impossible to condense further. It is, probably, also owing to this last circumstance that the author's style is somewhat involved, making his essay not easy to read in the original and still harder to translate.

Henle's 'Handbook,' in all respects that we have here referred to, will bear a most favorable comparison with Stricker's "Manual." This whole work being under the control of one mind is duly proportioned in all its parts: it is moreover, written in clear and readable German; each topic is very fully treated, and an ample series of references and quotations confirm or illustrate the details of each page. The woodcut illustrations, further, which accompany the work, call for particular and favorable notice. They are distinct and clear, and have besides the attribute of originality. The woodcuts in Stricker's volumes are, for the most part, printed so black that it is impossible to trace the figures without the help of a magnifying lens.

Introductory.—The following observations may convey to our readers an idea of the plan on which Meynert deals with his subject:—

“ In the structure of the brain are united two principal features: on the one hand, there is everywhere considerable uniformity in the elementary parts; on the other hand there is the utmost variety in their arrangement. It is because the significance of the elements is determined only by the particular locality in which they occur, that a purely histological description would but slightly aid the comprehension of the subject, and it is indispensable to take into account at the same time the proximate divisions of structure. Indeed, we must steadily keep in view the position of all minute details with respect to the larger masses. While we have in these considerations a justification for wandering in the following pages beyond the bounds of strictly histological fact, the compass of a manual permits in this respect of nothing more than a suggestive brevity; the more deeply inquiring student must be referred to the original sources of information. While this more discursive treatment of the morphological side allows of a more satisfactory arrangement of the subject, the reader will himself be able to aid most efficiently in making it clear if he take with him as his guide in these difficult matters three firm and unshaken physiological principles which appear to lie at the foundation of the architecture of the brain.”

Preliminary physiological propositions.—“ 1. The nerve-cells possess a functional attribute, viz. susceptibility to impressions. This must be regarded as a general attribute of the centric nerve-cells, it being borne in mind, at the same time, that it only becomes actual sensation under certain favorable circumstances.

* * * * *

"2. The second postulate is the *law of Bell*, so far extended as to admit that a continuation, undisturbed by the multiplication and segmentation of the internodes, of centripetal and centrifugal conductors reaches the uppermost centres of the brain mass, or, otherwise expressed, arises from them.

"3. The third postulate, lastly, is *the law of isolated conduction*, the morphological expression of which is found in the fibrillation of the white substance; and even in the gray masses, which, doubtless, constitute paths for transverse conduction by means of anastomoses, the laws of isolated condition hold good, though only conditionally. Here, too, it finds its expression in the fact that the axes of the nerve-cells appear to be elongated in the direction of the nerve-fibres, with which they are continuous."

In the first of these propositions we recognise the law of neurility as laid down by G. H. Lewes.

Passing on from these propositions, which are indisputable, the author proceeds to his survey of the morphology of the structures of the brain:

Outline of structure of the brain.—"The form of the cerebral cortex, which resembles a cap covering the outer surface of the hemisphere, appears specially fitted for this comprehension of the conduction tracts. This form results from the grouping of the innumerable sensory elements occupying the cortex, namely, the *nerve-cells*. The sensory nerves constitute their feelers, the motor their arms. Since this convoluted mass of fibres must, in great part, pass through the occipital foramen in order to reach the several organs, there is a *convergence* of them from all sides, both in the peduncles of the brain and in the spinal cord, towards the gray matter of the central cavities. After, however, they have traversed this central gray substance they *diverge*, in the peripheral nervous system, to all parts of the body.

Projection system.—"Since, now, this organisation effects the contact of the sensory shell of the cortex of the cerebrum with the various forms of sensory impressions derived from the external world, the image of which is coincidentally projected upon the cortex, the name of projection system is very appropriate to this great segment of the nervous system, and, on this comparison, the cortex of the cerebrum is to be regarded as the surface on which the projection is received, while the external world stands for the projected object" (p. 372).

Meynert's divisions of the nervous centres.—Thus, the "projection system," on the author's scheme, represents, first, the radiating medullary fibres of the central part of the brain converging to the masses of gray substance at the base of the hemisphere (the corpus striatum and optic thalamus; secondly, the gray matter of the crura; and lastly, the nerves arising from

the gray substance of the central cavities, from the origin of the third pair of nerves around the aquæductus Sylvii, to the nucleus of origin of the lowest coccygeal nerves of the spinal cord.

Medullated fibres on the inner surface of the cortex of the brain, the *fibræ arcuatae*, connect the different regions of the cortex, which are connected by anastomoses of the cell processes. These fasciculi of fibres form what Meynert designates the "*Associations system*," supplementary to the "*projections system*," and in this "*associations system*" we have "*interruption masses*," with regions of "*reduction*."

Reduction system.—In the latter the great bulk of the radiating fibres that enter the cerebral ganglia become diminished to the dimensions of the columns of the spinal cord. In the former the regions of interruption, the first link of the progression system, breaks up, at its point of entrance into the ganglia, into as many separate masses as there are gray nuclei in the latter." Among these gray nuclei the author enumerates the corpora striata, the optic thalami, corpora quadrigemina, with their radiating masses of fibres, and the fornix.

"The second segment of the '*projection system*,' the crus cerebri at its exit from the ganglion masses already becomes reduced to the merely double track, anterior and posterior, of the peduncle of the brain, i. e. the crusta and the tegmentum of the crus cerebri, which are continued into the anterior and posterior regions of the pons and medulla oblongata, and ultimately unite into a morphologically single tract, constituting the medullary investment of the medulla spinalis. These '*interruption-masses*' constitute circuits to centres situated apart from the direct continuation of the projection system, as exemplified by the centrifugal tract shown by innumerable anatomico-pathological observations to issue from the cortex of the cerebrum, and to reach the anterior nerve-roots of the spinal cord by passing through the corpus striatum," &c. (p. 375).

"The third principal mass of gray matter, the gray substance of the central cavities, so far from causing any reduction in the mass of fibres belonging to the projection system, is, on the contrary, the centre for a vast increase of them, which, in ordinary parlance, is expressed by saying that the number of fibres belonging to the nerve-roots, springing from the spinal cord, considerably exceeds the number of the fibres of the spinal cord. . . . The progress of the reduction of the projection system, in the substance of the pons and upper half of the medulla oblongata, is seen to be replaced by a variable amount of increase, since the circumference of this segment of the brain exceeds that of the crus cerebri. This increase of bulk depends in great measure on the interposition of gray matter that essentially accounts for the enlargement, whilst the portions of the cerebellum substance which enter into the composition of the pro-

jection system diverge from this as it passes onwards, and, after forming an interweaving plexus with it, run to the cerebellum. Below the point where this occurs the rapid diminution of the size of the medulla oblongata to that of the spinal cord corresponds also to the transition of the cerebral structure into the type of structure presented by that of the cord" (p. 377).

Such is an outline of the general view of the cerebral structure as given by the author, in accordance with which he enters on its consideration under the following sections.

"*Divisions of nervous centres.*—1. The lobes of the cerebellum; 2, the crista or base of the crus cerebri, with its ganglia; 3, the tegmentum of the crus cerebri with its ganglia; 4, the region of interlacement of the arms of the cerebellum; 5, the cerebellum; 6, the formation of the transitional region where the cerebral structure passes into that of the spinal cord" (p. 378).

Lamination of the cerebral cortex.—Following this order the author considers the form and arrangement of outline of the convolutions of the cerebrum, and of their textural lamination. The latter he treats of under the heading of *one common type* and four *special types*; viz., of the occipital apex, the Sylvian fissure, the cornu ammonis, and the bulbus olfactorius.

The general type of textural lamination which Dr. Meynert ascribes to the cerebral convolutions is that of five layers of gray substance. This enumeration of laminae we hold to be incorrect.

It is not always easy or even possible to distinguish the separate layers in all parts of the convolutions, but the prevalent type doubtless, as shown by Lockhart Clarke, possesses eight layers. On this point the author has misunderstood Dr. Clarke, whom he thus criticises:

"The formation presented by the summit of the occipital region has been taken by Clarke as the starting point of his researches on the cortex of the cerebrum, and he gives an accurate description of the two thinly corpusculated layers. But since, like other authors, he has not distinguished between the granule-like and fusiform formations as constituting separate layers, he fuses the external and internal granule formation with the adjoining pyramids and spindle-shaped bodies, and counts only six cortical layers instead of eight" (p. 391).

The translator has here appended a footnote drawing attention to this mistake of the author. On a disputed point of such importance we feel bound, in justice to a British anatomist of Dr. Clarke's repute, to quote his own words.¹

¹ 'Proceedings of Royal Society,' vol. xii, No. 57.

“*Structure of the Cerebral Convolution.*—In the human brain most of the convolutions, when properly examined, may be seen to consist of no less than *eight* distinct and concentric layers. This laminated structure is most marked at the end of the posterior lobe. On cutting off the rounded point of this lobe in the human brain, by a transverse section, at about the distance of an inch, measured along the side of the longitudinal fissure, I found, at this part, that the stratified appearance was very indistinct in the *upper* and *outer* convolutions, while it was still clearly observable in the *inner* and *lower* convolutions which rest on the cerebellum. It was most conspicuous in the convolution that lies over the bottom of the posterior notch of the cerebellum, and which runs outward and upward, and then winds inward, to reach the surface at the side of the longitudinal fissure.

“In vertical sections of convolutions taken from the end of the posterior lobe, where the laminated structure is most marked, the first or superficial layer is a comparatively thin stratum of fine and closely-packed fibres, intimately connected externally with the pia mater—with which they are very liable to be torn away—while internally they are continuous with fibres radiating from the grey substance.

“The second layer is of a pale or whitish colour, and several times the thickness of the one just described. It consists, first, of fibres running parallel with the surface, both around the convolution and longitudinally; secondly, of fibres radiating across them from the grey substance beneath, and crossing each other with different degrees of obliquity; and thirdly, of a small number of scattered nuclei, which are round, oval, fusiform, or angular, and have their longer axes in different directions, but mostly within-outward.

“The third layer is of a grey colour, from two to four times as thick as the one above it. It is densely crowded with cells of small size, but of different shapes, in company with nuclei like those of the preceding layer. The cells are more or less pyriform, pyramidal, triangular, round and oval, or fusiform. The pyriform and pyramidal cells—especially in the outer portions of the layer—lie for the most part with their tapering ends toward the surface; and the oval and fusiform cells have generally their longer axes and their processes in a similar direction. In the deeper portions of the layer, however, their position is more irregular, many of them lying with their longer axes parallel with the surface, and in connexion with a multitude of fibres which run in the same direction and in great number *along* the layer. They contain each a comparatively large granular nucleus, which frequently nearly fills the cell. Two, three, four, or more processes spring from the broader ends of the pyramidal cells, and run partly toward the central white substance, and partly in the plane of the layer, to be continuous with nerve-fibres in different directions.

“The fourth layer is of a much paler colour. It is crossed, however, at right angles to its plane, by narrow long and vertical groups of small cells and nuclei of the same general appearance as those of

the preceding lamina. These groups are separated from each other by bundles of fibres radiating toward the surface from the central white substance, and, together with them, form a beautiful and fan-like structure. This layer is distinguishable from the one immediately above it by a tolerably sharp outline, but internally it gradually passes into, or blends with, the next one below it, or the fifth lamina.

"This fifth layer consists of the same kind of vertical and radiating groups of small cells and nuclei; but the groups are broader, more regular, and, together with the bundles of fibres between them, present a more distinctly fan-like arrangement.

"The sixth layer is again paler, and somewhat whitish, but contains some cells and nuclei which have a general resemblance to those of the preceding layers and are arranged only in a faintly radiating manner.

"The seventh layer is of a reddish-grey colour, of about the same depth as the preceding, and contains the same kind of cells and nuclei, but in much greater numbers, and mixed with some others of *rather larger* size: only here and there they are gathered into the small elongated groups which give the appearance of radiations. On its under side it gradually blends with the central white layer, into which its cells are scattered for some distance. Both this and the preceding lamina are traversed by nerve-fibres which run *along* their planes, or parallel with the surface of the convolution.

"The eighth layer is the central white stem or axis of the convolution. As just stated, it contains, for some distance below its summit, a gradually diminishing number of scattered cells and nuclei, extending from the lower side of the next *upper* layer. The cells are all separate, and disposed with their longer axes at right angles to the curved surface of the convolution, and therefore in the direction of the fibres radiating from the central white stem, with which some, at least, are continuous."

Clarke's arciform fibres.—Dr. Meynert describes, after Kölliker, "on the surface of the first layer of the cortex, a very delicate medullary lamina or investment of extremely fine varicose nerve-fibres which decussate with one another in all directions." This lamina is doubtless the broad layer of arciform fibres thus described by Clarke.

"Sometimes, as in certain parts of the posterior lobe itself, one can scarcely make out more than seven layers, there being only one broad layer of arciform fibres running *along* the grey layer outside the white central stem. It is an error to call the layers containing these *arciform* fibres (for I shall so name them) the white layers of the convolution, for they are always interspersed with numerous cells, with processes of which they are continuous. In some parts of the brain (on the vertex, for instance) the second (from the centre) of the arciform bands of fibres is very broad and strong, and thickly interspersed with large and small cells of different shapes. These

arciform fibres of the convolutions run in different planes, transversely, obliquely, and longitudinally. Where a convolution bends round upon itself at a right angle, a section made at the angle contains them in abundance; but here the separate fibres forming the arciform bands are very short, being cut in their passage. The curved arciform fibres, then, establish an infinite number of communications in all directions between different parts of each convolution, between different convolutions, and between these and the central white substance. I have already shown that the more superficial layer of gray substance contains numerous arciform fibres, but finer and less strongly marked."

Henle's description of the structure of the convolutions of the brain, and the illustrations thereof given at pages 269—275, should be consulted by all who desire the fullest information.

Grey Matter of Olfactory Lobe.—The olfactory lobe, or nerve improperly so called, is described by the author as a hollow lobe of the cerebral cortex, having a cavity communicating with the lateral ventricle. Its cortex is continuous above with the cerebrum generally, and below with the *lamina perforata antica*.

"The *bulbus olfactorius* forms a cap superimposed upon this conical process of the cerebrum, from the external surface of which, as is well known, are given off the nerves to the Schneiderian membrane. From its hollow internal surface proceeds a layer of medullary fibres, which invests the anterior surface of the olfactory lobe like a membrane, divides along the internal and external convolutions of the olfactory lobe, and, as seen from the basal aspect of the olfactory lobe in man, has led to its receiving the erroneous appellation of a nerve.

"The *bulbus olfactorius*, which Luys rightly declared to be analogous to the retina, receives the brush of olfactory nerves terminating peripherally in the olfactory cells as a short projection system, just as the retina presents a still shorter projection system, to wit, the connecting fibres between the rods and cones as terminal organs, and their nervous elements (ganglion-cells of retina) as a centre. These olfactory nerves extend to a *stratum glomerulosum*, consisting of nodulated masses through the glomerule, of which some nuclear-like cells are distributed, whilst others are scattered around them; they also contain vessels, but essentially consist of a fine granular mass resembling the matrix of the cortex of the cerebrum" (p. 400).

A third layer of the olfactory lobe, distinct from the two preceding, viz. the nerve-layer and the stratum of glomeruli, is called Clarke's "gelatinous layer," and stated to consist of a layer of matrix containing partly fusiform and partly pyramidal cells. It is, doubtless, Dr. Clarke's designation of this layer of the olfactory

lobe that has been erroneously applied by the author as Clarke's term for the first layer of the grey matter of the convolutions generally.

Following on the gelatinous (p. 381) layer is the medullary stratum, which

"exhibits a concentric alternation of pure medullary layers with layers of small, closely arranged nerve-cells, very similar to the granules of Purkinje of the cerebellum. These small, irregular nerve-cells, perhaps, differ only in size from the granule layers of the retina, and from the elements of the fourth layers of the entire cortex of the cerebrum" (p. 401).

Distribution of Nerve-cells in the Brain.—We here quote Dr. Meynert's account of the general distribution of nerve-cells in the brain, forming the nuclei or centres of the nervous force, as follows :

"Nerve-cells of the brain are collected into four principal grey masses :

1. The uppermost mass, in which originates the entire medullary portion of the brain, is the superficial grey matter of the cerebral hemispheres, or cortex of the cerebrum.

2. The second collection of grey matter is formed by the masses which, since the time of Gull, have been termed the ganglia of the cerebrum (*corpus striatum* and *thalamus*).

3. The tubular mass of grey matter, the persistent expression of the original form of the brain, which extends from the tuber cinereum to the conus medullaris of the spinal cord, and lines the internal surface of the central organ as the grey substance of the central cavities.

4. The grey substance of the cerebellum, which occurs partly as a superficial expansion and partly in the form of scattered cells, that on the one hand constitute the superficial and deeply seated grey masses of the cerebellum itself, and on the other the grey substance of the segments of the cerebral peduncles that are traversed by the medullary substance of the cerebellum" (p. 369).

Neuroglia of the Cortex.—The presence of the laminae and their depth of colour depend upon the number of nerve-cells that are present in the matrix, the "neuroglia," which, as modified in the olfactory lobes and in the posterior cornua of the spinal cord, has been by Lockhart Clarke, in those situations, designated the "gelatinous" substance. The neuroglia consists of an amorphous substance containing granules and ramifications of the minute fibrils derived from connective tissue. This material is, moreover, thickly studded with minute cells and nuclei. Many of the cells give off very minute processes, which contribute to the fibrillation of the neuroglia. Lastly, the neuroglia contains nerve-fibrils given off from the

cells of the cortex and other collections of grey matter, to which it forms the support and channels of conveyance to their points of destination. The neuroglia of the brain presents several scarcely appreciable differences from that of the spinal cord.

Fibrous Medullary Structure of the Convolutions.—A thin section of a convolution, made perpendicular to its surface, treated with a strong solution of potass, shows the fibrous basis of the white substance. The centre of the convolution is then seen to consist of a thick bundle of fibres, which, diverging towards the circumference, pass at right angles from their stem as they successively pass to the surface. A section made at right angles to this, treated by the same means, exhibits the cut ends of the medullary fibres. These are rendered still more distinct when prepared with chromic acid and made transparent by the use of turpentine. The absence of a sheath from around the axis cylinder, and the presence of still more minute fibres and corpuscles intermingled, are also observable with high powers. By this plexus of minute fibrils the nerve-cylinders of the medullary structure are held firmly together, so that its tendency to separate in the direction of the fibres is but very slightly manifested.

Gerlach gives the following conclusions as the results of his latest researches into the intimate structure of the grey substance of the convolutions of the brain :

“1. That besides the well-known white medullated nerve-fibres running from the white into the grey substance, and which are arranged in fasciculi radiating towards the periphery, there are also numerous horizontally-running, medullated fibres, which communicate both with one another and with the radially disposed fibres, forming a coarse plexus visible even with a power of sixty diameters. 2. That in the meshes of this plexus are contained the ganglion-cells, and a second far finer plexus of extremely delicate non-medullated fibres, which can only be brought into view with the highest powers of the immersion system. This second plexus is formed of the finest protoplasmatic processes of the nerve-cells, whilst the medullated fibres appear in part to take their origin in it, the individual fibres becoming surrounded by medulla. 3. Some of the protoplasmatic processes of the ganglion-cells develop directly into medullated fibres without branching, and thus such fibres originate partly from the cells themselves, and partly from a plexus of non-medullated fibres.”¹

Structure of the Nerve-cells.—The cells of the grey matter of the nervous centres, whether of the ganglia of the brain and

¹ ‘Lancet,’ Aug. 17th, 1872; quoted from ‘Centralblatt,’ No. 18.

spinal cord, or of the nuclei of nerve-roots, or the ganglia of the sympathetic, are the essential and most important elements of these structures. The organic connection, therefore, of these with the nerves, by which they are brought into unison with remote structures, becomes a point of great interest anatomically. Under high powers of the microscope a granular and striated appearance of the multipolar cell may be clearly seen. The shape of the cell varies with the number and position of their processes, and hence they have been termed unipolar, bipolar, multipolar, according as observers have obtained a more or less complete view of the several aspects of the cell. Dr. Beale has shown that the cell process is often double, the one coiling round the other at its exit from the cell, and being ultimately united as the single fibre of double contour, or the dark-bordered nerve-fibre. With reference to the structure of the nerve-cell Dr. Beale observes—

“That there are neither ‘*cells*’ nor ‘*vesicles*,’ in the ordinary acceptation of these words, for there is no proper investing membrane, neither are there ‘*cell-contents*,’ as distinguished from the *membrane* or *capsule*; in fact, the so-called cell consists of soft solid matter throughout. The nerve-fibres are not prolonged from the nucleus or from the outer part of the cell, but they are continued from the very material of which the substance of the ‘*cell*’ is composed, and they are, chemically speaking, of the same nature. So that in these caudate cells we have but to recognise the so-called ‘*nucleus*’ (*germinal matter*) and *matter around this (formed material) which passes into the ‘fibres,’* which diverge in various directions from the cell.”

This question, thus decided by Dr. Beale in 1863, is still unsettled among German histologists, as may be seen in the essay by Schultze:—

“Certain granules, lines, and inequalities in their substance, particularly upon the surface, have long been familiar to observers; but in 1864 I found some cells in which the arrangement of lines at different depths was very distinct. These lines could be traced, as well represented, and shown diagrammatically in figs. 395 and 396;¹ they clearly pass from each of the fibres across the cell into every other fibre proceeding from it. I could not but conclude that these lines marked the paths taken by the different nerve-currents which traversed the cell.

“The fibres proceeding from the cell consist of the same material as that of which the cell itself is composed, and are, as it were, drawn off from it.”

With Beale and Gerlach, as to nerve-cells of the spinal cord, Mayer distinguishes in sympathetic nerve-cells

¹ ‘How to Work with the Microscope.’ London, 1868.

“a sheath, a proper cell-substance, a nucleus, and a nucleolus. The sheath or capsule of the ganglion-cells cannot be considered in the light of a cell-membrane, but it is rather the analogue of the sheath of the nerves; it consists of connective tissue in which numerous nuclei are distributed.”

The course of the nerve-fibres in the cell is described by Mayer and shown to resemble closely the arrangements already stated by Meynert, Gerlach, Beale, and Clarke. The spiral fibre of Beale is also figured by Mayer on a multipolar sympathetic nerve-cell. This author also describes and delineates a nerve process extending to the nucleus, thus confirming Beale's description of the connection of process with cell-contents.

Relations of fibres or processes to nerve-cells.—The result of researches into the centric relations of the nerve-fibres has been thus summed up by Schultz :

“If we, therefore, venture to inquire into the central origin of the fibrils in the brain and spinal cord, which appear to exist already formed in the larger ganglion cells, we may suppose that it is from these extremely small and, in part at least, unipolar nerve-cells, though it must be admitted that this is pure hypothesis. In the present state of our knowledge, however well we may be acquainted with the peripheric mode of termination of a great number of nerve-fibrils, it cannot be said that the mode of central origin of any single fibril has hitherto been proved. We may, however, conclude from analogy that the central extremity is to be sought either in the cell-substance of the nerve-cell, or in the nucleus, or in the nucleolus. Observations have been made which render all these three modes of central termination of the nerve-fibrils probable; but no perfectly satisfactory conclusion can be said to have been as yet attained on this point; and it is even conceivable, according to my observations, that there is no actual termination of the fibrils in the brain or spinal cord; in other words, that all fibrils originate at the periphery, and thus only traverse the ganglion-cells” (p. 184).

We need scarcely remind our readers how closely these conclusions coincide with the demonstrations of nerve-current and nervous circuits that have been given several years past by Dr. Beale, and of which illustrations and diagrams have been published by him in the work already referred to, and in the ‘*Philosophical Transactions*’ for 1863.

“The peculiar structure of the caudate nerve-cells, which I have described, render it, I think, very improbable that these cells are *sources* of nervous power, while, on the other hand, the structure, mode of growth, and, indeed, the whole life-history of the rounded ganglion-cells render it very probable that they perform such an office. These two distinct classes of nerve-cells, in connection with the nervous system, which are very closely related, and probably, through nerve-fibres, structurally continuous, seem to perform very different functions,—

the one *originating* currents, while the other is concerned more particularly with the distribution of these, and of the secondary currents induced by them, in very many different directions. A current originating in a *ganglion-cell* would probably give rise to many induced currents as it traversed a *caudate nerve-cell*. It seems probable that nerve-currents emanating from the rounded ganglion-cells may be constantly traversing the innumerable circuits in every part of the nervous system, and that nervous actions are due to a disturbance, perhaps a variation in the intensity of the currents, which must immediately result from the slightest change occurring in any part of the nerve-fibre, as well as from any physical or chemical alteration taking place in the nerve-centres, or in peripheral nervous organs."¹

The fibrillar or striated structure of the cell is figured by Schultze at pp. 178—80 of this essay in Stricker's first volume, where this appearance is fully discussed, together with the various opinions as to the connection of the processes with the contents of the cells.

The neuroglia of the spinal cord and brain-substance.—The finely granular matrix of the spinal cord closely surrounds the nerve-fibrils, and is traversed by extremely fine fibres which by communicating branches unite into a plexus. This fibrous plexus Gerlach considers to belong to the elastic tissues on account of its resistance to the action of alkalis and its non-reception of carmine colouring. By reason of the last property the cell of the connective tissue with its nucleus and its prolongation is, as it were, dissected out from the fibrous plexus that surrounds it. The granular character of the neuroglia, it is suggested by Gerlach, is probably owing to the coagulation of the tissue by hardening agencies.²

Varieties of nerve-fibres.—Schultze recognises the following kinds of nerve-fibres:—

- "1. Primitive fibrils.
- "2. Fasciculi of primitive fibrils.
- "3. Primitive fibrils with medullary sheath.
- "4. Fasciculi of primitive fibrils with medullary sheath.
- "5. Fasciculi of primitive fibrils, invested by the sheath of Schwann (as in the non-medullated nerve-fibres of the sympathetic, the olfactory nerve, and the nerves of the greater number of invertebrate animals).
- "6. Fasciculi of primitive fibrils, with medullary sheath, and the

¹ Beale, 'Indications of the Paths taken by Nerve-currents.'

² Henle and Merkel suggest the hypothesis that the corpuscles of the connective tissue are to be regarded as escaped white corpuscles of the blood. These two bodies, however, are often to be seen in brain-structure side by side, and their differences recognisable.

sheath of Schwann (as the fibres of most of the cerebro-spinal nerves).

"1 and 2 may be distinguished as naked axes cylinders; and where they are invested with a sheath, as simple axes cylinders. It remains undecided whether nerve-fibres exist, possessing a medullary sheath, and the sheath of Schwann, the axis cylinder of which is formed by a single primitive nerve-fibril.

"If the nerve-fibres be divided into two groups, according to the presence or absence of the medullary sheath, they may be further subdivided into—

"I. Non-medullated fibres.

1. Primitive fibrils.
2. Fasciculi of primitive fibrils.
3. These last, with a sheath of Schwann.

"II. Medullated fibres.

1. Primitive fibrils with medullary sheath.
2. Fasciculi of primitive fibrils with medullary sheath.
3. These last with a sheath of Schwann.

"We see then that the primitive fibril forms the elementary constituent of all nerve-fibres. The variations that are observed are dependent on the number of fibrils united together to form one cord, and upon the absence or presence of the medullary sheath and the sheath of Schwann."

Nerve-fibres or Plexuses.—Gerlach points out, and gives figures to show, that

"large fibres spring from the plexus of nerve-fibres that either coalesce to form still larger ones, and, traversing the grey substance, reach the white columns, or attach themselves to the fasciculi of medium-sized nerve-fibres contained in the posterior cornua."

This, however, had been described by Dr. Clarke in several communications to the Royal Society. In his paper "On the Development of the Spinal Cord,"¹ we find the following:

"These observations, then, appear to throw important light upon the question which I formerly proposed, as to whether there is any actual and essential difference between the connective and the true nerve-tissue, or whether the connective tissue of the cord be intermediate in its nature, passing, on the one hand, into *nerve-tissue*, and on the other into *pia mater*. We have seen that the cell-sheath or wall is the product of, and, indeed, is constituted by, the very surface of the primitive nucleus or cell, and that, while it ever after remains in connection with its contents, it forms a part of the surrounding connective tissue, which is itself a prolongation, not only of the *pia mater* of the surface, as well as of the walls of the blood-vessels, but also of the processes of the epithelium. But although there is this uninterrupted continuity between all the constituent

¹ Philosophical Transactions, 1863.

elements of the cord—although, perhaps, the nerve-tissue actually changes by insensible degrees into the tissues with which it is continuous—and although the cell-wall, which forms part of the surrounding reticular structure, is a product of the primitive nucleus—there is yet no ground for believing that the connective tissue, as such, can ever develop itself into nerve-tissue, any more than that any one of the differentiated parts of a fully developed organ can reproduce the entire structure, for the nerve-cell, although it develops itself from its own sheath, which forms part of the nucleated connective tissue, produces something more than this, viz. the granular contents of the cell.”

Characters of the Axis Cylinder.—The axis cylinder was held to be homogeneous in its structure until Beale, and subsequently Schultze, pointed out that, when seen under favorable circumstances, it presents distinct fibrillation. The fibrillar structure is beautifully shown in the illustrations that accompany Dr. Beale’s works.¹ The fibrillar prolongation, the cell-process, becomes the axis cylinder,

“Through diminution of the interfibrillar material, whilst the fibrils become more closely approximated on their parallel course, so that ultimately only a very small quantity of interfibrillar substance remains. In the periphery also it is not difficult to see the fibrillar character of the solitary axes cylinders, as, for example, in the corpuscles of Vater and Pacini, providing that the specimens are examined in the perfectly fresh state, without other addition than that of serum, and with sufficiently high powers.”

Nerve-processes of Posterior Vesicular Column.—One statement by Gerlach we possibly do not correctly apprehend. In commenting on the Deiters as to the existence of nerve-processes in all the ganglionic cells of the grey substance of the spinal cord, a question that has been answered in the affirmative by the last-named anatomist, Gerlach observes:

“I am of opinion, however, that a different answer may be given, as I have made a special examination of a particular group of cells. . . . This group is the already mentioned cell-layer limited on each side to the cervical portion of the spinal cord, and together known as Clarke’s columns. . . . In the nerve-cells of Clarke’s columns I was unable, in any one instance, to discover a nerve-process” (p. 354).

A reference to the original text satisfied us that the translation is perfectly correct. A difficulty, however, presents itself, since a few pages further on Gerlach depicts fasciculi of fibres

¹ See p. 160, and plate 64, of ‘How to Work with the Microscope.’

passing from the posterior vesicular column to the group of cells in the tractus intermedio-lateralis of Clarke.

The cells of the posterior vesicular column and their processes are fully described and delineated by Dr. Clarke in the 'Philosophical Transactions' for 1859, and they are readily seen in transparent sections, with the help of not extremely high powers of the microscope. In the spinal cord of the horse we may add the cells of the column are very distinct, being somewhat larger and more widely separated from each other than in the human cord. The posterior vesicular column itself, in the horse, is longer from side to side, and extends nearer to the central line than in man.

Nerve-fibres of the columns.—The relations of the nerve-fibres of the white substance to the surrounding neuroglia has been well discussed by Max Schultze.¹ They are best observed in stained sections of the spinal cord. In transverse sections the cut ends of the axis cylinder are said to be dyed with the carmine, while the medullary sheath around remains colourless. In longitudinal sections this is still more distinctly seen. The red axis cylinder may be seen lying along in the middle of colourless medulla, although from the great number of the fibres the individuality of each nerve is commonly lost. When the fibres going to the former nerve roots come out from the spinal cord, they traverse the longitudinal columns at right angles, and their divided ends are then easily compared with those which they cross. A good clear section, and a sixth or quarter of an inch object-glass, are required to see these to the best advantage.

Nerve roots of medullary oblongata.—In former numbers of this Journal² we laid before our readers Dr. Clarke's latest observations upon the nerve roots, and upon their nuclei in the very medulla oblongata. We would now refer our readers to the full and accurate account of these structures given by Dr. Meynert, which, however, it is not necessary that we should follow on this occasion. He has well described the intricate and complicated connections of these nerve roots and the morphological relations of the cerebral nerves to those of the spinal cord. It would not, however, be just to overlook a misconception of the author with respect to the origin of the facial nerve.

Lockhart Clarke has shown that just as the sensory root of the trigeminus is prolonged down the medulla through the grey tubercle of Rolando (caput cornu posterioris), so the *motor* nucleus of the trigeminus is prolonged downwards through the medulla oblongata at the inner side of the grey tubercle. This

¹ Stricker, vol. i, p. 154

² April, 1866, and July, 1869.

descending portion of the nucleus becomes one of the origins of the *facial* nerve before it makes its bend round the side of the median sulcus of the fourth ventricle. Meynert admits that this column of cells gives origin to some of the roots of the facial nerve, but denies it to be part of the motor nucleus of the trigeminus, and calls it the *inferior nucleus of the facial*. Clarke, however, has traced its continuity with the motor nucleus of the *trigeminus* above, and it is very evident that its cells are of precisely the same character as those of that nucleus, and much larger than those of the nucleus of the *facial* forming the *fasciculus teres*. Moreover, the physiological and pathological relations of the facial nerve render its connection with the motor nucleus of the trigeminus highly probable; and the substantiation of this anatomical fact is of the first importance as regards both physiology and pathology. Now, Meynert has overlooked the fact that Clarke described this descending prolongation of the motor nucleus of the trigeminus as one of the origins of the facial; for he remarks that Clarke has erred.

“in regarding the *inferior olivary body* as its nucleus of origin instead of the inferior facial nucleus which he has mistaken for the motor nucleus of the fifth.”

This mistake of Meynert is curious when we find in Clarke's description the following words:—

“The lower arm of the loop (of the facial nerve) in its course forwards divides like a brush into separate fibres which plunge into the *motor nucleus of the fifth nerve* and into the superior olivary body.”¹

Cerebellum.—The structure of the cerebellum is given in detail by Henle, and also by Meynert. The grey matter is distributed in three nuclei, or layers, viz. the cortex, the corpus dentatum, and the vermiform process.

Cells of the cerebellum.—In the cortex of the cerebellum three layers are generally described, (1) the outer or pure grey, (2) the middle layer, consisting of the large cells of Purkinje, and (3) the inner or granular layer. To these should be added a band of fibres, pointed out by Meynert, containing fusiform cells, and traversing the processes of the cells of Purkinje. These fibres are very distinct in man; in the monkey, however, they are not always apparent. The large nerve-cells of the grey matter of the cerebellum differ slightly in form, in the middle layer of the cortex, from those of the corpus dentatum. In the latter they resemble the cells of the olivary body, both in shape and in the folded arrangement of their groups. In the former they are arranged in a line, side by side, and are

¹ ‘Phil. Trans.,’ 1868, p. 298, fig. 55, plate xiii, s.

devoid of processes on their inner aspect. In several instances that we have examined we have observed that the protoplasm within had not more than half filled the space of the cell, the larger end being seemingly empty. How far this appearance may be due to the contracting influences of hardening agents is open to doubt.

Morphology of the cells of the cerebellum.—"Dr. Meynert considers that the cells of Purkinje are, in a morphological sense, bipolar. Their internal and external extremities are the rudiments of two types of nerve-corpuscles. If we could divide a nerve-corpuscle of Purkinje into two halves and connect each with another similar half, so as again to form one whole, the distended base, directed towards the granules of the commonly called 'flask-shaped' body with its (probably) single process, would by its duplication represent one of those articular forms, poor in processes, that are connected with the *sensory* roots in the interspinal ganglia, in the Gasserian ganglia, and in the descending roots of the fifth. The half which passes into the neck of the flask, that is to say, by gradual attenuation into the thick processes turned towards the pure gray layer, would, on the other hand, by its duplication, represent one of the slender forms, rich in thick processes, that form the origin of all motor roots" (p. 522).

Granular layer of the cerebellum.—The internal layer of the grey matter of the cerebellum consists of a large number of minute cells that resemble the corpuscles of the granular layer of the olfactory lobe, and in size resembles lymph corpuscles. Very fine processes may be seen given off from some of these cells; they are more readily seen in those cells that are scattered in the medullary or granular layer of the cerebellum.

The medullary fibres spread out between the leaflets or convolutions of the cerebellum, and send round a band of fibres externally to the cells of Purkinje. The radiating fibres may be traced branching off from the central stem and in contact with the minute corpuscles of the granular or internal layer of the grey substance of the cerebellum.

We are here compelled to bring our remarks to a close, regretting that we have not space to do complete justice to the mass of facts contained in the works upon which we have been engaged. We would repeat the opinion that in these, histological science,—particularly as concerned with the nervous centres, has made a great gain; at the same time we desire to express the conviction that the profession owes no small obligation to the New Sydenham Society for the very judicious selection it has made of continental treatises of lasting value, which otherwise might remain unknown to most English readers.

VI.—Dr. Thomas on the Diseases of Women.¹

DR. THOMAS opens his work with a tolerably complete "Historical Sketch of Gynækology." He truly says that "some of the most valuable contributions to modern gynækology will be found to be foreshadowed, or even plainly stated by the writers of a past age. Take, as examples, the use of the uterine sound, sponge-tents, dilatation of the constricted cervix, and even the speculum itself."

Soranus the younger, the biographer of Hippocrates, appears to be the first who wrote accurately upon the diseases of women. "He was the first," says Lessing, "who treated of Gynækology in a scientific manner." Aetius alludes to the use of a uterine sound as a repositor in displacements of that organ. He also "mentions the use of vapour, medicated or simple, conducted to the cervix by means of a reed passed up the vagina." Hippocrates and Avicenna however, had both referred to the sound, long previously. Truly do these and other facts mentioned by Dr. Thomas, incline one to agree with him as to the truth of the proposition formulated by Aristotle above two thousand years ago, that "probably all art and all wisdom have often been already fully explored, and again quite forgotten;" or, in the words of another wise man, "There is nothing new under the sun."

Dr. Thomas figures the ancient valvular specula of Scultetus, and does not fail to mention the well-known bivalve speculum which was found among the ruins of Pompeii, and is now preserved in the Museo Borbonico at Naples. There is abundant evidence to show that most, if not all the modern methods of exploration were known to the ancients; but to Recamier belongs the honour, if not of rediscovery, at least of scientific and intelligent use of several of them. He, indeed, popularised their use.

To Recamier and Sir James Simpson the present practice of gynækology is beyond measure indebted. Dr. Thomas pays a warm tribute to these distinguished men, and also to our compatriot, Dr. Henry Bennet, whose work on 'Inflammation of the Uterus' he eulogises, though he does not accept all the views advanced therein.

The vexed question of the causation and nature of the more common uterine diseases is touched upon by the author, who

¹ *A Practical Treatise on the Diseases of Women.* By T. GAILLARD THOMAS, M.D. Third edition, pp. 784. London and Philadelphia.

briefly refers to the different pathological doctrines propounded. Unhappily these have been of the most conflicting character, and often fundamentally opposed to each other; as, for instance, that inflammation is the starting-point of most of the affections of the womb, and, *per contrâ*, that uterine disorders commonly commence in displacement. With such radically different tenets as to the pathology of uterine affections came disputes between the respective holders of them, and the time has not long passed when much unseemly and unprofitable discussion arose thereon.

Unfortunately the pathology of uterine disease has rarely, if ever, yet been thoroughly and scientifically studied by those most competent to do so, *viz.* by gynæcologists themselves, who, being for the most part also engaged in obstetric practice, do not, in justice to their patients, dare to pursue with the necessary closeness the investigations required to throw light upon the obscurities that now enshroud their department of medicine. The researches of German pathologists have undoubtedly done much for gynæcology, but much more still remains, and until it is accomplished this important department of medicine must lack the precision possessed by its sister branches, physic and surgery, in a more abundant measure. It is not a little singular that men of ability should pin their faith to certain doctrines, and obstinately hold by them, to the exclusion of all other views, even when the latter, from their origin or character, are, to say the least, worthy of consideration.

What dispassionate observer, for instance, can doubt that in certain cases uterine displacements and other troubles follow engorgements and inflammations of the womb? Or, on the other hand, that displacements may suddenly arise from accidents—falls and the like—and that engorgements, inflammations, and a train of other evils, may ensue therefrom? An exclusive regard of either aspect is obviously fraught with danger as well as error, and seriously retards the progress of scientific medicine. It is this one-sided spirit that has elicited the sneer recently uttered that “some time ago we heard of nothing but ulcerations, and now we hear of nothing but flexions.” Such a sneer, however much it is to be regretted, is not to be wondered at, since it finds its justification in the practice of “cauterizing the ulcers through the speculum”—ulcers that probably never existed, save in the imagination of the practitioner, and the routine introduction of a pessary,—“stem” “saddle” or other, for remedying conditions that only the person who persistently employs these agents can discover. Cannot men see that the exclusive pursuance of either plan must inevitably

lead to mischievous mistakes, alike detrimental to their patients, their profession, and themselves?

These reflections are provoked by perusing Dr. Thomas's remarks on the conflicting views which have prevailed, and do still prevail, in this department of medicine.

Dr. Thomas candidly admits that he has seen reason to relinquish many of the exclusive views he formerly held and to enlarge the basis of his practice. He argues forcibly for the adoption of broader views, such as, indeed, must prevail before the practice of gynækology can be universally free from the reproach that now attends it, save in the hands of a distinguished few.

Unhappily the dissensions of gynækologists among themselves have lowered their department of practice in the eyes of those who do not pursue it, and they have thus laid themselves open to ridicule, a weapon easily wielded even by the ignorant, who are only too ready to follow the fashion of the day.

But there is much disingenuousness in the superficial comments of many who affect to look down upon gynækologists; they would be ashamed to ridicule the opinions of such men as Velpeau and Virchow in the matter of the amputation of a breast and the character of the disease which called for its ablation, and yet they have not the candour to refer to the views and statements of these eminent men upon the subject of uterine flexions, the former from a clinical, the latter from a pathological standpoint. Those who are acquainted with the writings of Velpeau and Virchow know that both these distinguished men have worked ably at the subject of uterine flexions, the former holding strongly "that the majority of women treated for other affections of the uterus have only displacements," and the latter showing the pathological changes that occur in these cases.

As we have intimated, it is the indiscriminating partizans of one-sided views, and the ill-informed holders of limited notions who bring gynækologists into discredit. Those who will take a broad and comprehensive view of their specialty, those who will alike view and practise it from the standpoint of the general physician, will do much to advance its interests and to place it in the position it merits. Dr. Thomas's work will help forward in this direction, and we hail such a worker as a real servant of science.

Dr. Thomas just touches upon the vexed subject of lady doctors. He disclaims any wish to oppose their admission into the profession, but adds, "Nevertheless, there is no resisting the evidence of history that, in spite of these opportunities (of which illustrations are given) and incentives, female practi-

tioners have failed in times past, not only to advance, but even to maintain the integrity of the art intrusted to their hands."

Regarding the etiology of uterine diseases the author at the causes which militate against her physical well-being, the outset declares that it is his intention to refer especially to the causes that are active in America. It would seem that American women of all classes are remarkably prone to uterine affections, considerably more so than their European sisters. The author states his belief that, "if properly developed and placed beyond human female would be in no great degree the inferior of the male;" and he maintains "that the customs of civilised life have depreciated her powers of endurance and capacity for resisting disease." The author's catalogue of "influences which, growing out of civilisation and refinement, tend most decidedly to produce uterine disorders," is pretty much such as would be drawn up by a European gynækologist, except that we doubt whether the latter would include as one of the leading factors "prevention of conception and induction of abortion." For although such practices are unhappily by no means unknown on this side of the Atlantic, they are yet not as commonly practised as they appear to be in America, where, indeed, one would have thought births would be welcomed, and would have hoped that the moral tone of American women had been too high to allow them to resort, almost as a matter of course, it would seem, to practices to prevent the bringing forth of offspring.

The author tells us that American women take much less exercise than those of Europe—exercise of every kind. "A morbid desire to cultivate an appearance of delicacy in form and complexion," and "great improprieties of dress," are mentioned by him as patent hygienic errors on the part of his countrywomen. It is not a little curious that women should be so grievously mistaken as to suppose that "delicacy of form and appearance" can ever be attractive to men,—on whose account it may be surmised they cultivate this morbid state, or that they can be so blind as not to see that the beauty of health is the best and most lasting adornment. The writer of this review has heard many American ladies exclaim with wonder and admiration at the fresh and blooming looks of their English sisters, whose obvious advantages in this respect they are wont to attribute to the "climate." Their mode of life, food, and occupation, would probably more correctly explain the difference. The only class in England which aspires to "delicacy of form and appearance" on account of such delicacy being, as they erroneously suppose, indicative of high birth, are the misguided people who affect—not gentility, but—to be "genteel."

If they knew more of their highly born sisters they would see that as a class none are more blooming than are those of this land, although from indolence and caprice here and there individuals are or affect to be "delicate."

Another cause of much of the female illness which prevails in America is attributed to the excessive development of the nervous system which is characteristic of Americans. We fully endorse the following quotation from the chapter on "Etiology of Uterine Diseases," which, if it have not the same force as regards the women of England as those of America, is not without its application:—"In a woman thus developed the physiological congestion of the pelvic organs attending ovulation produces pain which is known as neuralgic dysmenorrhœa; the normal hypertrophy of the uterus consequent upon utero-gestation slowly and imperfectly passes off, 'sub-involution' often remaining; while the enfeebled muscular supports of the heavy organ allow it to lapse from its position and assume that of 'flexion' or 'version.'"

Dr. Thomas thinks the dress of the present day unsuitable, the contraction of the body at the waist pressing down the abdominal contents upon the uterus and so favouring the production of displacement of various kinds. Simple pushing down of the uterus to a lower level than normal becomes a source of pain and trouble on marriage, from the liability of the organ to concussion during coitus. *Apropos* of this the author exclaims, "How often do we see uterine disease occur just after matrimony even when no excesses have been committed?" The radical treatment of flexions and other like displacements, when thus induced, must always be accompanied by alteration of dress, otherwise pessaries, &c., will be unavailing, if not hurtful.

When Dr. Thomas exclaims against imprudence after parturition, we feel that his remarks apply with equal if not greater force to our English women, among whom, probably, this is the most fertile cause of uterine troubles. Too early rising after parturition, so common amongst the poorer classes in this country, is a frequent cause of uterine displacements, some of which, as prolapse, are an ever-present burden afterwards. It is to be regretted that accoucheurs do not more firmly insist upon the recumbent position for, at least, the first fortnight. Much after-suffering would be thereby averted.

"Prevention of conception and induction of abortion" are both often productive of uterine disorder—the latter especially. We sympathise with Dr. Thomas in his sorrow that practices like these should be, as he says, of such "fearful frequency" in America. So serious has the evil become there that the

American Medical Association not long ago offered a prize for "a short and comprehensive tract for circulation among females for the purpose of enlightening them upon the criminality and physical evils of forced abortion," which was awarded to Prof. H. R. Storer for an able essay entitled "Why not?" For the sake of our American sisters we regret to hear Dr. Thomas's testimony that "this crime is frequent in all classes of society."

Marriage, as a cure for uterine disease, should be recommended with caution. Dr. Thomas thinks it rarely cures endometritis, and should not be enjoined in parenchymatous disease, peri-uterine cellulitis, or pelvic-peritonitis.

"The diagnosis of the diseases of the pelvic viscera of the female offers many obscurities, and frequently foils the most careful and capable practitioner," says Dr. Thomas, a statement from which few who have an intimate acquaintance with the subject would venture to dissent. The great difficulty experienced in investigating cases of uterine disease by those who are unacquainted with gynækology is well known; such persons are rarely familiar with the standards of health, and, therefore, find it exceedingly difficult to diagnose deviations therefrom; but even the practised gynækologist himself is sometimes sorely put to to determine with satisfactory exactitude the condition of some of his patients.

Dr. Thomas gives a fairly comprehensive scheme for investigating cases. His directions for physical examination are in some respects in keeping with those of Dr. Marion Sims. Like Dr. Sims, he prefers to place the patient not on the side but on the back, a position to which objection may be made on several grounds. In the first place a vaginal examination can be more easily and decently made with the patient in the ordinary obstetric position on the left side, and this obviates the necessity for entirely covering the patient with a sheet. When lying on the side the perinæum can be easily retracted and the examination be thus materially facilitated. Bimanual exploration can ordinarily be made equally well with the patient in this position, and the dorsal position has by no means the great value Dr. Thomas assigns to it. Conjoined manipulation is of great value, and should be practised by all.

We gather from the author's remarks on the speculum that it "chiefly aids us in this field by opening the way to the proper use of the sound." We confess to feeling some surprise at this statement. We are persuaded that the sound can, as a rule, be far more easily and safely passed without the help of the speculum than with it, provided the patient be placed on her side; and that much more information is gleaned by its use in this manner than when a speculum is employed. Hence

it is we prefer the side position, which generally enables us to dispense with the aid of the speculum, the effect of which often is the alteration of the relations of the uterus and vagina, and a danger of misleading.

The rectal touch is also a valuable mode of exploration. Although Dr. Thomas has much to say on the subject of specula, we see no mention of the speculum of Neugebauer, of Warsaw, which is useful in some cases; though, probably for all practical purposes, the old-fashioned speculum of Ferguson and Sims's duck-bill—of both of which Dr. Thomas has a high opinion—are greatly to be preferred to the many varieties to be found in shops and collections of instruments. We think it a great recommendation of Dr. Sims's speculum that it is to be applied with the patient in the lateral position, and thus obviates the necessity for disturbance when the patient is once comfortably placed on her side.

When considering the use of the sound we do not wonder, seeing the plan he adopts, that Dr. Thomas speaks of difficulty in introducing it in cases of displacement of the uterus. In the lateral position, which we usually prefer, we rarely have any difficulty in introducing the instrument, even in the most marked cases of flexion. This we attribute to our plan of bending the sound to the degree that we suppose desirable by information previously gained by touch. Neither do we experience the difficulty with the internal os which occurs to some. We cannot approve of a very yielding metal probe, such as Dr. Sims has introduced and Dr. Thomas approves. As regards uterine sounds and probes we prefer to have two kinds—first, a firm instrument, a sound which is soft enough to be bent into any desired form, but which will retain its shape when so bent; and, secondly, flexible instruments, such as probes of whalebone and bougies of various kinds and sizes. Thus armed we can make our explorations with safety and exactitude.

Dr. Henry Bennet's soft wax bougies are sometimes useful in enabling us to take a mould of the cervical canal, but Dr. Thomas does not mention them.

Dilatation of the uterine cavity by means of tents is certainly one of the most valuable means of investigation the gynæcologist possesses. It is not without risk, however, which makes the cautious physician reluctant to employ it. The author's remarks upon this subject are sound and judicious.

We now come to diseases proper, beginning with "Diseases of the Vulva." The chapter begins with the usual anatomical description of the parts, followed by a short account of vulvitis, purulent, follicular, and gangrenous. Neither of the first two

forms, in Dr. Thomas's opinion, arises from constitutional causes, though it may be questioned whether the follicular form does not sometimes depend on a general condition. About the third form, however, there is no doubt. Happily it is a rare affection. Cauterants are recommended. Very little is written about the eruptive diseases of the vulva, not enough, we think, seeing how seriously troublesome they may become. Here, again, much might be said upon constitutional states as predisposing to these forms of disease—the association of diabetes with eczema, for instance. Phlegmon of the labia is glanced at, but pudendal hæmorrhage and pudendal hæmatocele are more fully treated. Dr. Thomas's experience coincides with our own, that the latter affection is decidedly rare in the unmarried. Pudendal herniæ and hydrocele are also rare affections upon which Dr. Thomas makes some useful remarks.

Pruritus of the vulva, often a serious affection and one of considerable interest, is a disorder upon the pathology of which we had hoped that the author, out of the abundance of his experience, would have furnished us with some valuable information, but, though he handles the subject well, he throws no new light upon it.

We confess to some hesitation in attributing, as he does, the itching which occasionally accompanies diabetes to the direct and local influence exerted by the disordered secretions, without, probably, any connection with the constitutional effects upon the nerves. For, seeing the derangements in the cutaneous nerve supply of other parts of the body witnessed in diabetes, we should incline to regard this lesion as the more important. The remarks on treatment are judicious. Infusion of tobacco appears to be highly thought of, and so does a solution of corrosive sublimate.

In referring to coccygodynia but scant credit is given to Sir James Simpson. Dr. Nott is stated to have been the first to describe the affection, under the name of neuralgia of the coccyx, but the appellation given to it by Sir James Simpson is now preferred. But little is said as regards the pathology of the affection. In many cases we believe there is caries of the terminal bone or bones of the coccyx, and that extirpation is the best remedy; separation of the attachments alone rarely giving permanent relief in the presence of caries.

The influence of ruptured perinæum in producing uterine displacements is a moot point. Dr. Thomas regards it as considerable, while Dr. Matthews Duncan denies such influence, or, at any rate, holds it as very doubtful. Exclusive truth rests with neither of these two opposite views; it depends upon the

degree of rupture and other conditions whether much inconvenience ensues, but in most cases it is well to remedy the laceration by timely operation. The closure of the wound by silver sutures appears, on all hands, to be the best method of dealing with this accident.

Vaginismus, a most troublesome affection, would appear, from Dr. Thomas's statements, to be somewhat common in America. It may have a local or general origin, most commonly the former. Very opposite plans of treatment have been advocated, some resorting to the knife, others preferring dilations and anæsthetics, but both agree as to the necessity of rectifying any obvious local or general disorder.

The chapter on vaginitis, simple, specific, and granular, is a satisfactory *résumé* of what is known upon the subject at the present day. One or other form, either the first or second, is much more common than is generally supposed. The specific form is often extremely chronic, owing, probably, to insufficiency in the local application of remedies. Dr. Thomas does not mention ovaritis among the complications that may attend this form of vaginitis. We think it not infrequent. Granular vaginitis probably occurs, as Dr. Thomas says, much more commonly during pregnancy than in the non-gravid state, but we have met with instances in non-pregnant women, generally aged persons.

As regards treatment, there is little to be added to what the author has said; but we would call attention to the success which results from the local application of astringent remedies, which should be done by the physician himself to ensure their proper use. Setting aside the congenital form, probably atresia vaginæ (on which Dr. Thomas has a good chapter) arises more frequently from prolonged labour than from any other single cause. Accoucheurs, as a class, under the bondage of the dictum that "meddlesome midwifery is bad," too often, it is to be feared, allow their patients to remain hours in labour when delivery might, with infinite safety, be materially expedited by judicious interference. We hope this deplorable kind of practice is daily lessening, an end to which the publication of Dr. Barnes's able work on 'Obstetric Operations' will materially contribute.

The chapter on "Prolapsus Vaginæ" and "Vaginal Herniæ" is also good, though it is certainly a moot point whether prolapse of the vagina alone can ever occur. What is generally regarded as such consists of a prolapse of the vaginal wall with other adjoining parts; in fact, what is here comprehended under the term "vaginal herniæ." As Dr. Savage remarks, "Prolapse of the vagina alone, or prolapse of the vaginal

mucous membrane alone, are two affections which, anatomically considered, would seem impossible." Dr. Thomas has some valuable remarks on vaginal enterocele (or hernia of intestine into Douglas's pouch) in reference to labour, and adds a caution with regard to puncture of vaginal tumours during labour for the purpose of ascertaining their contents. The rule should be, we apprehend, to endeavour to return all such tumours of doubtful character out of the reach of injury by the fœtus. Failing this, of course a careful differential diagnosis must be made, and then the aspirator may be used in doubtful cases. After the use of mechanical and other means, perhaps surgical procedures promise more satisfactory results in cases of vaginal prolapse, uncomplicated by enlargement of the uterus, than in other forms of prolapse of the female genitals.

When the womb is large, narrowing of the vagina is rarely, if ever, permanently successful, owing to the constant downward pressure of the heavy organ; but when the uterus is healthy constriction of the vagina is a most successful operation.

Fistulæ of the female genitals are very fully and ably treated. This subject has yielded some of the best triumphs of modern surgery, to which our American *confrères* have pre-eminently contributed. The three essentials in the operation for these fistulæ are a speculum, an unirritating suture, and a means for keeping the bladder empty during the process of cure. As regards the last point, some English operators discard the continuous use of the catheter, and believe they obtain equally good results without it. Simon, of Heidelberg, does the same. He also prefers silk to silver sutures. Elytroplasty is now rarely employed, Simon's operation of closure of the vagina being generally preferred in the severe cases which call for such procedures. In the sad cases of fistulæ, with extensive destruction of the base of the bladder Dr. Bozeman's new operation of dragging down the womb and fixing it to the edge of the fistula, after vivification of both it and the cervix, promises success.

In the chapter entitled "General Considerations on Uterine Pathology and Treatment" Dr. Thomas reviews the various doctrines held, and briefly states his own views. He sides exclusively with neither party, but recognises truth (which he endeavours to illustrate) in each of the views propounded. It is clear, says he, that for the uterus to perform its functions naturally each of its component tissues must be in a healthy state, and that its position should be normal.

A laboured discussion, into which it would be unprofitable to enter, follows. What constitutes inflammation is the debatable point. Dr. Thomas, for reasons which he gives, but which we are bound to say scarcely satisfy us, proposes the name "areolar hyper-

plasia" for what has hitherto generally been known as chronic metritis. But much more careful pathological investigation is required before we shall be in a position to state with sufficient exactitude what term will, on pathological grounds, be most applicable to the affection in question. The author states that when the uterus is affected below the level of the inner os he always gives a favorable prognosis, except, of course, when there is reason to suspect malignancy; but when the disease is situated above this zone he is far less sanguine. Speaking generally of the prognosis in uterine disorders, Dr. Thomas states, what all conscientious gynecologists must concur in, that "the fact is notorious that the local treatment of these diseases (chronic inflammations) is not as successful in its results as we could wish." He attributes this circumstance mainly to imperfections and errors in diagnosis or treatment.

Endo-metritis of the cervix, of the body, or of both, would appear, in Dr. Thomas's experience, to be a very common affection. Its causes are numerous. Probably many of these cases might preferably be called examples of catarrh of the uterus, which may be expected to subside after a little while without special treatment. This, doubtless, not unfrequently occurs. But, like a catarrh of the air-passages, it may develop into something more serious, and become real inflammation, in which case the submucous tissues are commonly more or less invaded, thus giving rise to parenchymatous inflammation. We cannot agree with the author in seeing no valid reason why all the submucous tissue should not be involved in the inflammatory process; on the contrary, we should expect that each of the tissues would be more or less implicated, and not the areolar alone. Amongst the several judicious directions as to treatment, that for the administration of *veratrum viride* is one we would gladly see more frequently adopted in this country when high febrile action shows itself.

As might be expected from the differences in the anatomy of the cervix and body, there are variations in the character of the inflammatory processes which go on in them respectively. We note with satisfaction that Dr. Thomas declares his preference for general over local medication were he restricted to either; but he thinks a judicious combination of the two to be attended by the most satisfactory results, and gives full directions for both.

The author makes no mention of strong solution of iodine in refractory cases of cervical metritis, which will often yield to this remedy. We do not think his account of chronic corporeal endo-metritis quite so satisfactory as that given of the cervical form, for he seems to be hampered by consideration for his

favorite notion of "areolar hyperplasia." He subjoins a wholesome caution against injecting fluids into the uterine cavity—a practice which is fraught with danger.

The name areolar hyperplasia binds down the author to an hypothesis which will not hold water. It involves the notion that the connective-tissue elements alone hypertrophy, and disowns the muscular element as the one most readily provoked to increase. We do not deny that, in the disease in question, there is hyperplasia of connective tissue, or, at any rate, of non-muscular elements, but we must aver our belief that concomitantly there is increase in the muscular elements also.

Dr. Thomas says that "neoplasms, whether they be sub-mucous, subserous, or mural, keep up a constant nervous irritation that induces hyperæmia of active character, which proves the first step towards the affection." Now, in the first place, the presence of such bodies excites contraction involving the action of muscular tissue; then, again, how "hyperæmia of active character" can go on in the womb, and affect only one of its component tissues—the areolar—we are at a loss to know. We should have thought that the muscular tissue would have partaken in the augmented blood-supply, and consequently have undergone increase in the presence of foreign bodies or other causes exciting it to action.

We can well understand that some forms of congestion are accompanied by exudation, which would increase the bulk of the womb without setting up increased growth of muscle, but we have some difficulty in comprehending how "active hyperæmia" should do this. Observers disagree as to the nature of the tissues found in excess in chronic metritis, some stating that the connective tissue alone is augmented, as Dr. Thomas would appear to think; while others hold that both it and the muscular are more abundant than in health. Speaking generally, we decidedly concur in the latter view; but, as we have said, the whole subject calls for further investigation.

The difficulty of emancipation from the domination of old notions is well exemplified by the author in the chapter on "Ulceration of the Os and Cervix Uteri." While explicitly admitting that the affection commonly called "ulceration of the womb" "certainly does not present the features which are generally considered characteristic of the process of ulceration elsewhere," the author yet retains the term, because he thinks it "fulfils the purpose for which it is employed better than any other, and is too generally accepted and sanctioned to admit of alteration," though he has to ask the reader "to bear in mind that what is called ulcer here is called granular degeneration

when it occurs under the lids" (the eyelids, we presume). This is scarcely consistent in one who disregards the long-used term—chronic metritis, and coins a new one—*areolar hyperplasia*. In the interest of the poor sufferers it is to be regretted that Dr. Thomas lends his support to a term of evil signification by retaining it in a work of the advanced character which his treatise undoubtedly is. We are sure, from abundant observation and inquiry, that the statement of the physician to a woman having an abraded condition of the cervix uteri, that her "womb is ulcerated," is received with scarcely less terror than the statement that she has cancer would be.

It is cruel thus to trifle with the feelings of our patients by using a term which we know to be pathologically and clinically incorrect, and which at the same time conveys an unnecessarily exaggerated idea of the nature of the disease from which the patient suffers. Dr. Thomas himself furnishes us with the severest comment on the misuse of the word "ulceration," for at page 382 he says, "'Ulcer' in the popular mind means anything that is frightful in the way of lesion, from erythema to carcinoma."

Besides relieving the minds of our suffering patients it would advance professional knowledge to drop such a term altogether, since to the unskilled and unobservant in our ranks it conveys an utterly erroneous idea of the nature of the affection; an idea, too, which is fraught with mischief, inasmuch as it carries with it the notion that a certain line of treatment, mainly consisting in sharp cauterization, is called for in these cases.

We cannot, therefore, approve of the author's classification of the varieties of cervical ulceration. What he calls granular ulcer is, by his own showing, not an ulcer at all. It is, however, an extremely common affection, and on that ground alone is of great practical importance. The author says, "Of all the varieties of ulceration this is by far the most frequent."

Instead, however, of there being loss of tissue, as would be the case were there true ulceration, there is here rather hyperplasia. Admitting that cauterants, or rather, we should say, stimulants, of various kinds, are often useful in some, perhaps most forms of the affection, we cannot endorse what Dr. Thomas has to say upon their use, nor can we congratulate him upon the various therapeutic measures he recommends for its cure. Of the rest of the section on ulcers nothing need be said.

The important subject of "Displacements of the Uterus" comes next. An excellent historical *résumé* is given, together with a short account of the opposite views held as to the pathology of versions and flexions. This is an admirably written chapter, and contrasts favorably with that on "Ulceration."

The etiology of flexions and versions is also considered, though not in the light of all that is now known with reference to it. The section on descent of the uterus is complete and well written. The operation of elytrorrhaphy is highly thought of by the author. It affords much comfort for a time, but we believe that patients do not enjoy a long immunity from their troubles, the superjacent womb sooner or later forcing itself down through the constricted vagina, and then the state of things may be worse than before. Still, in some cases, *e. g.* when the uterus is small, the operation is one of great promise. Flexions and versions are next fully and ably considered, Dr. Thomas's remarks being complete and reliable. His observations on pessaries are particularly judicious.

The subject of inversion of the womb is also well handled in an instructive and interesting chapter. In considering this accident it should not be forgotten that when the organ contracts after delivery it does so in every diameter, longitudinal as well as transverse; and it may be that any irregularity or excess of contraction of one side over the other may drag down one cornu, and thus initiate inversion. He details two severe cases which resisted all known means of treatment but amputation, which was rejected by the patients, and he then resorted to abdominal section, dilatation of the cervical canal on the peritoneal aspect, and replacement. One case recovered, and the patient subsequently became pregnant. The other patient died of peritonitis forty-eight hours after the operation. Such an operation might be justifiable in very extreme cases, such as Dr. Thomas records, but probably the preferable and most satisfactory of all methods of reduction is that of continuous pressure, elastic or otherwise, as may be indicated.

For "pelvic cellulitis" Dr. Thomas proposes to substitute, as being more correct, the name "peri-uterine cellulitis." He gives a clear account of the affection, which he distinguishes from pelvic peritonitis. We are struck with the absence of any reference to the temperature, as indicated by the thermometer, in the chapter on this affection, and, indeed, throughout the work this valuable instrument is neglected. Pelvic peritonitis is defined as being "inflammation involving the peritoneum covering the female pelvic viscera, and limited to it," not that which may arise in the pelvis and spread into general peritonitis. The author believes that peri-uterine cellulitis is very rare in the non-pregnant woman, while pelvic peritonitis is very common, and that the two affections are entirely distinct, and may readily be distinguished. We think his observations on the pathology of pelvic peritonitis somewhat open to remark on the score of ambiguity.

Chapter xxvi is upon "Pelvic Abscess," a division which is superfluous, as the subject might more conveniently have been dealt with in the sections on peri-uterine cellulitis and pelvic peritonitis and elsewhere. For example, the author speaks of ovarian abscesses as pelvic abscesses, which, of course, is true in a broad sense; but they might preferably have been treated of, once for all, under the section devoted to diseases of the ovary. The questions as to the propriety of opening pelvic abscesses are fairly put.

The chapter on "Pelvic Hæmatocele" is an excellent one; it is clear, terse, and correct. The portion on treatment, however, is scarcely complete. No mention is made of the internal administration of astringents, a great oversight, inasmuch as gallic acid, the astringent forms of iron, turpentine, and other drugs of this class, are extremely useful in these cases.

The difficult and, therapeutically, somewhat disheartening subject of fibroids of the uterus comes next. No one who practises gynæcology but must feel how little within his control these growths for the most part are. Some, it is true, are amenable to treatment, but the more serious forms are, unhappily, as a rule, not so. And yet much may generally be done for the patient, as Dr. Thomas well shows in his able chapter on the subject.

In keeping with the advanced views and freedom from prejudice, which may be said to characterise his work, Dr. Thomas hopes that the time will soon come when we shall be enabled, by improved methods of operation, to deal as effectually with these growths as we now do with ovarian tumours, and perchance the galvanic cautery may hereafter offer the means of so doing.

A few remarks are made on cysto-fibromata, which, except as regards diagnosis, are rather of pathological than of clinical interest.

The author's classification of uterine polypi has the merit of simplicity, but in respect of the fourth class—fibrinous polypi arising from some foreign mass retained in the uterus—it is redundant. This form cannot be correctly called a polypus of the womb, and its appearance in a classification of polypi perpetuates an old and entirely erroneous notion as to the causation of such growths, whether of womb, heart, or elsewhere. Indeed, the author himself remarks, the *tissues* of the uterus give rise to true polypi, and therefore, logically, we may look only for such as arise from either the fibrous, the muscular, or the glandular elements; but a mass of blood retained within the uterine cavity can hardly, though it assume a polypoid form, be said to be a

polypus of that organ. The remarks on treatment are concise.

Dr. Thomas enters upon the chapter on "Cancer of the Uterus" in a desponding manner. "Few subjects," says he, "present themselves to the writer of a systematic treatise on gynækology which offer such difficulties and so many perplexities as that which we now undertake."

We think he does right, in view of the histological difficulties that present themselves in making a pathological classification, to adopt the clinical character of malignancy pervading all this group of affections of the uterus as the basis of his arrangement, though he might with advantage have adhered more strictly to it than he has done. A good account of the history of the affection is given, but no light is thrown upon the all-important point of etiology, which is dismissed in a dozen lines. Speaking of the treatment, Dr. Thomas advocates early ablation where possible, and, in some cases, the application of violent caustics. He does not mention the plan of scraping recommended by Professor Simon, of Heidelberg, which answers well in some cases, and greatly lessens hæmorrhagic and other discharges. The indications for treatment are fairly abreast with the therapeutical knowledge of the day. "Cancroid Epithelioma, or epithelial cancer of the uterus," is treated separately, but we doubt the expediency of so doing. Cancer and cancroid are both malignant. The difference between them is one of degree, or of rate of growth and rapidity with which they affect the constitution rather than of essence. The latest English researches on cancers, by Henry Arnott, lead one to doubt whether Dr. Thomas does well to say, as regards the distinctions between cancer and epithelioma, that the former "is probably from the first a constitutional disease," while the latter "is at first a local evil," since Arnott's observations lead him to conclude that all cancers are at first strictly local. The difference may be stated thus: in the one there is a tendency to the early implication of the neighbouring glands, while in the other this implication is a later evil.

Cancer of the body of the uterus, again, is considered in a separate chapter. There is, perhaps, some propriety in this, seeing how great are the diversities of opinion as to the occurrence of primary cancer in the body or fundus of the womb. Rare, however, as this form of malignant disease is, it is undoubtedly occasionally met with. Its recognition is obviously a matter of considerable importance, the earlier the better, since it is not unamenable to treatment.

The next chapter is devoted to "Fibro-plastic and Recurrent Fibroid Tumours," which the author regards as occupying de-

batable ground between the cancers and myo-fibromata. The chief characteristic of these growths is their marked tendency to return after ablation. Another feature is their proneness to fungosity. The little, good as it is, that Dr. Thomas has to say on these growths might, we think, better have been said in the section on fibroids of the uterus, which would then at a glance, as it were, have embraced the full consideration of all non-malignant fibroid or fibro-cystic tumours of the organ.

The next chapter is a compact one on "Diseases resulting from Pregnancy." The subject is not treated exhaustively, but what is said is useful. Then follows a chapter "On some of the most important Results of Uterine Disease, as Dysmenorrhœa, Menorrhagia, &c." The author's definition is scarcely logical; but it enables him to deal collectively with a class of disorders of great practical importance, both from their frequency and character.

Of dysmenorrhœa Dr. Thomas makes five varieties—neuralgic, congestive, inflammatory, obstructive, and membranous. The first he likens to ordinary neuralgia occurring elsewhere, arising from various causes, and calling for a like line of treatment. The congestive form he attributes to "hyperæmia not exciting true inflammation in the uterine vessels, which, being augmented at menstrual epochs, creates pressure upon the neighbouring nerves, and consequently pain." Whether this is the correct explanation of the origin of the pain may be disputed; but certainly there is a class of cases characterised by the symptoms detailed, apparently dependent on the hyperæmia which is so prominent a feature. In these cases we believe that saline purgatives and bromide of potassium are very useful adjuncts to bleeding when the latter is indicated. The next or inflammatory class is due, the author says, in a great many cases, to inflammation of the uterine mucous membrane, which gives rise to pain when "the erethism engendered by menstruation occurs." Dr. Thomas says but little, and that unimportant, on this form. He then deals with obstructive dysmenorrhœa. This is the form so commonly seen in displacements of the womb, and rarely in those diseases of other parts of the genital canal which are unaccompanied by mechanical impediment to the escape of blood from the interior of the uterus.

The therapeutic indications are obvious, though each case may call for some one or other of the special procedures which are detailed in the remarks on treatment.

It is to be regretted, however, that Dr. Thomas does not emphatically caution his readers against lightly resorting to incisions of the cervix, which are recommended in certain cases.

The operation is by no means devoid of risk, and should only be employed in otherwise irremediable cases. Membranous dysmenorrhœa is the last of Dr. Thomas's list of forms of painful menstruation. The origin of the membrane has been much debated. We agree with Virchow in regarding it as a normal product, the menstrual decidua, which under certain exceptional circumstances becomes organized to an abnormal degree, and thus gives rise to difficulty. The processes of parturition suggest that, analogically, every month there is a dehiscence of the outer epithelial layer of the lining membrane of the uterus. This ordinarily is disintegrated, and comes away as extremely fine débris. Under exceptional circumstances, or in certain states of constitution, this may become more highly organized, and separate "en masse," instead of piecemeal, and thus give rise to the severe symptoms witnessed in this serious form of dysmenorrhœa. Fortunately the disease is rare; the views, moreover, as to its pathology are exceedingly conflicting, and hence the plans of treatment proposed are widely discrepant. We incline to the belief that the exhibition of carbonate of potash or ammonia before the advent of menstruation, and of anodynes when the flow is on, affords promise of considerable relief. The rarity of such cases, however, does not warrant our speaking with any positiveness on this point.

Menorrhagia and metrorrhagia are next considered. The author gives the usual list of causes of excessive flow of blood from the womb, but he by no means exhausts all that can be said on this point. Dr. Thomas might, however, fairly plead that he could not be expected to deal exhaustively with the subject in a work embracing so many other topics, many of which might justly call for equally full treatment. What he does say is to the point, though its range of view as to causation may be too limited.

Amenorrhœa is a source of trouble and anxiety to numbers of young people or their friends, and is a condition which always calls for the greatest discrimination and nicety of judgment on the part of the physician called upon to treat it. Its forms are various, and each must be carefully differentiated from the other if the practitioner would be successful in remedying it. Dr. Thomas succinctly states the causes under three heads, viz. abnormal states of the generative organs, of the blood, and of the ganglionic nervous system, and gives safe instructions for the treatment of the various forms.

Of leucorrhœa Dr. Thomas does not say much, but he conveys a fair idea of the generally received opinions upon the subject. The able work of Dr. Tyler Smith, the best yet known, is referred to, but nothing fresh is adduced.

We cannot but think that there is more to be said about leucorrhœa than has yet been told, and that Dr. Thomas could contribute to our knowledge thereon had he space and inclination. As it is he merely divides the causes into two orders—one due to congestion, the other to inflammation, without one or other of which he, gratuitously, it seems to us, assumes that no agency can operate. The directions as to treatment are, in our judgment, feeble and insufficient.

Sterility is a subject of great interest to our American brethren, who would appear to be called upon to treat it more frequently than we are in these teeming islands, but it is dealt with in a brief and superficial manner. The key to this is, perhaps, to be found in the concluding sentence of the chapter on the subject, which is as follows :

“ In spite of the fact that we have at our disposal many valuable resources for the removal of the causes which create sterility, were I asked to mention the part of the field of gynækology which yielded me the least satisfaction and the greatest disappointment, I should cite this.”

Amputation of the cervix is considered in a separate chapter. Here the affection called longitudinal cervical hypertrophy is described, and directions for treatment given. This arrangement is not the best, as an important disease is too summarily dismissed. The chapter consists mainly in a description of the methods of removing the cervix.

We next come to “ Diseases of the Ovaries,” a field in which gynækology has of late years achieved greater triumphs than, perhaps, any yet recorded in medicine. The great and brilliant operation of ovariectomy is a creation of the present century, and by its beneficial means hundreds are rescued from terrible suffering and impending death. The knowledge upon this subject is all so recent and important that we are not surprised to find the author devoting a large section of his work to its consideration. Absence, imperfect development, atrophy, hypertrophy, apoplexy, and inflammation, are briefly discussed, tumours being the *pièce de résistance* the author presents to his readers.

Dr. Thomas appears to be bewildered and dispirited by the conflicting views of pathologists as to the true character of the majority of ovarian tumours, and to despair of rendering clear the prevailing views thereon.

The subject is, indeed, difficult for gynækologists who can rarely make pathological investigations for themselves; and, unfortunately, the elaborate and valuable labours of Virchow, Rokitansky, Kiwisch, and others, are too much at variance to render a succinct and connected account possible. With the

light we at present possess it would not be profitable for us to enter upon a full criticism of the various views advanced, since there is so little positively settled, or, at least, upon which pathologists are agreed. We proceed, therefore, to review the clinical aspects of ovarian tumours, and in regard of diagnosis we think Dr. Thomas gives scarcely sufficient information.

As, in view of operative procedure, diagnosis is all-important in ovarian tumours, the fullest information should be given as to the best means of compassing it, and, we apprehend, the author could not have done a greater service to the majority of his readers than to have freely enlightened them thereupon. That which he does give makes us regret that it is not fuller. He quotes an interesting paper from Tixier, of Strasbourg, on the diagnosis of the length of the pedicle. He also speaks highly of exploratory puncture by means of a fine needle, which, even though it pass through intestine, he regards as innocuous. The new aspirators should be used. Tapping he considers by no means free from danger, many deaths having resulted from it. Upon this opinion we would venture to remark that when evil symptoms follow tapping it would be better to perform ovariectomy than to let the patient die unrelieved. Our observation persuades us that there would be fewer deaths after tapping were this course more frequently resorted to. Dr. Thomas does well to discountenance all attempts to disperse ovarian growths by means of drugs, a point upon which all well-informed gynæcologists are agreed. In respect of measures for the radical cure of fluid ovarian tumours Dr. Thomas enumerates the following plans:—Tapping, drainage, incision, injection of the sac, partial excision, and ovariectomy. The first and last are beyond doubt by far the best methods of treatment, and we question whether the others should not be discarded or only retained for rare and altogether exceptional cases not admitting of the preferable modes of procedure. In describing the operation of tapping, as, indeed, in other parts of the section on ovarian diseases, we are surprised at the want of acquaintance the author displays with the practice of Mr. Spencer Wells, who may fairly be said to be the first ovariectomist of the day. That distinguished surgeon does not use the tapping instruments figured by Dr. Thomas, but adopts a much simpler and less painful method, with which the author betrays but an imperfect acquaintance. Mr. Wells first punctures with an ordinary bleeding lancet and then introduces a hollow silver tube, to which is attached a length of india-rubber tubing. He also discards the use of the many-tailed bandage.

Vaginal tapping, in the few cases in which it is practicable,

is very properly praised. Injection of the sac is now, we believe, almost entirely abandoned by the best ovariologists.

The consideration of "Peri-Uterine Fluid Tumours" is included in the section on ovarian diseases, on account of the similarity in physical aspects between these and fluid ovarian tumours. They exist as tubal dropsy, Wolffian cysts, sub-peritoneal cysts, and simple cysts of the broad ligaments, but no means of differential diagnosis are given. Generally, we believe, they are not diagnosable, though there are exceptions to this rule.

"Solid Tumours of the Ovary" come next. Respecting fibrous tumours the best ovariologists hold the opinion that they are rarely, if ever, met with in this organ. On histological grounds the possibility of their occurrence cannot, indeed, be denied, but, practically, it is the opinion of those best qualified by experience and observation to judge that they do not occur. As Dr. Farre has shown, the growths usually regarded as ovarian fibroids are really either cancerous or pediculated uterine fibroids. The different forms of adenoma, pure and cystic, are reviewed. What Dr. Thomas calls "histoid" tumours, comprising dermoid, pileous, and adipose, come next, but, being only shortly discussed, need not detain us.

Composite tumours of the ovary, according to the author, comprise "all those tumours which are composed of both solid and fluid contents." We are glad to observe that Dr. Thomas avoids the common error of regarding as cancerous all ovarian tumours containing colloid material. He gives a useful and clear account of this part of the subject, such as is worthy of his deservedly high reputation. He then proceeds to describe the operation of ovariectomy. He asserts that "the first real case of ovariectomy ever undertaken was successfully performed by Dr. Ephraim McDowell, of Kentucky," and adduces evidence in support of this position. It is singular to see with what persistence the operation was opposed by some of the leading minds in Germany, even when their American, French, and English brethren were achieving brilliant successes. According to Grenser, however, Germany claims the credit of two very important improvements in the operation, viz. the external treatment of the pedicle, and the adoption of the short incision and tapping the sac *in situ*. Happily, as Dr. Thomas truly says:—

"The time has passed away when, in an essay on this subject, the question need be discussed as to the propriety of recognising ovariectomy as a legitimate resource in surgery."

Vaginal ovariectomy, Dr. Thomas thinks, is applicable to only a few cases, abdominal section being far more commonly called for. To most of the directions for "preparation for the operation" no exception can be taken, but we doubt the propriety of

administering "one grain of opium, or the equivalent of its preparations, every six hours," for four days before the operation, as a routine practice.

Concurring in many of the author's directions for operating, we must differ from him as to the advisability of sweeping a large steel sound round the tumour as far as the pedicle. This is quite unnecessary, not to say injudicious. The hand is a far safer as well as more intelligent instrument. We also greatly prefer ligatures of pure silk for bleeding vessels within the abdominal cavity to the cautery or persulphate of iron, experience having shown their general innocuity.

We are astonished to find that Dr. Thomas figures as the clamp Mr. Wells uses an instrument which, we believe, that gentleman did devise, but which he has not used for some years, having quite discarded it for a much superior instrument. Mr. Wells's method of closing the abdominal wound might profitably have been described.

Dr. Peaslee's plan of washing out the peritoneal cavity by solutions of salt, carbolic acid, &c., when septicæmia threatens, is highly thought of, and may be valuable in the cases in which it is indicated. This part of the subject leads us to say that we are struck with the fact that Dr. Thomas makes no mention of the use of the thermometer in the after-treatment of ovariectomy. In our judgment the thermometer is an instrument which no ovariectomist should fail to have in constant use, for it will give him more timely warning of certain complications than anything else will afford.

The account of diseases of the Fallopian tubes is good. Speaking of chronic salpingitis, in which the tubes sometimes become dilated, the author says he has met with cases in which the sound passed up many inches, and that either there must have been dilatation of the tube or the instrument must have passed through the fundus uteri, and he concludes that the former was the case. There are, however, instances of the latter accident having occurred without any ill effects ensuing.

The concluding chapter is on "Chlorosis," which, the author says, "is probably a neurosis of the ganglionic system of nerves," but it may be said that he does not elucidate this opinion very satisfactorily.

It only remains for us to say of Dr. Thomas's excellent work that it is safe, reliable, and practical. It is a work which will enhance the already high reputation of its author. Nevertheless we hope he will take in kindly spirit the frank and friendly criticisms we have thought it our duty to make, and, should he think them worthy, avail himself of our hints to still further improve the next edition.

VII.—Poor-Law Medical Relief.¹

THE upper and middle classes will no longer solely be called on to administer poor relief and the thousand and one other functions that have heretofore almost entirely devolved upon them, for the working man is a coming power to share with them in all such public duties, and the result must be watched with no small amount of anxiety by the friends of the English people, and with much interest by all the civilised world.

One danger that looms in the distance must be manfully resisted, namely, practical centralisation of power with the appearance of popular government.

As the recent Public Health Act constitutes country boards of guardians the rural sanitary authority, it is to be hoped that the sanitary and poor-law duties will not in future be permitted to be encroached upon, whether by matters wholly irrelevant or by apathy on the part of elected guardians, or from any other cause. It has quite recently happened in Ireland that a union lost five hundred pounds by neglecting its proper functions in not promptly accepting a tender for coal from a merchant, because the elected guardians of the union converted the board-room into a political arena for the discussion of matters wholly unconnected with their duty. In another instance political topics so far interfered with legitimate business, that it was only after a peremptory order from the Poor-Law Commissioners that the guardians were brought to a sense of their responsibilities and duties.

Among causes of another class operating against the due guardianship of the poor is the frequency of the abuse of grants of medical relief to persons well able to pay for the same, the illegitimate expenditure of the public money, and the practical prohibition of redress to the medical men.

The abuse of gratuitous medical relief is, moreover, itself an evil, inasmuch as it fosters improvidence and drunkenness; nor can we wonder at its prevalence, and at the consequent results, when the small trader and the publican are but too commonly the poor-law guardians and distributors of tickets for medical relief. The granting such relief is a trust that should only be placed in the hands of a responsible and paid officer, who should

¹ 1. *First Report of the Local Government Board, 1871-72.*

2. *Annual Report of the Commissioners for Administering the Laws for Relief of the Poor in Ireland, including the Twenty-fifth Report under the 10 & 11 Vic., c. 90, and The Twentieth Report under the 14 & 15 Vic. c. 68; with Appendices. 1872.*

3. *Reports of the English Poor-Law Medical Officers' Association, and of the Irish Poor-Law Medical Officers' Association, for 1871.*

be held accountable for a portion at least of the fee justly due to the medical officer when the recipient of relief happens to be a person able to pay.

The working of the poor-law system in England and Wales, with a population of 22,704,108, a total expenditure in relief to the poor of £7,886,724, and a rate per head of amount expended in relief to the poor on the estimated population of 6s. 11¼*d.*, contrasts with that of Ireland, with a population of 5,402,759, an expenditure of £685,668, and for the expenses under the Medical Charities Act of £135,005. The Irish expenditure, with other items under the Sanitary and Registration Acts, does not amount to 3s. per head of the population. The expenditure, small as it is, would be reduced if a more commensurate payment was made for vaccination, (which at present amounts to only about 10*d.* per case in Ireland instead of 18*d.* to 30*d.*, as in England), and if other duties under the Sanitary Acts were properly paid for, and encouragement given to the medical staff of the poor-law department to carry out this important branch of preventive medicine. At present these hard-worked officers are not only not paid for sanitary work, but too often render themselves obnoxious to those who should be guardians of the poor if they attempt to represent the existence of preventible causes of disease.

It is within the powers of boards of guardians to award payment to their medical officers for sanitary work done by them at all times of epidemic, endemic, or contagious diseases, or at times when a locality is threatened with such, and it is clearly the interest of all to take energetic measures to meet visitations of disease as promptly and with as much effective resistance as possible, for there is nothing more capable of demonstration than the wisdom and economy of prompt and energetic measures in all such cases. Repetition of these truisms, though possibly unpalatable, is necessary when we consider the heavy mortality of many of our large cities. The reports show great variations as usual in the birth- and death-rates of various towns; thus, we find that during the second quarter of the present year (1872) the birth-rates in London, Dublin, Glasgow, and Edinburgh, were respectively 35 (per 1000), 30, 43, and 35, and the death-rates 21, 32, 29, and 30.

We have on a previous occasion observed that the increasing custom of granting out-door relief in Ireland is fraught with dangers. The serious dimensions that this mode of relief has already acquired is exhibited by the facts, that the sum expended on it has risen from £2245 in 1856 to £69,744 in 1871, and that an average daily number of 23,400 persons have

availed themselves of it. The commissioners remark as follows upon this matter:—"This rapid increase of expenditure on relief purposes it is fair to observe has taken place concurrently with the maintenance of the electoral division system of rating; and it is our conviction that the proposed change to union rating would have a salutary effect in checking the progress of any expenditure which may, perhaps, be unnecessary." To this we must add that the small expenditure of £2245 obtained under the same system of rating as now in force; it does not seem just, therefore, to blame the system, but rather to admonish those intrusted with a very serious responsibility, and this at a time too when the pay of the working classes exceeds anything ever thought of by our predecessors. We greatly doubt, however, that the present high rate of remuneration has bettered the condition of the working classes; indeed, we may judge from the large increase in the revenue derived by the Excise from the liquor trade, which amounted in the year ended September 1872, to £24,719,000 against £23,032,000 in the previous year, how much of the increase of emolument is spent, not on the workman's family, but in the gin-palaces and beer-houses of the United Kingdom.

We have seen much of the working of in-door and out-door relief, of dispensary and of hospital medical relief, and of grants of money by charitable persons or associations, and we repeat our experience stated on similar occasions before, namely, "that out-door relief offers a strong temptation to the sick to remain in their own, commonly most unfit, tenements, instead of entering suitable hospitals—so liberally provided at the present time almost everywhere, especially in Ireland—and so tends to render nugatory the best efforts and the oftentimes difficult work of the medical officer; as, for instance, the arrest of contagious disease, or the prevention of the consequences of overcrowding." This was our experience a year ago when we had before us the evidence taken before the House of Commons Committee on the very subject of union rating in Ireland, which the poor-law report now under our consideration specially advocates as a remedy for the growing lavish expenditure on pauper manufacture, for we can give no other appellation to out-door relief. And this we say with emphasis, after our experience of the dire epidemic of smallpox now hardly passed away.

The 'Dublin Morning Mail,' under the heading of "Abuse of Red Tickets," remarks that the following letter in the 'Medical Press' treats of a subject of great importance to the public as well as to the medical profession. The English system of out-door relief is often stigmatised as tending to pauperise the independent poor, but the medical branch of the Irish poor-law

system is abused in a still more intolerable way. It is made to pauperise a class of people who are in quite easy circumstances,¹ and who ought to be as much ashamed to come on the rates for their medical service as they would be for their food and clothes. The letter to which it refers runs as follows :

“SIR,—An evil is growing to such dimensions, as regards the issue of dispensary tickets by unauthorised parties, such as the wives, sons, daughters, and shopmen, &c., of dispensary committee members and wardens, to parties well able to pay for advice, that it is time a movement should be made by the dispensary medical officers of Ireland, protesting against regulations which are so lax as to permit of such abuses, &c. It is all nonsense to tell a dispensary medical officer he has a remedy in such cases by having the ticket cancelled ; to do this he must bring himself into *direct hostility* to the committee-man or warden, a member or dependent of whose family has usurped his authority by issuing a ticket in his name ; and, as a rule, instead of obtaining redress he *excites hostility*, and becomes persecuted for his temerity in daring to call in question the authenticity of a ticket bearing the name of a member of his committee or of a warden ; and the remedy suggested is procurable only after your services have in the *first instance* been rendered. The system of the issue of tickets to comfortable well-off parties has now arrived at such a pitch that there is scarcely a small farmer, an artisan, or shop-keeper, ever calling you in and paying you a fee. A red ticket is much more convenient, and *costs nothing*,” &c.

Dr. Rogers, President of the English Poor-Law Medical Officers' Association, seeing the gross injustice caused to the ratepayers as well as to the medical men, and the demoralising effect upon recipients of poor-law medical relief who are not legally entitled to the same, has advocated rendering fine or imprisonment a legal consequence of any one falsely representing himself as suitable for such relief. The same view is held by the members and officers of the Irish Poor-Law Medical Association, and by all the reflecting poor-law guardians and ratepayers in the kingdom.

The necessity for efficiency in the working of a public health act is self-evident, and the Irish Poor-law Medical Officers' Association has from its formation pointed out the need for truly effective preventive medicine as a measure of the soundest

¹ Dr. Maunsell states—“It is generally supposed that the issuing of a ticket for medical relief in Ireland merely involves the wear and tear of the doctor. It is not so. Every ticket so issued by the 30,000 irresponsible persons who are enabled to issue dispensary tickets in Ireland costs 4*d.* for medicine alone ; and the result is that the relative cost for medicines alone, irrespective of rent of dispensaries, salaries, &c., is £30,000, as compared with out-door relief, £59,000.

economy as well as of true philanthropy. This cannot be attained by the appointment of gentlemen wholly ignorant of medicine to the important offices of inspectors. Under the name of the Local Government Board the late poor-law board has been enlarged and remodelled to undertake a large portion of the sanitary work of the United Kingdom, and under this new régime appointments of inspectors wholly innocent of the requisite knowledge have been made. How can public confidence be reposed in the judgment of gentlemen, no matter how well connected either with the wealthy middle classes or the aristocracy, who must take all action upon the report of medical men? The attempt to conduct the great scheme of preventive measures (to which the nation has been looking with hope) in the manner shadowed forth by the appointments now made must end in disappointment, and we should forget our duty to the public as well as to the profession did we not raise our voice against it.

A matter in the Irish law relative to vaccination, to which attention has been drawn by Dr. Charles F. Moore, of Dublin,¹ needs alteration. It is that infant vaccination is not compulsory before six months. Dr. Moore has shown that, amongst the humbler classes especially, the result of the law, as it now exists in Ireland, is that parents frequently postpone getting their children vaccinated until they attain the age of six months a time not unfrequently unsuited for the purpose on account of the constitutional disturbance caused by dentition); and that, moreover, a very considerable proportion of fatal cases of small-pox in Ireland occurred in children under six months who were unvaccinated; loss of the children was not, of course, the sole evil resulting, as a very large number of cases of disease originated from them.

A good feature in the poor-law system in Ireland is that the medical officer of each dispensary district is (or should be) also the registrar of births and deaths, and this circumstance affords him the means of ascertaining if infants are vaccinated.

Both England and Ireland have suffered very severely from smallpox. It is with regret we are obliged to note the fact that in some places isolation of those ill of smallpox has not been efficiently carried out; such was the case in Dublin. In short, the severity of the smallpox epidemic, as well as the annual loss from preventible disease, is well spoken of by the report of the Irish Poor-law Commission as "painful to contemplate;" nor can we look forward with confidence that the operation of the new Public Health Act promises well to effect much improvement by its machinery.

¹ 'Saunders's News Letter.'

The inapplicability of quarantine between the several parts of the United Kingdom in regard to smallpox is treated of in the Irish report. From this document, also, it would appear that the law of removal of paupers from England and Scotland to Ireland needs inquiry and amendment. The report to be issued next year for Ireland will be entitled that of the Irish Local Government Board, in accordance with the plan pursued in England.

The great importance of lessening the amount expended in out-door relief in England is under consideration by the local government board, and has by it been brought under the notice of several boards of guardians. It is to be hoped that the extension of the dispensary system will operate beneficially in this direction in England, as we have pointed out above has been the case in so remarkable a manner in Ireland. Out-door relief in England needs considerable reduction and the exercise of a very close scrutiny; in some cases this has already been resorted to, and with the best results. In Ireland also, as before adverted to, a tendency to increase in the out-door relief expenditure needs constant watching. It is truly a matter to be deplored that poor-law administration does not attract more zealous workers among the upper and middle classes than it at present does in the United Kingdom. It is well worthy of consideration how great a benefit would arise from copying, in many of its particulars, the system so successfully pursued at Elberfeld and other places on the Continent. There the administration of the poor-law devolves primarily upon the Armenverwaltung, or town administration of the poor, composed of a president, four members of the municipal council, and four citizens, usually selected from the more wealthy and more distinguished inhabitants, one of whom of each class retires yearly in rotation, but are generally re-elected. By this body a large number of visitors and several overseers are appointed; their mode of selection and appointment is attended with some ceremony, and is found to confer dignity upon the office, which is unpaid and compulsory, and made solely on account of fitness for the office, without reference to politics or religion.

The greatest care is used so that no grant shall be made or relief given to any person not in need of same; and those persons who are in the poor-house are permitted to go out and obtain work, the wages for which are paid to the manager of the poor-house (*Armen-haus*), and when the amount exceeds the cost of their maintenance the earners are allowed to retain the difference. Through this practice these poor people not unfrequently find permanent work sufficient to maintain them out of the house.

Among matters deserving commendation is the greatly increased as well as improved workhouse and infirmary accommodation provided in London, where thirty-seven dispensaries are in operation and thirteen in course of construction or contemplated. The satisfactory results of supervision and training are evidenced by a marked and most encouraging improvement in the physical development and in the bearing and general intelligence of the boys transferred to the "Goliath" training ship from metropolitan unions. It is intended to extend this beneficial training to lads not belonging to the metropolis.

The severity of the smallpox and the vast number of cases that were treated in hospitals at the disposal of the Metropolitan Asylums Board severely tried the arrangements improvised on the emergency; on the whole, however, the Local Government Board considered on investigation that the Asylums Board merit explicit recognition for their services, unremunerated and arduous as they undoubtedly were. The great importance of convalescent accommodation in connection with hospitals for infectious diseases is dwelt upon by the Irish report.

The number of vaccinations, by public vaccinators, for 22,704,108 inhabitants in England in the year ending Michaelmas, 1871, was 693,104, of whom 455,416 were under one year of age: the births in the same period were 792,663. Ireland, with its population of 5,402,759, had in the same year 179,889 vaccinations; of these, 109,413 were those of infants under one year of age. The births registered in Ireland in the same year were 151,159; hence a larger proportion of infants were vaccinated within the first year of life in Ireland than was the case in England.

The cost to the poor-rates in England for vaccination fees and expenses was £73,175, whilst in Ireland the addition to the poor-rates from this cause was but £9,627.

The result of much inquiry and a prolonged investigation by the select committee of the House of Commons has been to establish the possibility of the co-infection of syphilis and cowpox, which fact had been long doubted by many professional men of long experience and great and practical competence, owing to its extreme rarity. The committee reported that if the operation (of vaccination) be performed with due regard to the health of the person vaccinated, and with proper precautions in obtaining and using the vaccine lymph, there need be no apprehension that vaccination will injure health or communicate any disease! It is a too well-known fact, both to the profession and to the public, to make it necessary to remind our readers of the dread fatality of the recent (if we can even now use that term) epidemic of smallpox. Two points come

out in strong relief in relation to it—one is the great value of efficient primary vaccination, as well as of the repetition of vaccination at the close of childhood, and the other is the necessity for suitable hospital and convalescent accommodation to meet outbreaks of epidemic disease of all forms when infectious.

In parts of our manufacturing districts, on both sides of St. George's Channel, the accommodation for the working classes is sadly deficient. In some cases the local authorities are far behind the requirements of circumstances. The wealthier classes of all grades in life, especially those persons who have become rich by holding tenement houses and houses of bad repute, not only neglect their obligations to their poor tenants, but too often set at defiance the authorities, who, in some instances, as we have said above, are engrossed with matters wholly unconnected with the legitimate functions of the offices undertaken by them.

The only remedy for this state of things is the active and concerted action of the great body of ratepayers, and, in case of need, the adoption of measures of relief such as those pursued at Elberfeld and other places.

We are glad to observe that associations have been formed in London, Dublin, and other places, with a view of awakening public attention to the great and vital importance of sanitary matters.

No one will deny the great value of suitable sanitary works ; expenditure in such a direction is not only just and politic but is also the soundest economy. We use the word suitable, however, to imply the necessity for scientific and practical inquiry before the commencement of such works, and we deprecate outlay on works which further investigations may prove to be either inefficient or even injurious. The total expenditure under Sewage-Utilization, Nuisance Removal, and Diseases Prevention Acts in Ireland, collectively, in 1870, was but £3,321, and in 1871 only £4,844 ; whilst in England loans were sanctioned by the Secretary of State, under the Local Government Act of 1858, in the same years, amounting to £736,225 and £1,212,890, and, under the Sewage Utilization Act, to the amount of £48,920 and £53,691 respectively. The great disparity in the relative expenditure in the two countries surely demands a better adjustment, more especially when we find by the records of the Dublin authorities that there are in that city a thousand tenement houses unsuited for human habitation, and that several of these serve as hotbeds of fever, smallpox, and other diseases, year after year.

It is surely very short-sighted to permit thousands of tons

of decomposing refuse from ashpits, middens, piggeries, stables, street sweepings, &c., to pollute the air, soil, and water of that city, as we learn from the reports submitted to the Dublin Corporation by the Sanitary Association and published in the local journals.

It seems almost incredible that nearly three months were allowed to lapse after notice had been given to the local authorities of Dublin of the dangerous state of a tenement, and that at last the upper part of the house was allowed to fall (at midnight), though fortunately without the loss of any of its many inmates. We trust that, as the local authorities are so supine, the Sanitary Association may continue the efforts it has so well commenced, and that it may arouse the public mind to the necessity of comprehensive and efficient legislation in a city so much in want of active sanitary and other protective measures.

The subject of re-vaccination, as an additional safeguard, which persons who have been vaccinated in infancy ought in general to adopt about puberty, independently of the existence of any panic of smallpox, is one which local authorities should keep before the public.

The reports and other papers before us would demand a much larger space than that at our disposal, but we are obliged to content ourselves with the foregoing glance at some of their many important features.

VIII.—Recent Works on Heart Disease.¹

DR. FOTHERGILL is favorably known to the profession by the publication of an essay on Digitalis, which deservedly obtained the Hastings Prize of the British Medical Association in 1870. That work contained a considerable amount of original research, and many of the views advanced, although theoretical, were ingenious and instructive. As might have been expected, Dr. Fothergill has extended his investigations to a wider sphere, having entered into the whole subject of cardiac pathology, diagnosis, and therapeutics, and presented the result of his labours in the volume before us, entitled 'The Heart and its Diseases, with their Treatment.'

¹ 1. *The Heart and its Diseases, with their Treatment.* By J. MILNER FOTHERGILL, M.D., M.R.C.P. Pp. 377. London, 1872.

2. *A Treatise on the Causes of Heart Disease, with a Chapter on the Reason of its Prevalence in the Army.* By FRANCIS W. MOINET, M.D., F.R.C.P.E. Pp. 112. Edinburgh, 1872.

3. *Percussione del Cuore (Percussion of the Heart).* By Professor BUBBESI, of Siena.

It is very difficult to determine whether this book deserves praise or censure in the greater degree. There is, unquestionably, as in the essay on *Digitalis*, much sound reasoning and many useful suggestions, and the field of cardiac literature has, no doubt, been laboriously worked by the author, both British and foreign authorities having been placed under contribution. But, on the other hand, the style, the composition, the orthography, and the punctuation of the book are so extraordinary that it is exceedingly difficult, and sometimes quite impossible, to discover the author's meaning in the sentences presented to the reader.

Under ordinary circumstances, it is sufficient, in noticing a book, to draw attention in a cursory manner to the errors in composition, and to make allowance for the sins of omission or commission—

“Quas aut incuria fudit
Aut humana parum cavit natura,”

but in Dr. Fothergill's volume the mistakes are so numerous as to be quite inexcusable. He gives, indeed, a list of six *errata*, for which, perhaps, the printer may be partially responsible, but if he had given the number of *errata* at six hundred he certainly would be nearer the mark. To give only a few specimens of the spelling, the muscoli papillares of the heart are almost universally spelt “papillaries;” that anomalous class of animals, the monotremata, are the “monotremnata;” the words rhythm and rhythmic, which are frequently used, are almost invariably “rythm,” “rythmic,” &c.; anæmia is almost always spelt “anœmia;” septic is “sœptic;” sphygmograph is “smygmograph;” pleuritic is “pluritic;” mucus is “mucous;” symptomatic is “symptomic;” pathognomonic is “pathognomic;” ætiology is “œtiology,” and sometimes, rather more correctly, “etiology;” endarteritis is “enderteriitis;” exercise is “excercise;” reddened is “redened;” menorrhagia is “mennorrhagia,” and metrorrhagia is “metorrhagia;” locomotor ataxy is locomotor “artery,” &c. We need scarcely remark that these mistakes, and hosts of others, are quite independent of the six *errata* admitted and corrected at the beginning of the book.

The style, the composition, and the grammar, are as faulty, or more so, than the orthography, and the words and ideas are so jumbled together, the nominative cases sometimes not agreeing with the verbs, the relatives sometimes being without antecedents, and the sentences altogether being so entangled and involved, that the meaning of many passages is utterly unintelligible. We shall adduce the following amusing passage in

illustration of the remarks just made, with the punctuation precisely as it stands :

“Syncope, and even death, is not uncommonly met with in elderly persons who have long felt themselves less equal to exertion, but with that disinclination to think themselves failing in power, let alone making mention of it to any one, which characterises the oncome of age, have thought as little as possible of it, when some sudden exertion is ventured upon. Thus hurry to catch a train, or even more, haste to catch an omnibus, with the anxiety, as a stimulus to exertion, increased by its visible propinquity, and not rarely by the conductor who will allow it to move on a short way in order to give the lagging would-be passenger a lesson, not uncommonly induce an effort which results in most distressing faintness and general uneasiness, sometimes lasting for hours or even in sudden death” (p. 172).

In the above passage, however, in spite of the punctuation or the want of it, we can obtain a glimmering of the author's meaning, and we can see the respective parts played by the old would-be passenger and the omnibus conductor; but what is the meaning of the following passage in reference to the treatment of hypertrophy of the heart ?

“Still even here” (in hypertrophy with dilatation) “the greatest danger is the loss of hypertrophy, so that no treatment to reduce that hypertrophy, even granting that it were possible, could not be justified, as avoiding the Scylla of arterial destruction could only run us on the Charybdis of cardiac failure” (p. 90).

We have tried in vain to discover what the author means in this sentence, and we have equally failed to detect his meaning in what follows, where he is treating of the symptoms of that somewhat mythical disease, myocarditis :

“It is said that the blood” (in myocarditis) “is dark and of a violet colour, but that is a post-mortem appearance which is of no use in life, and even if hæmorrhage did occur, the difficulty of the accompanying systemic affections would effectually prevent any diagnostic value being attached to any peculiar appearance in the blood” (p. 146).

A *post-mortem* appearance being of no use *in life* seems to us something like a bull.

But passing over the mechanism, as we may term it, of Dr. Fothergill's book, and examining the nature of its contents, we find much to commend, although there is a great quantity of extraneous matter pressed in apparently for no other purpose than to swell the size of the volume, while many subjects of great interest and importance relating to heart disease are lightly passed over or are almost altogether unnoticed. The sphygmograph, for instance, is summarily dismissed from notice as

being of hardly any diagnostic service. Dr. Richardson's researches on the pathological importance of fibrinous clots are barely mentioned, and the able practical investigations recently made as to the causes and the significance of the præstolic murmur are very inadequately described.

One merit of the book should be noticed, namely, that it is not overloaded with the details of cases; indeed, these methods of illustration are very rarely employed by Dr. Fothergill, and the few he does introduce are not by any means striking or important. The following is a fair specimen:

"This" (temporary improvement in heart-disease) "was well seen in an old Irishwoman, a whilome patient, who was so quickly relieved by treatment, that she became quite indifferent to her dropsy and dyspnoea, getting rid of them almost so soon as she wished to (*sic*). Relief was immediately followed by the resumption of the black pipe and the 'cratur.' The whole thing became very absurd, but in a few months it became serious, and too long delay in resorting to treatment was followed by rapid aggravation of all the symptoms, and death" (p. 209).

The bulk of the volume, then, is made up of minute and elaborate descriptions of the pathological conditions of the heart and of the secondary affections with which they are associated; of the diagnosis and prognosis of the different diseases; and of the indications of treatment, which last are chiefly of a theoretical nature. As we have just hinted, very little information as to treatment is given from the author's personal experience, and, indeed, the same may almost be said of the other portions of the treatise, but abundant material is adduced from foreign authorities, especially the German. From the announcement made in the preface we were prepared to find that Dr. Fothergill had availed himself of the researches of the German physicians, and we looked forward with considerable interest to the light that might be thrown upon the pathology and treatment of cardiac diseases by our Teutonic brethren, as their views might be interpreted and selected by one of our countrymen. We were the more anxious to derive some light from this source because we had hitherto found that German literature was rather meagre in the department now under consideration, and the German books on heart diseases which had fallen in our way appeared to contain a great quantity of superfluous disquisition with very little novelty or interest. Dr. Fothergill has not dissipated this opinion on our part, by the copious references he has made to German books; and with every respect for the labour and industry which those volumes generally display, we cannot admit that they tend much to enlarge the sphere of our knowledge, to sharpen the accuracy of our diagnosis, or to improve our canons

of treatment. On the contrary, they appear to be often very verbose and to contain a great quantity of materials of very questionable value. Let us take, for instance, the subject of myocarditis which is treated at considerable length in Dr. Fothergill's pages, and the information relating to which is derived chiefly from German authorities. No English reader need be told that myocarditis, even if it ever exists, is not distinguishable by any marked diagnostic character during life, and is not much more recognisable after death. Nevertheless, any information as to this disease must be welcome if it be given as the result of experience, and our previous ignorance of its symptoms or appearances would only render us more anxious to be enlightened on the subject. But we find that Rindfleisch tells us that myocarditis is, from the obscurity of the subject, "the darkest chapter in all pathology," and Oppolzer states that it is not easy to find a disease with so dark a combination of symptoms; and Dr. Fothergill, while agreeing with those authors, and admitting that there are few objective signs, and rarely even palpitation, and no subjective symptoms except those common to all cardiac failure, adds nothing of his own to clear up the obscurity. But, nevertheless, he gives us eight pages of elaborate description of the pathology, the symptoms, the prognosis, the terminations and the treatment of this disease, which he admits that he and the most acute German physicians are unable to detect either in life or after death with any approach to certainty. After the eight pages of description of this disease, Dr. Fothergill naïvely states, to use his own words, "the subject of myocarditis is too shrouded yet to admit of any dogmatizing, and the medical man, who can diagnose it, is, in my opinion, quite capable of forming a prognosis and deciding on a line of treatment for himself without any extraneous aid" (p. 150). In other words a medical man who can diagnose a disease which Rindfleisch and Oppolzer, and Dr. Fothergill himself, regard as one of the darkest problems in pathology, is quite capable of forming a prognosis and deciding upon a line of treatment—a conclusion with which, we apprehend, very few persons will be inclined to disagree. We may observe that Dr. Walshe, no mean authority on the subject of cardiac disease, states that he is not aware that the existence of myocarditis has ever been diagnosed, and he expresses his opinion that idiopathic inflammation of the muscular and connective tissues of the heart is, to say the least, an affection of extreme rarity.

Myocarditis would become a very important disease if we could agree with Dr. Fothergill that it is at times the precursor of fatty degeneration and other chronic morbid conditions of the heart-walls; but the author has not proved this con-

nection to exist. In fact, as he himself observes (we use his own somewhat peculiar phraseology), "the causation of fatty degeneration of the muscular fibrillæ of the heart is yet so unascertained, that the circumstances under which it occurs must be supposed (?) for it, with such inferences as they may appear to indicate" (p. 155). He, moreover, goes on to show that fatty degeneration, so far from being caused by inflammation of the muscular tissue of the heart, is more commonly induced by causes which cut off the supply of blood to that organ, as by embolism, and by ossification of the coronary arteries. Fatty degeneration, he also tells us, is one of the risks which "dog" (?) dilatation, and is caused under this condition by impaired tissue nutrition, and he regards it as being intimately associated with defective blood supply. All these views of the causation of fatty degeneration of the heart are surely inconsistent with the hypothesis that this disease results from inflammation of the heart-walls. The whole history of fatty degeneration of the heart is so important, and is at the same time so much shrouded in mystery, except when the results of post-mortem examination reveal its presence and its nature, that we have looked with great interest through Dr. Fothergill's pages for an exposition of its causes, its symptoms, and its treatment, but we have failed to obtain any very satisfactory result. The German physicians do not seem to have thrown any new light upon the subject at all, and Dr. Fothergill, while explaining its causes as we have just indicated (but in which explanation we by no means agree), does not enlighten us much more, and he is perhaps correct when he surmises that fatty degeneration is a histolytic process, variously instituted, probably commencing in the germinal matter of the tissue and spreading to the formed material, thus being a kind of arrest to the nutritive process. "Further than this," says Dr. Fothergill, "we cannot go, nor will any consideration of the pathology, so far as is known, aid us in any way in affecting this morbid process therapeutically, except so far as it is connected with the amount and nature of the blood supply" (p. 161). These last remarks are very sensible and just, and we find no fault with Dr. Fothergill for his inability to clear up difficult questions which have hitherto defied the sagacity of the most acute observers; but we do complain that he fills his pages with a mass of details which he himself often tells us are of no use, and this complaint on our part is, we think, justified, *inter alia*, by the sections on myocarditis and fatty degeneration, the first affection almost mythical by its rarity, and the second, although unhappily too common, being still exceedingly obscure as to its causes, symptoms, and treatment.

The distinction existing between fatty degeneration of the heart and fatty infiltration of that organ, the one consisting of a development of oil-globules within the muscular fibrillæ, and the other of a deposition of fat-cells around the muscles, is correctly described, and illustrated by diagrams from Rindfleisch; but the diagnosis, prognosis, and treatment of the last-named affection are somewhat unnecessarily and elaborately set forth, seeing that the phenomena of fatty infiltration in the tissues generally, including the heart, are pretty obvious, and that there is by no means any necessary connection between this condition and the formidable disease known as fatty degeneration. The subject, however, gives an opportunity to the author of discussing the system of *Banting*, which is condemned as a dangerous liberty with man's construction, but Dr. Fothergill's remarks on the diet and regimen to be adopted for the diminution or removal of fat in excess are judicious and sensible.

The section on endocarditis is very unsatisfactory, partly on account of the errors in style which pervade this portion like the rest of the volume, and partly from the confused manner in which the materials are put together. The subject is thus introduced :

"Acute endocarditis is, as its name implies, an acute inflammation of the living (?) membrane of the heart, which is continuous with the endarterium, with which it is homologous (?). This inflammation of the living (?) membrane of the heart is chiefly associated with acute affections, in which the blood itself is altered, as in acute rheumatism, Bright's disease, pyæmia, septicæmia, the acute exanthemata, and typhoid fever (?). It is thus found along with conditions of blood-poisoning with ostensible, or rather material agents. Whether these act as joint irritants to the serous (?) membrane, or not, is not ascertained" (p. 96).

In the above passage the "living membrane," twice so printed, is probably an error for "lining," but these are not among the list of *errata* at the beginning of the book. The word "homologous" too is probably intended for "homogeneous;" but we are not aware of the reasons for placing the endocardium among the "serous" membranes, nor without further explanation do we understand why "typhoid" fever alone should be associated with acute endocarditis, and not typhus fever as well. We only adduce these instances to show the difficulty of comprehending Dr. Fothergill's meaning in many instances.

The pathological anatomy of endocarditis, its symptoms, prognosis, and treatment, are discussed with apparent care, but the want of care with which the materials are really put together may be exemplified *inter alia* by referring to the

description of the symptoms of the disease, which we are told is not attended with pain, "unless there is accompanying "myocarditis;" while on turning to the symptoms of myocarditis, in another section, we are also told "that there are no positive symptoms of myocarditis," and that "in acute myocarditis pain is commonly absent" (p. 145). Thus the reader is told in one page that in a certain disease there is no pain unless it be accompanied by some other disease, and in another page he is told that in that other disease pain is commonly absent.

Dr. Fothergill's essay on Digitalis, as we have already remarked, was a valuable contribution to the therapeutics of cardiac disease, but rather, perhaps, in the way of suggestiveness than of actual practical utility. Experiments on some of the lower classes of the animal kingdom had proved to the author that digitalis possessed the power of causing contraction of muscular fibre, and this power seemed to depend upon the influence of the drug upon the vaso-motor system of nerves. Digitalis, therefore, so far from diminishing the contractions of the heart, actually increases them, and, indeed, owes its efficacy to this circumstance, and the idea formerly entertained, that the force of hypertrophy, for instance, is subdued by digitalis, must be abandoned. Hypertrophy, in fact, is a beneficial compensatory condition of nature, and digitalis is efficacious by aiding the power conferred by the thickened muscular structure, and not by counteracting it. Digitalis, accordingly, is to be used to promote or assist hypertrophy, and when hypertrophy is fully established as a compensatory condition, digitalis is no longer of service. In Dr. Fothergill's 'Essay on Digitalis' this leading idea of the action of the drug was carried into the investigation of its effects in various morbid conditions of the heart, as hypertrophy, hypertrophy with dilatation, dilatation, fatty degeneration, and the several diseases of the valves. In Dr. Fothergill's present and larger work it might have been expected that the remedial application of digitalis and other drugs would have been still further exemplified by the experience of actual cases submitted to treatment, and that definite rules would be established as to the modes and times of administration. But we fail to discover in the pages of Dr. Fothergill's larger book that any advance has been made in the direction we have just indicated, and, in fact, the sections on treatment are no better than the other portions of the volume. We have before observed that the cases recorded are very few, and these few are not of much more interest than that of the old Irishwoman who fell a victim to her attachment to the "cratur" and her tobacco-pipe. General statements, however, occur in abundance, and dietetic rules and medicinal *formulae* are laid down in almost

every chapter. The advice given as to regimen is, in the main, sound and useful; but the same can scarcely be affirmed of what we may call the drug medication, although we should have expected that this portion of therapeutics would be handled with peculiar care. With the exception of digitalis, which, of course, is regarded as the chief of cardiac medicines, the information as to the use of drugs in heart-disease is vague and meagre. After mentioning, for instance, the efficacy of digitalis in causing the more efficient contraction of the heart, where the power of the organ has become deficient, the author thus loosely passes in review other therapeutical agents:

“Allied to it are other agents, as the scilla maritima; the dagasck, or arrow poison of Borneo, unquestionably belladonna; the alkaloid of veratrum; caffen; others of the scrofulariaceæ, and, probably, scoparium; and possibly some of the trial poisons of the tropics” (p. 214).

It is true that we are told the names of some of the authorities by whom these agents have been respectively recommended; but we are still in doubt on many points, as, for instance, the therapeutic relationship of scilla maritima to digitalis, the names of the “others of the scrofulariaceæ” which resemble digitalis in their action, the effects of scoparium as compared with digitalis, and the effect on the heart of the trial poisons of the tropics. In the treatment of the sequelæ, too, a little explanation is required from the author when he recommends two drachms of Pulvis Jalapæ Compositus with a grain of gamboge in it for a patient with “advanced heart disease,” and tells us that the sufferer under such treatment “feels sprightly, enlivened, and altogether improved.” Such may probably be the result in some cases; but surely a little care is required and some power of selection should be exercised as to the cases, when employing drastic cathartics in the complications of heart failure, especially when Dr. Fothergill himself warns us, in another passage, that in advanced heart disease “slight exertion is apt to induce unpleasant symptoms, and temporary causes of exhaustion may be accompanied by alarming attacks of syncope.”

The combination of heart and kidney disease has often been noticed, and it is not difficult to conceive how the diseases of the one organ may injuriously affect the tissues and consequently the functions of the other. The state of venous congestion induced by obstructions in the right side of the heart will necessarily cause congestion in the organs *behind* the heart, and consequently the kidneys will become congested, their secreting cells will be injured, the urea of the blood will be retained with much of the water, and the albumen will pass into the urine. But, on the other hand, it has been lately asserted, especially

by Traube and George Johnson, that the kidneys are often the organs first attacked, the impeded flow through the diseased kidneys causing hypertrophy of the heart. Dr. Fothergill adopts the views of the two last-named authors, and his chapter on the whole subject of the connection of the cardiac and renal affections is one of the best in the book, although its value is impaired by the obscurity in diction and the other errors to which we have previously alluded. What, for instance, can be more unintelligible than the following sentence, in reference to the compensatory changes following blood-poisoning:

“Consequently, while compensatory changes are spoken of, it must not be imagined that they are perfectly compensatory, or not morbid actions, and that each compensatory change, though conservative in its way and tending to the preservation of life, and also to some extent of health, has destructive consequences following in its wake, inseparable from itself” (p. 288).

The meaning of the author is probably that compensatory changes, although beneficial to a certain extent, are, nevertheless, morbid actions, and that they often carry with them distinctive consequences inseparable from their very existence; but we are not sure that we are right in this interpretation. Again, when treating of the hygienic treatment of the uric acid diathesis, Dr. Fothergill states, in the following terms, the effects of fresh air and exercise, the advice being, no doubt, good, but the explanation being utterly obscure by the peculiarity of the diction and the punctuation:

“Fresh air and exercise are good, and aid in oxidizing the waste products lingering in their decomposition, and reduce the necessity for rendering uric acid, or, as it must exist in the alkaline blood, in union with some base, its insoluble compounds, soluble by potash or lithia” (p. 333).

Here the meaning probably is that air and exercise convert the uric acid into urea and carbonic acid, and so eliminate it from the system, thus obviating the necessity of giving potash or lithia for the purpose of neutralising and dissolving the uric acid; but if this be the meaning the author still further obscures it by gratuitously assuming that uric acid must exist in the alkaline blood as an insoluble compound in union with some base. The general belief is that uric acid is held in solution by the salts of the urine, and if in solution in the blood it is probably kept so by the same agencies.

If we forbear to analyse further Dr. Fothergill's book it is from the fear that, in consequence of the peculiarities of the style, the great brevity and obscurity with which some of the subjects are treated, and the great extent to which others are

unnecessarily drawn out, we may unconsciously misrepresent the meaning of many, if not most of the passages. We regret the more our inability to do justice to his labours in the preparation of this volume, because he has evidently read and thought much on the subjects of which he treats; but he is lamentably deficient in the power of arrangement, in the faculty of conveying his ideas in perspicuous language, and even in that ordinary care which all writers should exercise in the grammatical construction of their sentences, in the spelling of their words, and in punctuation. We can, then, only observe generally that the work is divided into sixteen chapters, which successively treat of the anatomy and physiology of the heart, the physical examination of the organ, the objective symptoms of heart disease, the subjective symptoms, hypertrophy and dilatation, affections of the endocardium, valvular diseases, diseases of the muscular walls, rupture of the heart, the general treatment of heart disease, the affections of the pericardium, nervous disorders of the heart, combined heart and kidney disease, diseases of the great vessels near the heart, malformations of the heart, and the elements of prognosis in heart disease.

Dr. Moinet's work, entitled 'A Treatise on the Causes of Heart Disease, with a Chapter on its Prevalence in the Army,' is an unpretending contribution to cardiac pathology, and comprehends only a limited view of the subject. Within such limits, however, the aspect of heart-disease, as it is embraced in the treatise, is discussed with considerable ability. It is very doubtful whether heart-disease has any special causes which influence its production in an exclusive manner, although, from the heart being the central organ of the circulation, its actions necessarily command especial attention, both in a subjective and objective point of view. One great difficulty in the diagnosis of this class of affections is, that the objective symptoms are often unaccompanied by the subjective, and *vice versa*, and sometimes neither of the two classes of symptoms are present, even in aggravated pathological conditions. Hence it appears to be somewhat of a thankless and unprofitable task to endeavour to discover the causes, or prevent the development of a malady, of the very existence of which the patient himself may be quite unconscious. These remarks, which are applicable to several forms of heart disease, are perhaps especially so to the case of fatty degeneration of the organ, a disease which often, and, indeed, perhaps generally, steals on without any subjective or objective signs whatever, and nevertheless may prove rapidly or suddenly fatal. Still, it is the duty of the pathologist to collect whatever light may be obtainable upon any subject, however obscure, connected with the causation of disease,

and Dr. Moinet's observations on this fatal malady will be perused with interest even by those who are, perhaps, not convinced by his reasonings. Dr. Moinet very justly observes that, in order to maintain a healthy and natural condition of any part of the body, the blood must be in a right state and the nervous system in a normal condition, and he is equally correct in advancing another series of propositions, namely, that food, improper in either quantity or quality, want of exercise, and intemperance, will tend to deterioration of the health and to degeneration of the tissues. Still, we are not sure that these causes, either separately or collectively, actually tend to produce fatty degeneration of the heart, or that other diathetic states of the body, syphilis, Bright's disease, gout, or phthisis, can be distinctly proved to stand to it in the relation of cause and effect, although they may, perhaps, predispose to its development. As to the supposed relations existing between fatty degeneration of the heart and ossification or degeneration of the coronary arteries, the connexion is probably more imaginary than real, or, if there be any relationship, it is very probable, as Dr. Moinet suggests, that the degeneration of the heart may be the first event in the link of morbid causes, and the degeneration of the coronary arteries may be the second. Thus, the degeneration of the walls of the heart by diminishing the healthy flow of blood, may lead to degeneration of the coronary arteries, which latter condition becomes the consequence and not the cause of cardiac failure.

In tracing certain diseases of the heart to the existence of previous disease of the respiratory system, Dr. Moinet is on much surer ground, for the heart and the lungs are so intimately connected together that morbid conditions of the latter very frequently induce disease of the former, and *vice versa*. Hence it is very easy to agree with him that bronchitis or emphysema, or any other malady which obstructs the passage of blood through the lungs, will throw back that fluid upon the right cavities of the heart, and thus produce dilatation, a dangerous condition, which is compensated only by the supervention of hypertrophy. From the obstruction in the right side of the heart, the left side may also become affected, and, according to Dr. Moinet, the valves of this side are involved; but here we think that the inference is not quite so clear. In fact, we cannot forget that many pathologists of the present day, both British and foreign, look upon hypertrophy and dilatation as almost entirely the results of valvular disease, and although we may not altogether adopt this exclusive view, yet it is by no means easy to understand how valvular disease can be the result of disease of the heart-walls. The obstruction offered to

the onward flow of blood through the narrow orifices may and does cause accumulations in the cavities *behind* the orifices, and also gives rise to increase in the muscular walls to enable the heart to overcome the obstacle, and nearly the same reasoning applies in the case of regurgitation; but the converse of the proposition is not by any means so clear, namely, that dilatation of the cavities and thickening of the heart-walls will induce *narrowing* of the orifices or regurgitation through the valves. We cannot agree, therefore, altogether with Dr. Moinet that hypertrophy and dilatation, either or both, are often the *causes* of valvular disease, nor do we think that there is much foundation for his opinion that there is a connection of cause and effect between emphysema of the lungs and fatty degeneration of the heart.

In another chapter Dr. Moinet discusses the relationship existing between heart-disease and rheumatism, a connection which indubitably exists, whether we admit the relation to be one of cause and effect, or of coincident morbid action. But the connexion of gout with heart-disease (at least, as heart-disease is generally described) is not quite so obvious, and when Dr. Moinet also suggests that in young persons heart disease is almost always traceable to the rheumatic diathesis, he forgets the cases of congenital disease of the valves and heart-walls, which are of pretty common occurrence in infancy and childhood, and are not proved to have any rheumatic origin. With these modifying remarks the short chapter on rheumatism and gout may be generally commended, but surely there must be a printer's error responsible for the statement, "rheumatism we know to be hereditary, and gout also, though in a much smaller degree." We always imagined that the reverse was the true view of the case.

There is a brief chapter on Bright's disease as a cause of disease of the heart, but the connexion is generally admitted, and the reasons for the relationship existing between the two morbid conditions have been frequently explained, and are at present being made the grounds of experimental investigation. Dr. Moinet does not enter, as he might have done, into a description of the microscopical appearances presented by the arterioles of the kidney in Bright's disease as explanatory of the subsequent heart affections, but contents himself with the general statement, which is no doubt correct, so far as it goes, that—

"the blood is in an altered condition, and on this account, and also in consequence of the obstruction in the kidneys, the heart is stimulated to increased exertion, which necessarily entails additional growth of the muscular substance. This change can only advance

gradually, which explains the increasing frequency of hypertrophy with the advance of the renal disorder" (p. 64).

The section on Functional Diseases of the Heart is well written, and the suggestions offered for the treatment or prevention of these affections are judicious. Among the causes of palpitation Dr. Moinet places the abuse of tea, coffee, and tobacco, all of which, in strong doses, directly affect the nervous system, first exciting it and keeping it in a high degree of tension, and, when the stimulating effect has passed off, leaving it weak and depressed.

In the chapter entitled "A Cause of Heart Disease in the Army" Dr. Moinet, while alluding to Mr. Myers's essay on the same subject, arrives at a somewhat different opinion as to the exact cause of heart-disease in the soldier. Mr. Myers, it will be recollected, attributed the great prevalence of heart-disease in the army to the constriction caused by the soldier's accoutrements, but Dr. Moinet offers an explanation founded upon an anatomical examination of the organs of the circulation. From the relative connexion of the heart and the aorta with the diaphragm in the various positions of the body, Dr. Moinet shows that the upright posture throws a greater strain upon the aorta, and this, when long continued, tends to cause aneurism of that vessel; and he adduces, in proof of the correctness of his theory, the fact that the cardiac lesions most frequently met with among soldiers are diseases of the aortic valves and aneurism of the ascending aorta and its arch. In Dr. Moinet's opinion these serious lesions are induced in the soldier by the long-continued exertion made during drill by carrying the rifle and going through the musketry exercise, the body being, for the most part of the time, in the erect position. The remedy he proposes is to diminish the amount of rifle exercise and to make the soldier perform the company and battalion drills without that weapon; and although the appearance of the men might be less imposing, he considers that their health would be improved and the loss by invaliding be obviated.

The last chapter of Dr. Moinet's book is on Angina Pectoris, but it may be a question whether this affection can be considered a *cause* of heart-disease: it is rather a disease itself. We think that Dr. Moinet somewhat overrates the obscurity which he describes as enveloping the pathology of angina pectoris, for although the exact cause of the symptoms may not perhaps always be demonstrable, yet modern science has at least shown that what was formerly called angina pectoris is, in very many cases, only a symptom itself. The affections grouped under that name may attend or denote various diseases of the lungs and of the heart, but angina pectoris *per se* is rare, that is to say, where

it is unaccompanied by organic lesions discoverable during life, or at least after death. Dr. Moinet himself seems to be aware of this truth, for he divides the disease into functional and organic angina pectoris; but he ought rather to have divided it into idiopathic and symptomatic. The former, which, although rare, is nevertheless a recognisable disease, is true angina pectoris; in all other cases the symptoms are due to organic disease. Dr. Moinet states that in those idiopathic cases which have been fatal during a paroxysm (and these must be very few) there are no remarkable appearances found after death; and, after all, we think that Heberden was not far from the truth in regarding angina pectoris as a nervous affection, which, although very distressing, may exist for years without other injury to the health.

Professor Burresi's monograph, '*Percussione del Cuore*,' treats of the information to be derived from an important element in the physical exploration of the præcordial region, and offers some suggestions towards the acquisition of a more accurate diagnosis by this mode of examination. The Professor considers that the common method of performing percussion over the region of the heart is not sufficiently exact in its results, as it investigates only the extension of *absolute* dulness in the longitudinal and transverse direction, whereas the determination of the absolute area occupied by the heart can only be established by means of ascertaining the *relative* dulness. In this question of improved diagnosis by percussion some Italian and other physicians have been lately engaged, and especially Concato, Baccelli, and De Giovanni, each of whom has proposed a special method of percussing the heart, and which is called by Baccelli *topo-cardio-graphia*. All of these methods are distinguished from each other by some peculiarity. They all require certain points to be taken over the præcordial region where the pleximeter is to be used, and the method of Concato requires eleven of such points to be taken, that of Baccelli requires only five, and that of De Giovanni requires only three. It is justly remarked that the first of these methods must be the most inconvenient in application, especially when the patient is suffering from urgent dyspnœa; the second is less inconvenient, and the third is least so. Professor Burresi considers that all the three methods present some favorable features, and by combining these together he has arrived at a plan which he thinks gives the best results with the least trouble to the patient. His method is essentially founded on that of De Giovanni, and requires only three pleximetrical points, one corresponding to the right sixth rib, another to the left third rib, and the third point to the

apex of the heart, between the left fifth and sixth ribs. Between these points lines are drawn corresponding respectively to the base of the heart and its two sides, and thus a triangle is formed, the three angles of which are more or less removed from a perpendicular line running along the middle of the sternum. These angles are larger in proportion as there is enlargement of one part or another of the structure of the heart. The exact description of the pleximetrical operations is impossible without the aid of the diagram accompanying Professor Burresi's monograph, but, from what we have stated, it may be understood that the angle corresponding to the right sixth rib will be increased when there is enlargement of the right auricle, the angle corresponding to the interval between the fifth and sixth rib (in health) will be increased when there is enlargement of the ventricles. It is obviously difficult to describe Professor Burresi's propositions in all their details, but it will be seen that they display a great amount of ingenuity, and may form a contribution of no inconsiderable importance to the diagnosis of cardiac disease.

IX.—The Modern Surgical Armamentarium.¹

THE work which we have placed at the head of our list was designed by its author, M. Gaujot, to form, as its name implies, a complete "arsenal" of apparatus and instruments (so far at least as their description went) to which the surgeon might have recourse when in difficulty. Unfortunately the inventive genius of surgeons and instrument makers is infinite, and a

¹ 1. *Arsenal de la Chirurgie Contemporaine, description, mode d'emploi et appréciation des appareils et instruments en usage pour le diagnostic et le traitement des maladies chirurgicales, l'orthopédie, la prothèse, les opérations simples, générales, spéciales et obstétricales.* Par G. GAUJOT, Médecin-major, Professeur agrégé à l'École Impériale de Médecine Militaire du Val-de-Grâce. Paris, 1867.

— Tome II. Par E. SPILLMAN, Médecin-major de 1re classe, Professeur agrégé à l'École d'application de Médecine Militaire du Val-de-Grâce. Paris, 1872.

2. *Orthopraxy, the Mechanical Treatment of Deformities, Debilities, and Deficiencies of the Human Frame.* By H. HEATHER BIGG, Assoc. Inst., C.E. London, 1869.

3. *A Catalogue of Surgical Instruments, Apparatus, Appliances, &c.*, manufactured and sold by JOHN WEISS and SON, 62, Strand, London, 1863.

4. *Book of Illustrations.* S. MAW, SON, and THOMPSON'S 'Quarterly Price Current.' London, 1870.

5. *A Catalogue of Surgical Instruments and Apparatus.* By JAS. COXETER and SON. London, 1870.

6. *Salt and Co.'s New Illustrated Catalogue of Surgical Instruments, &c.* Birmingham, 1872.

work, the first volume of which appeared in 1867, and the second (by another hand), in 1872, must of necessity be unequally up to the day. We prefer, however, to take this work, which is of a very comprehensive character, for our guide in the discussion of the various surgical inventions of modern days; and shall refer, as occasion may require, to the other works noticed at the commencement of this article. The list there given might, however, have been enlarged almost indefinitely, for from the days of Albucasis, who first illustrated his writings with figures of surgical instruments, down to the present time, surgeons have constantly given drawings of instruments and apparatus in their works. Paré, Fabricius ab Aquapendente, Portal, Heister, Petit, and in this country Cheselden, Sharp, Bell, Astley Cooper, &c., are all instances in point; and in these modern days no work is considered complete without several hundred illustrations,—many of them of apparatus,—which become tedious by repetition and reproduction. This applies still more forcibly to works on special subjects, *e.g.* orthopædics, where each writer has his own special apparatus, or “modification” of some one else’s; and as it would be impossible to name the whole of the current surgical literature, we shall take the liberty of referring to any work *en passant* without further apology.

Instruments for the administration of anæsthetics are the first described by M. Gaujot, who gives no fewer than nine apparatuses for the administration of chloroform. When we say that twenty-one figures are allotted to this subject alone some idea will be given of the elaborateness of the work; and yet Clover’s apparatus is unillustrated, nor does it seem to have gained M. Gaujot’s support, for he snubs it in the following terms: “Que de complications extraordinaires pour un résultat d’aussi peu de valeur!” This is rather hard measure for an apparatus which is theoretically absolutely safe, and which has, we believe, never induced a fatal result in its inventor’s hands; but it may be, as maintained by Sir J. Simpson, that a common napkin is after all the safest inhaler.

Just at the present time, when the “old original” nitrous oxide is given daily by hundreds of dentists, and when another American reaction in favour of ether seems about to invade us, it may not be inappropriate to remind our readers that, so long ago as 1859, the Société de Médecine of Lyons pronounced strongly in favour of ether as being less dangerous than chloroform, and according to modern views the handkerchief well saturated is the safest and best inhaler.

Local anæsthesia need not detain us longer than to notice that all the attempts to use anæsthetic vapours locally have practically

failed, and that Richardson's ether-spray, which acts by freezing the part, has proved of comparatively limited application, notwithstanding the flourish with which it was introduced and the testimonial it gained for its inventor.

The French have always been great authorities on enema-apparatuses, and the well-known *irrigateur d'Equisier*, in which the motive power is supplied by a spring after the manner of a moderator lamp, is probably one of the best ever produced. Contrasted with the dirty "bladder and pipe" of the old surgeons, the india-rubber Higginson's syringes are works of art, and yet surgeons whose practice lies principally in the lower bowel appear to be dissatisfied with the means at their disposal, and invent, from time to time, or rather re-invent, apparatuses of their own pattern. The various complicated methods of producing a spray for the medication of the air-passages, &c., have all practically been abandoned in favour of Dr. Andrew Clark's india-rubber hand-ball (which, by-the-bye, is not given by Gaujot); and, as regards vaginal injections, the same may be said as with respect to the rectum—the simpler the instrument the better. Indeed, we would back Dr. Rasch's simple syphon-tube, which costs five shillings, to do more good to an engorged uterus by injecting a continuous stream of cold water per vaginam than all the complicated machinery to be found in Charrière's shop, with the whole pharmacopœia at its back. As an example of complication, we may notice an apparatus of Bonnafont for the insufflation of vapours into the ears. Two glass retorts, each containing a different fluid, hang round and are attached to a single syringe. A lamp placed beneath a given retort produces evaporation of its contents, which pour into the syringe, and are then to be injected into the ear through a Eustachian catheter.

The apparatuses devised for the treatment of fractures are absolutely numberless. Fashion has something to do with the general adoption of a given method, and the sanction of a great name goes far to introduce an apparatus. Thus Liston's long splint for fractured thigh has for nearly forty years so completely ousted the double inclined plane of Pott and the older surgeons, that the apparatus necessary for the latter mode of treatment is not to be found in many hospitals at the present day; and yet a reaction in favour of the flexed position of the limb is again setting in under the auspices of Nathan Smith and Hogden, who sling the limb by an ingenious application of strong wire to its anterior or lateral aspects. So also with regard to the cumbrous McIntyre splint, which the pupils of both Liston and Fergusson have been accustomed to consider the *ne plus ultra* in the treatment of fracture of the leg; it is being superseded

by the light wooden side splints commonly known as Cline's, and there can be little doubt that the majority of simple fractures of the legs are more easily treated, both as regards patient and surgeon, by this method than by any other.

Splints of iron wire have been from time to time brought forward, but have never taken a firm hold of the profession in this country. The names of Mayor of Lausanne and of Bonnet of Lyons are specially connected with this subject, and the "wire breeches" of the latter surgeon have been used occasionally after resection of the head of the femur in children. This apparatus is figured by Gaujot, who also describes and draws a similar contrivance, adapted to the entire body by Palasciano, of Naples. Gutta percha, which, when first discovered, was considered to be of almost universal application surgically, has, in progress of years, found its true level, and no one, for instance, would in the present day think of using a bougie made of that material. For fractures of the fingers, &c., gutta percha is a useful appliance, and for forming a moulded cap to the shoulder and around a fractured jaw, its convenience is, we believe, fully recognised. We are not aware, however, that M. Desormeaux has any claim to priority in its use, which should justify the attachment of his name to a very ordinary gutta-percha splint for fracture of the neck of the humerus by Gaujot (p. 168).

The moulded cardboard splints of Merchie are described and figured at great length by Gaujot, and resemble very closely those employed by Seutin and Gamgee in conjunction with the starched bandage, but with the important difference that their edges are *cut* instead of being *torn*, as they ought always to be. The work before us confessedly does not describe the various immovable apparatuses made with starch, gum, or plaster of Paris, the reason for which does not clearly appear, since there can be no question of the utility of the method, though few surgeons are as enthusiastic on the subject as Mr. Gamgee ('Fractures of the Limbs,' 1871).

Among wooden apparatuses, that of J. Roux bears away the palm for ingenious complication. It consists of a wooden splint perforated throughout with holes into which pegs of various sizes are fitted so as to hold the limb firmly, straps passing across it and through slits in the pegs to maintain it in position. The arrangement thus somewhat resembles a gigantic "cribbage board," and its complication has effectually prevented its general adoption. The plan of slinging a fractured limb dates back at least a century, but modern ingenuity has improved the method. Probably Salter's well-known sling is as perfect an instrument as need be desired, unless the surgeon prefers to adopt Green-

way's bedside leg-suspender in order to have the bed itself free from apparatus. The method of anterior suspension by Nathan Smith's wire splint has already been referred to, and promises to be more generally employed as it becomes better known.

Granted that extension of a fractured limb is necessary, it is obvious that the extension should be as little injurious as possible. In this respect we owe much to American surgery, since the introduction of extension by means of a broad strip of plaster carried up either side of the limb and forming a loop below came to us from the other side of the Atlantic. The employment of a simple weight or of elastic tension is open to the surgeon, who may if he please combine the method with a side splint, as has been done by Barwell, De Morgan, and others, or he may employ some form of screw tourniquet applied to a cross-bar in order to extend the limb, of which several varieties are given by Hamilton ('Fractures and Dislocations').

The successful reduction of dislocations is yearly becoming more and more a matter of manipulation and manœuvring than of brute force. This has especially been the case since the introduction of anæsthesia counteracted all muscular spasm, and the surgeon has little need now-a-days to resort to the forcible measures of the ancients which may be seen depicted in the older works, or in a series of illustrations presented to the museum of the College of Surgeons by Sir W. Fergusson. This tendency towards manipulation has received a great impetus from the recent work of the distinguished American surgeon Bigelow, who has taught us how to reduce dislocated thigh bones by relaxing the great ilio-femoral ligament, and then rotating in a given direction, instead of forcibly dragging upon the limb in the extended position. Still, both Gaujot and Hamilton describe and figure plenty of ingenious mechanism for giving the surgeon increased power of extension and for suddenly intermitting the effort. Jarvis's "adjuster" is, perhaps, the most complicated of these apparatuses, but other surgeons have not been behindhand in their inventions, though probably few of these contrivances, save the common pulleys of the instrument makers' shops, are ever employed. The applications of a dynamometer to reduction apparatus is a piece of French ingenuity, which would be of more practical value were it always possible to gauge accurately the power of resistance of a given limb. The dislocation forceps of Luer and of Charrière for holding a dislocated finger are ingenious and remarkable instruments, but must yield for simplicity to the Indian puzzle popularised three years ago in England under the name of the Siamese-link, or the splint and tapes of Levis figured by Hamilton.

The treatment of joint disease by rest has been strongly insisted upon by many surgeons, and especially by Mr. Hilton in his lectures on "Rest." Immovable apparatuses for the retention of the limb are, therefore, common enough, and probably none answer their purpose better than those made of leather moulded to the joint, and strengthened when necessary by steel bands. These, however, confine the patient to the couch more or less, and it remained for Dr. Sayre of New York to show how it is possible to obtain physiological rest for joint surfaces, whilst permitting locomotion to the patient. One form of Sayre's splint for hip-disease, but not the most recent one, is given by Gaujot, nor do we find it in Bigg nor in any of the surgical mechanician's catalogues. The treatment of joint disease by absolute rest may, however, be carried too far, and as Dr. Wharton Hood (on 'Bonesetting') has shown, the successes of the "bone-setter," depend upon his breaking up by rough manipulation the adhesions which surgeons have induced. Numerous ingenious mechanical contrivances have been invented for the purpose of restoring motion to ankylosed or semi-ankylosed joints, of which numerous examples are described by both Gaujot and Bigg. But these all err apparently in acting slowly instead of forcibly on the adhesions, with the result of stretching instead of tearing them. Many of them, also, are intended for the patient to work by his own efforts. But every surgeon must know how impossible it is to get any but a very exceptional person to inflict pain upon himself; and without inducing pain, it is, we believe, hopeless to attack adhesions in or about joints. For osseous ankylosis of the hip-joint, Mr. Wm. Adams's ingenious and very successful operation of dividing the neck of the femur subcutaneously must not be forgotten, though the peculiar saw he employs is of too recent invention to have found its way into any of the catalogues before us.

Compression of the main artery of a limb, or even of the aorta, for the treatment of aneurism has, since its revival by the Dublin surgeons, become more or less universally adopted. The tourniquet of Petit, suited only for amputation, gave way to the horseshoe-shaped instrument of Signorini, and the bulk of the more modern instruments are modelled upon the latter. Carte's apparatus ingeniously combined elasticity with pressure, and this idea has been successfully imitated by his successors. Of these, numerous examples by French surgeons are given by Gaujot, who, however, does not describe Bellingham's method by a metallic cone, the apex resting on the artery and the base supported by a cradle, which is highly spoken of by Bryant in his recently published work.

Orthopædic mechanism has become such a specialty that it

necessarily occupies a large space in Gaujot's work, which may be advantageously contrasted with Bigg's 'Orthopraxy' and with the works of various orthopædic surgeons. We fear we shall incur the wrath of these last gentlemen when we say that there is a growing conviction in the professional mind that spinal curvature is practically an incurable complaint, which may possibly be checked in its progress by judicious mechanical treatment, but can never justify the application of apparatus the key of which is kept by the surgeon and used by him only. Mr. Barwell has done much to dispel the terrorism of spinal supports, and we regard his "sloping-seat" as one of the few real improvements in modern orthopædics, though we cannot agree with all his mechanical theories as to the action of muscles.

As regards club-foot, undoubted improvements have been made since the days of Dieffenbach, and, given time and patience, we believe all cases of spasmodic club-foot are or ought to be curable. We shall not, however, devote any further space to the consideration of these matters, since little more than ten years ago ('Medico-Chirurgical Review,' October, 1861) we devoted a lengthy article to the consideration of the entire subject of orthopædics.

The second volume of the 'Arsenal,' by M. E. Spillman, dates from 1872, and its first 180 pages are devoted to apparatuses for supplying defects in or losses of parts of the body. Artificial eyes are traced from their primitive condition in the days of Ambrose Paré to the perfection which they have attained in the hands of Boissonneau of Paris, Gray, and others. Artificial eyes must, we fear, always be *articles de luxe*, for they require to be made specially for each case, and they are not long-lived, partly from the corrosive action of the tears and partly from inevitable accidents. Some ingenious experiments of M. Abatte, on the insertion of a glass window into the cornea, receive a more lengthy notice than they deserve, though we may mention in passing that Mr. H. Power brought before the Ophthalmological Congress, last August, some results of the transfer of portions of cornea from living animals to the human subject, which appear to be more promising.

The supply of artificial teeth has become so entirely a specialty of the dentist that the subject need not detain us; but the restoration of the palate, whether congenitally malformed or destroyed by disease, must always interest the surgeon.

M. Preterre, the well-known dentist of Paris, has devoted very considerable attention to both of these subjects, and his labours are recorded in the volume before us at considerable length. It is pretty well known among surgeons that even

after most successful operations for cleft palate the voice too frequently is but little improved. This depends, in the majority of cases, we believe, upon a shortness of the palate, by which it is prevented from coming into contact with the posterior wall of the pharynx, and, therefore, the older mechanical contrivances of rigid material which stopped abruptly, or at best had a hinged palate not reaching the pharyngeal wall, produced no better results than the operation. A palate of soft elastic material, modelled to the flaps of the divided palate, and moving with it, offers the best substitute for the natural muscular curtain which completely separates the nose from the mouth during oral respiration, and the first effort in this direction seems to have been made by an American dentist named Stearn. This was a complicated piece of machinery, however, and it was not until the manufacture of soft vulcanized india rubber came into use that Kingsley, of New York, and Preterre, of Paris, were able to construct their palates, which do so effectually fill up the gap left by nature. These contrivances are figured in the 'Arsenal,' and so also numerous pieces made by M. Preterre for filling up gaps in the alveolar border of both upper and lower jaws, caused by gunshot injury or surgical operation.

The subject of artificial arms and legs is fully discussed, both in the 'Arsenal' and in Mr. Bigg's 'Orthopraxy.' Traced from the heavy metal hands of historical celebrity, we have all the modifications introduced by successive ingenious mechanics until we come to the perfection of the present day. The simplest and, at the same time, very efficient hand and arm is, so far as we have seen, that contrived by the Count de Beaufort, in which the fingers are carved in wood, and the movable thumb is controlled by a piece of catgut passing to the *opposite* shoulder across the back. The more complicated apparatuses contrived by Von Petersen, Huguier, Charrière, and others, are triumphs of mechanical skill, but are necessarily more expensive and liable to get out of order than the simpler contrivances, of which the well-known "hook" is probably the most primitive.

The requirements, as regards artificial aid, of the modern amputations of Hey, Lisfranc, and Chopart have been readily met by the instrument-makers; but they all appear to us to have the great drawback as regards artificial feet, that the steel supports which pass up the sides of the leg render the ankle very thick and clumsy, and necessitate a specially made boot. In the amputations of Syme, Pirogoff, and Roux, on the other hand, the removal of the malleoli being an essential part of the operation, the steel supports make the ankle only of its normal size, and, therefore, an ordinary pair of boots can be

worn. Apart from the purely surgical advantages of the ankle amputations, these points are worthy of consideration.

In the application of all forms of artificial legs the mode of formation of the stump and the position of the cicatrix are matters of the first importance. It may be remembered that the late Mr. Teale found that, universally, instrument-makers did not venture to make pressure on the face of a stump because of the cicatrix across it, and it was one of the great advantages of his method of amputation by the long anterior flap that the cicatrix was thrown completely behind. Since that time skin-flaps have more and more come into fashion, and thus amputations through the knee-joint and Carden's amputation in the thigh, or amputations by the "mixed method" of skin-flaps and a circular sweep through the muscles, have almost superseded the older methods of making fleshy flaps by transfixion. The old "bucket" of all artificial legs, which took its bearing from the sides, and not from the extremity of the stump, may, therefore, it is to be hoped, gradually fall into disuse, to the great improvement of the patient's locomotive powers.

The simpler forms of artificial leg, whether for amputation at the "point of selection" below the knee or in the thigh, need not detain us; but some of the more modern and ingenious contrivances deserve a passing notice.

The well-known Anglesea leg of Mr. Gray had rigid hinge-joints, and its motion was given by a catgut tendo Achillis, and anterior india-rubber spring. The American leg of Palmer and the French ones of Béchard and Mathieu were improvements upon the Anglesea leg, and the former has had great popularity in America. Dr. Bly's American leg has, however, great advantages over all its predecessors (as is allowed both by Spillman and by Bigg), in possessing rotation and lateral action at the ankle by the adoption of a ball-and-socket joint, controlled by five elastic tendons working within the hollow leg. It has also a self-acting spring in the knee-joint, by which the swing necessary in other jointed legs is avoided, whilst the joint itself is rendered strong enough to resist violent shocks by short cords, after the manner of crucial ligaments. In 1867, Marks, of New York, added to the Bly leg a foot composed of light wood, entirely covered with india rubber, and Bigg claims to have recently superseded both by a leg with a ball-and-socket ankle-joint, through the centre of which a single cord passes.

The description of the ordinary surgical instruments in the 'Arsenal' may be conveniently studied in connection with the catalogues of the surgical instrument makers, which are all more or less pretentious, but are in some cases singularly wanting in

accuracy. This want of accurate following of the original pattern of an instrument by the several makers is very annoying, both to practitioners and to the originator of any instrument, since failures constantly occur in practice from want of care on the maker's part. Thus we take, for example, an instrument in pretty general use, viz. Holt's stricture-dilator. As originally made by Savigny, the blades, when closed, are equal to No. 3 catheter, and the opening of the hollow guiding-rod is at the bend of the instrument. A dilator made by other firms is invariably much larger and more clumsy, and has the opening at the extremity, where it is much more liable to become obstructed when the instrument passes along the urethra. Were it necessary we could multiply instances of the kind. To return, however, to the 'Arsenal.'

Dressing instruments have always been more simple in England than in France, where the use of the abominable *charpie* and the abundant employment of cerates still survive. The *portemèche* or wick-carrier for pushing charpie to the bottom of sinuses has never been a member of the English dressing-case, and the spatula has been used more for examining the throat than for spreading grease. One continental improvement is very long in finding its way into the instrument-makers' catalogue and into common use, though it may, perhaps, be met with in most shops if inquired for, and it is the method of connecting the blades of scissors and forceps. Here the screw which gets rusty and wears loose is the almost invariable form of hinge, but abroad the lock hinge of Charrière or some modification of it is in common use, and has the great advantage of allowing the blades to be readily separated and cleaned.

The scalpels and bistouries of the English makers have always been of a stronger and heavier make than those of the continental manufacturers. This is in some respects an advantage now that we have somewhat modified that tremendous scalpel figured by Samuel Sharp (1739) as "the round-edged knife, of a convenient size for almost all operations where a knife is used," the length of the instrument figured being six and a half inches. The blades of scalpels are even now made much too large as a rule, for the heel of the knife is seldom used, and is very apt to cut the middle finger when the instrument is held like a pen. A fashion has sprung up of late of making miniature surgical instruments, but these are rather toys than weapons. Whether the point of a scalpel or bistoury should be parallel to the back or edge of the blade or midway between the two is comparatively of little moment, though probably in this as in other matters the middle is the best. Scissors, straight, bent, and curved on the flat, are now of universal use in sur-

gery, but we may notice that the angular scissors which some people suppose to be a modern invention are given in the same plate of "Sharp's Surgery" as the scalpel mentioned above, under the title of "a pair of probe-scissors."

Forceps have undergone comparatively slight modifications in course of years, since their object has always been the same. The re-introduction of torsion of arteries for the arrest of hæmorrhage has made the forceps fitted with a sliding catch more common just at present than those with a spring-catch, but these last, especially if made with interlocking points, are unrivalled for picking up arteries in tough textures where the broad-ended torsion forceps are quite inapplicable. It is extraordinary that instrument makers persist in grooving the blades as if they were always intended to act as needle holders. For complicated needles and needle-holders the French have always borne the palm from English makers, and many of them are figured in the 'Arsenal.' The fact is, we believe that those who operate most for cleft palate and vesico-vaginal fistula use the simplest tools, and that the ingenious mechanisms devised in the study almost invariably break down in the operating theatre.

Exploring trochars have long been known, but their use has received a most decided impulse from the introduction of the aspirator of Dieulafoy, to the invention of which, by the way, Dr. Protheroe Smith also lays claim. The advantage of the aspirator over former methods is, that the size of the trochar is reduced, that the most important organs, *e.g.* the bladder, may be penetrated without giving rise to extravasation or mischief, whilst the access of air and all its consequences are prevented. For exploration, therefore, as well as for treatment, the instrument may be safely employed, and seems likely to be of considerable service. Not content with simply tapping obscure swellings, some surgeons have proposed to bring away portions of tumours for microscopical examinations; and for this purpose minute drills or gimlets have been invented by Buisson, Kuss, and Middeldorff. Duchenne de Boulogne also has invented a trochar and canula furnished with a hook to draw out a portion of the growth.

The variously shaped and named cauteries of the ancients have almost fallen into disuse, but the application of the hot iron, whether for the arrest of hæmorrhage or for purposes of counter-irritation, has undoubted advantages. Of late years some attempts have been made to do away with the troublesome charcoal stove, which is such a regular attendant in French hospitals, by the utilization of coal gas. Nélaton employed the actual flame of hydrogen or coal gas, and Auger speaks highly of the method. The late Mr. Alexander Bruce most ingeniously

intensified the gas flame by means of a common blow-pipe so as to heat platinum cauteries of various shapes to the necessary degree of heat. The galvanic cautery which was first introduced into this country by Marshall, has great advantages over other forms of cautery for certain purposes, *e. g.* the removal of the tongue, penis, or other vascular parts, when it acts as a heated *écraseur*; and since the introduction by Middeldorff of a more powerful battery by which a thick wire can be kept hot when imbedded in living tissues, the method has become more generally adopted. Galvanism has also been adopted to the detection of bullets lodged in the body, Trouvé having invented an exploring trochar and canula by which two insulated wires connected with a battery are made to touch the foreign body, which, if metallic, completes the circuit and puts the vibrator in action. A simpler instrument is one made by Mayer and Meltzer for Dr. Taylor, in which the insulated blades of a pair of bullet forceps are placed in communication with a galvanic needle, so that when the bullet is touched the circuit is completed and the needle deflected. These ingenious mechanisms are, however, rather toys than instruments for war time, and Nélaton's porcelain probe is probably the only generally useful addition to the army surgeon's armamentarium of late years. As regards the extraction of bullets, the American experience, which was very large, was all in favour of a simple hooked forceps known as Gemrig's, one blade being bifid and slightly capped, and the other single so as to fit between the two points of the other when closed.

For amputation, the straight-bladed knife with a sharp point adapted for perforating a limb in the flap-operation has completely superseded the old-fashioned circular knife, the curve of which varied according to the fancy of the maker, and yet with the growing tendency towards skin flaps, and a circular division of muscles, we might, perhaps, with advantage, return to the curved knife with a rounded point. Certainly, it is easier to dissect up a skin flap with a round-pointed knife, and there is much less risk of the young surgeon scoring his flap and thus leading to its destruction. Catlins, too, are quite things of the past, but they are very useful knives when there are two bones to be freed from soft textures. As regards saws surgeons seem to work in a circle. The old-fashioned bow saw (of which numerous examples may be seen in the museum of the College of Surgeons). was superseded by the straight-backed mortice saw of the carpenter; and now, again, Mr. Butcher has introduced a bow saw which possesses the advantage of a narrow blade which can be set at any angle, but is an expensive and, we venture to think, unnecessary instrument. Certainly for resection of the knee,

for which operation the inventor specially recommends it, a deep-bladed ordinary saw will be found to give a much more even surface in the hands of the majority of surgeons. The chain saw has the great drawback of inherent weakness of the links and has never been a favorite with English surgeons. Mathieu has mounted the chain saw on a bow, and Heim has adapted to it a most complicated apparatus with a crank for working it! As regards the surgery of the bones, really no improvement has been made since the introduction of bone forceps by Liston, for the chisel and gouge are very ancient tools, and as regards osteotomes, such as the formidable instrument of Castelnovo, figured in the 'Arsenal,' we regard them as instruments belonging to the Middle Ages. It is, by-the-by, rather amusing to find Fergusson's well-known "lion forceps" figured and described as the "davier d'Ollier."

The whole subject of ophthalmic surgery may be said to have undergone a revolution in the last quarter of a century, and it follows of course that ophthalmic apparatus and instruments have been correspondingly modified. The introduction of the ophthalmoscope has opened a new field for inventors, and accordingly we have ophthalmoscopes of every variety, from the simple mirror perforated in the centre to the ingenious demonstrating ophthalmoscope of Liebreich and Carter. It is impossible in the space at our disposal to discuss all the modifications of knives, &c., employed by various ophthalmic surgeons, but we will briefly indicate a few of the most valuable additions to their armoury. The spring-speculum was a great improvement upon the old retractors, and this again has been improved by the introduction of a bar with a stop to fix the instrument; though this again has been superseded by a screw action which is most ingeniously applied in the speculum of Fornari. The probes and dilators for the lachrymal passages, introduced by Bowman, are undoubted improvements, and the same may be said of the ingenious canula forceps and scissors for delicate operations within the anterior chamber. The various shaped curettes or spoons which have been introduced to assist the removal of the lens seem to be of less certain utility, since they are again falling into general disuse.

In aural surgery the modern additions may be even more shortly summed up, for, beyond some improvements in the methods of illuminating the meatus, the otoscope of Toynbee, and the method of inflating the tympanum by means of Politzer's bag, are the chief additions to the surgery of an obscure organ.

The popularisation of the laryngoscope has brought under the treatment of surgeons a large number of cases previously

misunderstood, and laryngeal surgery may be said to be the growth of the last ten years. The various laryngoscopes and methods of illumination are fully described in the 'Arsenal,' and the numerous ingenious snares and forceps for the removal of morbid growths, invented from time to time by continental and British authors, are abundantly illustrated both here and in the instrument-makers' catalogues. On the allied subject of tracheotomy we may remark that a great improvement of the last year or two has been the abolition of the tube which was curved so as to be a segment of a circle. This, though convenient for holding an inside tube, had many disadvantages, first among which must be put the tendency to press against the back of the trachea and induce ulceration into the œsophagus, or, possibly, into some blood-vessel. This was partially obviated by making the tube fit loosely in the neck-plate so as to move readily with the trachea in respiration, but the greatest gain has been the alteration of the shape of the tube by Mr. Durham, so that the upper part is straight and horizontal and the extremity only turns down into the trachea. Tubes of this kind are somewhat expensive owing to the fact that the inside tube is necessarily jointed, but when the instrument is obliged to be worn for any time there can be no question as to its greater safety.

The practice of English surgeons in the treatment of stricture of the urethra seems to be undergoing a revolution, and a return to the use of soft bougies in place of metallic instruments is imminent. In this they are but following a French example, and as the names of the French instruments have formed a fruitful source of contention between some distinguished London surgeons, it may be as well to indicate clearly what the instruments in question are. There is the *bougie olivaire*, with an olive-shaped bulb at its extremity; then there is the *bougie conique*, with a tapering point; the *bougie à boule*, with a bulb for the detection only of stricture; and the *bougie à nœuds*, with more than one projection for the same purpose. Undoubtedly the olivary bougie or catheter is a very useful instrument, especially for a patient to use for himself, but we believe in very tight strictures it is impossible to introduce elastic instruments, or instruments made of catgut, so readily as a silver catheter or metal bougie. As regards more forcible dilatation Holt's instrument is most in use in this country. This is, undoubtedly, a modification of Perrève's instrument, but the latter was never used, as Mr. Holt employs his instrument, to split up the stricture at one operation. Instruments for simply dilating the strictured portion of the urethra have been invented by Michalena, Thompson, and others, but do not appear to hold

their ground, whilst the ingenuity of other surgeons has been expended in devising internal urethrotomes, of which Civiale's is probably the simplest and best. The large curved prostatic catheter of the English instrument-maker finds no favour with the modern French surgeon, who prefers the short-beaked and abruptly bent instrument of Leroy d'Etiolles and Mercier. This last surgeon has introduced a series of instruments for operating upon the enlarged prostate by excising portions of the hypertrophied lobe or incising the neck of the bladder, which will we hope be long in finding their way into English practice.

Lithotrity owes so much to the labours of French surgeons, especially Civiale, that the subject is sure to be fully dealt with in any French work, and the 'Arsenal' is no exception. It should not be forgotten, however, that the first application of the screw action, and the adoption of the fenestrated blades, are due to our countrymen. Civiale's latest lithotrite left little to be desired, and that little has been gained in Thompson and Weiss's latest pattern. The simplicity of Fergusson's instrument, and its lightness, as compared with the old lithotrites of Brodie, were points in its favour; but it lacked the great advantage of the modern instruments in locking the blades with the slightest movement of the finger on a button, so as to fix the stone prior to the application of the crushing force. Even its distinguished inventor has, we believe, practically abandoned its use in favour of Thompson's instrument, which must be considered the English lithotrite of the present day.

Mr. Clover's ingenious bottle and catheter for evacuating fragments of stone is another useful addition to the operation of lithotrity, which bids fair to supplant in adults, at least, the old cutting operation. This need not detain us, however, since with the exception of the introduction of Buchanan's rectangular staff the instruments for lithotomy are much what they were thirty years ago. The majority of surgeons still prefer to cut on the ordinary curved staff with a lateral groove, the surgeons of Guy's Hospital and their pupils preserve their preference for Aston Key's straight staff, and a few surgeons have employed the rectangular staff from time to time. So long as the bladder is safely reached with the knife and finger, the guide is probably a matter of indifference.

The last section of the 'Arsenal' which is devoted to the instruments employed by gynæcologists, fully illustrates the operation of ovariotomy and the various operations upon the female genito-urinary organs. Though not quite complete it fairly represents the foreign instruments, but does not do justice to British practitioners, as may be seen by contrasting with it the catalogue of obstetric and other instruments exhibited by the

Obstetric Society of London in 1866. Still, as a guide to the various instruments of surgery the work is most valuable, and, taken in conjunction with the English works we have coupled with it, cannot fail to be a most useful book of reference for many years to come.

X.—Erichsen and Gross on Surgery.¹

THESE are new editions of works so well known to the profession, and which have been so frequently noticed in our pages before that we need not review them at any great length. They are, however, such excellent representatives of the state of modern surgery in this country and in America, and give such a comprehensive view of the practice which prevails on both sides of the Atlantic, that we could not be content to pass them over in silence.

It needs but a glance to see that they both belong to the foremost rank of surgical literature. That one has reached a fifth edition and the other a sixth is of itself a testimony in their favour. But as soon as we turn to their contents we find much more substantial proofs of their merits. Each is a complete system of surgery—not a mere text-book of operations, but a scientific account of surgical theory and practice in all departments. Even Mr. Gant could not complain that surgical pathology was overlooked in these volumes. Both works enter rather largely into those questions of morbid anatomy and of physiology which constitute what is sometimes called the science of surgery, and both authors have made strenuous efforts to keep themselves abreast of the knowledge of the day, and to give their readers the benefit of the most recent research—a matter of no small difficulty in these days of active inquiry.

Mr. Gross's work is founded upon the lectures which he has been in the habit of giving for the last thirty-two years, first at Louisville, and afterwards at Jefferson's Medical College, Philadelphia :

“During all that period,” he says, “I have been unceasingly devoted to the duties of an arduous practice, both private and public ; to the study of the great masters of the art and science of medicine

¹ 1. *The Science and Art of Surgery.* By JOHN ERIC ERICHSEN, Senior Surgeon to University College Hospital, &c. London. Sixth edition, 2 vols, 1872.

2. *A System of Surgery ; Pathological, Diagnostic, Therapeutic and Operative.* By SAMUEL GROSS, M.D., D.C.L. Oxon., Professor in Jefferson Medical College, Philadelphia, &c., &c. Fifth edition, 2 vols. Philadelphia, 1872.

and surgery ; and to the composition of various monographs having a direct bearing upon a number of subjects discussed in these volumes. The work should, therefore, be regarded as embodying the results of a large personal experience, of extensive reading, and of much reflection ; in a word, as exhibiting surgery as I myself understand it, and as I have for so many years conscientiously taught it."

But Mr. Gross's long experience and deep study have led him to some conclusions which will hardly be accepted in this country without dispute. Thus, in speaking of bloodletting, he says :

"Its value was not over-estimated by the older writers when they designated it as the 'great remedy' in the treatment of inflammation, yet, strange to say, it has of late years fallen much into disrepute, not only in Europe, but also on this side of the Atlantic, where it had at one time so many advocates."

These praises and these regrets will, we venture to think, be shared by very few of Gross's professional brethren. The words used by Erichsen more nearly express the prevailing opinion among modern surgeons :

"Bloodletting is certainly not often required in the treatment of surgical inflammations ; and it should be especially avoided in very young and in very old subjects, in the inhabitants of large towns generally, and in those in whom inflammation of a specific character occurs."

And, as a matter of fact, general bleeding is resorted to even less often than these expressions imply : indeed in English practice it is almost entirely proscribed.

But Mr. Gross is faithful to his principles throughout, and altogether advocates a much more actively antiphlogistic system than that which the rising generation of surgeons is disposed to adopt. To take a single instance :—In speaking of acute glossitis he recommends that blood should be taken from the arm and the patient brought fully under the influence of nauseants. Now, those who have given any attention to this disease know that such heroic treatment is not necessary. Scarification of the tongue, mustard plasters to the neck, and such comparatively mild measures, are all that are needful. Here the English surgeon is more judicious, as well as more correct than the American.

Another point upon which we must demur to Mr. Gross's conclusions is this :—he holds that epithelial cancer is not produced by irritation, and he derides the idea that epithelioma of the lip is in any way due to smoking a clay pipe. But there is hardly a fact in pathology which is better established than that local irritation does determine the seat of the epithelial

cancer. Chimney sweeper's cancer of the scrotum is a notable example of this, so are the numerous instances of epithelioma of the tongue, which are caused by a jagged tooth or a rough accumulation of tartar. Indeed there is no class of cancers which afford a stronger illustration of the modern doctrine that cancer is in its origin a local disease than these various forms of epithelioma.

Mr. Gross has included in his system both the diseases of the eyes and of the teeth. We doubt the wisdom of this course very much. Dentistry has become such a special branch of surgery that it is best to leave it to be treated specially by dentists. And the same thing, though in a less degree, applies to ophthalmology. It is impossible to follow out general surgery and at the same time to enter into all the details of ophthalmic surgery. It is better for the writer on general surgery only to deal with the superficial and comparatively simple diseases of the eye, with which every surgeon ought to be familiar. The plan which Mr. Erichsen has followed of calling in the aid of a specialist to help him in this part of his work is not one which commends itself to us. In speaking of ophthalmia neonatorum Mr. Gross advises the use of a lotion of bichloride of mercury with the internal administration of small doses of calomel. This again is unnecessarily heroic. It cannot be too widely known that a lotion of alum (gr. vi ad ʒi aquæ) used with a syringe every half hour is absolutely specific for this formidable disease, and that no preparations of mercury whatsoever are needed.

Mr. Gross's visits to this country, where he has been a welcome guest among us, have made him well acquainted with English surgery, and the special operations which have originated here are set forth in his pages, with a discriminating judgment. He has, too, borrowed largely from the woodcuts which illustrate our English works. This is a system which has gone rather too far in surgical literature generally on both sides of the Atlantic. Erichsen's book shows it as well as Gross's, and we may take this opportunity of alluding to it. A well-selected illustration is as much to the credit of the author as a well-selected phrase, and he ought to be allowed to enjoy undisturbed possession of it.

In this sixth edition of Mr. Erichsen's well-known work no great alterations have been made such as those which marked the transition from the fourth to the fifth edition. At that period some radical changes were introduced in the general arrangement, which brought it into harmony with the requirements of the day. In the present edition the feature that presents itself is that of continuous improvement in such slighter matters and

details as the advancement of surgery necessitates. We have always thought it strange that the work should open with an account of surgical operations, culminating in amputation at the hip-joint, before the elementary principles, such as the process of repair or the course of inflammation, are explained to the reader. We observe, however, that an improvement has been made in the position of "abscess" and "ulceration;" for whereas these subjects used to be grouped with mortification, erysipelas, pyæmia, &c., in the third division of the work, they are now placed in their natural position in the first division, among the events of inflammation. We should like to see "gangrene" similarly transposed. There is no reason why it should be so widely separated from ulceration.

The particular subjects which seem to have received the fullest development in this edition are the processes of repair, the pathology of morbid growths, and the larger operations—more particularly the amputations. In all these subjects fresh and very excellent illustrations have been introduced, while the letterpress has been correspondingly amplified. In treating of the dislocations of the thigh bone, Mr. Erichsen has introduced a series of drawings from Bigelow. They are, no doubt, good, and help to elucidate the subject; but it was sufficiently illustrated before, and there was no need to borrow woodcuts from extraneous sources.

Of the antiseptic system of dressing wounds Erichsen speaks in terms of well-merited praise :

"Of the great value of this method of treatment, more especially in the case of chronic and cold abscess, there can be no doubt in the minds of any one who has given it a fair trial. By an 'antiseptic' method, properly carried out, and in accordance with a scrupulous attention to those details that are necessary for its successful employment, it will be found that the formation of pus speedily diminishes, that the danger of its decomposition is removed, and that the chance of constitutional irritation is, consequently, greatly lessened, if it be not entirely removed—that those dangers, in fact, which are apt to result from the opening up of large suppurating cavities are greatly obviated by the use of antiseptic dressings."

Of this system Gross speaks very briefly and in terms of modified approval. Probably he has not had the opportunity of seeing it as it is carried out by the distinguished Edinburgh surgeon, who has devised it and brought it to its present perfection.

Of skin grafting Mr. Erichsen speaks in higher terms than we should have expected. We doubt very much whether it will really be found of so much value as he anticipates. If

it only expedites the healing of a healthy sore, that is something, it is true, but not very much. If it does not help to improve the character of the cicatrix, if cicatricial tissue still remains as hard, as prone to contract, as liable to inflammation as before, it is hardly worth while to "graft."

Mr. Streatfield has again contributed the chapter on ophthalmic surgery. Several sections have been entirely rewritten and some fresh ones added. The operations of iridectomy and abscission are condensed, while the description of Von Graefe's method of extracting cataract has been extended and its advantages insisted on. We are surprised to find that the recently proposed operation of tattooing leucomata of the cornea is only casually mentioned.

The illustrations in this edition have been greatly improved. The old woodcuts, badly drawn and badly engraved, which disfigured the earlier editions, have been omitted altogether, or amended, as to make them worthy of the high position which the work has now attained. Many new ones, likewise, have been added which are much better artistically than the old ones, and are, in fact, all that could be desired. A few of the original ones still remain, and mar the effect of the whole. We may mention particularly Figures 247, 543, 545, and 546, as examples; but we hope that, if the work reaches another edition, these also will be redrawn, and the entire series made equal to the rest of the work, as it now stands.

XI.—Arnott on Cancer.¹

Is cancer in its origin a local disease, that is to say, entirely independent of any humoral fault?

This question was discussed at some length in our volume for July last, but it is hardly possible to take up the consideration of the minute anatomy of the various forms of morbid growth without referring to this supremely important point. Truly, as Mr. Arnott says in his preface, much patient experimental research is before us ere the truth of the recent views of the local nature of cancer, as opposed to the notion of a specific blood disease like syphilis, can be either established or refuted.

Mr. Arnott states that his aim has been, while endeavouring to clear up the confusion which has resulted from a new

¹ *Cancer; its Varieties, their Histology and Diagnosis.* By HENRY ARNOTT, F.R.C.S., Assistant-Surgeon to St. Thomas's Hospital, and Joint Lecturer on Morbid Anatomy in the Medical College. Illustrated by lithographic and wood engravings by the author from nature. London, 1872, 8vo, pp. 86.

nomenclature of tumours by giving an account of the microscopic structure of tumours, to render less unsatisfactory our mode of treatment by contributing to a larger knowledge of the pathology of such forms of disease, thus making more trustworthy the conclusions drawn from the observations of the effects of remedial measures employed.

Mr. Arnott begins by defining what meaning he attaches to the word "malignancy;" he describes a malignant tumour as having such an energy of growth as to baffle, in a greater or less degree, the surgeon's interference. It is convenient, he thinks, to speak of three gradations of malignancy, (1) the persistent recurrence *in loco* after removal, (2) the tendency to infect the nearest chain of lymphatic glands with the same morbid growth, and (3) the possible combination of one or both these conditions with a proneness to the formation of other like tumours in distant parts of the body, and especially in the lungs and liver.

It is the last quality that is so striking. What is the difference between cancer germs, content with a local career, and cancer germs of the propagandist order? What are the conditions that render cancer germs stationary, living their life and undergoing retrograde changes without travelling to distant parts of the system, and there proliferating? Is non-contamination due to resistance of parts or tissues exposed to contaminating influences, or to some local intrinsic change in the cancer "stuff" destroying its power of contamination?

In proof of the migration of cancer cells and the consequent formation of other like tumours in distant parts of the body Mr. Arnott quotes Sir James Paget's case of primary cancer of the liver in which all the new growths were "stained bright yellow by bile, and in which were found numerous small cancerous masses of the same colour infiltrated in the lungs." Sir James Paget thinks that "the accidental colour of the cancer materials in this case made their transference from the liver to the lungs very evident."

This case is remarkable in two ways at least; for cancer, as commonly observed in the liver, is white or pearly, not yellow; and it is not easy to see how the small cancerous masses, disseminated through the lungs, could have derived their bright yellow colour, unless each mass was a little heap of cancer cells direct from the liver, and unmixed in any great degree with cancer newly bred at the seat of secondary deposit. Possibly the pathology of this rare case is more complicated than it may at first sight appear. But Mr. Arnott proposes to avoid, as far as he can, such recondite problems which suggest themselves to the pathologist, limiting himself to a brief account of

the structures and mode of growth of the common forms of malignant tumours, and the manner in which their structure may be most readily demonstrated.

Carcinoma he defines as "a tumour in which more or less dense fibroid growth forms a spongelike or cavernous framework, whose alveoli are filled with loose cells of an epithelial type, grouped together disorderly, bathed in a clear fluid, and having no visible intercellular material" (p. 22). There are thus offered for examination two main structures in carcinoma the fibroid framework or stroma, and the cells therein enclosed. On minute details, we leave our readers to consult Mr. Arnott's work, drawing attention, however, to his summary, namely, "that first we have an accumulation of small bodies resembling granulation corpuscles, which may be leucocytes or (more probably) the product of connective-tissue proliferation, these gradually form small clusters; and the next appearance is a series of groups of larger oval and nucleated cells. These in their turn give place to well-marked meshes in the fibrous material, filled with irregular densely-packed cells, the typical structure of carcinoma, and no sooner are these formed than symptoms of decay appear, the cells becomes generally obscured by oily accumulations within them, burst and the oil runs into larger drops; lastly, the connective-tissue corpuscles in the stroma may themselves degenerate, and then we have merely a granular fibroid stroma enclosing spaces filled with oil particles" (p. 30).

Cancer, we think, essentially consists in the formation of a cell-growth amongst the textural elements of a part, such cell-growth being of low vitality, and being also shortlived. This cell-growth, so inherently prone to atrophy, either gives rise to atrophic changes in the textures in which it is generated, or, acting as an irritant induces a *vascular* outgrowth; accordingly there occurs a slow wasting and shrivelling of the parts, or, a vascular hypertrophy with great tendency to inflammatory action which rapidly runs into gangrene—a gangrene that destroys *en masse*, as well as by the molecule.

Villous carcinoma, fungus hæmatodes, melanotic carcinoma, colloid carcinoma, and myxoma, are associated by Mr. Arnott in one class with scirrhous as the most malignant growths. These are distinguished from the varieties of sarcoma by their wanting the intercellular material which the sarcomata possess, and which constitutes one of their histological characteristics.

The spindle-celled, round-and-oval celled, and myeloid, with glioma, are Mr. Arnott's chief sarcomata. Glioma, the cancer of childhood, one might reasonably assume, would have certain peculiarities, derived from the activity of the general development-

processes going on in the system. We think, then, that glioma doubtfully belongs to the class of sarcomata.

Mr. Nunn suggested ('Path. Soc. Trans.,' vol. xix), as a distinction between true cancer and sarcoma, the fact that in sarcoma the cell elements betray no irregular development and intrinsic tendency to degeneration, the cells having a maturity definitely marked by a certain size and possessing a persistent vitality, and that, therefore, inflammatory phenomena in such tumours are due to extensive irritation, or are, so to speak, accidental.

Next to the sarcomata Mr. Arnott describes lymphadenoma and psammoma, and, lastly, as the least malignant of the cancers, epithelioma.

The late Maurice Collis, of Dublin, writing in 1864, said of epithelial cancer:—"I do not believe its analogies to Cancer to be so marked as to justify us in calling it Cancer. . . No doubt in its last stage it is an infiltrating growth, as Cancer is." If the reader will refer to fig. 22, p. 73, of Mr. Arnott's work, he will find drawn the appearances presented by a scraping from a coarse epithelioma of the arm. This drawing shows cells of *various* forms and obviously containing oil-globules. Fig. 20 (c) illustrates colloid degeneration within the cell. We would, therefore, distinctly claim epithelioma as true cancer, but as a carcinoma possessing a peculiar tendency to confine itself to the tissue first attacked.

One word as to Mr. Arnott's method of examining tumours. He advocates hardening of specimens in a solution of chromic acid (20 per cent.) and the employment of $\frac{1}{4}$ -inch objective with a low eye-glass, magnifying together about 220 diameters, and he gives general directions as to the management of the specimens. In respect of cancerous tumours, indeed, it is difficult, even with a Valentin's knife, unless the specimen be hardened, to get a uniform section through the *quasi* normal tissue and the diseased part on account of their unequal elasticity and widely different structure.

Mr. Arnott by no means underrates the value of scrapings where more elaborate examination cannot be had; a scraping, he says, may in doubtful cases render good service to the operator by informing him of the nature of the tumour, and by thus determining the degree to which the surrounding tissues should be removed.

The illustrations on wood and stone which enrich Mr. Arnott's work are from his own pencil, and add greatly to the value of his lucid descriptions.

XII.—Legg on Hæmophilia.¹

It has hitherto been our custom in this country to group together under the head, Hæmorrhagic Diathesis, a number of conditions characterised by a tendency to obstinate and prolonged bleeding. An analysis of these conditions, however, shows that we may fairly form a distinct class of those cases in which the tendency is hereditary and congenital, and associated with a peculiar liability to swelling of the joints. The combination of these features constitutes the affection which Dr. Wickham Legg, following the French and German writers, calls hæmophilia. In his first chapter he gives a detailed history of the cases which have come under his own observation; and afterwards, in a most carefully compiled chapter, he sketches the history of the disease from Albucasis, who first noticed it, to Virchow and Otte, our most recent authorities. It was an early notion that only boys were affected. This is now known to be untrue, although Grandidier has shown that there are fourteen cases in males to one in the female. In the latter sex, too, there is less danger to life, and the hæmorrhages are mainly connected with the generative organs. Wachsmuth, indeed, records the death of a bride from hæmorrhage, caused by the rupture of the hymen on the marriage night.

The most striking feature of the malady is its hereditary character. Some writers have on this account argued for a common ancestry for all bleeders, a view which modern literature, by disclosing the wide distribution of the disease, has discountenanced. Others have regarded it as a result of much intermarrying, and the frequency of the disease among the Jews is an interesting fact in support of this idea. The daughters of a bleeder family are generally free from the hæmorrhagic tendency, which, however, shows itself strongly in their male offspring, peculiarities which also occur in the transmission of gout. These women, too, are unfortunately very fertile, but even when they suffer from hæmophilia themselves they do not transmit it in a greater degree. The men of a bleeder family, on the other hand, do not, as a rule, beget bleeders; their sons and daughters are free, but the disease appears in the grandsons born of the daughters. The women of a bleeder family transmit this fatal peculiarity to their children, however healthy they may appear themselves, and irrespective of the robust health of their husbands. When cases of the disease appear without any

¹ *A Treatise on Hæmophilia, sometimes called the Hereditary Hæmorrhagic Diathesis.* By J. WICKHAM LEGG, M.D., Casualty Physician to St. Bartholomew's Hospital. London, 1872.

clear evidence of hereditary transmission, bad health on the mother's side, or severe mental emotions, are the most common antecedents.

Dr. Wickham Legg divides the disease into three degrees, according to the intensity of the phenomena. In the first or most marked degree "there is a tendency to every kind of hæmorrhage, traumatic, spontaneous, interstitial, or superficial." The swelling of the joints is also well seen. This, the worst form of hæmophilia, is seldom, if ever, met with in women. The second degree is much less intense; "spontaneous hæmorrhages from the mucous membrane only are present; neither traumatic hæmorrhages nor ecchymoses are met with, and the joint affection is absent, or represented only by rheumatic pains." This is the form usually seen in women. The third has all the symptoms less marked; spontaneous ecchymoses are, indeed, its chief symptom. In bleeder families some members, especially females, are thus affected, and their menstruation is often early and abundant. These three forms of the disease may be useful for clinical reference; they lack the clear definition which the closet student seeks; but in clinical medicine, as in pathology, it is often impossible, not to say unwise, to attempt to create clearly defined lines of separation between kindred conditions.

Grandidier, who has analysed some 256 cases, finds that the mouth and nose are the common seats of bleeding, the bowels and lungs come next, while the stomach, urethra, and female generative organs, are less often affected. Wherever the bleeding occurs, be it traumatic or spontaneous, it is almost always capillary; it may last a few hours, and it has been known to continue for eighteen weeks. The extraction of a tooth is one of the most common causes of the hæmorrhage. This operation is, as Dr. Legg says, "the touchstone for a bleeder."

The joint affection is peculiar; it begins suddenly with swelling, and is often attended with much pain and a high temperature. The joint is never reddened; it feels soft and fluctuating, and the bones can rarely be felt. Movement increases the pain. The swelling may last for a few days or weeks; it may pass from joint to joint, or alternate with hæmaturia or some other hæmorrhage. The larger joints are most commonly affected, and may owe the swelling to either traumatic or idiopathic causes. Exposure to cold is, however, the most common cause. Some authors have referred the swelling to hæmorrhage within the joint. In Reinert's case the shoulder-joint suppurated and a quantity of blood escaped. Assmann saw a free hæmorrhage follow a puncture of the swollen knee of a bleeder. It appears to us, however, that in both these instances the bleeding was

probably from the soft tissues surrounding the joint, which bled just as an abscess in any part in these patients bleeds, either when opened by puncture or when bursting spontaneously. The joint affection is often very troublesome, and is very apt to recur.

The peculiar phenomena of hæmophilia have been the subject of many explanatory hypotheses. Rieken regarded the disease as an anomalous form of gout. Others have referred it to scrofula, the scorbutic state, and altered conditions of the blood. The analyses published up to the present do not support the notion of any change in the chemical constituents of the blood in true hæmophilia, however valuable such an explanation may be in the case of the temporary hæmorrhagic tendency. It has long been observed that in cyanosis there is a tendency to hæmorrhage, and this fact has been invoked in explanation of the disease under notice. There is, no doubt, some connection between the two conditions ; in both there is arrested development of the vascular system, and we think with Dr. Legg that the connection consists in the persistence of a foetal state of the blood-vessels in extra uterine-life. Newly formed vessels are very liable to bleed, whether they exist in newly born children or in new growths. The occasional disappearance of the tendency in mature life might, on this hypothesis, be explained. The examination of the vascular system lends some support to this explanation of Dr. Legg's, which is, however, as he very honestly remarks, "only the removal of the difficulty one step backwards." Still it is a step, and, if further inquiry confirms the view as to the condition of the vessels, the action of the vaso-motor system may explain the variation in the locality and intensity of the bleeding at different times.

Facts are steadily increasing which force on us the belief that local tissue changes are greatly under the control of the nervous system acting on the vessels. This appears to be especially true in women, and it is to the further elucidation of this action that we must look for the explanation of some of the so-called *miraculous* manifestations which have lately attracted notice. In a case related by Magnus Huss the patient could bring on local hæmorrhages and ecchymoses by directing her attention steadfastly to the part. This case certainly adds weight to Stahl's theory of the influence of what he called the soul on the occurrence of hæmorrhages.

We have no space to enter on a consideration of the chapters on prognosis and treatment ; we leave them to our readers with the remark that, like all the rest of the book, they will repay perusal. We have introduced our readers to Dr. Legg's work because it treats of a disease of singular interest. Hitherto

we have wanted a monograph on this subject. Dr. Legg has given us a most satisfactory one, modest in its tone, pleasant in its style, and exhaustive in its information.

XIII.—Case of Louise Lateau.¹

THE history of female patients who, after occasional attacks of catalepsy, at a certain period of their lives allege that they are marked with miraculous *stigmata*, similar to those on the hands, feet, and side of the crucified Saviour, would, if fully written, form a large volume. It would include, however, with one exception, that of St. Francis of Assisi, female instances alone. The apparition of these stigmata happens always about the period of puberty. In all cases there is a suspicion of fraud, and in those described by the Abbé Curicque the mind cannot shake it off, even when reading the recital of natural and unimportant circumstances.

Perhaps the worst case in the work referred to, but one which has of late attracted most attention, especially in Belgium, is that of Louise Lateau, the "ecstatic" of Bois d'Haine, near Malnage, in Hainault, between Mons and Charleroi. A girl, now twenty-two years of age, the third child of healthy parents, but herself of sickly constitution, was left in the care of her mother, who educated her as a domestic and farm servant. Her physiognomy is intelligent, her complexion fair, and, though she is alleged never to show any sign of morbid tendency, she has had during her "chlorotic" period, and since, loss of appetite, "angina of the pharynx," eczema, neuralgia, vomiting of blood (whether from respiratory or digestive organs is not stated), and frequent general debility. She appears, nevertheless, to be tolerably active and healthy, though "circumspect" in her manner. The mother, a woman fifty-eight years old and very healthy, is of a "surlly and morose disposition," and appears by the violence of her manner to exercise perfect dominion, not only over Louise, but over the visitors and strangers who may be in the house. Dr. Lefebvre (p. 63) relates cases in which she obstructed the mechanical expedients deemed advisable in order to test the truth of her daughter's statements, and it was necessary that they should be applied at a time when she was absent from home.

Two descriptions of phenomena are described by Dr. Lefebvre,

¹ 1. *Louise Lateau, the Ecstatica of Bois d'Haine*. By Dr. LEFEBVRE. Translated by J. S. SHEPARD. London, 1872.

2. *Voix Prophétiques*. Par M. L'ABBÉ CURICQUE. 2 vols. Brussels, 1872.

l'Abbé Curicque, Mr. Meyer, and other observers. We may remark at the outset that all the witnesses give accounts which are contradictory of each other's statements, and that the greatest possible amount of divergence of opinion as to matters of absolute fact exists. On Friday, 24th April, 1868, nine days only after the time when the mysterious vomiting of blood ceased, a hæmorrhage appears to have issued from the side, for which, "with her habitual reserve," Louise Lateau, then eighteen years of age, did not call in medical advice. The side began to bleed profusely, and the next Friday the blood also manifested itself on the upper surface of each foot. On Friday, the 8th May, the phenomenon extended to the two hands. Four months afterwards, on the 25th September, blood flowed from a circle surrounding the forehead. On the ordinary six days of the week this blood does not flow, but on Fridays the hæmorrhage is great.

"When the various points by which the blood escapes on the Fridays are examined during the other part of the week, they present the following appearances:—On the back of each hand is an oval shaped surface of above five sixths of an inch in length, and slightly redder in colour than the surrounding skin; this surface presents no signs of moisture, and has a sort of smooth glazed look. On each palm there is also a similar surface, corresponding in every respect with that on the back. On the sole and instep of each foot the mark takes the form of a long square, with the angles rounded off, and about an inch in length . . . On the head no permanent marks are visible, and, save on the Friday, it is impossible to detect the points by which the blood escapes.

"A feeling of delicacy, which will be easily understood, has prevented my examining her side during the week, but on the Friday, during the ecstasy, I have been able to do so most fully when she has lost all knowledge of what is passing around her."

On the Thursday, about mid-day, a blister appears, formed by the epidermis being detached from the cutis or true skin, and raised in its rounded form by the accumulated serum. The surrounding skin shows no signs of redness or inflammation. The flow of blood commences on a Thursday afternoon, when the "rent in the blister from which the blood flows" forcibly reminds Dr. Lefebvre of the bite of a leech. The white triangular and indelible scars which follow leech-bites have, however, not hitherto been discovered on the hands and feet, though it does not appear, from the statement of the principal medical witness, that they have been looked for, either with or without a magnifying glass. In fact, the description of the scars is of the most unsatisfactory nature, Dr. Lefebvre apparently possessing the most vague notions as to the connection between the epidermis and

the true cutis. We are not vouchsafed a physiological examination of the wounds on the side and feet during the six ordinary days of the week. The matted hair also precludes a minute examination of the wounds on the head, the idea not having struck Dr. Lefebvre that shaving, or at least cutting the hair short, would be advisable. The quantity of blood lost was assumed by the earlier witnesses as nearly thirty ounces per diem, but Dr. Lefebvre on this occasion alone respects our capacity for belief, and moderately estimates the amount at eight ounces.

Still, this is a larger amount than this weak girl may be expected to produce from her own circulation. The suspicion of the existence of relays of freshly killed mice or sparrows in the voluminous sleeve of the patient will, of course, immediately occur to all students of similar cases. The late "Colonel Stodare," at the Egyptian Hall, used to perform the trick we allude to, with the applause of his audience, on many successive evenings. The mother, who is sedulously desirous, as shown by the testimony of Mr. Meyer and others, to wipe the wrists, hands, and feet of her victim, has due opportunities for the removal of one blood-producing subject and the introduction of a fresh specimen.

We pass over the fact, which seems to be a little at variance with the supernatural, that Louise Lateau does not show on every Friday all the conditions we have mentioned. There are no statistics of the correlations between the degree of blood-flow in Louise Lateau and the number of visitors who thronged and throng her cottage. We regret that Dr. Lefebvre's description of the blood, as neither arterial nor venous, but "of a light violet colour, in fact, the blood of the capillary veins," has not been corroborated by a minute examination of the blood-corpuscles—whether, in fact, the blood is on all occasions human or animal

We now come to the "ecstatic" or cataleptic state of the patient. Every Friday morning Louise Lateau falls into an ecstasy, which, commencing during work, lasts, under various conditions, from about noon till about 6 or 7 p.m., the individual maintaining perfect immobility over the voluntary muscles, the strain of which may be imagined when she is described as "poised on tiptoe in an eager expectant attitude," like unto Taglioni or Cerito. After a highly poetical description the account goes on to say that she drops, about half-past one, on her knees, so as to refresh the muscles, "the hands being joined, and the body bent considerably forward." After half an hour's intermission of the previous violent strain, "she rises and reseats herself." Towards two o'clock the scene changes.

"The ecstatic, with a slight forward inclination, rises at first

slowly, then more rapidly, and, by a sudden movement, falls with her face to the ground. In this position she is extended on the floor, resting on her breast, the head pillowed on the left arm, the eyes closed, the mouth half open, the feet stretched out to their full extent, and entirely covered by her dress.

“At three o'clock she makes an abrupt movement. The arms are thrown out on each side of her in the shape of a cross, and the two feet place themselves the one upon the other, the sole of the left on the upper surface of the right. Thus she remains until five o'clock, when she rises with a sudden bound and falls on her knees in the attitude of prayer, reseating herself after a few minutes of profound absorption.”

Certainly the *rests* which take place during the ecstasy should lead physiologists to appreciate its absolute signification. The ecstasy is now to terminate

“in a most appalling manner; the arms fall nerveless at her side, the head sinks upon her chest, the eyes close, the nose becomes pinched, the face is deadly pale and covered with a cold sweat, the hands are like ice, the pulse absolutely imperceptible, and the death rattle is heard in the throat. This state lasts from ten to fifteen minutes, and then life slowly returns to her inanimate form.”

The patient gives the vaguest and most contradictory accounts of her symptoms, and is alleged to be fasting all the while; but it is a most significant fact that the conjunctivæ are sensible to irritation during the ecstasy. “If the hand is sharply thrust towards the face, as if to strike it, a slight trembling is perceived. The same effect occurs on touching that membrane with the finger.” This proves that Louise Lateau is not entirely unconscious.

There appears no doubt, even on the testimony of Dr. Lefebvre, that the circulation is extremely diminished, and even that during the height of the cataleptic attack the pulse reaches its lowest ebb so far as regards force; but as its strength decreases its quickness augments in proportion, so that, as well as one can count, the beatings reach as high as 120 to 130 per minute. The character of the investigation may be imagined when it does not appear that the sphygmograph has been once used. It is, however, alleged, upon the combined testimony of Drs. Imbert-Gourbeyre and Lefebvre, that while the pulse quickens the breathing diminishes in an inverse ratio. The pulse has been noticed to rise successively from 96 to 130 pulsations per minute, whilst the respiratory movements fell from eighteen to ten. As the breathing becomes weaker, of course the temperature of the body falls. At the close of the simulated “fit” the pulse, respiration, and temperature return to the

normal condition. Such, therefore, is the medical statement of the case.

But, says Dr. Lefebvre and his supporters, the sceptic should visit Bois d'Haine himself before he asserts the impossibility of the miracle. To this we answer, that if a miracle has happened in Connemara it is not incumbent on him to voyage to the distant land to expose the imposture. If the Lateauists are in earnest, let them send their patient to a Brussels or Paris hospital, where, the mother being rigorously excluded, Louise might be placed under the control of skilled and trustworthy nurses. It is not given to every one to leap at Rhodes, or to bleed at Bois d'Haine. A scientific examination of Louise by qualified physiologists, acting with perfect liberty to conduct fair experiments, would lead to results certainly more scientifically definite than any which have hitherto been carried out. We hope that we shall not be accused of rudeness to Dr. Lefebvre when we tell him that his "experiments" are simply ridiculous, and must be rejected by searchers for the real evidence and testimony of qualified witnesses. In fact, we can scarcely believe that a physiologist so favorably known for original research can himself believe what he states. The connection of Dr. Lefebvre with the matter bears rather the appearance of an elaborate joke, which is not diminished, even when the testimony of "Dr. Hairion, Professor of Hygiene and Dermatology at the University of Louvain," of "Dr. Severin, of Braine," and of a hundred other medical friends, whose names are not given, is thrown into the scale in favour of the miracle; but out of respect for the creeds of Christians of every sect, we would suggest that the trick of Louise Lateau is too close to a blasphemous imposture to be made the subject for Dr. Lefebvre's solemn and scarcely concealed mirth. Men of every religious belief must shrink with disgust from the introduction of the comic element into a subject on which both the religious devotee and the practical physiologist must feel deeply.

If the moral argument is used with regard to the patient, the topic, of course, becomes complicated to a greater extent.

The plea that the Lateau family do not take money for the performances of the daughter is, no doubt, a powerful one; but there is this *suppressio veri* in it, that money is solicited for the building of a little new church at Bois d'Haine, and that there thus exists a powerful moral reason why the practices of Louise Lateau should continue. The "moral reasons" which induced the poor Welsh fasting-girl to suffer pain and ultimate death are fresh in the memory of our readers. The throngs of devotees who visit the hamlet in which Louise Lateau resides must bring profit to the dwellers in Bois d'Haine.

Other instances have occurred in history similar to that of Louise Lateau. An instance of stigmata occurred in Italy towards the beginning of the present century, which we can vouch for on the authority of a distinguished venerable Catholic priest in England. The usual phenomena of stigmata had been shown, even when the patient's hands had been sealed up and covered with tight-fitting kid gloves. The palms of these were found to be full of blood, although no punctures were visible through the gloves. The idea struck one of the examiners to place tissue-paper within the palms of the gloves. These were duly sealed, and when the gloves were opened, although the blood was present in normal quantity, the tissue-paper was found to have been perforated by needles, which had left no trace on the gloves. The "ecstatic" was condemned to a long term of imprisonment by the Tribunal of Correctional Police. We are unable to ejaculate *Absit omen!* in the case of Louise Lateau.

Bibliographical Record.

Ultzmann and Hofmann on Uroscopy.¹—The Germans, as a rule, carry more theory into their practical work than do the English, and this book is no exception. The analysis of the urine is with most English practitioners a very simple matter, and every one of us probably performs many such analyses in the course of a month, but thinks very little of the principles on which his operations depend. It is nevertheless quite safe to say that the amount of theory brought forward in these pages might be not only safely and easily, but with advantage, carried even by the busy medical man along with him. And we opine that to German students and practitioners the work will be a very welcome one. It is cheap, and we are glad to see that the authors do not make the mistake of putting in bad engravings of urinary casts, &c., but, on the contrary, refer the reader by numbers to an atlas, which they have themselves brought out. This we have not seen, but trust it is a good one, since bad diagrams in such a matter are worse than none.

The work commences with six introductory pages on the history of uroscopy. An analogous British work which we have before us opens with a chapter on the different sorts of instruments required for urinary analysis. The former has a bare enumeration of the instruments, occupying half a page; the latter has nothing, unless accidentally, on the history. *Ecce signum!*—The proper path, no doubt, is between the two, though for practical purposes, if bound to choose, we would rather have the instruments than the history.

The first chapter is on the histology of the urinary organs. It is well and clearly written, and embraces the newest views (up to its own date) on such points as the course of the uriniferous ducts, the functions of the Malpighian bodies, and those of the convoluted tubes. Henle's researches are accepted as regards the course of the

¹ *Anleitung zur Untersuchung des Harnes, mit besonderer Berücksichtigung der Erkrankungen des Harn-Apparates.* Von Dr. ROBERT ULTMANN, Em. Assistant der Pathol. Chemie in Wien, unter Mitwirkung von Dr. KARL BERTHOLD HOFMANN, Docent an der K. K. Universität in Wien. Vienna, 1871. Pp. 133.

ducts, and on the subject of the secretion of urine the most commonly received opinion is maintained, that the Malpighian bodies secrete a watery urine, in consequence of the increased blood-pressure in them, and that this watery secretion is afterwards supplied with the usual solid constituents by a process of diffusion when it is passing through the convoluted tubes. The theory of the secretion of urine makes a short second chapter.

The third chapter is occupied with the consideration of the urine, its normal and abnormal constituents. Practical hints as to the diseases in which the quantity or quality of any constituent changes are abundantly interspersed. We regard the author's remarks on urohæmatin, indican, urophäin, uroërythrin, the colouring matters of the blood and those of plants like rhubarb and senna, as especially interesting, and very valuable to the practical physician, and we would willingly quote some of the distinctive tests were there space at our command. The tests for diabetes are arranged according to their value in the following order:—First, the potash test (“*Moor-Helbeische Probe*”); next, the bismuth test of Böttger; and last, the sulphate of copper test, known as Trommer's. The potash test is especially praised, because the depth of the colour produced gives an indication of the quantity of sugar present. This indication is in the present work reduced to approximate numbers, and this is by no means a solitary instance in the work of much pains taken to bring to a real practical value rough and ready ways of testing, such as are perfectly accessible to the busiest practitioner. Farther on in the same chapter there is excellent information as regards deposits, casts, fungi, &c.

The fourth chapter has a list of reagents and instruments. The fifth deals briefly but instructively with the quantitative methods of analysis, by the balance alone and by volumetric tests. We see nothing under the heading of *Sugar* about the fermentation method of estimating this substance, a method which is certainly convenient, if not very correct. The book, we may remark here, though it has a fair table of contents, has no index, a great mistake in a practical work.

The sixth chapter is “A Key to an approximative Examination of the Urine;” such keys are inserted in other works on the urine, and the present one is up to the average. The seventh and eighth chapters are occupied with the diagnosis of diseases of the urinary organs, and this very important part of the work is carefully, if sometimes rather briefly, carried out. We have been especially attracted by the attention given to the diagnosis of hæmorrhage from the kidneys and of that from the bladder, and by the concluding pages on spurious albuminuria.

We should strongly recommend this work to every one not an adept in urinary matters who can read German, and also to medical

students of the German language, who will find it supply their *desideratum* of a cheap, easy, and useful work, on which to try their maiden efforts at translation.

Qualitative Chemical Analysis.¹—This edition is an immense improvement upon that of 1869, in which, indeed, we hardly recognised the Fresenius of our younger days. The English editor then took what he now confesses to have been “too broad a view” of his duty, remodelling, condensing, and omitting much of the very valuable material which the German author had accumulated. The manual no longer presented that completeness and precision of detail which had so greatly helped to secure for it the pre-eminence among similar manuals. Now, however, that Mr. Vacher has abandoned his reforms and stuck to the original text, we have a first-rate textbook of qualitative analysis for students’ and teachers’ use. We need not say more about the merits of a volume which is so well known and so highly appreciated, but we cannot refrain from noticing with surprise and regret that the old atomic weights are still retained by Dr. Fresenius. It is really extraordinary that the progress of the science in this direction should have been completely ignored by so eminent a chemist.

The Elements of Inorganic Chemistry.²—The unnecessary multiplication of small books on chemistry is becoming a positive nuisance. It has been instigated by the greater attention paid to science in all educational programmes, and is so far a good sign of progress. But as these little manuals are intended, not only for the use of pupils, but to enable the teachers in schools and science-classes to pick up the knowledge they are supposed to impart, they should at least be written by well-trained and accomplished chemists. We have nothing to say against Mr. Buckmaster as a lecturer on the great importance of the present series of annual international exhibitions, or against Mr. Jarman as a purveyor of pure and commercial chemicals (a price-list of which may be seen at the end of the work we now notice), but we do object to entrust to mere compilers the chemical education of young England. The present work may be disfigured by no glaring errors, for it is adapted from the best authorities in chemical science, but we fail to see in it any particular merit save an exact compliance with the requirements of the South Kensington “Syllabus.” Indeed, as a cram book, it leaves little to be desired, save the correction of awkward sentences and of a few mistakes arising rather from a meagre acquaintance with

¹ *Qualitative Chemical Analysis.* By Dr. C. R. FRESENIUS. Eighth Edition, translated from the Thirteenth German Edition, by A. VACHER. Pp. xv and 400. London, 1872.

² *The Elements of Inorganic Chemistry.* By J. C. BUCKMASTER, revised by G. JARMAN. Eighth Edition. Pp. 346. London, 1870.

chemical science than from downright ignorance, and showing the difference between first-hand and second-hand knowledge. We will not, however, trouble our readers with a detailed critique of the work before us, but content ourselves with a justification of the sentence we have just written. Turning to the account of silver, we find it stated (p. 192) that many photographers are in the habit of reducing this metal from their silver residues by means of the metal magnesium. Considering the relative prices of silver and magnesium in the reguline state, this process cannot be *very* remunerative. Again we read, "Silver is often contained in lead ores to such an extent that it is profitable to extract it even when it is not in greater proportion than three to four ounces of silver to a ton of lead." The term "such an extent" seems to contradict the latter part of the sentence about the three or four ounces to a ton; it is, perhaps, intended to convey the fact as to the general distribution of minute traces of silver through vast quantities of lead ore. We cannot but think that a book like the present one should be characterised by greater clearness of expression and precision of statement. Its considerable employment in science-schools is doubtless due in part to the adoption throughout its pages of the peculiar system of notation introduced by Dr. Frankland, the official examiner in chemistry to the science and art department. We think it unfortunate that this perplexing notation should be forced upon all the government science-schools throughout the country, thus rendering the use of such books as Buckmaster's 'Chemistry' almost obligatory upon teachers. As the excellent manuals we already possess are from the pens of eminent chemists who have not adopted the methods of writing formulæ originated by Dr. Frankland, these books are pushed aside by inferior works.

Cooley's Cyclopædia of Practical Receipts.¹—A big book containing a little of everything. It includes paragraphs, not only on medicine, pharmacy, and domestic economy, but on agriculture, scientific chemistry, metallurgy, painting, and what not. We even find an excellent receipt (see page 1037), given on the authority of Professor Redwood, for the manufacture of sherry-cobbler! The preparation and properties of this elegant liquor are described in language which is positively scientific. The work, however, taken as a whole, is not quite satisfactory; too much of the old matter has been retained in an unrevised condition, while the new is of unequal merit. The attempt to embrace a very large number of subjects in a single volume has prevented the adequate treatment of the most important amongst them. Yet individual articles may be found throughout the volume which contain recent and trustworthy information not easily accessible elsewhere.

¹ *Cooley's Cyclopædia of Practical Receipts.* Edited by R. V. TUSON, Pp. 1201. London, 1872.

Botany for Beginners.¹—Dr. Masters, in this little book, has achieved a success in unfolding the principal facts and the nomenclature employed in descriptive botany in such a way that a beginner, even without a botanical friend at his elbow, can prosecute the study of this most pleasing department of natural history.

We have carefully examined the plan pursued, and fully appreciate the gradual manner in which he opens up the mass of technical knowledge conveyed. There is no sudden overwhelming of the student by an avalanche of new terms and “abstract propositions,” so commonly found in introductions to botany, but, taking the simplest forms of flowering plants, he dissects them, and both describes and illustrates the several distinctive parts or organs. A novice might indeed at first sight be somewhat staggered at being called upon to deal first of all with the inflorescence of a willow, which, to the non-botanical mind, hardly rises to the rank of a flower, and looks a complex mass, difficult by reason of the minuteness of its component parts to unravel and to apprehend in its true nature. However, such a novice, by the aid of Dr. Masters's descriptions and figures, will soon find the eyes of his understanding enlightened and be able to comprehend in due time the principles of classification unfolded in the ninth chapter, and to value the brief outlines of vegetable physiology placed before him in the tenth and concluding chapter. In fine, we cordially recommend this little treatise to every would-be student of botany.

Dr. Pereira's *Materia Medica*.⁴—The admirers of the late Dr. Pereira's large work on ‘*Materia Medica*,’ in three volumes, will welcome this abridged edition as of more convenient size and of easier reference. The great work is certainly encyclopædic and, regarded as a treatise on materia medica, calculated to alarm and deter a would-be student of the science. And yet the time was when, under the auspices of the author, armed with the powers and functions of an examiner at the University of London, the much-to-be-pitied candidates for a medical degree had to wade through his ponderous tomes and surcharge their memory with a multiplicity of natural history and pharmaceutical manufacturing details, about as valuable to them in the professional duties of after-life as exercises on Hebrew roots or a knowledge of the Talmud. Judging from his examination papers, his views of the requirements of would-be medical men extended little beyond the range of pharmaceutical details, of adulterations practised, and of manufacturing processes,

¹ *Botany for Beginners: an Introduction to the Study of Plants.* By MAXWELL T. MASTERS, M.D., F.R.S. London, 1872.

² *Dr. Pereira's Elements of Materia Medica and Therapeutics; abridged and adapted for the use of Medical and Pharmaceutical Practitioners and Students.* Edited by ROBERT BENTLEY, F.L.S., and THEOPHILUS REDWOOD, Ph.D., F.C.S., &c. London, 1872. Pp. 1093.

and embraced the most meagre knowledge of therapeutics. Although his influence kept such views current for some years, yet latterly this trade-information and chemico-natural-historical-pharmaceutical knowledge has been less appreciated, and attention been much more given to discover the therapeutical properties, uses, and doses of drugs.

Nevertheless, some remnants of the old leaven still cleave to examiners and lecturers on *materia medica*, and candidates for licences to practise must perforce get up more or less pharmacy, pharmaceutical botany and chemistry, and evince some knowledge of the mysteries of drug manufacture. Medical students, therefore, owe their best thanks to Messrs. Bentley and Redwood for reducing the portentous volumes of the original Pereira to one volume—one, indeed, of no mean dimensions. This abridgment appears well done, although close examination of the contents discloses deficiencies and omissions on the one hand, as it does redundancies on the other. In other words, this volume repeats the merits as well as the demerits of the larger work of Pereira. It is rich in descriptive details of the drugs, full in pharmaceutical teaching, but unsatisfactory in therapeutical information.

It is the second time that this abridgment has been published, and this second edition has been issued to bring the work to the level required by the new pharmacopœia. This has rendered necessary the introduction of new remedies, notices of new processes of manufacture, and alterations of descriptions to suit modern chemical theories and the notation and nomenclature of the pharmacopœia. In its present form it takes rank as a valuable treatise on *materia medica*.

Dobell on Diet and Regimen.¹—Judging from the demand for new editions of this treatise on ‘Diet and Regimen,’ there must be a considerable craving for information on those subjects, and this craving must likewise be so keen as to be little discriminating as to the quality of the material afforded.

In our number for April, 1871, we had occasion to review the fourth edition, and we then pointed out some of the defects of the volume, and especially its prominent character as an example of book-making. This new edition retains the same features, differing from the previous one only in the transposition of certain sections, in altered type, and in the introduction of some letters and newspaper paragraphs which add little to its worth. The longest of the added matters consists of a letter from the author’s friend, Mr. Pritchett, on “House Drainage,” and of a collection of communica-

¹ *On Diet and Regimen in Sickness and Health, and on the Interdependence and Prevention of Diseases and the Diminution of their Fatality.* By HORACE DOBELL, M.D. Fifth and revised Edition. London, 1872.

tions from wine merchants interested in different varieties of wine, of much the same calibre as are the wine trade circulars posted so assiduously to all supposed consumers of wine.

Now that diet and regimen occupy so important a place in practical medicine, it is no credit to British physic that the subject is virtually unrepresented by any publication that adequately reflects the present state of knowledge and experience with regard to it.

Oppolzer's Lectures on Special Pathology and Therapeutics.¹—The appearance of each successive part of these clinical lectures, by the distinguished Vienna Professor, Oppolzer, has been noticed in these pages since 1866, when the first part was issued, and we have had to comment severely on their dilatory publication, remarking that, at the rate of appearance of each part in succession, a long life would be required to witness the completion of the projected entire course of lectures. Unhappily, the eminent teacher himself has been taken away by death, and the editor, Dr. Stoffella, has now to tell us that the recently issued part—the first division of the second volume—will be the last to appear; and thus, those who have subscribed to the work with the anticipation of having a complete record of Oppolzer's teaching, will have to put up with an unfinished work.

From the editorial note it would seem that the professor made no copies of his discourses, which were constructed, as occasion required, out of the clinical materials at the time at his disposal. Consequently no material exists to enable Dr. Stoffella to reproduce the lectures, as he has hitherto done under the guidance and oversight of Oppolzer himself.

The many pupils and admirers of the Vienna professor will profoundly lament the loss involved by these circumstances, and deplore the tardiness with which his lectures were reduced to writing preparatory to publication. The conclusion forces itself upon us, that Dr. Stoffella is much to blame for not showing more activity in obtaining the material required from Oppolzer. The production of one volume was made the business of six years; and this slowness has involved the loss of the very large and well-matured experience and instruction of one of the best teachers of practical medicine of the age.

The new section now before us is occupied with the consideration of diseases of the mouth and throat, and of the œsophagus, and consequently deals with stomatitis, aphthæ, affections of the saliva, simple angina, croupous angina, angina tonsillaris, and angina Ludwigii, also with inflammation and other lesions as well as neurosis of the œsophagus.

¹ *Oppolzer's Vorlesungen über Specielle Pathologie und Therapie.* Zweiter Band. Erste Lieferung. Erlangen, 1872.

Those who know the thoroughness of preceding parts and the lucidity of the pathological teaching need no demonstration from us to satisfy them that the same excellent qualities pervade this last section issued.

Aitken's Science and Practice of Medicine.¹—The success of this large and important work on medicine is, compared with any kindred work of like dimensions, probably unprecedented. It is only fourteen years since the first edition was published. On its first appearance it challenged attention by characters of its own, remarkable chiefly by reason of the space devoted to pathology, and particularly to the teachings of the modern German school. This speciality made it peculiarly valuable to students reading for examinations. By practitioners generally it was not so highly appreciated, for, from their point of view, it was less complete than some other treatises in therapeutical details, and in references to the results and teachings of practice.

Each successive edition has been marked by the painstaking efforts of its author to make the work a truly representative one of modern physic; but notwithstanding all the alterations, emendations, and additions, its character remains unchanged, and this last edition may be applauded or blamed, according to the point of view it is regarded from, or the wants felt, by its readers.

We have allowed a considerable time to elapse since the copy of this sixth edition came to our hands, in order to get opportunity to examine the extent of revision and remodelling it has undergone from the last preceding one; and as the result can testify to the accuracy of the statements made on the title-page, and also in the preface, that, to a great extent, it has been remodelled and rewritten, and that "descriptions of many diseases, altogether omitted in former editions, are now introduced."

We began, in progress of reading the work for this notice, to jot down the amendments and novelties introduced, and the transposals of chapters and sections, with a view of calling attention to them, but they multiplied so rapidly upon us that we were compelled to desist, and now consider it sufficient to attest generally to their number and their importance. Indeed, as Dr. Aitken tells us in the preface, the improvements and additions have been so considerable that "the new material added is equivalent in bulk to a third volume added to the last edition, yet the size of the work has not increased, as a special fount of type was cast to enable the printer to preserve clearness without adding to the bulk of the volumes."

Bearing in mind the rapid development of the doctrines of in-

¹ *The Science and Practice of Medicine.* By WILLIAM AITKEN, M.D.. Sixth edition, greatly enlarged, remodelled, carefully revised and many portions rewritten. In two volumes, with illustrations. London, 1872.

flammation, we have particularly directed attention to the enunciation of those doctrines by Dr. Aitken, and are pleased to find he has successfully fulfilled his task and fairly represented the existing state of our knowledge.

The sections on fever have been considerably modified. In the account of the general doctrines of fever the practice of thermometry and the lessons deducible from it are more largely set forth, and the illustrative diagrams recast on an improved model. The word *zymotics* was employed in the last editions as a heading to represent a certain class of general diseases, but the author has since become impressed with the looseness of the term and now discards it. The subject of cholera has likewise received more lengthened consideration, and the principles of the many methods of treatment recommended are pretty fully set forth. With Dr. Johnson's theory of elimination, however, Dr. Aitken has no sympathy, but believes it to be based on erroneous reasoning, and to be mischievous when put into practice.

In accordance with the prevailing sentiment that the term *amyloid* keeps alive an exploded hypothesis, Dr. Aitken has, in this new edition, abandoned its use and replaced it by the word "*lardaceous*," which, if it do not in many cases serve to afford an accurate conception of the physical characters of the morbid change, is, at least, harmless in not conveying any hypothetical notion of its nature.

In the matter of general contents the first volume of each later edition includes, for the most part, the same subjects; viz. those appertaining to introductory matters, to the classification and nomenclature of diseases, to general morbid processes and diseases, and to parasitic affections. The second volume contains the completion of the history of general maladies, and then deals in detail with the local diseases arranged under the heading of the system of organs affected. A considerable chapter is devoted to diseases of the eye. Skin diseases are treated in a concluding chapter, and involve a re-introduction to certain parasitic affections to which a chapter was appropriated in the first volume. The last part is occupied by several chapters on the distribution of disease, malarious places and the influence of climate.

The lists of contents are very copious and well arranged, and there is an ample index. The type employed, although smaller than in previous editions and set closer, is nevertheless very clear, and will not be found more trying to the sight to read.

Altogether this voluminous treatise on the science and practice of medicine is a credit to its author, to its publishers, and to English physic; it affords an admirable and honest digest of the opinions and practice of the present day, in which the work of British medical men receives its due share of notice, whilst that of foreign physicians is adequately represented. In perusing it we do not feel as we do in

reading the 'Practice of Physic' of Sir Thomas Watson, that we are receiving the views and practice of the individual author, but rather the collective opinions of most of the best physicians of the day; consequently the treatise is less a subject for a critical review. In fact, it is itself in no small degree an analytical review of the opinions prevailing in the profession; and in this character commends itself most highly to us for sterling value, width of retrospect, and fairness of representation. At the same time we must do Dr. Aitken justice by stating that he does express clearly enough in many instances an individual opinion, and that his stated opinion always demands our best attention.

In conclusion, we wish for this valuable work a continued career of success and utility.

Dictionary of Medicine and Surgery.—We have advertised our readers from time to time of the appearance of each successive volume of this most important and valuable 'Dictionary of Medicine and Surgery,' produced by the enterprising firm of J. B. Baillière and Son, and under the able editorship of Dr. Jaccoud. The fifteenth volume is now reached, and, as only about one fourth of the alphabet is got through, we may anticipate the appearance of a score more volumes. Such a work on medicine far exceeds in extent any that the most courageous publisher or the most diligent editor has in this country ever meditated, and we must yield the palm to French enterprise and industry in this matter.

It is, moreover, not only a big undertaking, but also a well-executed one in all particulars. The staff of contributors comprises many of the best known physicians and surgeons of France, and the articles are distinguished by completeness, particularly in the representation of French principles and practice. We took occasion in a previous notice of this dictionary to remark on the too evident exclusiveness of the doctrines and practice taught; but this failing pervades French medical literature, and is largely due to the want of acquaintance of French doctors with the English and German languages. It is singular indeed to notice how imperfectly informed most of the writers in this dictionary are respecting the work done in other countries than their own.

The most important articles in the [present volume are—"The Anatomy, Physiology, and Pathology of the Fœtus," by Emile Bailly; "Generation," by M. Duval; "Insanity," by Achille Foville and Lunier; "Gangrene," by Raynand; "Pathology of the Liver," by Jules Simon; "Fœtus in relation to Medical Jurisprudence," by Amb. Tardieu; and "Fractures," by Valette.

¹ *Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques.* Illustré de figures intercalées dans le texte. Tome xv, Fœt.—Général. Paris, 1872. Pp. 785.

Simple on Croup and Diphtheria.¹—For some years there has been growing up an opinion that, under the term croup, we have grouped together conditions essentially distinct. Modern practitioners generally recognise a catarrhal and a membranous form of the disease, and separate the latter from diphtheria, which is regarded as a different affection. In this pamphlet Dr. Semple challenges this classification, and argues for the identity of membranous croup and diphtheria. He shows that the name croup was originally given by Francis Horne to a class of cases similar to tracheal diphtherite, and he quotes from Cullen's description of croup, the *cynanche trachealis* of that nosologist, passages which describe the false membrane as affecting the fauces as well as the larynx and trachea. Cullen was evidently acquainted with the class of cases which Bretonneau afterwards described as diphtherite; but to the French observer belongs the great merit of recognising the implication of the fauces as "an essential feature of the disease." The Pathological Society's 'Transactions' afford the author another argument, because that "in proportion as diphtheria appears in the 'Transactions' croup disappears, "showing," says Dr. Semple, "that the old croup is the modern (tracheal) diphtheria."

To remedy this confusion our author proposes to abolish the use of the word croup altogether, and to substitute "two others which really convey a pathological significance, namely, laryngo-tracheal diphtheria, in which there *is* a false membrane, and laryngitis stridulosa, in which there is none." This is very much the French view, and the translator of Bretonneau is the natural advocate of it. If he can bring about some more precise application of the term diphtheria than at present prevails, he will certainly increase the gratitude which we owe him for his translations. The great obstacle to the acceptance of his views, however, appears to us to reside in the pathological characteristics of diphtheria, as described by recent German authorities. Our pathology is now mostly German, and in accordance with it we ought to exclude even pharyngeal diphtheria from the domain of diphtheritic inflammation, and call it pharyngeal croup, as Rindfleisch does, extending the use of the word croup, while we limit that of diphtheria. This we are inclined to think will prove the more correct classification, and, if so, will be a return almost to the old position of Cullen. Whichever view may finally prevail, Dr. Semple has done a service in calling attention to the loose application of the name croup, and all who read his paper will be convinced of the necessity of a more precise definition of croup and diphtheria.

¹ *On Croup and Diphtheria.* By ROBERT HUNTER SEMPLE, M.D., M.R.C.P. Lond., Physician to the Hospital for Diseases of the Throat. Reprinted from the 'Transactions of the St. Andrew's Medical Graduates' Association.' London, 1872.

Le Gros Clark's Outlines of Surgery.¹—The first edition of Mr. Clark's 'Outlines of Surgery' was published nine years ago in a smaller size than the present, which is altogether a more pretentious work. The earlier pages relating to pathology have undergone considerable revision, and there are numerous additions, some by Mr. Wagstaffe; but the main part of the book remains as before. We gather from the preface that the author designs his book for the use both of the student and practitioner; but though probably serviceable to either as a reminder, we fear it would prove but a broken reed in the hand of any one who relied solely upon its *dicta*. Take, for example, the paragraph on *hectic* (p. 6), the symptoms of which are compressed into seven lines, and the treatment given as follows:—"Nutritious diet, fresh air, cooling drinks, soothing medicines." No hint is here given of removing the cause, if possible, of the use of mineral acids, &c., internally, or hot sponging externally. Would such an answer satisfy Mr. Clark as an examiner at the College of Surgeons? In the treatment of gonorrhœa Mr. Clark postpones the use of injections until after the exhibition of *copaiba*, and in paraphimosis suggests puncturing the swollen *glans* (!) "if required." We may note, by the way, that many subjects are treated twice over in nearly precisely similar terms; thus the statement concerning puncture of the *glans penis* occurs at pp. 43 and 170; retention of urine is described at pp. 170 and 282; fractures and dislocations are treated separately in the earlier part of the book, and again in most of their essentials at the end, in the chapters headed "Of the Joints and Muscles, in relation to Dislocations and Fractures."

Mr. Wagstaffe's chapters on minor surgery, on case-taking, and on post-mortem taking, are creditable to his industry, if not very original, and enhance the value of the work, the merit of which we cannot, however, regard as of the first order.

Dr. J. L. Smith's Diseases of Infancy.²—This excellent work has already been fully reviewed in our pages. We need, therefore, do little more than chronicle the appearance of a new and improved edition. No better work on children's diseases could be placed in the hands of the student, containing, as it does, a very complete account of the symptom and pathology of the diseases of early life, and possessing the further advantage, in which it stands alone amongst other works on its subject, of recommending treatment in

¹ *Outlines of Surgery and Surgical Pathology, including the Diagnosis and Treatment of Obscure and Urgent Cases, and the Surgical Anatomy of some Important Structures and Regions.* By F. LE GROS CLARK, F.R.S., Senior Surgeon of St. Thomas's Hospital. Second Edition, revised and expanded by the Author, assisted by W. W. WAGSTAFFE, F.R.C.S., Resident Assistant-Surgeon to, and Joint-Lecturer on Anatomy at, St. Thomas's Hospital. London, 1872. Pp. 350.

² *A Treatise on the Diseases of Infancy and Childhood.* By J. LEWIS SMITH, M.D. Second Edition, enlarged and thoroughly revised. Philadelphia, 1872.

accord with the most recent therapeutical views. Many new chapters are added, as, for example, on diseases incidental to birth, rachitis, tuberculosis, scrofula, intermittent, remittent, and typhoid fevers, chorea, and the various forms of paralysis. On certain points it would be easy to show that more might have been said, as, for example, in the chapter on pleurisy, in which thoracentesis is regarded with a traditional dread, which those who have experience in its value will decidedly object to, and in which nothing is said as to the merits of drainage. But, on the whole, we can strongly recommend his work to all who are interested in this most important subject.

Graily Hewitt on Diseases of Women.¹—The first edition of this work gained a great and well-merited success. To use the author's own description of it, it was "mainly a summary and a criticism of the then existing knowledge of the diseases of women," and, as such, it supplied a manifest want. The subject it treated of had made such rapid strides that all the existing books were more or less out of date, and Dr. Hewitt's appeared just when a work of this kind was much needed. The success it met with was the best proof that it gave all the most recent knowledge in gynæcology in a way that was highly creditable to its author's industry and literary power.

The second edition differed from the first inasmuch as it contained, again to quote the author, "what may be termed suggestions of an improved system of uterine pathology;" or, in other words, Dr. Hewitt began in it to develop the peculiar and, as we believe, most erroneous views of the extreme importance of uterine flexions which, in the present volume, are carried to so extravagant a pitch. "Gradually, but steadily and certainly," says Dr. Hewitt, "a system of pathology of the uterus essentially different from that which has generally been received up to the present time has forced itself on my acceptance, and has become the basis of my treatment," and as gradually, but as steadily and as certainly, has the value of the book as an authority on uterine disease diminished. The first edition could be safely placed in the hands of every student as a guide to diagnosis and treatment, but we regret to have to record our opinion that, in its present altered shape, it seems to us to teach a practice as dangerous, as we believe it to be, unsound and unscientific.

The extent to which Dr. Hewitt carries his notions as to the influence of flexions may be gathered from the following aphorism, the italics in which are our own :

"Patients suffering from symptoms of uterine inflammation (*or, more properly, from symptoms referable to the uterus*) are almost *universally* found to be affected with flexions or alterations in the

¹ *The Pathology, Diagnosis, and Treatment of Diseases of Women.* By GRAILY HEWITT, M.D., F.R.C.P., &c. Third Edition, revised and enlarged.

shape of the uterus of easily recognised character, but varying in degree."

A statement more astounding to those who see much of uterine disease, or more utterly at variance with the facts of the case, it would be difficult to imagine.

We all know that when Dr. Henry Bennet's admirable work on 'Uterine Inflammation' appeared, the importance of erosions and abrasions of the cervix, the so-called ulceration, came to be greatly exaggerated. Those whose practice was not guided by the author's skill and knowledge found them everywhere, and the universal use or abuse of caustic applied to the cervix caused much obloquy to be cast on uterine treatment. All who have carefully mastered Dr. Bennet's work know that there is nothing in it which justified such erroneous practice, although, no doubt, he exaggerated the importance of inflammatory conditions of the os and cervix as distinguished from other parts of the uterus. This erroneous practice was the natural result of imperfect knowledge and deficient experience. But the harm resulting was probably insignificant compared to that which we may expect if Dr. Hewitt's views become prevalent, which, from his position as a teacher in a large and important school, seems likely enough to be the case. Conceive the condition of patients whose every backache or slight leucorrhœal discharge is to be treated on the new "mechanical" system, unguided, as it is sure to be, by the care and proper selection which we do not doubt Dr. Hewitt applies to his cases!

As the author says,—“Naturally, evidence will be required to be produced for the purpose of sustaining views on the subject of uterine pathology so entirely opposed to those which have hitherto obtained professional support.” But when we come to look into the evidence adduced, which consists of an imposing array of cases observed in University College Hospital in which flexions were marvellously predominant, it seems to be sadly wanting in force. For, of course, as Dr. Hewitt believes that congestion, hypertrophy, and chronic inflammation of all kinds, are secondary to displacements of the uterus, and not—as Bernutz and Goupil, Scanzoni, Courty, Thomas, Meadows, Bennet, and the majority of those who have written on the subject, teach—their primary cause, these conditions find, as he says, “a very limited representation in these statistics.” Against a “*petitio principis*” of this kind it is difficult to argue; but the day is past when a mere array of figures, prepared with so evident a wish to support a foregone conclusion, is likely to carry much weight. Of course it would be easy enough for any of those who hold opposite views to Dr. Hewitt to prepare an equally convincing table in which, on account of the prevalence of inflammatory complications, flexions had “a very limited representation.”

It is not surprising that, with such views, all the ailments

that the uterus is subject to, barring a few comparatively unimportant conditions, such as pelvic cellulitis, fibroid tumours, cancer, hæmatocele, and the like, are found to depend on displacements. Thus endo-metritis, and its treatment by intra-uterine medication, on which Thomas, Courty, Miller, Playfair, and others who have written on the subject, lay so much stress, turns out to be nothing but inflammation resulting from the cooping up of uterine discharge by flexion, and to be easily remedied by straightening the womb mechanically. The author assumes that dilatation of the cervix is an essential preliminary to intra-uterine treatment, and that to this, which removes the obstruction, and not to the topical application, the cure is due. But nothing of the sort is required if swabbing out the uterus by medicated probes, or the introduction of caustic points, are used instead of intra-uterine injections, as they ought to be; and it has, over and over again, been pointed out that an abnormally patulous condition of the cervical canal and uterine cavity is found in all cases of obstinate uterine leucorrhœa.

The sickness of pregnancy, irritable uterus, hysteria, and many other conditions, too numerous to mention, all find their simple explanation in this new and improved system of mechanical pathology, which certainly has the merit of amazingly diminishing the labours of the gynæcologist.

It is with much regret that we write thus of a book on which so much honest work has been expended, and which is unquestionably the result of real conviction; of that there can be no kind of doubt. But Dr. Hewitt's work gained its reputation under very different colours, and it is essential to point out what we believe to be its present faults. Nor need we have so written were it merely the exposition of the hobby of some obscure author, but coming, as it does, from one whose opinion of necessity carries great weight, a decided protest against such one-sided teaching seems imperatively called for.

None the less are we debarred from paying a well-deserved meed of praise to the book in other respects, the merits of which have formerly been fully recognised in our pages.

Keller on Extra-Uterine Pregnancy.¹—Dr. Keller at the outset declares that he has never seen the operation of gastro-tomy performed for extra-uterine foetation, but has been incited to write a monograph by the success of Mons. Koeberle in two cases which that gentleman has permitted the author to make known. The brochure is divided into two parts relating respectively to the pathology and to the treatment of the abnormality in question. M. Koeberle's two cases are first related. In the first there was an

¹ *Des Grossesses Extra-Uterines et plus Spécialement de leur Traitement par la Gastro-tomie, &c.* Par THEODORE KELLER, Docteur en Médecine. Paris, 1872, Pp. 94.

extra-uterine pregnancy of fifteen months' duration. The patient was aged 41, and had had one child previously. The operation was performed in the usual way as regards opening the peritoneal cavity, but nothing more than the fœtus and the fluid surrounding it was removed. The cord was cut long and left hanging out of the end of the wound. On the seventh day some shreds of placenta and cord began to detach themselves and were removed; this continued until the fourteenth day, when it nearly ceased. A month from the day of operation the patient was well. In the second case the extra-uterine pregnancy was of fourteen months' duration. The patient was 22 years old, and it was the first pregnancy. Scanzoni was consulted by this patient, and at first thought there was extra-uterine fœtation. Subsequently, however, he concluded the tumour was a colloid cyst of the ovary. The operation was performed as before, but the placenta was found adhering to the anterior wall of the abdomen as M. Koeberle had previously indicated. In order to avoid opening "the cavity of the peritonæum, properly so called," the operator went through the placenta to get at the fœtus. The vessels being obliterated there was no bleeding. The breech and trunk of the fœtus were extracted without rupture of the cyst; but when the head was about to be engaged it gave way, and some coils of intestine escaped. An assistant held up the edges of the cyst and prevented the further progress of this accident and also the entry of fluid into the cavity of the peritonæum. M. Koeberle fastened the edges of the cyst to the abdominal wound. The cord was left, and catheters placed in the wound as in the first case. Elimination of the placenta went on from the seventh to seventeenth day. The patient went out a month after the operation, and five months afterwards, when seen by M. Koeberle, was found to be very well, but there remained a small fistula.

In his remarks Dr. Keller admits four forms of extra-uterine pregnancy: ovarian, tubal, interstitial, and abdominal. The author has some interesting remarks on the etiology and pathological anatomy of the various forms of extra-uterine fœtation, and upon their course and diagnosis.

The second part of the monograph is devoted to a review of the treatment of the accident, and the following are the conclusions arrived at:

"(1.) The dangers to which extra-uterine pregnancies expose women are so grave that it is the duty of the physician to provoke internal abortion in the first half of gestation.

"(2.) The internal abortion may be practised by puncture of the ovum, but above all by the capillary injection of toxic substances.

"(3.) When pregnancy has passed the first half of its evolution it is rational to leave its course free until term, but the patient must be closely watched.

"(4.) On the arrival of the term, gastrotomy may be practised, and a living child extracted. The operation should be performed without temporising from fear of rupture of the cyst and death of the fœtus.

"(5.) When the term has passed and the child is dead gastrotomy should still be practised to spare the mother the dangers to which the presence of the dead child exposes her.

"(6.) The diagnosis of adhesions should be made with great care. It is on them that the success of the operation is largely based. One should respect the envelopes and the insertion of the placenta.

"(7.) It is not possible at present to prognosticate the success of gastrotomy at term. There have been successful cases. Gastrotomy after term, done at an opportune moment, appears to be not more grave than ovariectomy."

Domville's Manual for Nurses.¹—This is a well-meant and sufficiently well-performed intention to convey briefly the most necessary instructions for the guidance of those in charge of the sick. Defects and ambiguous directions might be discovered, but altogether the manual may be followed with advantage. We do not appreciate the value of applying cold water to the face in epileptic fits; nor do we endorse the practice of making post-mortem examinations, in private cases, whilst the body remains in the shell. The author will, by age and experience, learn more thoroughly the art and practice of nursing, and probably be enabled hereafter to produce an amended edition of this manual, to which a higher character will attach for completeness and accuracy.

Stratton's Affinity of Hebrew and Celtic.²—We had occasion to review a little book by the same author in our number for April, 1871, on the Celtic origin of Greek and Latin, and, whilst commending his industry, to regret its almost complete waste by reason of his insufficient acquaintance both with the philosophy of the languages he sought to elucidate, and with the works of the philologists of the present century who have replaced the guesswork of former times by well-based science.

We regret to be compelled to repeat the same opinions relative to the matter and manner of this present treatise. He naïvely confesses in his preface, "I do not make the slightest pretence of being a Hebrew scholar," and his knowledge of Gaelic was picked up when fifteen years of age by means of books only "in the course of two or three months," and has been little recruited by intercourse with Gaelic-speaking people.

¹ *A Manual for Hospital Nurses and others engaged in attending on the Sick.* By EDWARD J. DOMVILLE. London, 1872.

² *The Affinity of the Hebrew Language with the Celtic.* By THOMAS STRATTON, M.D., &c. Edinburgh, 1872.

He further tells us that in noticing the signs of similarity between Hebrew and Celtic, he has "not received any help from any quarter, printed or written matter, or conversation." Self-help is, indeed, an excellent thing; but when a man seeks by it to build up a theory or a science, and looks not around him to see what others have done and are doing in the same direction, and so spurns their work, he is likely rather to display the results of an ambition that overleaps itself. Moreover, if we look to the works he recommends for the enlightenment of others in philology, and, at the same time, consider his own qualifications for the task he has undertaken, we are not surprised he is groping in the dark, mistaking rubbish for precious ore, and rather rearing stumblingblocks in the way of future investigators into the affinities of the languages he would explore than helping them forward.

We are sorry to write thus of the work of a meritorious naval surgeon, but whilst willing to recognise in him a medical practitioner of large experience and industry, we cannot accept him as a philologist.

A Gigantic Family.¹—Perhaps we may make no excuse for departing from the custom of not noticing exhibitions, when we call the attention of our readers to the most remarkable development of adipose tissue which has, perhaps, ever been observed in Europe, at least within one family. It is interesting as testing the laws of heredity, to observe the peculiarities of the O'Neal family, of which we will only remark that a careful examination leads us to vouch for the accuracy of the extraordinary measurements we give.

They are natives of Ireland, Queen's county, forty-seven miles from the city of Dublin. They are born of respectable parents, hard-working farmers. The father stood six feet and weighed twenty-seven stone. The mother is forty-five years of age, stands five feet two inches in height, measures round her arm twenty-six inches, across her shoulders three feet, round her waist five feet six inches, and weighs the enormous weight of twenty-one stone. Her eldest son is twenty-five years of age, stands six feet two inches, weighs eighteen stone five pounds, and, at the present time he is a Life Guard. All the sons and daughters were of large dimensions. Miss Ann O'Neal, the eldest daughter, is twenty years of age; she stands five feet six inches in height, and measures round the arm twenty-seven inches, across her shoulders one yard and a half, round her waist eight feet, and weighs the enormous weight of thirty-nine stone. Her younger sister is eighteen years of age; she stands five feet two inches in height, measures round her arm twenty-five

¹ *Description of the O'Neal Family.* London, 8vo, 1872.

inches, and her shoulders three feet, round her waist six feet, and weighs twenty-three stone.

Her eldest daughter is, as may well be imagined, on account of her obesity, scarcely able to walk. She appears to be uneasy on her legs, and compelled to lean up against the wall for support. The vaccination marks on her arms having increased with age and development of adipose tissue, are as large as ordinary saucers. As there is no padding or artificial method employed to enhance the enormous weight of the specimens, the disproportion which strikes the observer between the gigantic bodies and the relatively small though absolutely large crania is almost startling. The hands are coarse and large-boned. In Ann O'Neal (affectionately and absurdly named "Lily" by her smaller relatives) the malar bones are enormous, and the mouth is much underhung, by the forward projection of the lower jaw. Although the mother shows signs of excessive alcoholic consumption, there is no disease noticeable or complained of; and the subjects do not appear to suffer from any other affection than the inconvenience of having to support so much fat.

Development of the Boil-plague in Kurdistan in 1871.¹—The epidemic disease referred to by Dr. Tholozan has remained for six months confined within the narrow limits of certain districts situated in the northern part of the country of the Kurds, who live, as is well known, on the confines of Turkey and Persia, and at the time of Dr. Tholozan's report the Persian government was taking the most energetic measures for preventing the spread of the malady. In the villages where the disease was most severe it carried off 90 per cent. of those who were attacked, and when an epidemic was about to terminate it carried off only 40 or 50 per cent. It appeared to be decidedly contagious, and at its commencement presented the characteristics of a severe form of typhus fever, but in most cases there was glandular swelling appearing in the groin, the axilla, and in the parotid or sub-maxillary gland, and ending in suppurating infiltration. Sometimes at the onset of the attack spots like flea-bites appeared all over the body, but principally on the chest, the neck, the back, and sides. Sometimes the disease lasted three or four days, and then the severe symptoms disappeared and the health was gradually re-established, and sometimes death occurred only on the tenth or eleventh day. When the disease was unattended with boils the uneasiness and agitation of the patient were greater, and violent spasms ensued in the lower limbs together with a kind of emprosthotonos which proved certainly fatal on the third day. This form of

¹ *Note sur le Développement de la Peste Bubonique dans le Kurdistan en 1871.*
Par le Docteur THOLOZAN.

Note on the Development of the Boil-plague in Kurdistan in 1871.

plague was communicated not only by contagions from one person to another, but was also conveyed by various articles of commerce, and one well-marked case is given where a man had brought some cattle from a certain village to another at the distance of several leagues, and was soon himself attacked and died. Two days afterwards another person in the same house who was attacked also died, and all the inhabitants of the house, ten in number, died in succession in two weeks ; and afterwards a neighbouring house was attacked and nearly all the inmates fell a prey to the malady.

Dalton's Human Physiology.¹—That this is an acceptable work to the medical profession in the United States is sufficiently manifest from the fact of its having reached a fifth edition. It would be also well appreciated and patronised by numerous readers in this country could it command a sale, but in the presence of several valuable treatises on physiology of established reputation amongst us such success cannot be looked for.

Moreover, although Dr. Dalton has been an original experimenter and has his own results to record, yet the work is essentially a digest of the generally accepted doctrines and facts of physiology. Hence it makes no special claim upon us for a critical examination, and we need do no more than refer to its general character.

The preface informs us that whilst, as a general rule, the discussion of doubtful and theoretical questions has been avoided, new and fully established facts from all sources have been incorporated with the results of previous examinations. The general avoidance of unsettled questions is commendable in an elementary work addressed to students, and renders the subject matter more readable. This latter advantage is possessed by the book before us ; but whether from a too close adherence to his principle of stating only well-established doctrines and facts, or from neglect in consulting the most recent authorities on physiology, the teaching imparted is not fully up to the standard of the present day, and would not suffice for the requirements of students other than those content with a common pass examination. We have particularly noted the omission of much recent observation and teaching in the physiology of the nervous system as set before us in this volume. Thus, the nerves are described as terminating by free extremities at the periphery, and no other opinion referred to ; there is no distinct account of the minute distribution and action of nerve-fibrils on the blood-vessels ; none of the now well-ascertained minute anatomy of the brain and spinal cord ; none of Broca's views respecting the localization of speech, &c.

¹ *A Treatise on Human Physiology ; designed for the use of Students and Practitioners of Medicine.* By JOHN C. DALTON, M.D., &c. Fifth Edition, revised and enlarged. With 284 illustrations. Philadelphia, 1871, H. C. Lea. London, Trübner and Co. Pp. 728.

Consequently, from an English critical point of view this treatise does not come up to the requirements of the day, although great credit is due to the author for the clearness and distinctness of what information he gives.

Of the several sections into which the work is divided, that on reproduction has the largest space assigned it.

Boston City Hospital Report.—This magnificent volume has a right and title to be called a hospital report, for it is really occupied with histories of patients treated in the Boston Hospital, and with tabulated particulars of some of the most important maladies submitted to treatment. As the brief preface tells us, it is the “enlarged and consolidated report,” published on the completion of the fifth year from the establishment of the hospital. The volume opens with a short history and description of the hospital. From this we learn that the number of in-patients in the year 1868 was 2078, and of out-patients 7691. The accidents admitted amounted to 421 in the same year. The accommodation is limited to 130 beds.

Dr. Bowdich, one of the physicians, is the writer of the first contribution on perinephritic abscess, its complications, and its treatment. In this paper he goes beyond the bounds of his hospital experience, and cites cases that have occurred in his private practice. The points he makes are—1. The liability to chest complications consequent on the presence of the abscess beneath the diaphragm. 2. The importance of an early and thorough radical operation to empty the abscess.

In operating he either punctures with a trocar or more freely lays open the abscess with a bistoury; and when the pus is not at once come upon he employs a seton or tents. He advocates an operation so soon as a distinct tumour is formed, and the earlier when auscultation reveals any lesion of the lung or pleura. He prefers to make the opening in the renal region when the tumour “lies in part in that region.”

The second article is “On Excision of Joints,” by Dr. Cheever. The operation had been performed, in all, twenty-eight times on the larger joints, viz. elbow in ten instances, wrists in one, hip in eleven, knee in six. The ratio of mortality is put at 43 per cent. on the whole of the cases; but we notice that there were seven deaths, or a mortality of one fourth of the number. However, we apprehend Dr. Cheever would explain the ratio he assigns by excluding all deaths not directly consequent on the operation. Such would be the decease of Case 4, from cerebral disease, ninety-eight days after the operation; of Case 20, from tubercular meningitis, ten weeks

¹ *First Medical and Surgical Report of the Boston City Hospital.* Edited by J. NELSON BORLAND, M.D., and DAVID W. CHEEVER. 1870. Pp. 688.

after; of Case 28, from shock following amputation of arm at shoulder after nine days; of Case 11, which was removed from the hospital, but died subsequently of Bright's disease. But besides these deaths from secondary lesions we note others in twenty-four days, in ten weeks, and in fifty-seven days, respectively, from exhaustion, and one from pyæmia after twenty-five days. Moreover, in six instances amputation had to be resorted to on failure of the attempt at resection.

Article III is occupied with comments on the cases of pneumonia admitted into the wards, and with a tabulated statement of some of their chief features and of their treatment. Of this last it is enough to state that Dr. Hughes Bennett's principles are accepted and followed.

The next article is occupied by a notice of cases described as samples of "Displacement of the Upper Jaw;" but, in less ambiguous language, instances of tumours springing from the vicinity of the fauces and posterior nares. After narrating his own operative proceedings, the writer, Dr. Cheever, reviews those adopted by Langenbeck and by Ollier in similar diseased conditions.

In the fifth article Dr. Blake seeks to estimate the results of different modes of treatment of acute rheumatism, particularly of the alkaline and non-alkaline plans; and the upshot to be gathered is, that there is not a "pin to choose between them." We must observe, however, that it appears odd to find cases tabulated as dealt with by the *non*-alkaline treatment, in which bicarbonate and acetate of potash with iodide of potassium are freely and frequently given daily.

Dr. Damon, in the next paper, gives short notes on the diseases of the skin encountered by him as physician to the department for skin diseases. He singles out certain rarer and anomalous cases for a fuller description and for illustration by figures. We cannot linger to take special notice of some of these instances, although of much interest, and must, in the absence of space, content ourselves with a mere enumeration of the remaining articles by title; to wit:—Dr. Upham on "Typhoid and Typhus Fever;" Dr. Cheever, "Case of Reproduction of the Tibia,"—a very interesting observation; Dr. Williams, "Ophthalmic Report;" Dr. Green, "Aural Report;" Dr. Cheever, "Encephaloid Tumour of Tonsil;" Dr. Sinclair, "On Peri-uterine Inflammation;" Dr. Cheever, "Surgical Abstract;" and, lastly, the general medical and surgical tables.

As a record of hospital practice, a narrative of remarkable cases, and a mirror of the principles of treatment pursued in New England, this volume ought to find a place in every large medical library attached to our public institutions and hospitals.

Original Communications.

I.—Observations on Smallpox. By ALEX. OGSTON, M.D., Aberdeen.

IN a disease so well known and well studied as smallpox it can hardly be profitable or interesting to recapitulate the well-established facts to be met with in every complete treatise on the subject; and in the following pages, therefore, attention will rather be requested to the less known varieties and complications which the unusual opportunities of studying the disease during the recent epidemic have enabled me to investigate.

A preliminary glance may, however, be taken at the proportion in which, among the 227 cases observed, true and modified smallpox, and the relations of sex, were distributed; as also the relative frequency of each in persons, 1st, recently vaccinated; 2nd, persons having good vaccination marks; 3rd, persons having indistinct vaccination marks; 4th, persons having no vaccination marks; and lastly, persons never vaccinated, among whom are classed those whose history of never having been successfully vaccinated seemed thoroughly trustworthy. Those recently vaccinated include such as were successfully vaccinated at any period from six months before to the first day of the febrile stage, and do not include those vaccinated after the fever appeared. Those classed as "good marks" or as "indistinct marks," presented respectively typical and faulty scars, irrespective of the number of scars present; the "no marks" are those having a history, but no other indications of successful vaccination.

		Males	Females.	Total.	
Modified variola	Recovered	Recently vaccinated	3	3	6
		Good marks . .	49	52	101
		Indistinct marks.	11	13	24
		No marks . . .	7	8	15
		Unvaccinated. .	2	1	3
} 149					
Unmo- dified variola	Dead . .	Recently vaccinated	0	2	2
		Good marks . .	5	5	10
		Indistinct marks	4	2	6
		No marks . . .	6	4	10
		Unvaccinated. .	5	4	9
	} 37				
	Recovered	Recently vaccinated	0	0	0
		Good marks . .	6	6	12
		Indistinct marks	5	5	10
		No marks . . .	4	10	14
Unvaccinated. .		3	2	5	
} 41					
Total of sexes		110	117	227	
} 78					

or, otherwise expressed, in numbers and percentages,

	Recently vaccinated	Good marks.	Indistinct marks.	No marks.	Unvaccinated.
Numbers .	8	123	40	39	17
Per-centage	3·52	54·18	18·06	17·18	7·48

The cases of unmodified variola were 34·3 per cent. as against the modified cases, which formed 65·6 per cent.; the males were 48·4 per cent., and the females 51·5 per cent. of the whole cases.

In the 8 recently vaccinated the recoveries were 6, or 75 per cent.; deaths 2, or 25 per cent.

In the 123 good marks the recoveries were 113 or 91·9 per cent., deaths 10, or 8·1 per cent.

In the 40 indistinct marks the recoveries were 34, or 85·0 per cent., deaths 6, or 15 per cent.

In the 39 no marks, the recoveries were 29, or 74·4 per cent., deaths 10, or 25·6 per cent.

In the 17 unvaccinated the recoveries were 8, or 47·1 per cent., deaths 9, or 52·9 per cent.

Among the cases were two who had *failed to take smallpox* when *previously* exposed to it, of whom one unvaccinated died, and one twice vaccinated recovered.

In seven cases *previous attacks* of smallpox were alleged, and of these five recovered and two died. Some of these alleged attacks

appeared to have been real, as the cicatrices of the previous disease were distinct, but in some, at least, an attack of varicella had probably been mistaken for variola. The high rate of mortality in alleged second attacks corresponds to what others have already observed, and is probably owing to supposed immunity producing carelessness as to the protection afforded by vaccination. In one of our cases an interval of twenty-eight years had elapsed between the two attacks.

As regards the *age* of the patients there were—

Under one month, one case unmodified, which died.

Between one and five years, one modified, which recovered.

Between—

5 and 10 years,	18 modified recovered,	and 8 unmodified,	of which 1 died.
10 " 15 "	37 "	8 "	all recovered.
15 " 20 "	23 "	13 "	of which 7 died.
20 " 25 "	39 "	15 "	8 "
25 " 30 "	11 "	9 "	5 "
30 " 40 "	14 "	17 "	11 "
40 " 50 "	4 "	3 "	1 "
50 " 60 "	1 "	2 "	1 "
60 " 70 "	1 "	0 "	0 "
70 " 75 "	0 "	2 "	both died.

The youngest case treated was ten days and the eldest seventy-three years old.

The *period* which had elapsed *between the last successful vaccination and the onset of the attack* of variola varied greatly in the cases where this could be ascertained in a reliable manner. Thus, where this interval was under one year, there was one case unmodified.

Between one and five years there were two cases, both modified.

Between—

5 and 10 years,	there were 7 unmodified,	and 25 modified,	or proportionally 1 : 3·5
10 " 15 "	8 "	33 "	1 : 4·1
15 " 20 "	10 "	30 "	1 : 3
20 " 25 "	10 "	30 "	1 : 3
25 " 30 "	5 "	11 "	1 : 2·2
30 " 40 "	14 "	12 "	1 : 0·8
40 " 50 "	3 "	2 "	1 : 0·6

Showing a steady increase in the proportion of the unmodified cases; and, besides these, one modified case showed an interval of sixty-one years, and one unmodified case an interval of seventy-two years.

History of the infection.—In 127 cases a distinct history of exposure to the infection was obtained, and in 100 no such account could be elicited.

Duration of the febrile stage.—In 196 cases the duration of the first stage of the disease, *i. e.* the interval between the onset of the

febrile symptoms and the appearance of the characteristic eruption was obtained and noted.

The length of the interval was 1 day in 14 cases; 2 days in 60 cases; 3 days in 102 cases; 4 days in 16 cases; 5 days in 2 cases; 6 days in 1 case; and 9 days in one case; while in one patient who died hæmorrhagic on the fifth day of the disease, the eruption of smallpox never appeared at all; even on his head and face, not a single papule, vesicle, or pustule could be detected by the most careful examination during life or after death.

Roseola variolosa.—The rose rash, so similar in appearance to that of measles, but differing from it in affecting chiefly the extensor surfaces of the limbs, and being slight or absent on the flexor surfaces, was noted as occurring in seventeen cases. In five of these it was at the same time visible on the face. The eruption of the roseola commenced with the onset of the fever, and faded before the rash characteristic of smallpox came out.

Vomiting, nausea, and backache were almost invariably present during the febrile stage, and ceased on the appearance of the variola rash; but they were not recorded except in a few of the patients.

Purpura and hæmorrhages, when present at all, were for the most part found appearing with the onset of the febrile stage, and lasting into and through the eruptive stage; but they will be mentioned more particularly afterwards under the notices of the hæmorrhagic cases.

Insomnia occurred in all except the mildest attacks, persisted during the febrile, and extended a day or two into the eruptive stage, in the majority of the cases.

ERUPTIVE STAGE.

Site of Eruption.—It is evident that the proper eruption of smallpox, while systematically sparing some of the surfaces of the body and attacking others, has its abundance as well as its earliest appearance determined, in a great measure, by the relative vascularity of the individual parts of the surfaces which are prone to be affected by it. Thus in the external integument it is usually earliest of appearing, and most abundant, on the face and hands, which are the most vascular and exposed portions of the true skin. But it is by no means invariable that these regions suffer most; while in twenty-five cases the face is noted as presenting the most copious eruption of the efflorescences, and their predominance on the face and arms is noted in a much greater number of cases; in one patient no eruption ever appeared on the face, although it existed elsewhere; in one it appeared first upon the chest; in four it was most abundant on the arms; in one on the arms, knees, nates, and scrotum; and in one on the

legs and arms. In a patient suffering from psoriasis the affected portions of the skin, being very vascular, exhibited a greater abundance and a shorter course of the eruption than was observed on the other parts of the same patient; in a patient who had numerous recent scratches on the arms the eruption was confluent on and around the scratches, although slight elsewhere. The same was observed round the dried crust of a recent successful vaccination, on a patch of erythema, and on eczema of the arm, in three other patients; while, curiously enough, a mustard poultice which had been applied over the left false ribs of a man a few days before the onset of the febrile stage, and had acted so energetically so as to have left pigmentation of the skin, produced no increased eruption over the affected part.

On mucous membranes the eruption was noted as present, especially on the mouth and throat, in every case where it was abundant on the skin; and although in these regions it gave rise to the well-known difficulty of swallowing and salivation, it invariably ran a shorter course than on the skin, the pocks becoming so early broken that they were rarely seen in the entire state, and being already clothed with restored epithelium when those on the skin were still actively suppurating.

In one patient, who recovered, and where the throat symptoms were very marked, hoarseness and laryngeal pain indicated the probable involvement, to some extent, of the mucous lining of the upper part of the windpipe.

The condition of the *ears* was closely investigated in every case, and it was observed that while the nasal portion of the Eustachian tube was often, as could be inferred from the symptoms, thickly studded with eruption, and the outer ear and outer third of the external meatus were also frequently affected, the inner two thirds of the external meatus, the drum, the middle ear, and the tympanic part of the Eustachian tube never once presented the slightest appearance of the characteristic rash. In fact, in only one case did inflammation of the middle ear present itself, and then it was not only slight, but occurred late in the disease from the extension upwards of a nasal and pharyngeal catarrh. The eruption of smallpox was noted on the external ear in sixty cases, and on the outer third of the external meatus in fifty-nine cases.

Eruption on the *conjunctiva* of the lids was present in a large number of cases, and in thirteen on the conjunctiva bulbi, where it ran its usual short course and was attended with no bad effects. Ordinary conjunctivitis, independent of eruption, was noted once.

In the post-mortem examinations made, no eruption was discovered in the *intestinal tract*, and in a boy with extroversion of the *bladder*, who was treated, the protruded organ never presented a single trace of the efflorescences.

Form of Eruption.—The occurrence of the rash in *corymbose* patches was occasionally observed, as well as the tendency of such cases to turn out badly. It was met with ten times, and three of these ended fatally. As a curiosity may be mentioned the presence in one patient of a smallpox pustule on the centre of an old vaccination cicatrix.

Course and Complications of Eruption.—In cases with hæmorrhagic tendency it was frequently observed that on the appearance of the eruption the bases of the individual pocks became the seat of extravasation, especially on the lower limbs, so that at first sight it seemed as if the pustules had come out over the extravasations. Close observation, however, proved that the sequence was the reverse of this, for the pocks appeared first, and their bases seemed to form a point of least resistance for the occurrence of extravasation. The hæmorrhages which supervened into the efflorescences at a later stage occurred under their centre, and these central purple effusions were frequently of bad omen, and but the beginning of graver complications.

As regards the much vexed question of the causation of *umbilicated vesicles and pustules*, it was not difficult to arrive at a decided conclusion. At the commencement of the eruptive stage two forms of vesicles exist, umbilicated, and those presenting no central depression. Just as in other vesicular diseases, such as varicella, the umbilicus occurred where a sweat-gland or sebaceous follicle pierced the centre of an efflorescence, and as the disease progressed the tube of epithelium, which produced the pit, giving way, allowed the centre to rise to the same level as the rest of the vesicle, and obliterated the appearance altogether. The umbilicated appearance observed at a later stage of the disease was clearly dependent on quite another cause, viz. on the greater rapidity of effusion at the margins than at the centre of a pock. When it is considered that a smallpox efflorescence consists essentially of an infiltration of the deeper and softer layers of the epidermis and of the superficial layers of the true skin with white blood-cells and exuded fluid, going on to the molecular death of the infiltrated parts, it will occur to us as the most natural thing possible that the periphery of the sequestered part which is thus presented by every pustule should be the foremost to present the phenomena of the reactive swelling necessary for the separation of the necrosed tissues. I am convinced that this is the true explanation of the occurrence of the umbilicus, the more so as this latter umbilicated form is wanting in the milder form of the eruption, where the epidermis alone is probably involved, and occurs solely in severe forms, or in pronounced individual pocks, where the fluids, unable to penetrate from the depths through the necrosed pellicle of true skin, have to wander in from the circumference to the centre. It seems to me also that the essential difference between

modified and unmodified variola consists entirely in this, that the disease, having in the former instance to act on less susceptible structures, involves the true skin to a less extent, and hence the ease with which the milder forms of eruption crust and dry up, since a suppurative separation of portions of the cutis vera is not required as it is in the severer pocks.

It may be mentioned here that the observations of others regarding the sudden and *unexpected drying up of the eruption* in cases which are apparently threatening to be very severe, were amply confirmed by the cases in our hospital; but it must be added that, where this sudden desiccation occurred, the pocks were invariably of small dimensions.

The occurrence of *pemphigoid bullæ* with clear watery contents and no areola in the surrounding skin, each bulla underlying a true pock, thus forming a cavity containing pus situated on the top of a larger cavity filled with serum, is noted in eleven cases, and was always accompanied by a favorable termination. In two of these cases the pemphigoid eruption was coincident with the appearance of *Miliaria crystallina*, which existed alone in nine cases besides, and always likewise ended in recovery. Where miliaria occurred the patients exhibited septic symptoms, a fact which would induce me to consider this eruption as caused by septic poisoning, a view supported by Hebra.

The production of *large blisters* at the localities where the eruption was very dense was from a different cause altogether, viz. from the great irritation of the skin at the stage of suppuration. These blisters are mentioned as having been very extensive in six of the cases.

Rupious variola, where the pustules at the period of suppuration continued spreading circumferentially, and extending into broad round spots of the size of a shilling or less, covered with a crust similar to that of rupia, is found recorded in only three cases, but was present in a considerable number.

Boils and phlegmons are recorded in sixteen cases; *herpes* of the lip was found as a complication in one case; and the curious phenomenon of a *second pustular eruption* after disappearance of the first, which has been mentioned as a second smallpox rash by some, but is referred by Hebra to a pyæmic origin and named by him *metastatic impetigo variolosa*, was observed in one case.

Hæmorrhagic variola.—The appearance of hæmorrhagic complication in smallpox is, as will be presently shown, an almost universal factor in the disease; indeed if under this head are included all degrees of extravasations, from that where only one or two minute capillary ecchymoses exist, to that where hæmorrhage in nearly every texture of the body forms the prevailing feature, the tendency to

extravasation of blood is one of the best diagnostic signs of small-pox. This tendency shows itself in various grades of intensity and severity, and so completely do those grades run into each other that it is difficult to draw a line anywhere between hæmorrhagic and non-hæmorrhagic smallpox. Out of 227 cases of smallpox, 142, or 62·5 per cent. of the whole, showed in some degree the tendency to effusion of blood, and I have no doubt that this percentage would have been very much increased but for the unfortunate circumstance that the regularity of the occurrence of capillary ecchymoses, especially in the skin, was not detected until more than half the cases had run their course. After attention was particularly directed to the symptom and every portion of the patients' bodies was submitted to a strict scrutiny, these minute capillary ecchymoses were detected in every case, saving in those where the advanced stage of the disease had already permitted their absorption, and where, consequently, they had ceased to exist. Even these latter cases, however, were so infrequent that it may be stated without exaggeration that, out of 100 or 120 patients last admitted not more than four or five failed to present this striking feature.

Out of the 227 cases tabulated at the commencement of this paper, the hæmorrhagic, tabulated by themselves, stand as follows :

		Males.	Females.	Totals.	
Modified variola	} Recovered	Recently vaccinated	2	3	5
		Good marks . . .	29	31	60
		Indistinct marks . .	5	6	11
		No marks	3	5	8
		Unvaccinated . . .	2	1	3
				87	
Unmodified variola	} Dead . .	Recently vaccinated	0	1	1
		Good marks	4	4	8
		Indistinct marks . .	3	2	5
		No marks	4	4	8
		Unvaccinated . . .	4	3	7
				29	
	} Recovered	Recently vaccinated	0	0	0
		Good marks	5	4	9
		Indistinct marks . .	2	3	5
		No marks	2	5	7
		Unvaccinated . . .	3	2	5
				26	
Total of sexes		68	74	142	

The table shows that the percentage of deaths in hæmorrhagic cases was 20·4, and a comparison of the tables shows the percentage of mortality in non-hæmorrhagic cases to have been only 9·4. Of the total cases of modified smallpox 58·3 per cent. were hæmorrhagic,

and of the unmodified 70·5 per cent. were hæmorrhagic. The situations of the hæmorrhages are mentioned as follows :—

6 patients had bleeding from the intestines,	
5 " " uterus,	
3 " " bladder,	
3 " " nose,	
1 patient " lungs,	
and 1 " " stomach.	

Capillary ecchymoses occurred in

78 cases on the body alone	
43 " body and limbs.	
7 " body, limbs and face.	
4 " limbs alone.	
3 " limbs, body, face and conjunctiva.	
1 case on the limbs, body and conjunctiva.	
1 " conjunctiva alone.	

In the mildest hæmorrhagic cases merely a few capillary ecchymoses of the size of a pin's head were dotted here and there over the trunk, generally on its anterior surface; in severer cases they occurred elsewhere and were accompanied by hæmorrhages from the orifices of the body, under the conjunctiva, into the centre of the pustules, &c. These capillary extravasations appeared before the true eruption, generally at the commencement of the febrile stage, and if the disease went on favorably they had been completely absorbed by the time desiccation or suppuration was established. A frequently observed condition was that described by Hebra as *Erythema variolosa*, where these ecchymoses, densely grouped or even confluent, but not very bright in colour from being deeply seated in the true skin, occupied the belly below the navel, the groins, and the fronts of the thighs. The pyramidal form, tapering down the insides of the thighs and ending at the knees, described by Hebra under this head, never presented itself in the cases at the hospital here. Where ecchymoses were confluent the variolous pustules were few or absent.

COMPLICATIONS OF SMALLPOX.

Albuminuria occurred in five cases, gangrene of the nose in one, lupus in one, erysipelas during recovery in a mild form in three, catarrh of the bladder in one, diarrhœa in eighteen, inflammation of the mamma ending in resolution, in three women who were nursing before they fell ill, mania in one, abscess of the tonsil in two, epilepsy in one, bedsores in four, eczema in two, enlarged scrofulous glands in two, diseased mesenteric glands in one, and ulcer of the tongue in one. In one of the fatal cases, lobular pneumonia, probably the result of embolism, manifested itself on the supervention of septicæmia. Three patients had suppression of urine for

twenty-four hours, and one for thirty hours. One patient, who had been *delivered* of a child at the full time, immediately before the commencement of the eruptive stage, died; while out of four admitted in various stages of *pregnancy* none aborted, although two of them threatened abortion, and one of these died.

As already noticed, none of the cases exhibiting efflorescences on the conjunctiva had any further trouble with their *eyes*, and no efflorescences were visible in any case on the cornea; but in the stage of suppuration five patients presented ulceration of the cornea terminating in cure, one presented unilateral iritis (cured), one presented panophthalmia and died, and one had for some days chemosis of the conjunctiva, probably from a thrombus in the ophthalmic vein, which disappeared as recovery proceeded.

TEMPERATURE IN SMALLPOX.

Space forbids more than a short *résumé* of the results obtained by the thermometer being given here. The *maximum temperature* in the fatal cases was as follows:

Between 106° and 107° in 2 cases.	Between 102° and 103° in 9 cases.
" 105° " 106° " 1 case.	" 101° " 102° " 4 " "
" 104° " 105° " 10 cases.	" 100° " 101° " 3 " "
" 103° " 104° " 7 " "	" 98° " 99° " 1 " "

In the unmodified cases which recovered the maximum temperature reached was—

Between 105° and 106° in 2 cases.	Between 101° and 102° in 5 cases.
" 104° " 105° " 9 " "	" 100° " 101° " 3 " "
" 103° " 104° " 11 " "	And under 100° in 2 cases.
" 102° " 103° " 9 " "	

In the modified cases, where the temperature was taken, the highest point reached by the thermometer was—

Between 105° and 106° in 1 case.	Between 100° and 101° in 30 cases.
" 104° " 105° " 6 cases.	" 99° " 100° " 26 " "
" 103° " 104° " 11 " "	" 98° " 99° " 21 " "
" 102° " 103° " 23 " "	" 97° " 98° " 8 " "
" 101° " 102° " 21 " "	

These tables show that, in unmodified variola, the average maximum temperature was over 102°, while in the modified it was only over 100°. They also show that no case survived in which the thermometer stood higher than 106°.

The *minimum temperature*, though of little value, may also be mentioned. The minimum temperature of the non-hæmorrhagic unmodified cases which were cured reached between 96° and 97° in one case, in the hæmorrhagic unmodified which were cured the same in one case, while in the modified cases which were cured it reached

to between 96° and 97° in four cases, 96° in one, 95.6 in one, and 95.5° in one.

In the unmodified cases who died the minimum temperature was between 96° and 97° in three cases with, and in two cases without, hæmorrhagic tendencies; while in one hæmorrhagic unmodified case, which died, it reached 95.5° , and in a similar case 94.8 on the morning and 95.7 on the evening of the day of her death. Thus 95.5° was the lowest temperature noted in cases which recovered.

COINCIDENCE OF VARIOLA AND VACCINIA.

In five of the cases admitted a recent successful vaccination was running its course at the same time as the smallpox. In four of these the vesicles coincided pretty closely with the pustules of the smallpox in their stages of development and maturity, and in the fifth the vaccine vesicle had reached the stage of a dry crust before the eruption of variola appeared.

VARIOLA SINE ERUPTIONE.

The fact that the utmost caution must be employed in pronouncing as smallpox any malady in which the characteristic rash is wanting must induce considerable scepticism as to the existence of variola without eruption. But there are nearly as good grounds for believing in such a mutilated disease as in the now universally credited "defaced" or incomplete scarlet fever. In a family who were attended in private during the epidemic, one of whose members was affected with an attack of unmodified variola, of which he subsequently died about the fourteenth day of the eruption, a sister, who had never had the disease, suddenly sickened, and presented rigors, vomiting, anorexia, feverishness, and strongly-marked back-ache. I expected an attack of smallpox, but the third day passed without the eruption appearing; and being unaware at that time of the diagnostic value of the purpura I did not look for it, and concluded that I had been wrong in my surmise as to the nature of the illness. On the fifth day, however, a moderate degree of serous infiltration (chemosis) under the conjunctiva of the right eye led to the discovery of a *single efflorescence on the conjunctiva* between the bulbus and the lower lid. This ran the usual course, and *was the only efflorescence which appeared*. Such a case as this might readily have existed without even the single efflorescence, and left little doubt in my mind that smallpox can occur without any eruption.

In only one other case of undoubted smallpox, but one of very different import, did none of the characteristic efflorescences show themselves. As previously remarked, a patient was admitted into the hospital on the second day of the febrile stage. Besides the other

symptoms he showed an abundant crop of purpura on the body; on the third day they had increased in number, and extended to the limbs. On the fourth day there were, in addition, minute hæmorrhagic blisters on the trunk, and the purpura had extended to the face. Late on the fifth day he died, and I can positively affirm that he had no eruption of any nature on any part of his body beyond the purpura and blisters mentioned, and these blisters presented not the faintest resemblance to the vesicles of smallpox, having no hard or reddened bases, and being quite irregular in size and outline.

SEQUENCES OF SMALLPOX.

Nothing new was observed in relation to the occurrence of *cicatrices* and *pigmentation* as sequelæ, nor as to the frequent existence of *seborrhœa* of the head and other hairy parts after desquamation had been completed; but attention may be called to the less known existence of *cutaneous warty excrescences*, as a consequence of severe attacks. This hypertrophy of the papillæ of the skin was observed in almost every confluent case which ended in recovery, and was exclusively confined to the face. In such cases, at the stage of suppuration, when the whole or portions of the skin were covered with uniform yellowish moist scabs, small red warts resembling granulations were usually seen here and there pushing their way towards the surface through the soft scabs, and when the scabs had been replaced by more coherent and dryish crusts, the detachment of these was impeded by the warts imbedded in them. After the fall of the crusts the subjacent skin was densely covered, principally over the cheeks, nose, and brow, with hypertrophic papillæ of various size, which gave the skin of these parts a rough or sometimes velvety aspect, and prevented the thorough cleansing away of the softer flaky crusts which followed the earlier and thicker scabs. In time the disappearance of this deformity was completely effected by the contraction of the granulation tissue forming the main constituent of the warts, some falling off and others shrivelling; but pigmentation of the skin was a marked feature following this process of papillary hypertrophy.

TREATMENT OF SMALLPOX.—In the milder cases suitable food and a moderate supply of stimulants were the only treatment employed; in the severer cases, on the other hand, stimulants, sometimes in enormous quantities, were used, and with the best results. The pain produced by the pustules under the unyielding skin of the hands and feet was best relieved by hot fomentation. The prevention of pitting was not attempted, on the grounds that in the severer cases superficial portions of the true skin are involved in the

infiltration and suppuration, and hence scars must exist, while in milder cases avoidance of irritation of the pustules should best ensure a cure without cicatrices. In one aggravated case of rupious variola with boils and phlegmons, packing in warm wet blankets averted an unfavorable termination, and in all the regular use of hot baths encouraged the detachment of the crusts.

With the view of curing the disease itself only two remedies were tried, viz. xylol and vaccine lymph. *Xylol*, then, much praised by Zueltzer in Berlin, was, through the kindness of him and Professor Virchow, early forwarded us with directions for use. At first it seemed to answer, but its more extended employment negatived these hopes. For the sake of accuracy it was administered only in such cases as seemed likely to turn out of an unmodified and severe type. It was administered according to the direction of Zueltzer, who first suggested its use in smallpox, and the results are—in four cases of modified variola where it was given all recovered. Of forty-five cases of unmodified variola where it was given twenty died, not by any means an encouraging result.

Vaccine lymph.—The first forty patients admitted were vaccinated on admission, but as the disease was rendered neither milder nor more intractable, vaccination was abandoned. It certainly never aborted the disease, and I am convinced that it had neither a good nor a bad effect in any one case. At the very end of the epidemic, Dr. Furley of Edinburgh advocated vaccination, or subcutaneous injection of one or two tubes of lymph; subsequent to his paper only one case was admitted suitable for testing the subcutaneous injection, viz. a male, who showed every appearance of being about to undergo a very bad attack of unmodified smallpox, but without any marked tendency to serious hæmorrhagic complications. On the second day of the eruption he had *eleven* well-filled large tubes of recent good lymph injected under the skin of the arms. The disease ran exactly the course anticipated, the patient barely escaped with his life from a very severe unmodified attack, the lymph appeared to have not the slightest influence on the course of the malady, and caused only an insignificant induration of the subcutaneous cellular tissue at the places where it had been injected.

II.—The Public Health Aspects of the Adulteration of Food Act and the Mines Regulation Acts. By HENRY W. RUMSEY, M.D.

THE sanitary exploits of the last Session include the passing of laws on the adulteration of food and on labour in mines, both of which subjects have intimate relations with the national health.

I propose, therefore, first to notice "An Act to amend the Law for the Prevention of the Adulteration of Food and Drink and of Drugs."

The permissive Act of 1860 was, for reasons fully stated at the time, almost inoperative. Its failure was predicted before it passed. But now that certain local authorities, instead of individual sufferers, are charged with the duty of initiating proceedings under the Act, the new law appears already to have led, here and there, to vigorous and comparatively successful action. There is, however, something of the same error in this as in the Public Health Act, as regards the districts and authorities concerned in the appointment of officers. For, the town councils of English boroughs, having a separate Court of Quarter Sessions or a separate police establishment—and some of these towns are not populous—are to appoint analysts, if required by the central authority; so are the vestries and district boards of the metropolis. But these bodies afford no security for the selection of thoroughly skilled persons, as free as possible from the influence of local adulterators. Except in the case of boroughs having a population of not less than 250,000, the power of appointment ought to have been vested exclusively in the county authorities, also named in the Act. In the metropolis, one supreme authority should alone appoint these very important officers.

The Act does not show how the possession of "competent medical, chemical, and microscopical knowledge" is to be tested. Hence the necessity for instituting some special examination and diploma as a guide to the authorities.

A question about the combination of this office with that of health officer was raised at the Plymouth Congress, and has since been discussed in London. It can scarcely be solved by the same method in every locality. There is many a borough not large or rich enough to confer the necessary independence on its health officer without giving him some other public employment, as that of analyst. On the other hand, many an excellent health officer does not possess the requisite practical skill in chemical analysis.

In any case, the laboratory ought to be a distinct establishment. Generally speaking, one good laboratory, with all needful aids and appliances, in a county or first-class borough, would more effectually secure the exercise of superior skill than a division of the duties

among several health officers. In Liverpool, Dublin, and I believe Glasgow, the analytical office is distinct. Dr. Letheby reasonably suggests that there should be official co-operation between the health officer and the analyst if these offices are not held by the same person, and that the salary of the latter should not be less than £200. Some further valuable suggestions for the effective working of the Act have since been promulgated by the Metropolitan Association of Officers of Health. Their most important recommendations are—that two great laboratories be established in London, and that skilled assistants be constantly engaged therein, to conduct the analyses, under the superintendence of the analysts appointed by the vestries and district boards,—these analysts contributing, *pro rata*, according to the work done, towards the maintenance of the laboratories,—and that the analysts be strictly debarred from giving any certificate or testimonial as to the purity of any article of food, &c. &c., other than for the purposes of the Act. This is good. Advertising quackery must not be encouraged under scientific auspices.

The Licensing Act of 1872 provides, though very imperfectly, against the adulteration of intoxicating liquors. The Excise department also has always employed skilled analysts, for fiscal purposes, with benefit to the public health. All will agree with Dr. Letheby, that—

“Looking at the multitude of Acts of Parliament which deal with questions of adulteration, and at the divided authority and jurisdiction of the matter, it is evident that what is required is a consolidation of the law and a very clear and explicit declaration of the thing to be dealt with, as well as of the authority, and its duties, powers, and obligations.”

The punishment of offenders under the new Act is apparently very severe; the difficulty of bringing home the offence will often be very great, for wilful intention must be proved. Heavy fines and imprisonment will also tend to prevent conviction. We have always thought that freely publishing and *placarding* the names of offenders would be the most efficacious and practical method of preventing the crime. This Act does not give much promise of success.

Secondly, I would call attention to two Acts for consolidating and amending the Acts relating to the regulation of coal mines and metalliferous mines; and to the proceedings of the Association of Factory Surgeons thereon.

Evidently the bent of the ruling official mind is to abolish the office of “certifying surgeon,” on the following grounds;—(1) that a certificate of age is needless, now that the registration system has been long established,—although the births of many children have never been registered, and children under age are often made

to personate those elder ones whose certificates they use ; (2) that a certificate of health and physical ability for labour is superfluous,—although this certificate has proved an invaluable protection to the rising manufacturing population, and has mainly ensured the success of the Factory Acts ; (3) that mill owners dislike the regulation, and that mine proprietors will not tolerate it,—although the same sort of objection was vehemently urged, but happily in vain, against the Factory Acts before they were passed.

On all these grounds the Factory Medical Officers, with the veteran Inspector Baker at their head, join issue with the Government. It requires no *précis* of their arguments to convince an impartial inquirer of the great importance of the factory surgeon's office. This needs only to be made a more effective engine of legal and preventive medicine, by empowering and directing the medical officers to visit the workplaces periodically and at various hours, and to observe carefully the children at their work, the atmospheric condition of the rooms, and the circumstances and manner of conducting the processes, so as to detect abuses and suggest precautions for the health and safety of those employed.

Very interesting are the recent publications of this Association. The "Remarks" on the Mines Bills while before Parliament, the Report of the committee, and especially Dr. Arlidge's masterly address at the annual meeting in September, are all contributions of the highest value to the literature of legislation on industrial hygiene. These documents show clearly that, as far as the health of the younger operatives is concerned, the Mines Regulation Act is a retrograde measure. In the abandonment of medical inspection and certificates (imperfect as the factory regulations on this point may be), Parliament has departed from that most valuable principle of the Factory Acts, which prevents the employment of children who, on account either of tender age, or of imperfect development, or of actual disease—and these conditions are prevalent in the manufacturing districts—are also quite unfit for the naturally unwholesome and dangerous occupation of the mines. Dr. Arlidge says:—

"Though it be difficult to credit such a desertion from the accepted sanitary principles of factory legislation, it is, alas ! too true ; and the deformed and lame, the feeble and diseased may find a haven of labour in the darkness and wet, and in the more or less foul air, of mines, even when they have been declared by the officers of factories incapable of work in the more eligible field of labour on the earth's surface."

In the absence of all safeguards of this kind, mines will be, as in the experience of factory surgeons, they have already become, the resorts for those rejected as bodily unfit for labour in other easier occupations. Any relaxation of the sanitary requirements will speedily intensify the damaging influences of town and factory life,

and "a rapid degenerescence of the operative population must ensue." Again, the unsexing and degrading nature of the employment which the Mining Acts still tolerate for women at the pit's mouth or on pit-banks may, we hope, be admitted as a reason for a speedy amendment of the Acts.

Dr. Arlidge points out many anomalies in mine and factory legislation, for which I refer to the publications before mentioned. He shows that the Workshops Acts are defective in the same direction as the Mining Acts. "No troublesome inquiries are made as to age and physical ability to work," either in workshops or in those factories which, from employing less than fifty persons, "are arbitrarily, but legally, relegated to the category of workshops."

Mr. Redgrave and his school of publicists seem to be unaware of the fact that, beside the large number of children rejected by the medical certifiers on account of deficient age, a considerable proportion are also rejected as physically unequal to the labour imposed on them.

In an article on sanitary legislation in this Review for Jan., 1871, the reviewer showed the great advantage of extending the duties of factory surgeons and of investing them with additional responsibilities as regards both workers and workplaces—in fact, of making them, like the union surgeons, *deputy* officers of health. It is satisfactory to find that Mr. Baker approves of this suggestion.

That the factory surgeons are able and fully prepared to undertake additional responsibilities of inspection and scientific investigation, is shown clearly enough, by a schedule of suggestions and propositions, in the interrogatory form, drawn up by a sub-committee of their association, on this subject.¹

Under twenty-one heads, this inquiry embraces every material point in which information is desired, and if it be explicitly answered by the majority of these energetic officers, a body of evidence on industrial hygiene will be collected next year far surpassing in scientific and administrative value even the very useful series of annual reports made by the Inspectors of Factories to the Home Secretary. From the proposed returns we shall learn the actual proportion of candidates rejected by the certifying surgeons on account of physical incapacity and disease, even when accepted as of legal age. Moreover, some important information will be elicited as to physical tests of age, criteria of incapacity, and developmental diseases.

It appears that in many cases fitness for employment is a question of degree, and that even when this fitness is fairly certified in a general sense the certificate ought not to apply to *every* process or stage or department of the same manufacture or industry. In such

¹ 'Report, Factory Medical Officers,' pp. 9—13.

cases, therefore, *special* certificates, limiting the qualification for employment, are very desirable. This would be a great reform, as it would minimize medical interference with the supply of labour.

No less important is the proposed record of instances in which individuals who have been rejected on examination by the certifying surgeon are afterwards allowed to work in mines, or in workshops, or in factories not medically visited. Such facts would prove the necessity for re-examination, not only on every change of occupation, but also on every renewed hiring in the same employment.

Under the heads 11, 12 and 13 of this schedule, inquiries are to be made into the various conditions and circumstances affecting health and safety, in different industries—depending either on the kind of machinery or on the materials used, or on the adventitious products, as dusts, vapours, chemical compounds, &c.—or on the attitudes and movements of the workers.

Information of great value might also be obtained as to the moral and social results of associated labour in factories, with reference, *e. g.* to the habits of the employed, their hours of work, their disposal of wages, their diet and use of intoxicating drinks, the ratio and fecundity of their marriages, the “recruiting of the manufacturing community from the outside districts,” the sanitary condition of schools to which factory children resort, and not omitting the conditions of out-door labour, as in brick-fields or in agriculture.

Hence will accrue a mass of invaluable statistics, which can hardly fail to clear away much uncertainty and misconception, and to settle many controverted statements.

The practical question for Parliament is—Shall the factory medical officers be utilized in their inquiries, and thus take their proper place in a national organization of State Medicine?

The writer of an official article in the ‘Times’ on “Medical Officers of Health” (Oct. 17) mentions the sanitary duties to be performed in factories among those to be committed to ordinary health officers—another method of shelving the factory surgeons.

There can be no doubt that the former, appointed as they are to be under Mr. Stansfeld’s unfortunate Act, will be far less reliable and effective in the labour department than the present officers of factories; for these in every industrial district “are selected with care by the factory inspectors,” and have now become experts in their department. Their co-operation with county officers of health would give them additional security and confidence in the execution of their responsible duties.

But too much must not be expected. For, as “the Public Health Act was passively assented to by the opposing parties in Parliament to save their credit as representatives,” so, it seems, “the Mining Acts received their final form under pressure of the mining interests, from an administration weakened by many defeats, and unable to

enforce either its own clauses or amendments proposed by independent members."

We shall all agree with the president of this association that the same protection is needed for the young, whether employed in factories, in workshops, or in mines; and that, as in regard of the laws relating to the adulteration of food and drink, so also, as to this question, nothing is more necessary than a consolidation of all laws relating to labour, an application of the same principle of medical inspection to every great industry, and the placing all under a department of *Manufactures and Mines*, acting harmoniously, if possible, with the Local Government Board.

III.—Tabular Report and Remarks on Two hundred Cases of Extraction of Cataract by Graefe's Modified Linear Section.—
By DAVID LITTLE, M.D., Surgeon to the Royal Eye Hospital, Manchester.

WHEN the late Prof. Von Graefe published his papers in 1865-66, on his now well-known method of extraction of cataract by a modified linear incision, the results he had then obtained were so favorable as to warrant him in recommending it for general adoption. Not only was his success greater as compared with that of his cases of flap extraction or scoop extraction, but his method possessed many other advantages. He pointed out, for instance, that it was comparatively safe in marastic subjects, in whom flap extraction would be exceedingly dangerous; that it was applicable to almost all kinds of cataract in the adult; that it permitted an examination of the eye at an early period after the operation, and was attended with less inconvenience both to patient and surgeon. Encouraged by these advantages, most ophthalmologists zealously adopted Graefe's plan, and so eminently satisfactory has it proved to be, that it is now almost universally practised both in this country and on the Continent.

In Graefe's operation, however, the liability to an escape of vitreous and to hæmorrhage into the anterior chamber, the necessity of performing iridectomy, and the somewhat frequent occurrence of iritis, led Liebreich to consider the subject more fully. Concluding that these disadvantages were due to the position of the wound, he sought to obviate them by a different form of incision, first described by him in the 'British Medical Journal' for 2nd December, 1871, as follows:—"With a Graefe's knife, puncture and contra-puncture are made in the sclerotic about one millimetre beyond the cornea, the whole remaining incision passing with a very slight curve through the cornea, so that the centre of it is about one millimetre and a half distant from the margin of the cornea, and the traction is made downwards without iridectomy." His results are superior to Graefe's as regards optical perfection, and equally successful as regards immunity from the worst inflammatory consequences. In performing this operation myself, I have been much pleased with the rapidity and ease with which it can be accomplished, and the comparatively little pain it gives the patient; at the same time, the great tendency to prolapse of the iris and its ultimate adhesion to more or less of the corneal wound, besides the production, probably, of a greater amount of astigmatism than by any other operation, appear to me to be serious objections to it. My experience, however, as yet, is too limited to enable me to speak authoritatively on this point; I

hope, however, that Dr. Liebreich will give a detailed account of the results of a number of cases operated upon after his method, as it deserves a fair trial at the hands of ophthalmic surgeons.¹

Considering that Graefe's operation is the one most extensively practised, a detailed report of 200 extractions according to his method will, no doubt, be an important addition to the statistics already published, and cannot fail to interest ophthalmologists.

The above number includes every case, complicated or otherwise, operated upon by me by the peripheric section since 1868. They are submitted to no selection, but are taken from my note-book consecutively.

The 200 operations occurred in 148 individuals, of whom 78 were males and 70 were females; their ages varied from thirty-two up to eighty-one years; 115 of the eyes belonged to patients who were sixty years of age and upwards, and it is interesting to observe here, what effect age has upon the result of extraction of these 115 eyes. Eighteen were attacked with iritis (nine of which ended in a closed pupil); two were lost from panophthalmitis, two from irido-choroiditis, and one from sloughing of the cornea.

In fifty-six of the extractions the patients are noted as being marastic, delicate, rheumatic, or as being in bad health.² Of these cases, ten were followed by iritis, five of which terminated in a closed pupil, and five were lost. Here also the state of health is some criterion as regards the prognosis.

In twelve instances both eyes were operated upon at one sitting.

Eye complications.—As regards the nature of the cataract, six eyes were noted as having posterior polar cataract, in thirteen instances the lens was retrogressive, and three were of a glutinous consistence. Three cases were complicated with myopia, one of them amounting to $\frac{1}{7}$ th, and all were successful. Four eyes presented posterior synechia and two iridodonesis, two were glaucomatous, one was accompanied with enlargement of the lachrymal sac, two had chronic conjunctivitis, and three were marked as having some posterior disease.

Operation and accidents during operation.—In making the incision with a Graefe's knife I have endeavoured, with a few exceptions, to lay the centre of the section just within the cornea, and thereby diminish the risk of rupturing the hyaloid membrane. I have endeavoured also as much as possible to ascertain beforehand the size of the nucleus in each case, and limit the length of my incision accordingly. This examination, however, can only be satisfactorily made with a dilated pupil and by oblique illumination, and

¹ Le Brun, of Brussels, I believe, practises a similar operation, but makes the incision upwards instead of downwards.

² One patient was suffering from diabetes of four years' duration; the extraction was completely successful.

in hospital practice it cannot always be accomplished. The consequence has been that in eight instances I had to enlarge the incision with blunt-pointed scissors before the expulsion of the lens could safely take place.

Loss of vitreous occurred in twenty-two of the extractions (in nine cases before the exit of the lens); eight of these twenty-two cases were followed by iritis, making one third of the whole number.

Bowman's spoon was introduced into the eye to remove the cataract on twenty occasions (twice without any loss of vitreous). In 180, therefore, of the cases, the lens was expelled and the pupil cleared by pressure in the usual way.

Collapse of the cornea or eyeball occurred twenty times after the extraction; vitreous was lost in four cases; iritis took place four times and one case terminated in irido-choroiditis.

Healing process.—Amongst the inflammatory consequences of this method of extraction iritis is the most frequent. It happened twenty-seven times in these 200 operations, nine of which resulted in closed pupils, the remaining eighteen recovered useful vision. Ten of these ultimately read No. 1 Jaeger, three No. 2, two No. 4, one No. 14, one No. 16, and one No. 19. In three instances the pupil was so much contracted upwards that a secondary operation was afterwards performed. I have always been in the habit of instilling atropine into the eye from six to eight hours after the operation, and continuing its use two or three times daily for several days. Many surgeons believe that so early an application of atropine irritates and is sometimes apt to produce iritis. I certainly entertain a very different opinion. I have never yet seen any disturbance to the healing process by atropine, but I am convinced, on the contrary, that in a good many instances early dilatation of the pupil has warded off an attack of iritis. Seven out of the nine cases of closed pupil promise well to result in useful vision after some further operative interference; the iris in each case appears quite healthy, there is a good anterior chamber, the pupil is partly occluded by false membranes, and there is very good perception of light. The other two cases, although there is excellent perception of light, are not so favorable for any secondary operation in consequence of some exudations behind the iris, causing a bulging here and there on its anterior surface.

Of the 200 extractions there was a total loss of seven cases—two from sloughing of the cornea, two terminated in panophthalmitis, and three in irido-choroiditis. It will be observed on reference to the tables that the seven eyes lost are described as belonging to patients who were either in bad health or were sixty years of age and upwards. And with regard to the cases of iritis, we find that two-thirds of them occurred in people upwards of sixty years, and that the whole of the nine cases of closed pupils also occurred

in those of advanced age and indifferent health. There can be no doubt that the loss of vitreous and introduction of instruments into the eye to remove the lens are most productive of iritis and other inflammatory trouble, arising not only from the bruising of the iris and posterior surface of the cornea, but also from the impossibility in most instances of clearing the pupil. The tables show that more than one third of the cases of iritis occurred where there was loss of vitreous.

Small hæmorrhages occurred in seven cases in the process of healing, between the second and ninth day after the operation, the cause of which I could not account for except in one case, where the patient accidentally struck his eye.

Chloroform was administered in four cases only. I prefer operating without it if possible, if only for this advantage—that one can more readily and effectually clear the pupil of cortical remnants when the patient is conscious to direct the eye as required.

Secondary operations.—In seventeen cases of the whole number the needle was used to clear the pupil of capsule at various periods after the extraction. The pupil was enlarged in seven instances, either by iridectomy or with a broad needle and a Tyrrell's hook.

The following is a short statement of the cases lost after operation :

CASE 30.—A male, æt. 48, whose right eye was operated upon by me successfully six weeks before. He has for some years been addicted to habits of intemperance; is very bloated looking and bronchitic. During the interval of the two operations he had been drinking heavily at home. No accident occurred during the operation on his left eye; the pupil was left perfectly clear. The incision, however, was rather longer than requisite. On the following morning sloughing had commenced in the wound, which rapidly spread to the cornea.

CASE 36.—A very stout woman, æt. 66 years, with chronic bronchitis, from whose left eye I removed a cataract about fifteen months before. Her eyeballs were very prominent. No accident attended the operation. The nucleus was a very large one, and the incision was unusually long in consequence. She had considerable aching pain the first night after the operation. Next morning, when I saw her, there was swelling of the upper eyelid, great conjunctival chemosis, and a quantity of purulent matter in the pupil. Ultimately, suppuration of the globe supervened.

CASE 43.—A healthy, stout man, 65 years of age, with an ordinary nuclear cataract and soft cortex. The incision was a small one. On rupturing the capsule, the least pressure with the cystotome seemed to disturb or perhaps, partially displace the lens. Pressure

was used to the eyeball in the usual way, and after the escape of a considerable quantity of cortex the nucleus suddenly disappeared into the vitreous, and I made no further attempts to remove it. The pupil, notwithstanding, remained apparently clear. The eye went on well for nearly three weeks, when the patient went home some distance into the country. He returned to me a month afterwards with well-marked irido-choroiditis : ultimately the eye atrophied.

CASE 62.—A soldier, in good health, æt. 69 years, with retrograde cataract in both eyes. Right eye was successfully operated upon by me three months previously. In his left eye the cataract had contracted so much that he could count fingers ; the capsule was thickened and calcareous looking, and the nucleus was small and hard —T. — 1. No accident occurred during the operation, and the pupil was left quite clear, the capsule having been removed along with the lens. He had much pain during the night notwithstanding morphia injections. Suppuration of the ball was established next day. Eye ultimately atrophied.

CASE 108.—A thin marastic woman, 74 years of age, with chronic bronchitis and emphysema, accompanied by extensive cardiac disease. There was nothing to note as regards the operation. The eye went on well for five days, when suppurative iritis began, and in spite of stimulants, nourishment, and good nursing, irido-choroiditis supervened. The eye still preserves a good appearance, but is rather softer and smaller than before.

CASE 175.—A man of weak intellect, low vitality, 39 years of age, with Morgagnian cataract in both eyes. Both eyes were operated upon at one sitting. On rupturing capsule in left eye Morgagnian fluid escaped. The nucleus was likely to sink in the vitreous, and the spoon was at once introduced to remove it. Some liquid vitreous followed and collapse of the eyeball. Next day there was swelling of eyelids and chemosis without any pain. There was no acute inflammatory action going on in the eye, notwithstanding the great chemosis. Suppuration was beginning in the wound and extended to the pupil in a few days. The eye ultimately became soft and slightly atrophied, but still presented a fair appearance.

CASE 187.—A woman, 63 years of age, having indifferent health, and presenting very small corneæ with hard nuclear cataract in both eyes. Extraction in both eyes was performed at one sitting. In her right eye infiltration commenced in the wound next day and gradually involved the whole cornea. No cause could be assigned. The left eye recovered without a bad symptom.

Resulting Vision.

No. of Eyes.			
146	could read	Jaeger's test types,	No. 1.
14	"	"	No. 2.
11	"	"	No. 4.
3	"	"	No. 6.
2	"	"	No. 8.
1	"	"	No. 10.
1	"	"	No. 14.
4	"	"	No. 16.
1	"	"	No. 19.
1	could only count	fingers.	
9	same as before	operation.	
7	lost.		

200

If we consider those cases that can read from No. 1 to No. 14 as perfect results, those from No. 16 down to good perception of light as imperfect, and all those the sight of which is destroyed as failures, then we shall have the result of my 200 extractions as follows:—3·5 per cent. of loss; 7·5 per cent. imperfect; 89 per cent. perfect.

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
1	M.	Pale and flabby	Ordinary hard nucleus	None	61	Jan. 1868	L.	None	Clear	...	...
2	M.	...	"	"	70	"	L.	Loss	Cortex	Irit.	...
3	M.	...	"	"	70	May, 1868	R.	None	Clear	"	...
4	F.	Marastic and deaf	"	"	60	"	L.	...	...	...	...
5	F.	Good	"	"	54	April, 1868	R.	...	...	...	...
6	M.	"	"	"	50	"	L.	...	...	...	...
7	M.	Gouty	"	"	60	"	R.	...	...	...	...
8	M.	Good	"	"	56	May, 1868	L.	...	Cpsule.	...	...
9	M.	"	"	"	56	"	R.	...	"	...	...
10	M.	"	Polar cat.	Myop.	40	June, 1868	R.	...	Cortex	...	...
11	M.	"	"	"	40	July, 1868	L.	...	"	...	...
12	F.	"	Ordinary nucleus	None	50	June, 1868	R.	...	Clear	...	...
13	M.	Rheumatic	"	...	50	Aug. 1868	R.	Loss	"	...	...
14	M.	"	"	...	50	"	L	...	"	...	...
15	M.	Good	Polar	...	52	July, 1868	L	...	Blood	...	...
16	M.	"	"	...	52	Oct. 1868	R.	...	"	...	...
17	F.	"	Ordinary	...	64	June, 1868	R.	...	Clear	...	...
18	M.	"	"	...	45	July, 1868	R.	...	"	...	...
19	F.	"	"	...	61	"	R.	...	"	...	...
20	F.	"	"	...	61	"	L.	...	"	...	...
21	F.	"	"	...	55	Aug. 1868	L.	...	"	...	...
22	F.	"	"	...	55	Feb. 1869	R.	...	"	Irit.	...
23	F.	Delicate	"	...	58	Sept. 1868	L.	...	Blood	"	...
24	F.	Good	"	...	55	Oct. 1868	R.	...	Clear	...	...
25	F.	"	"	...	55	Dec. 1868	L.	...	"	...	...
26	M.	Delicate	"	...	60	"	R.	...	"	Irit.	...
27	M.	Good	Amber-coloured	...	64	Oct. 1868	L.	...	"	...	...
28	M.	"	"	...	64	Jan. 1869	R.	...	"	Irit.	...
29	M.	Bad	Ordinary	...	48	Oct. 1868	R.	...	"	...	...
30	M.	"	"	...	48	Dec. 1868	L.	...	"	...	...
31	F.	Moderate	"	...	55	Oct. 1868	L.	...	"	Irit.	...
32	M.	Marastic	"	...	65	Dec. 1869	L.	...	Blood	...	...
33	F.	"	Amber-coloured	...	55	Feb. 1869	R.	...	Clear	...	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	Right eye lost after a cataract operation 2 or 3 years ago.
...	16	Chloroform was given; iritis on the 5th day; pupil was contracted upwards.
...	1	Slight iritis on 3rd day; collapse of cornea after operation; no chloroform.
...	1	
...	1	
...	1	Patient of intemperate habits.
...	1	A stout person, and subject to attacks of gout.
...	1	Needle was used to displace capsule.
...	1	A fortnight elapsed between the operations.
...	10	Extensive choroidal atrophy was seen afterwards, and vitreous opacities.
...	1	Posterior staphyloma.
...	4	Chloroform was administered; the wound was rather long in healing.
...	1	Both eyes were operated upon at one sitting; patient unsteady.
...	1	
...	1	Posterior polar cataract and thickened capsule; collapse of eyeball after operation, and pupil filled with blood.
...	1	Incision was enlarged with blunt curved scissors, as the nucleus was very large.
...	1	
...	1	Capsule afterwards cut across.
...	1	
...	1	Both eyes operated upon at one sitting.
...	1	Eye collapsed after operation.
...	1	Slight iritis on 7th day.
...	1	Slight iritis on 4th day; blood in anterior chamber.
...	1	
...	1	
...	1	In making section knife cut a portion of iris; iritis on 9th day.
...	1	In both eyes the cataracts were immature; very large amber-coloured nuclei; no cortex; cornea very small; before the operation the pupils dilated very little with atropine; in right eye the pupil was slightly contracted upwards after iritis.
...	2	
...	1	Patient most intemperate; very bloated looking and bronchitic; during his discharge from the hospital, between the 1st and 2nd operations, he drank excessively; in left eye cornea began to slough next day after operation.
...	Cornea slough.	...	Lost	
...	2	Iritis of a mild form 3 weeks afterwards; needle was used to clear the pupil.
...	1	Patient very unsteady during operation.
...	1	Collapse of cornea after operation; left eye lost after cataract operation 6 years ago.

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
34	F.	Moderate	Morgag.	...	55	Feb. 1869	R.	...	Clear	...	...
35	F.	Very stout, brnchitic.	Ordinary hard nucleus	...	66	Mar. 1868	L.	Loss	Cortex left	...	...
36	F.	"	"	...	66	July, 1869	R.	...	Clear	...	...
37	M.	Good	Ordinary	...	61	Mar. 1869	R.	Loss	Blood	Irit.	...
38	M.	"	"	...	61	April, 1869	L.	...	Cpsule.	...	...
39	M.	"	"	...	58	"	L.	...	"	...	...
40	F.	"	"	...	64	"	L.	...	Clear	...	...
41	F.	"	"	...	64	July, 1869	R.	...	"	...	...
42	F.	"	"	...	74	May, 1869	R.	...	"	...	...
43	M.	"	"	...	65	June, 1869	R.	...	...	...	Irido-choroiditis.
44	M.	"	"	...	68	"	L.	...	Cpsule.	...	...
45	F.	"	Small nucleus and soft cort.	...	32	"	R.	...	...	...	...
46	F.	"	"	...	32	Aug. 1871	L.	...	...	...	...
47	F.	Marastic	Ordinary	...	60	June, 1869	L.	...	...	...	...
48	M.	Tremulous palsy	Hard, amber-coloured	Tremulous iris, &c.	74	July, 1869	R.	Loss	Cpsule.	...	...
49	M.	"	"	"	76	Sept. 1871	L.	"	Clear	...	...
50	F.	Moderate	Ordinary	...	75	Aug. 1869	R.	...	Cpsule.	...	...
51	F.	Good	Retro-grade	...	54	Sept. 1869	L.	...	Clear	...	...
52	F.	"	"	...	54	Oct. 1869	R.	...	Cpsule.	...	...
53	M.	"	Ordinary	...	57	Sept. 1869	L.	...	Clear	...	...
54	F.	Marastic	"	...	60	"	L.	...	"	...	...
55	M.	Good	"	...	51	Oct. 1869	R.	...	"	...	...
56	F.	"	"	...	59	"	R.	...	Cpsule.	...	...
57	F.	"	"	...	61	May, 1871	L.	...	Clear	...	...
58	M.	"	"	...	51	Nov. 1869	L.	...	"	...	...
59	M.	"	"	...	51	Mar. 1870	R.	...	Cpsule.	...	...
60	M.	"	"	...	59	Nov. 1869	R.	...	Clear	...	...
61	M.	"	Retro-grade	Pupill. adhes., &c.	69	Jan. 1870	R.	...	Cpsule.	...	...
62	M.	"	"	...	69	April, 1870	L.	...	Clear	...	...
63	F.	Marastic	Ordinary	...	52	Jan. 1870	R.	...	"	...	...
64	F.	"	"	...	52	Mar. 1870	L.	...	"	...	...
65	F.	Good	"	...	73	Jan. 1870	R.	...	"	...	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	Cataract retrogressive; collapse of eyeball after operation.
...	1	Prominent eyeballs; vitreous escaped before lens; collapse of cornea; needle afterwards used to divide capsules.
Panop.	Lost	There was no accident during the operation; the incision was long on account of the very large nucleus; purulent iritis began next day, followed by panophthalmitis.
...	...	Closed pupil	Good percep. of light	Iritis began on 4th day, resulting in a closed pupil; perception of light good; suitable for iridectomy; collapse of cornea occurred after extraction.
...	1	Collapse of cornea after extraction.
...	1	Patient unsteady during operation.
...	1	
...	1	Unsteady at operation on second eye.
...	1	
...	Lost	On pressure being used to expel the lens the nucleus completely disappeared in the vitreous, and no further attempt at extraction was made; all went on well for nearly 3 weeks, when he went home. When I next saw him he had irido-choroiditis.
...	2	Right eye lost from chronic disease.
...	2	
...	2	
...	1	
...	1	Iris was tremulous; pupil uneven; lens slightly dislocated; fluidity of vitreous; needle used 2 or 3 weeks afterwards to divide capsule; patient very unsteady.
...	1	Cataract removed in its capsule with Bowman's spoon.
...	1	Needle afterwards used to capsule in pupil; left eye nearly lost from choroidal atrophy and vitreous opacities.
...	1	Capsule was much thickened, and was stripped from lens and removed with cystitome before expulsion of cataract; 4 days after, a little hæmorrhage occurred on surface of iris.
...	2	Capsule was very much thickened.
...	1	
...	1	Chloroform was given; collapse of cornea after operation.
...	1	
...	8	Very small eyes and corneæ; patient very unsteady.
...	1	
...	1	Patient unsteady at operation on second eye.
...	4	
...	1	
...	6	In both eyes cataracts had contracted; only nuclei and tough and thickened capsule; T. in both eyes — 1; suppurating inflammation began next day.
Panop.	Lost	
...	16	Slight corneitis took place 4 or 5 days after operation, commencing at the corneal margin of wound and extending downwards, producing some opacity.
...	16	Cornea became similarly affected.
...	1	Patient very unsteady; slight hæmorrhage occurred in anterior chamber two days after operation.

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
66	M.	Good	Ordinary	...	70	Feb. 1870	R.	...	Clear	...	...
67	M.	"	"	...	71	April, 1870	R.	...	"	...	...
68	M.	"	"	...	66	Feb. 1870	L.	...	Cpsule.	...	...
69	M.	"	"	...	67	July, 1871	R.	...	Clear	...	...
70	F.	"	Ordinary hard nucleus	...	69	April, 1871	R.	...	"	...	...
71	M.	"	"	...	51	May, 1870	L.	...	"	...	...
72	M.	"	"	...	53	Aug. 1872	R.	...	"	...	...
73	F.	Marastic	"	...	75	May, 1870	R.	...	"	...	...
74	F.	"	"	...	76	Mar. 1871	L.	Loss	Cpsule.	Irit.	...
75	M.	Good	"	...	56	May, 1870	R.	...	"	...	...
76	M.	"	"	...	66	Dec. 1870	R.	...	Clear	...	...
77	M.	"	"	...	61	April, 1870	R.	...	"	...	...
78	F.	"	"	...	68	July, 1870	R.	...	"	...	...
79	M.	Gouty	"	...	54	"	L.	...	"	...	...
80	F.	Good	Retro- gressive Ordinary	...	72	June, 1870	R.	...	Cpsule.	...	...
81	M.	"	"	...	36	July, 1870	L.	...	Clear	...	...
82	F.	"	"	...	71	"	R.	...	Cpsule.	...	...
83	F.	"	"	...	76	"	L.	...	"	...	...
84	F.	"	"	...	68	"	R.	Loss	Clear	Irit.	...
85	F.	"	"	...	68	"	L.	...	"	...	...
86	M.	Moderate	"	...	76	Aug. 1870	L.	...	"	...	...
87	M.	"	"	...	77	Aug. 1871	R.	...	"	...	...
88	M.	Good	"	...	70	Aug. 1870	R.	...	"	...	...
89	M.	"	"	...	71	April, 1871	L.	...	"	...	...
90	F.	Marastic	"	...	57	Aug. 1870	L.	...	"	Irit.	...
91	M.	"	"	...	64	"	R.	...	"	...	...
92	M.	"	"	...	65	April, 1871	L.	...	"	...	...
93	M.	"	"	...	60	Aug. 1870	R.	...	"	...	...
94	F.	"	"	...	59	Sept. 1870	R.	...	Blood	...	...
95	F.	"	"	...	60	July, 1871	L.	...	Clear	...	...
96	F.	Good	"	...	69	Sept. 1870	R.	...	"	...	...
97	F.	"	Retro- gressive Ordinary	...	59	Oct. 1870	R.	...	"	...	...
98	M.	Marastic	"	...	54	"	R.	...	"	...	...
99	M.	"	"	...	54	Nov. 1870	L.	Loss	Cortex	Irit.	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	Collapse of eyeball after operation.
...	1	
...	16	
...	1	
...	1	
...	1	On rupturing capsule a bead of vitreous appeared; spoon used at once to remove lens; very little vitreous followed; some blood entered the anterior chamber; iritis began on the 8th day, resulting in a closed pupil with false membrane; good perception of light only. Iridectomy was performed 3 months after with very little good effect.
...	1	
...	1	
...	1	
...	...	Closed pupil	Good percep. of light	
...	1	Needle was used afterwards to divide remnants of capsule.
...	1	Needle was used to divide remnants of capsule in pupil.
...	1	
...	1	
...	1	
...	1	
...	Counts fingers	Extensive separation of the retina afterwards observed.
...	1	The section had to be enlarged with scissors.
...	4	
...	4	Most unmanageable patient; cataracts of deep amber colour; collapse of cornea took place after operation in her right eye, and there was slight iritis on 3rd day. Both eyes operated upon at one sitting.
...	1	
...	1	Section had to be enlarged with scissors.
...	1	Iritis took place on the 6th day, resulting in the formation of false membrane in the pupil and some contraction; pupil afterwards enlarged downwards, and needle used to capsule.
...	1	
...	1	
...	1	
...	1	
...	1	Section was enlarged by scissors.
...	4	Delicate and bronchitic subject.
...	1	Point of knife caught iris; slight irido-dialysis; hæmorrhage into the anterior chamber.
...	1	A well-marked arcus senilis.
...	1	
...	1	Left eye operated upon for cataract some years ago, resulting in a closed pupil.
...	2	Collapse of eyeball after operation.
...	...	Closed pupil	Good percep. of light	Iritis began next day, and ended in a closed pupil, with false membrane; good perception of light; patient would not submit to another operation; very unsteady at operation on second eye.

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
100	M.	Good	Ordinary	...	40	Aug. 1870	R.	...	Clear	...	...
101	F.	Marastic	"	...	76	Dec. 1870	R.	...	Cpsule.	...	...
102	F.	"	"	...	77	Jan. 1871	L.	...	Clear	...	...
103	M.	Good	"	...	45	"	R.	...	"	...	...
104	M.	"	"	...	54	"	L.	...	"	...	...
105	M.	"	Ordinary hard	...	65	"	R.	...	Cpsule.	Irit.	...
106	M.	"	"	...	65	Mar. 1871	L.	...	"	...	...
107	F.	"	"	...	53	Feb. 1871	L.	...	Clear	...	...
108	F.	Marastic	"	...	74	Mar. 1871	R.	...	"	...	Irido-chor.
109	F.	Good	"	...	44	"	L.	...	"	...	...
110	M.	"	"	...	60	"	R.	...	"	...	...
111	M.	"	"	...	60	April, 1871	L.	...	"	...	...
112	M.	"	"	...	73	Mar. 1871	R.	Loss	Cpsule.	...	...
113	M.	"	"	...	73	April, 1871	L.	...	...	...	...
114	M.	"	"	...	68	Mar. 1871	L.	...	Clear	...	...
115	F.	"	"	...	60	"	R.	...	"	...	...
116	F.	"	"	...	65	"	L.	...	"	...	...
117	M.	"	"	...	69	"	R.	...	"	...	...
118	F.	"	"	Lac. obstr.	42	April, 1871	L.	...	"	...	...
119	F.	"	"	...	54	Mar. 1871	R.	...	"	...	...
120	M.	Bad	"	...	62	April, 1871	L.	...	"	...	...
121	F.	Moderate	"	...	75	"	R.	...	...	...	...
122	F.	"	"	...	75	June, 1871	L.	...	...	...	...
123	F.	Good	Glutin.	...	54	April, 1871	L.	...	...	...	...
124	F.	"	"	...	54	Jan. 1872	R.	...	Cpsule.	...	...
125	F.	Marastic	Ordinary	...	66	May, 1871	R.	...	...	...	...
126	F.	"	"	...	66	"	L.	...	...	...	...
127	F.	Bad	Polar cataract	...	56	"	R.	Loss	Cpsule. &c.	...	...
128	F.	"	"	...	56	July, 1871	L.	"	Clear	...	...
129	M.	Good	Ordinary	...	43	May, 1871	L.	"	Cpsule.	Irit.	...
130	M.	"	"	...	33	"	R.	...	Clear	...	...
131	F.	Bad	"	...	61	"	L.	...	Blood	...	...
132	F.	"	"	Glaucoma	61	July, 1871	R.	...	Clear	...	...
133	M.	Good	"	...	65	May, 1871	L.	Loss	...	...	...
134	M.	"	"	...	76	"	R.	...	...	...	...
135	M.	"	"	...	64	"	R.	...	Clear	...	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	Exophthalmos; left eye atrophied after inflammation many years ago.
...	4	Capsule in pupil obstructs the vision.
...	1	Collapse of eyeball.
...	4	Small hæmorrhages occurred repeatedly between 5th and 9th days after operation, and the eye remained weak for more than a fortnight.
...	1	Repeated attacks of slight hæmorrhage into anterior chamber after 3rd day.
...	1	Slight-iritis on 6th day; needle afterwards used to divide capsule.
...	1	Needle afterwards used to capsule.
...	4	Chloroform was given; two days after operation a small hæmorrhage occurred in anterior chamber.
...	Lost	Patient had bronchitis with emphysema and cardiac disease; purulent iritis, followed rapidly by iridochoroiditis and atrophy.
...	1	
...	1	Small cornea.
...	1	Small cornea; collapse of cornea after extraction; key-shaped pupil.
...	1	
...	1	On rupturing capsule a bead of vitreous appeared, and spoon was used to remove cataract.
...	4	
...	1	
...	1	
...	1	Immature cataract.
...	1	Immature cataract; key-shaped pupil.
...	1	Epiphora and lachrymal obstruction on same side.
...	1	
...	1	Patient has diabetes mellitus of 5 years' duration.
...	1	Some bronchitis.
...	1	Patient very unsteady during operation.
...	1	Unsteady during operation.
...	1	Needle used to capsule.
...	1	Collapse of eyeball.
...	1	
...	1	Cataract immature; after rupturing capsule vitreous was likely to escape on the slightest pressure; spoon was used to extract lens, followed by liquid vitreous; needle afterwards used to divide capsular remnants.
...	1	Liquid vitreous escaped on completing section; lens removed by spoon with capsule entire.
...	1	Immature cataract; iritis on 4th day; pupil contracted upwards; pupil afterwards enlarged downwards and capsule cut.
...	1	
...	1	A spirit drinker; hæmor. in ant. chamber aft. operation.
...	1	An upper iridectomy had been performed by me 12 months ago for an acute attack of glaucoma.
...	1	
...	1	Has shaking palsy.
...	1	

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
136	M.	Good	Ordinary	...	62	Oct. 1871	L.	...	Clear	...	...
137	F.	Bad	Glutinous	Post. disease	63	"	L.	...	Cortex	Irit.	...
138	M.	Marastic	Ordinary	"	70	June, 1871	R.	...	...	"	...
139	M.	"	"	"	70	Sept. 1871	L.	Loss	...	"	...
140	M.	Good	Ord. hard	...	64	June, 1871	L.	...	Clear	...	...
141	M.	"	Morgag.	...	40	"	R.	...	...	...	...
142	F.	"	Ord. hard	...	58	"	R.	Loss	Cpsule.	...	...
143	M.	"	"	Con-junct.	70	"	L.	...	...	...	...
144	M.	"	"	"	70	Aug. 1871	R.	...	...	Irit.	...
145	M.	"	"	...	65	July, 1871	L.	...	Clear	...	...
146	M.	Marastic	"	...	67	Aug. 1871	R.	...	Cpsule.	...	...
147	F.	"	"	...	64	"	R.	...	Clear	...	...
148	F.	Good	"	...	59	"	L.	...	"	...	...
149	M.	"	"	...	77	"	R.	...	...	...	...
150	M.	"	"	...	72	"	R.	...	Clear	...	...
151	M.	"	"	...	72	"	L.	...	"	...	...
152	M.	"	"	...	59	Sept. 1871	R.	Loss	...	...	...
153	M.	"	"	...	59	Dec. 1871	L.	...	Clear	...	...
154	F.	"	"	...	58	Sept. 1871	R.	...	"	...	...
155	F.	"	"	...	58	Oct. 1871	L.	...	"	Irit.	...
156	M.	"	"	...	56	Sept. 1871	R.	...	"	...	...
157	M.	"	"	...	56	Dec. 1871	L.	...	"	...	...
158	F.	"	"	...	38	Sept. 1871	L.	...	Cpsule.	Irit.	...
159	F.	Marastic	"	...	70	"	R.	...	...	...	...
160	F.	"	"	...	70	Oct. 1871	L.	...	...	Irit.	...
161	F.	Good	"	...	46	"	R.	...	...	...	...
162	M.	"	"	Glaucoma	53	"	L.	...	...	...	...
163	F.	"	"	...	49	"	R.	Loss	Cortex	...	...
164	F.	Bad	"	...	80	Nov. 1871	R.	...	Clear	Irit.	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	
...	...	Closed pupil	Perception of light only	Patient has been nervous and delicate for many years; perception of light was indifferent; lens was so glutinous that the pupil could not be cleared of cortical masses; cornea collapsed; sclera pitted on pressure. 4 days after operation purulent iritis set in, ending in a closed pupil with false membranes.
...	4	Pupil acted feebly under atropine; iris tremulous; a dull cornea; very weakly patient. Some extravasations of blood took place in anterior chamber a few days after operation; some iritis on the 14th day.
...	19	Wound was enlarged with scissors; lens was likely to sink; spoon was used; liquid vitreous escaped; slight iritis on the 4th day.
...	1	
...	1	
...	1	
...	1	Collapse of cornea after extraction.
...	...	Closed pupil	Good percep. of light	Collapse of cornea; eye did well, and patient went home 3 weeks after operation, and could see small objects well. He returned with iritis. Iris now healthy and
...	1	Right eye leucomatous. [promises well for artificial pupil.
...	1	Unsteady during operation; needle afterwards used to clear pupil of capsule.
...	1	Pupil key-shaped.
...	1	Pupil key-shaped.
...	2	
...	1	Both eyes operated upon at one sitting; patient had an attack of acute mania three days after operation, and was sent to workhouse hospital, and remained there for three weeks; no harm took place to his eyes.
...	1	
...	1	Vitreous appeared through wound on completing section.
...	6	
...	1	On 3rd day some blood observed in anterior chamber.
...	1	Slight iritis on 3rd day after operation.
...	1	
...	1	
...	14	Iritis on 9th day; pupil contracted upwards; pupil enlarged downwards, and capsule divided; needle again required to displace caps., but patient would not submit [to further interference.
...	6	
...	...	Closed pupil	Good percep. of light	Incision was enlarged by scissors; iritis began 2nd day; pupil closed; patient has not been seen again.
...	1	Needle was used to displace capsular remnants.
...	1	Operated upon for an acute attack of glaucoma seven wks. previously; right eye lost from glaucoma some years ago.
...	1	Vitreous escaped on rupturing capsule; ocular muscles contracted powerfully; eyeball collapsed.
...	...	Closed pupil	Good percep. of light	Patient a spirit drinker, bloated look; iritis began on the 3rd day. A day or two afterwards she went home and would not stay in hospital. When next seen she had no irritation in the eye, a closed pupil, and good perception of light.

No. of case.	Sex.	State of health.	Nature of cataract.	Complication.	Age.	Date of operation.	Right or left eye.	Loss of vitreous.	State of pupil immediately aft. oper.	Iritis.	Irido-choroiditis.
165	M.	Good	Ordinary hard	...	56	Oct. 1871	R.	...	Clear	Irit.	...
166	M.	"	"	...	56	Jan. 1872	L.	...	"	...	...
167	F.	"	"	Iritic adhes.	81	Nov. 1871	R.	...	"	...	...
168	F.	"	"	"	81	"	L.	...	"	...	...
169	F.	"	"	...	57	"	R.	...	"	...	...
170	F.	"	"	...	57	"	R.	...	"	...	...
171	F.	Marastic	"	...	64	"	R.	Loss	"	...	...
172	M.	Good	"	...	63	Dec. 1871	L.	...	Blood	...	...
173	F.	Marastic	"	...	61	"	R.	...	Cpsule.	...	...
174	F.	"	"	...	61	"	L.	...	"	...	...
175	M.	Weak	Retrog.	...	39	"	R.	...	"	...	...
176	M.	"	"	...	39	"	L.	Loss	"	...	Irido-chor.
177	F.	Good	Ord. hard	...	51	Feb. 1872	L.	...	"	...	...
178	M.	"	"	...	70	"	R.	...	"	...	...
179	M.	"	"	...	66	"	R.	...	"	Irit.	...
180	F.	"	"	Myop.	65	April, 1872	L.	...	Cpsule.	...	...
181	F.	"	"	...	63	June, 1872	R.	...	Clear	...	...
182	F.	"	"	...	63	"	L.	...	"	...	...
183	F.	"	"	...	52	April, 1872	R.	...	"	...	...
184	M.	"	"	...	58	"	R.	...	"	...	...
185	M.	"	"	...	58	Sept. 1872	L.	...	"	...	...
186	M.	"	Morgag.	...	60	April, 1872	L.	...	"	...	...
187	F.	Marastic	Ord. hard	...	63	"	R.	...	"	...	...
188	F.	"	"	...	63	"	L.	...	"	...	...
189	M.	Good	"	...	71	May, 1872	R.	...	"	...	...
190	M.	"	"	...	71	Sept. 1872	L.	Loss	Cortex &c.	Irit.	...
191	M.	"	"	...	48	May, 1872	R.	...	Clear	...	...
192	M.	"	"	...	43	June, 1872	R.	...	"	...	...
193	M.	"	"	...	43	"	L.	...	"	...	...
194	M.	"	"	...	54	"	L.	...	"	...	...
195	F.	"	Morgag.	...	65	July, 1872	L.	Loss	Cpsule.	...	...
196	F.	Marastic	Ordinary	...	77	June, 1872	R.	...	"	Irit.	...
197	F.	"	Morgag.	...	77	"	L.	...	"	...	...
198	F.	Good	Ordinary	...	64	Aug. 1872	R.	...	"	Irit.	...
199	M.	"	"	...	67	Sept. 1872	L.	...	Cortex & caps.	...	...
200	M.	"	"	...	65	Aug. 1872	R.	...	Clear	...	...

Panophthalmitis	Slough. cornea.	Closed pupil.	Resulting vision.	REMARKS.
...	1	Struck eye during night three days after operation and produced some iritis.
...	1	
...	1	Incision was enlarged with scissors; cataract was removed by spoon without accident; extraction in both eyes made at one sitting.
...	2	Iris was adherent to capsule all round the pupillary margin; six months after the extraction was made pupil was enlarged downwards.
...	4 } 2 }	Both eyes operated upon at one sitting.
...	1	Rheumatic subject; unsteady during the extraction; slight prolapse of iris.
...	8	
...	2 } 1 }	Both eyes operated upon at one sitting; needle used to capsule in right eye.
...	1	Collapse of cornea; both eyes operated upon at one sitting; patient was thin, badly nourished, and of weak intellect.
..	Lost }	
...	1	
...	1	
...	...	Closed pupil	Good percep. of light	Iritis on 9th day after operation; he brought on the inflammation by reading the newspaper with his good eye for 2 days before the attack; there is good perception of light.
...	1	Patient myopic $\frac{1}{4}$ th; needle afterwards used to displace capsule.
...	1 } $1\frac{2}{3}$ }	Both eyes operated upon at one sitting.
...	2	
...	1	
...	1	
...	2	Liquid cortex.
...	Supp. cornea	...	Lost }	Cornea very small; next day purulence began in wound and spread rapidly to cornea. Both eyes operated upon at one sitting.
...	1 }	
...	1	Deaf.
...	...	Closed pupil	Good percep. of light	Patient unsteady at 2nd operation; iritis commenced on the 4th day after operation; after inflammation had subsided there was very good perception of light.
...	1	Immature cataract.
...	1 } 1 }	Both eyes operated upon at one sitting; prominent eye-balls and small cornea.
...	1	Key-shaped pupil.
...	1	Vitreous escaped after excising iris; spoon at once used.
...	2 } 1 }	Incision was enlarged with scissors. Both eyes operated upon at one sitting.
...	1	Slight iritis began on 5th day; patient a rheumatic subject.
...	1	Needle was afterwards used to clear pupil.
...	$1\frac{2}{3}$	

IV.—The Morphology of Vaccine Lymph.

By P. M. BRAIDWOOD, M.D.

A DISCUSSION of the morphology of vaccine lymph is involved in much obscurity, and requires to be approached with diffidence. By the term morphology I desire to indicate the real nature of the vaccine virus, and its analogy to the virus of other epidemic and inoculable diseases. The vaccine virus is probably a germ—a living organism. Now, vaccinia is related very closely to other diseases, concerning the germ-nature of whose viruses there is no proof. At present the analogies between these diseases require us to consider them along with vaccinia; but to some of them vaccinia plays the part of substitute, while with others it holds no friendly intercourse. The morphology of vaccine lymph must be considered in the relationship of vaccinia to certain diseases met with in the lower animals, and by the changes which it undergoes in the lower animals. In the next place, this morphology of vaccine lymph requires to be examined with the light shed by the analogy of vaccinia to certain human febrile affections. Lastly, I shall endeavour to trace the nature of vaccine lymph from the study of certain viruses which are inoculable, but do not give rise to epidemic diseases. Thus it is required to distinguish the bovine origin of vaccinia, its relationship to diseases in the lower animals, its epidemic character when spontaneously generated in the bovine economy but not when introduced there by inoculation, its analogy to but not fraternity with human epidemic affections, and its inoculability, both into the lower animals and into man.

Vaccinia is a disease natural to the cow, showing its contagious qualities only when it attacks spontaneously members of the bovine species, and capable of being produced in the cow by inoculation. Moreover, the contagious form of vaccinia is distinguished from the inoculated variety by the intensity of its febrile action, both locally and on the constitution. In this quality vaccinia resembles variola, and the contagious and inoculated varieties of vaccinia are thus analogues of human variola, and of the modified smallpox induced by inoculation. Inoculated variola in man differs, however, from inoculated vaccinia in the cow by its retaining its contagious properties.

The experiments of Jenner, Loy, Viborg, Sacco, Lafosse, Ritter (of Kiel), and others, as well as the opinions expressed by Woodville, Steinbrenner, Coleman, &c., concur in proving the fact of the occurrence, among horses, of a certain epizootia—an epidemic, contagious fever; and they agree in demonstrating that the virus of this equine disease, when inoculated casually or intentionally into the human and bovine economies, produces in them an affection allied to

and resembling modified variola and vaccinia. A considerable proportion of failures have attended these inoculations with the virus of equinia, which shows that certain qualities in the lymph and certain conditions of the system are necessary to success in transferring the disease from the horse to other animals. What these qualities and these conditions are remains undetermined. This very interesting and important analogue of vaccinia has not yet been studied with the care it deserves. The natural history of equinia, the various changes this disease undergoes when transmitted through a successive series of horses, the alterations manifested by the vesicles when they appear in cows and in man, and the amount and duration of protection against variola and vaccinia afforded by equination, require still to be minutely described and depicted. Variola equinia is analogous to vaccinia, inasmuch as it is a vesicular disease developed spontaneously in horses, is transferable to cows and to men, producing in them a similar affection, and is protective against small-pox and cow-pox, at least against these diseases when inoculated. The modifications presented by inoculated equinia are, moreover, very closely allied to those of inoculated variola and inoculated vaccinia. But these three diseases are essentially different from one another when they occur spontaneously in the three different species of animals. They do not become *one identical* disease when inoculated, but they become *indissolubly allied*. The exact relationship of equinia with variola and vaccinia is best understood by a comprehension of the likeness and the dissimilarity existing between the two latter affections. All three are epidemic febrile affections belonging to the three different species of animals, being contagious and attended by a general vesicular eruption when of spontaneous origin, and producing, on inoculation, vesicles resembling one another.

Next, as regards variola ovina. This disease is a contagious fever accompanied by a vesicular eruption. Like variola and vaccinia, it has a marked period of incubation, and it attacks large numbers of individuals in succession. In the spontaneous form it is very fatal, resembling in this respect variola, and differing thus from vaccinia and equinia. Its vesicular characters also differ essentially from those of the other three allied diseases. Sacco succeeded in producing in cows and in children vaccinia, and in protecting them against the effects of variolous inoculation, by inoculating them with ovine virus. On the other hand, Marson, Ceely, and the French veterinarians, failed in their inoculations of the bovine and human species with ovine lymph. Moreover, the vesicles obtained by inoculating sheep with vaccine lymph are totally different from the vesicles characteristic of variola ovina, and dissimilar to the vesicles induced in sheep by the inoculation of ovine virus. Sheep are not protected against sheep-pox by inoculation with vaccine lymph, and

they can immediately after vaccination be successfully revaccinated. Vaccine lymph produces, seemingly, only a local action in the case of sheep. Marson's extensive series of experiments, in which he inoculated sheep with variolous matter, all failed, and proved that sheep are insusceptible of variolous inoculation. It is certain, then, that variola ovina, in its local manifestations at least, is a totally different disease from variola, vaccinia, and equinia; that variola and vaccinia cannot be imparted to sheep by inoculation; and that variolous inoculation and vaccination do not protect against the variola ovina (sheep-pox). It requires to be yet determined by experiment whether or not the vaccine disease is imparted to human beings by ovination. The variolous and the vaccine viruses produce only a local effect on sheep; and it is *probable* that the ovine virus acts reciprocally on the human and bovine species. We may, therefore, infer that, as far as our present knowledge goes, the variola ovina or sheep-pox is not analogous to smallpox, cow-pox, or horse-pox. Why certain species of animals are exempt from the influence of viruses which operate freely on other species is an unsolved problem, and one which often presents itself to the comparative pathologist.

Variola and vaccinia are, however, beyond doubt, closely allied to one another, and in endeavouring to discover the nature of vaccinia it behoves us now to compare them together. From the discovery of the protection against human variola afforded by vaccinia up till the present day, many observers have devoted time and labour to the unravelling of this mystery; and very various opinions have been expressed regarding the relationship subsisting between these two diseases, regarding the constitution of their respective viruses, and regarding the nature of the changes produced in the human economy by these two affections. When the active principle (lymph) of human variola is inserted into the human body it reproduces itself; but its effects, both constitutional and local, are modified; they present a milder type than when the disease is generated by contagion. Again, as Jenner first remarked, the effects vary according to the tissue of the body exposed to the variolic virus. Moreover, the inoculation of cows and horses with human variolous lymph produces in them a pustular disease accompanied by constitutional changes; and these effects, both local and systemic, differ essentially from those induced in these animals by their own peculiar viruses when introduced by inoculation or contagion. The active principle in all these affections is probably only one; but it becomes modified to an important extent by these six methods. These modifications are seemingly the effects of certain undetermined chemical alterations of the blood-plasma; and similar chemical influences appear to be exercised by the blood in the various tissues of the body. The successful production of a modified form of smallpox or

cow-pox in cows and horses, by exposing them to variolous contagion (as, for example, by enveloping such animals in clothes removed from a smallpox patient), and the observation that 'variola vaccinae' and 'variola equina' are most commonly met with when human variola is epidemic, indicate that the bovine and equine species are influenced by variolous *contagion* as well as human beings, though to a much more limited extent and in a very different manner. Now, if the viruses of these diseases were identical, the mere chemical constitution of the blood of these animals would not explain the modified forms thus induced. The study of the various changes produced on the human body by variolous inoculation alone shows us that, besides the effects of species and individuals, the influence of the different tissues of the same animal on this one virus is so important as to require us to acknowledge that the variolic virus generated by an animal is not the same as that which was introduced into it; that the virus inoculated is not absorbed, but generates a virus by some peculiar process in the animal economy; and that different parts of the human body prepare or modify the virus differently. This was the opinion of Jenner; and it appears to be the most feasible theory by which to explain the effects of the various species of the variolic virus when introduced by inoculation or received by contagion. "Although the skin," remarks Jenner, "adipose membrane, or mucous membranes are capable of producing the variolous virus by the stimulus given by the particles originally deposited among them, yet I am induced to conceive that each of these parts is capable of producing some variation in the qualities of the matter previous to its affecting the constitution. What else can constitute the difference between the smallpox when communicated casually, or in what has been termed the natural way, or when brought on artificially through the medium of them? After all, are the variolous particles, possessing their true specific and contagious principles, ever taken up and conveyed by the lymphatics unchanged into the blood-vessels? I imagine not. Were this the case, should we not find the blood sufficiently loaded with them in some stages of the smallpox to communicate the disease by inserting it under the cuticle, or by spreading it on the surface of an ulcer? Yet experiments have determined the impracticability of its being given in this way, although it has been proved that variolous matter, when much diluted with water and applied to the skin in the usual manner, will produce the disease."

A very interesting series of experiments, bearing on these remarks, was performed by M. Chauveau, with the object of inducing a generalised vaccine eruption in horses by injecting vaccine lymph into the lymphatics of those animals. "He inoculated four old horses by injecting some vaccine lymph into a blood-vessel, and four more by injection into a lymphatic vessel just before its entrance into a

gland. The first series of experiments (those in which the injection was into a blood-vessel) failed. But of the animals in the second series (those inoculated through the lymphatics) the inoculation succeeded in three out of the four, producing a fine eruption of vaccine, which had all the characters of the spontaneous horse-pox. One, a horse, had a full eruption, commencing at the end of eleven days, and completely developed in three or four days more, on the nostrils and lips, as well as on the hind heels; the second, a mare, injected from the preceding, had isolated vesicles disseminated over the body, except the neck and pasterns, but chiefly on the mammary region and on the lips, the eruption commencing on the eighth day, and continuing to appear up to the fourteenth; and the third, a mare, had on the twelfth day an eruption chiefly on the genital organs and the inner surface of the thighs; and virus taken from the eruption on *each* of those animals produced, it is said, regular vaccine, both on the cow and on children. M. Chauveau, in a later course of experiments, succeeded in inoculating a young colt by two injections of vaccine lymph, at intervals of two days, direct into the sanguineous system through the jugular vein, vesicles beginning to appear principally in the naso-labial region in twelve days, and continuing to appear for four days more, the lymph of which was found to produce regular vaccine, both on a child and on animals of the ox tribe. Following out still further the same idea, M. Chauveau, by injecting vaccine into a pouch formed in the subcutaneous cellular tissue on the left side of the neck of a colt, but with great care that the lymph should not touch the wounded skin, obtained no vesicle; but an eruption, commencing on the tenth day, of a few vesicles on the naso-labial region. From these results, in connection with the fact that, in nearly thirty successful inoculations of horses with vaccine lymph in the ordinary way, no general eruption followed, M. Chauveau concludes the one essential condition of a *generalised* eruption that the virus should not pass through the membrane which is the anatomical seat of the vaccine eruption."¹ M. Le Blanc, however, states that he had seen a general eruption to occur in a case in which inoculation had been performed in the ordinary way, and he proved the vaccinal character of these vesicles by successfully vaccinating from them horses and ruminants. Such inoculations succeed better in the case of young colts than in old horses. We conclude, therefore, from M. Chauveau's experiments, that lymph-plasma affords a better soil for the fertilisation of the vaccine germ than does blood-plasma. Hence, probably, it is that vaccinia pursues a more normal course in infancy and at puberty, when there

¹ "Chauveau, "Des Conditions qui président au développement de la Vaccine dite primitive," 'Bulletin de l'Acad. Imp. de Méd.,' tome xxxi; also, 'Comptes Rendus de l'Acad. des Sciences,' tome lxii, p. 1118, and tome lxiii, p. 573. Quoted by Seaton, 'Handbook of Vaccination,' pp. 31—33.

is the largest amount of lymph-plasma generated in the body; and, for the same reason, a slight abrasion or superficial incision succeeds better than a deep-wound or an ulcerating surface.

M. Depaul considers variola and vaccinia to be identical—that cow-pox is human smallpox transmitted to and modified by the cow. Human, bovine, equine, and ovine variola he believes to be one and the same disease; hence he says, “it follows that the true secret for mitigating smallpox in the human race consists in causing the disease to pass through another species of animal and in then communicating it to man by inoculation.”¹ The commission appointed by the Society of the Medical Sciences at Lyons arrived, however, at a different conclusion. M. Chauveau, in the report he published in the name of that commission, stated that “smallpox can be perfectly well communicated to the bovine species by inoculation, to which species it stands in the same relation as vaccinia to man; that is to say, that when an ox is inoculated with smallpox it is thereby made proof against cowpox, just as a vaccinated man is proof against smallpox. But a much more important practical point” (brought out by this report) “is, that *smallpox in its passage through the system of a cow is not transformed into vaccinia: it remains smallpox, and returns to the original state of smallpox, when re-introduced into the human species.*”² Some observers even believe in a mixed virus, the “vaccino-variolic” virus; that is to say, the lymph taken from the pustules on a cow which had been inoculated with smallpox.

Again, the vaccine and the variolous diseases affect the system consentaneously, and the one shows its major influence over the other only when it has obtained any priority of time. If the virus was in each instance identical, two different results would not be manifested. Moreover, the further transmission of lymph taken from such cases, if the viruses were identical, would give rise to one form of disease only; whereas experiment has proved that inoculation of either species of lymph from cases of concurrent vaccinia and variola produces the one or the other variety of disease indifferently; or, according to some observers, lymph from a vaccine vesicle surrounded by smallpox pustules produces vaccinia only, while variola is induced by the lymph from the smallpox pustules on the same individual.

But vaccinia also may run its course, and reproduce itself again. Mr. Ceely has recorded a case of a secondary eruption of perfect vaccine vesicles. Trébault has seen vaccinia pass through all its stages, and then recommence at the same spot. The method of vaccinating termed Bryce’s test is to a certain extent a reproduction of vaccinia from an early stage of vaccinia. These idiosyncrasies of

¹ Depaul:—Bulletin de l’Académie de Médecine, 1863—64, t. xxviii.

² Trouseau, ‘Lectures on Clin. Med.,’ translated by New Syd. Soc., vol. ii, p. 118.

vaccinia indicate that the pabulum which nourishes the vaccine germ is being constantly reproduced, for a limited time at all events; but that it is not always present in the human system is shown by the fact, that in most individuals vaccinia cannot be reinduced except after the lapse of an interval of time. How soon after vaccinia has run *completely* through its normal course it can be reproduced has not yet been proved by experiment; and this can be determined only by revaccinating the same individual frequently at short intervals.

The pabulum which causes the vaccine virus to multiply in and act on the system "is not anything essential to the blood," remarks Dr. Ballard, "in the sense that it is necessary to that fluid as the source of supply of nutritious matter for the tissues and organs; it is nothing essential to their well-being, for, when it is absent, as it is sometimes from the blood, the body thrives just as well without it. Still," he adds, "it is something natural to the blood, since few people exist in whom it is not present in that fluid."¹ Dr. Ballard refers the local effects of the vaccine and variolous lymphs when inoculated to nervous action. He considers this localisation to be "an arrest of the virus in the capillaries of the spots where it takes place," and that the nervous centres determine "where these spots shall be." He remarks further, that "we know that the nervous centres do thus operate in some other diseases of the skin." "Probably," continues Dr. Ballard, "the action is a reflex one, and consists in effecting some contraction of the calibre of the capillaries at the selected spots. But no amount of contraction that we conceive of would probably suffice to arrest so very minute a thing as a particle of virus, unless the latter were enlarged in some way; and it is believed to be not unlikely that this occurs by an accretion about it of some material from the blood, perhaps of fibrinous matter so as to form a little embolus, which would choke up the contracted capillary, and give thus an opportunity for the local development of the arrested particle it contains. At the spot where the virus becomes arrested it attains its complete development (if it had not attained it before), and there it generates until all the transformed material in the blood has been removed or exhausted—"eliminated," as we commonly say,—and thus the nervous phenomena which its presence in the blood occasioned cease, and the fever subsides." The differences between a general and a local eruption, which we observe in the three species of variola (human, bovine, and equine), Dr. Ballard ascribes to the quantity of the virus in the system. He thinks that if vaccine virus were injected into the lymphatics of a human being, it would be possible to induce a general vaccine eruption. But it is well known that the local insertion of even a minute quantity of

¹ Ballard, 'Essay on Vaccination,' 1868, p. 17.

variola lymph produces a more or less general eruption. This Dr. Ballard would explain by the fact that such variola lymph is of human origin, and more likely to fructify in its native soil than in a foreign soil; but vaccine lymph when inserted into a cow does not produce a general eruption, though this is its native soil. "The effect," says Dr. Ballard, "of the operation, to the full extent possible in the individual, of the virus of a febrile eruptive disease, is to exhaust the system of pabulum or material capable of transformation, so that the subsequent introduction of a second dose of virus produces and can produce no effect."

I agree with Dr. Ballard in supposing that the variola and the vaccine viruses when introduced by inoculation "exhaust the system of pabulum;" but to me it appears to be a very unphysiological explanation of the local phenomena to ascribe them to embolism and to nervous action. The length of time which elapses between the insertion of the virus and the earliest manifestations of the vaccine vesicle precludes the embolic theory. The effects of an embolus are manifested early, the effects follow soon after the cause. The more feasible and natural explanation of the local phenomena induced by variola and by vaccine inoculation appears to me to be that the germ is inserted in the inanimate state and requires a certain interval for its vivification: the life of the germ is latent and becomes animate when brought into contact with the lymph plasma. This power of reviving the dormant vitality of the vaccine germ is displayed most by youthful subjects; hence vaccination succeeds best in children, in heifers, and in colts. As vaccinia operates on the blood, it produces seemingly such changes in this fluid that the vaccine lymph, when reapplied soon after vaccinia has been *fully* developed, does not afford the germ the pabulum it desires; or, more probably, vaccinia has altered the chemical constitution of the blood, so that the germ is not reanimated by the blood.

We are enabled, by the numerous and most carefully conducted experiments which have recently been made by Dr. C. Bastian, as well as formerly by M. Pasteur, to carry our germ theory of the vaccine virus a step further. The vaccine germ is to all appearance similar to the earliest forms of vitality depicted by Dr. Bastian, and which he met with in certain solutions which he had boiled and kept in hermetically sealed flasks.¹ These most primitive forms of life Dr. Bastian observed in boiled solutions of organic matter (beef juice, carrot, turnips, &c.), and also in solutions of saline substances in distilled water. They became developed in the fluid some days after it was sealed in the flasks. M. Pasteur, moreover, found that the presence of phosphates greatly favoured the growth of fungi in certain saline solutions; we know now that vaccine lymph, when

¹ Bastian, H. C., 'The Beginnings of Life,' 1872, vol. i, p. 320 et seq.

preserved for some time in the fluid state, exhibits phosphatic crystals, and if kept longer fungous forms become developed in it.

To return, however, to the more strict examination of the morphology of vaccine lymph, it may be asked what light is thrown on the inherent qualities of vaccine lymph by the occurrence of other febrile conditions concurrently with vaccinia? Measles, varicella, pertussis, relapsing fever, and smallpox, I have met with among some of the children I have vaccinated. In some of these instances the primary vaccination did not succeed. These children were "sickenings" (to use the mother's expression) for something. They were feverish; but the revaccination of such cases was successful, and five or six days thereafter the eruption of measles or smallpox, or of chicken-pox, showed itself. Now, in the cases of measles, chicken-pox, and whooping cough, the vaccinia pursued its independent course, and so did the measles, the chicken-pox, and the whooping-cough. The two affections (say, measles and cow-pox) struggled at first, and retarded each other's development; then one of them took the lead, and the other followed. Under this head we may quote the following remarks made by Dr. Seaton:—"If vaccination has been successfully performed during the incubation of measles, but the vesicles have not reached their mature or areolar stage by the time that the disease manifests itself, it will very frequently, if not usually, be found that they will not go through that stage until such time as the measles have subsided. In such cases the areola may not be formed till a fortnight or more after vaccination, or it may not be formed at all. The same has been observed with regard to scarlatina and chicken-pox, and the early or febrile stage of whooping-cough. Jenner gives a very interesting account of two sisters, in whom scarlatina manifested on the eighth day from vaccination. In one, the vaccine vesicle remained at its maturity, but 'there was a total suspension of areola till the scarlatina had retired from the constitution;' as soon as this occurred, the areola advanced in the usual way. In the sister, the symptoms indicative of scarlatina came on severely for about twelve hours; then a rash showed itself faintly upon the face and part of the neck, but in two or three hours suddenly disappeared, and the patient was free from every complaint; it was then observed that the vesicle had the usual areola, and this continued till the fourth day, when it subsided, and scarlatina again appeared and went through its course with the common symptoms. It is not always, however," adds Dr. Seaton, "that scarlatina, or measles, or chicken-pox acts thus on the course of cow-pox or cow-pox on them; vaccination has been repeatedly seen running its course along with them," and uninfluenced by them (Seaton, *ibid.*, p. 73). I have also met with instances of measles attacking a child, and

receding on the second or third day when scarlatina has become developed; and in such instances scarlatina generally runs its course, and thereafter the measles reappears and runs its course. Ring records several instances of smallpox and measles running their course together, uninfluenced the one by the other. Now, in the case of concurrent variola and vaccinia, if both diseases obtained equal mastery of the system, each pursued its own course as far as the local phenomena were concerned, though even then the constitutional effects of the smallpox were often somewhat modified, seemingly, by the cow-pox. If, however, the smallpox had got a distinct mastery of the system before the cow-pox, it was unaffected by the latter; and the cow-pox did not exhibit its full local phenomena when the system was under the influence of the smallpox contagion. If, however, vaccinia preceded variola, it modified the latter, or altogether prevented its development. This struggle between two febrile viruses is illustrated also by comparative pathology. A medical friend informed me that during the severe epidemic of rinderpest which raged in England some years ago he vaccinated a large dairy of cows. Half of his vaccinations succeeded perfectly, the other half failed; the latter class of cows a few days later exhibited rinderpest, and a certain proportion of them died. In this instance, probably, rinderpest and vaccinia contested for the occupation of the system; and according to the priority in time of the one over the other the one or the other became developed. These observations indicate, moreover, that the viruses of these several fevers differ from one another in their nature, and that they severally operate on and multiply in different constituents of the blood. Furthermore, my experiments have assured me that lymph removed from vaccine vesicles developed in children covered with a measles or chicken-pox eruption, or from that on children suffering from whooping-cough, even if blood is removed with the vaccine lymph, does not give rise to any disease except vaccinia. Vaccine lymph produces vaccinia, and no disease but vaccinia.

Lastly, I must say a few words respecting the morphology of vaccine lymph as explained by the observation of an inoculable but not febrile disease. The disease referred to is *syphilis*. This affection can be inoculated, but it cannot be received by contagion. It requires a much longer time than cow-pox in order to obtain such a thorough possession of the system as not to be capable of being again developed when inserted. It produces constitutional as well as local effects; but its phenomena are not accompanied by fever. The active principle of this disease is probably also a germ, but its chief characteristic is its latent activity. The syphilitic virus germinates slowly in the system; but its action is most intense, affecting often every tissue and even every organ. It appears, however, to afford a life-long protection against itself.

It differs, also, from the virus of the three species of variola in not being capable of inoculation into the lower animals.

From this study of the comparative physiology and pathology of the vaccine virus, I conclude: 1. That it presents three very distinct species in human variola, in variolæ vaccinæ, and in variola equinia. 2. That the modified varieties of these species, resulting from their inoculation, or their reception by contagion, are similar but not identical. 3. That the virus of variola ovina may be allied to these three species, but that this has not been determined by the observations already made. 4. That human variola and vaccinia, probably also variola equinia, act reciprocally on one another—an attack of one of these diseases, either in the inoculated or contagious form, protects against the other two members of the species. Human variola, for example, renders inert the viruses of vaccinia and variola equinia. 5. That this substitutive or protective quality of each species of the variolous virus distinguishes this type of virus from that of other epidemic fevers. 6. That the vaccine virus is unaffected by other febrile viruses, and it exerts no influence upon them. 7. It seems to be impossible for two separate fevers to invade the system at one and the same time. If they attack the system concurrently they nullify each other's influence; and whichever virus obtains the earliest mastery of the system shows its effect first, and influences, but is not influenced by the other febrile virus. 8. The syphilitic virus more closely resembles the vaccine virus than do other febrile viruses, inasmuch as it is inoculable, and almost always affords protection against a second attack; but it differs from the variolic viruses in not being contagious under any circumstances, and in not being capable of inoculation into the lower animals. 9. The germs of human, bovine, and equine variola are not identical, but they are indissolubly allied. This variolic germ is affected by the chemical constitution of the blood in the various tissues of the same animal. 10. The vaccine germ is in a latent state, its vitality is suspended when it is introduced into the body, but life is restored to it by contact with the warm, active blood-plasma. 11. The several febrile viruses differ from one another, and operate on separate elements of the blood.

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REPORT ON OBSTETRICS, GYNÆCOLOGY, AND THE DISEASES OF CHILDREN.

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I. THE NON-PREGNANT STATE.

1. *On the Nature of the Uterine Supports.* By Dr. BUSEY.
2. *Œdematous Elongation and Prolapse of the Cervix Uteri.* By Dr. GUENIOT.
3. *On Urethral Hæmorrhoids.* By M. RICHEL.
4. *Hysterical Vomiting.* By Dr. AMANN.
5. *On Intra-Uterine Pessaries.* By Professor SPIEGELBERG.
6. *On Ante-Uterine Hæmatocele.* By Professor BRAUN.
7. *On the Subcutaneous Injection of Ergotin in Fibro-myoma of the Uterus.* By Professor HILDEBRANDT.
On the Subcutaneous Injection of Ergot in Uterine Disease. By Dr. SWIDESKI.
8. *Ovariectomy by Enucleation without Clamp, Ligature, or Cautery.* By Dr. J. F. MINER.
9. *On a new Apparatus for the Reduction of Chronic Inversion of the Uterus.* By Dr. J. BRAXTON HICKS.
10. *On the Enucleation of Uterine Fibroids.* By Dr. T. GAILLARD THOMAS.
11. *On Fibrous Tumours of the Uterus.* By Dr. GEORGE H. KIDD.
12. *On Pelvic Peritonitis and Peri-uterine Cellulitis.* By Dr. J. L. BROWN.
13. *On Uterine Inflammation subsequent to the Change of Life.* By Dr. E. J. TILT.
14. *On Uterine Disease as an Exciting Cause of Insanity.* By Dr. FORDYCE BARKER.
15. *On the Treatment of Cancer of the Uterus by the Curette.* By Dr. MUNDE.

1. The author contributes an elaborate paper on this subject, in which he considers the natural means by which the pelvic viscera are

retained *in situ*, the nature of the various forces tending to their displacement, and the mode in which they are applied. He controverts the usual theory of displacements, especially that which holds that prolapsus is usually preceded by vaginal cystocele. The arguments brought forward by him can hardly be understood, except by a reference to the paper itself; but the thesis he sets himself to prove is as follows—that “displacements find their cause in the action of new forces generated by anatomical mal-relation, or in the irregular or disturbed operation of normal forces consequent upon anatomical mal-relation; and, *per contra*, that the uterus finds its support *in situ naturali*, in forces due to normal anatomical construction and arrangement.”—*Amer. Journ. of Obstetrics*, February, 1872.

2. The author considers this disease to be comparatively frequent, being often confounded with hypertrophic elongation or pure prolapsus. Its symptoms, however, are quite distinct; hyperæmia of the organ, the peculiar disposition of the cavity (transformed into a long and open canal), the rapidity with which the various symptoms are liable to disappear and return under certain circumstances, ulceration of the os, inversion of the vagina, attenuation and flaccidity of the uterine walls, pains around the pelvis, general weakness, and disorders of nutrition being the characteristics of the disease. The causes are complex, and are anatomical or mechanical. The disease is more painful and inconvenient than dangerous to the mother; but it is highly serious to the child by producing premature labour or abortion.

The treatment suggested is to put back the prolapsed organ into the vagina, and to maintain the reduction by means of a bandage to the vulva; horizontal posture; careful abstinence from the use of pessaries; and, after delivery, prolonged observance of the recumbent position.—*Arch. Gén. de Méd.*, July, 1872.

3. Under the name of “urethral hæmorrhoids” the author describes an affection which he believes not to be of great rarity. It depends essentially on the presence of hæmorrhoidal vegetation at the opening of the urethra, accompanied with intense pain produced by the passage of the urine over the sensitive, and occasionally ulcerated growths, which, as a secondary consequence, occasions spasmodic contractions of the urethra, which is one of the characteristics of old-standing cases. Mere excision of the growths, the author believes, will not remove the contraction and hypertrophy of the urethra, which often gives rise to most painful symptoms; and in order to effect this he advises forceable dilatation of the urethra, which rarely fails to give relief.—*Gaz. des Hôp.*, June, 1872.

4. Dr. Amann, of Munich, records a case that occurred in a well-developed female, who had slight attacks of it when ten years of age, but from a fall in the water when she was about seventeen, hysteria in a most aggravated form occurred, globus and clonus hystericus, giddiness and fainting, crying and laughing, clonic convulsions of the extremities, &c., and, finally, inveterate sickness. All

remedies, solid or liquid, were returned a few minutes after being taken, and even subcutaneous injection of morphia failed to check it.

Regarding the condition as dependent upon some direct uterine cause, the author passed a sound into the uterus coated with Argent. Nit., made an incision in the external os uteri, which was very small, and applied leeches to the cervix. After about a fortnight of this treatment the symptoms gradually subsided, and the sickness became less frequent. In three weeks the cure was complete, and she was discharged shortly after. In five weeks the symptoms returned, and were again removed after a week's treatment.—*Bayer Arztl.*, Bl. xviii, 43, 1871.

5. Prof. Otto Spiegelberg is neither convinced of the necessity nor the harmlessness of the treatment of flexions by intra-uterine stems, as described by Winckel. They are only useful for cases in which the uterus is indolent and free from reaction; in those cases where the uterus is over sensitive they are dangerous; and in such cases he prefers withdrawal of blood, cold, ergot, purgatives, manual redressing, &c.

Their harmlessness may frequently be accounted for by the fact that the stem slips beyond the angle of flexion, and until it is proved that a cure cannot be effected by other means he rejects this mode of treatment.—*Arch. f. Gyn.*, iii, 1, 1871.

6. Prof. G. Braun gives the history of a fatal case in a married woman, æt. 35, where puncture by Dieulafoy's pneumatic aspirator was employed to confirm the diagnosis, which was doubtful, the swelling being elastic, smooth, and fluctuating, simulating an ovarian cyst, though the possibility of extra-uterine fœtation or malignant disease was not precluded.

Nearly a pint of dark-red thin fluid was extracted, warm water injected, and pumped out again. Fever ensued the next day, sickness and collapse followed, and the patient succumbed.

On section, a sac the size of a fœtal head was discovered on the left of the pelvis, in front of the uterus. Peritonitis seemed to account for the fatal issue. The author believes this to be the only case in which ante-uterine, intra-peritoneal hæmatocele has been diagnosed during life.

As to the cause of hæmatocele the hæmorrhage occurs, during menstruation, from the ovary or from the tubes, or at other times from rupture of a small vessel, bursting of a vein in the ovary, rupture of a varicose vein in the abdominal wall, or of the sac of a sanguineous tumour, especially in extra-uterine pregnancy.

Apart from these causes hæmorrhage may occur in the pelvis from hæmatometra, menorrhagia, retroflexion of uterus, or also from menorrhagia in anæmic and cachectic patients, and also in certain diseases, typhus, measles, scarlet fever, variola, and scorbutus.

Hæmorrhage from the uterus causing stretching of the organ and the tubes, where there is closure of the vagina or cervix uteri, may cause effusion of blood through the tubes, or it may be follicular.

Most observers hold the view that the effusion occurs most fre-

quently under the influence of the menstrual flux. French authors believe that coitus during menstruation is the most frequent cause.—*Wien. Med. Wochenschr.*, xiii, 1872.

7. Prof. Hildebrandt, in a series of nine cases of intra-uterine tumour, tried this method, and in a short time the troublesome symptoms subsided, and after long-continued treatment the tumours themselves decreased. In four the diminution was free from any doubt, and in one the tumour completely disappeared.

The author thinks it probable that partly through means of the ergot, spasm of the vessels supplying the tumour was induced, and partly through the compression which the contracting walls produced, a defective nutrition of the tumour occurred.—*Berl. Klinik. Woch.*, 1872, No. 25.

The author has found the subcutaneous injection of ergot of great value, especially in chronic metritis, certain displacements, and in metrorrhagia. In the first of these he injects it every two or three days, and even when a complete cure cannot be hoped for the leucorrhœa speedily ceases, and the uterus returns to its place.—*Gaz. Med. Wal. Lombard*, No. 4, 1872.

8. Dr. Miner proposes a novel method of dealing with ovarian tumours, which he terms *enucleation*. He says, "Recent observations have confirmed and made it, I think, certain, that ovarian tumours can be removed by *enucleation*; that is, by separation from the vessels and tissues by which they are surrounded and nourished; that it can be done without hæmorrhage, and without ligature of vessels, thus avoiding many of the dangers attending the operation, such as secondary hæmorrhage, as when large vessels have been ligatured or secured by the clamp; the *débris* of burnt tissue, as a source of peritoneal inflammation, where the cautery has been employed; the decomposition of parts strangulated beyond the ligature," &c.

No details are given of the precise number of cases treated on this plan, or their results. The method adopted has been to insert the finger firmly down upon the cyst, at the base of the pedicle, and strands or bundles of vessels are traced out to their final termination upon the walls of the cyst.

Any vessel from which hæmorrhage occurs should be twisted or have a small ligature applied, and in this way, says Dr. Miner, "*all ovarian tumours capable of removal can be*, and I am convinced *should be removed by enucleation.*"—*Amer. Jour. Med. Science*, Sept., 1872.

9. Dr. Hicks has had peculiarly shaped india-rubber bags made for the purpose of facilitating reduction in old-standing cases of inversion. The first to be introduced is a ring-shaped one, about four inches in internal diameter, and its opening about two inches, the fundus uteri passing through the ring; the pressure on the upper vagina all round, and steadies the uterus under pressure of the second bag, which is a globular one, completely filling the vagina below the ring-shaped bag. This gives support to the first bag, and,

pressing the fundus, prepares it for pressure to follow. This is effected by a vulcanite stethoscope, having a pear-shaped elastic bag drawn over the aural end, and tied tightly round the stem. This bag can be distended by an india-rubber spraying apparatus.

To apply them to a case:—The two elastic pessaries are first applied, and kept *in situ* for twenty-four hours by a T bandage. They are then removed and washed, and reintroduced for twenty-four hours more. If by these alone the uterus is not reduced the stethoscope is introduced and pressed against the fundus, a pad being placed on the ear-piece outside the vulva, and there kept in position by a T bandage.

This arrangement is removed next day. If the restoration be accomplished the end will have entered the uterine cavity; but to secure complete restoration inflate the ball on the end. The distension of the ball is intended to distend the uterus enough to allow the instrument to be withdrawn before it is wholly closed on it.—*Brit. Med. Journ.*, August 31st, 1872.

10. Dr. Thomas contributes an important paper, in which he records the history of six cases, in which he has practised the enucleation of intra-uterine fibroids, with a broad sessile base. In performing the operation he maintains that—1st. The cervix uteri should be very fully dilated with sponge tent. 2. The attachments of the tumour should be ascertained as accurately as possible. 3. The uterus must be depressed as much as possible by pressure from above, and a tenaculum fixed in the cervix, and the vagina cautiously dilated so as to admit the entire hand.

In the cases narrated the cervix, after dilatation, was cut to the vaginal junction on each side, and an incision was made through the capsule of the tumour, which was then separated from the finger as much as possible. In some of the cases the tumour was not removed, but only separated from its capsule as much as possible, its extension being subsequently effected. A solution of carbolic acid was daily injected into the uterus. All these cases recovered.

On two other cases the operation was to have been performed, but the preliminary dilation of the cervix brought on severe peritonitis, which proved fatal. Dr. Thomas considers enucleation to be a *dernier ressort*, to be employed only when the sessile nature of the tumour does not admit of its being grasped by the wire or chain of an *écraseur*.—*Amer. Journ. of Obstetrics*, May, 1872.

11. Dr. Kidd communicates an interesting paper on this subject. He adopts the usual division into subperitoneal, intra-mural, and intra-uterine tumours. He relates some interesting examples of the distress produced by mechanical pressure, also a carefully observed case in which a tumour as large as a pregnant uterus at the eighth month entirely disappeared by spontaneous absorption. He believes that the continuous use of the chloride of calcium favours cretaceous degeneration of the tumour, and gives more comfort than any other treatment he has adopted.

In intra-mural tumours accompanied by hæmorrhage he has never

had occasion to adopt such measures as incision into the capsule of the tumour, gouging, incision of the neck of the tumour, &c. In some cases he has dilated the uterus and applied nitric acid to its cavity with benefit, the tumours being checked in growth, and the hæmorrhage lessened. Palliative treatment is of great importance in these cases, and the best form is plugging. With regard to intra-uterine tumours, Dr. Kidd points out the peculiar way in which they bulge into the uterine wall opposite their point of attachment. They should be removed by the écraseur, if necessary, piecemeal, and a solid steel wire is found to be much more easy of application than the soft wire generally employed.—*Dubl. Med. Journ.*, August, 1872.

12. The author contributes an elaborate paper on this subject. He maintains that the differential diagnosis is more easily and generally made than most authors admit. In peritonitis we have displacement and fixation of the uterus, diffused hardness of the pelvic roof, and no tumour. In cellulitis we have always a tumour, generally on one side of the uterus, little or no hardness of the pelvic roof, and not much displacement or fixation.

Pain in the pelvis is more generally the result of peritonitis, pain down one thigh of cellulitis. Retraction of the thigh is almost always the result of cellulitis; suppuration is much more common in cellulitis. With regard to treatment, the author advises that the acute stage of both should be treated on general principles—*anodynes*, local depletion, fomentations, and sedatives being the chief therapeutic agents. After this stage has passed, the most efficient means of causing the absorption of the products of inflammation, for both affections, are successive fly blisters over the hypogastrium and the copious use of the vaginal douche night and morning.—*Amer. Journ. of Med. Science*, July, 1872.

13. The author contributes a paper on this subject, the substance of which is summed up as follows:

“(1) The occasional recurrence after the menopause of inflammation of the sexual mucous membranes may be safely predicted to those who have long been martyrs to inflammation of the entire womb, when they presume too much on their partly recovered strength, for I have always found this to occur whenever I have had the opportunity of watching such patients for the ten years that followed cessation.

“(2) That we may safely predict inflammation of the sexual mucous membranes in those who overtax their strength after the menopause, whenever the uterine tissues are being constantly teased by a small interstitial fibroid or a polypus, when the cervix is hypertrophied or of a fibroid consistency, and also when women are cachectic and have always one or more of these mucous membranes in a diseased condition.”—*Brit. Med. Journ.*, Sept. 21st, 1872.

14. The author calls special attention to the frequency of insanity in females arising from disease of the sexual organs, such as dys-

menorrhœa, amenorrhœa, menorrhagia, uterine and ovarian displacements, inflammation and organic affections of these organs, and the new relations, mental and physical, resulting from marriage and from the change of life.—*Journ. of Gyn. Soc. of Boston*, May, 1872.

15. Dr. Munde advocates the removal of as much as possible of the cancerous structure by the curette, as used by Professor Simon, of Heidelberg. The instruments used are oval scoops, with moderately sharp edges and slender stems. By these diseased structures can be easily and effectually removed where caustics are inapplicable. The loss of blood is said to be inconsiderable, and the pain slight. The operation has been performed in sixteen cases by Simon and in three by Munde with great benefit. Wherever there are loose cancerous granulations, fungoid excrescences, or the proliferating papillæ of vegetating epithelioma, from which the exhausting hæmorrhage and discharge come, wherever the cancerous deposits have proceeded so far in the normal tissue, and are so extensive as to be beyond the control of knife or caustics, there the use of the scoop is indicated, and there its beneficial effects will be most felt. The danger of the operation is very slight, the pain is hardly worth mentioning, the cancerous substance is more thoroughly, safely, and easily removed than by means of the knife or caustics, and the return of the disease much less rapid.—*Amer. Journ. of Obstet.*, Aug., 1872.

II.—PREGNANCY.

1. *Examination of the Quantity of Blood in Pregnant Bitches.* By Drs. SPIEGELBERG and GOSCHEIDLEN.
2. *Prediction of the Sex in Utero.* By Dr. T. J. HUTTON.
3. *Absence of the Uterus after repeated Pregnancies.* By Mr. WHITEHEAD.
4. *On the Treatment of Hæmorrhoids in Pregnant and Puerperal Women.* By Dr. FORDYCE BARKER.

1. Prof. Otto Spiegelberg and Dr. Richard Goscheidlen contribute an interesting article, *apropos* of the former's paper on complications of pregnancy with chronic heart disease in a previous number. They give a series of careful observations in the unimpregnated as well as in pregnant bitches, comparing the percentage of blood to the body weight in both, from which they draw the following conclusions:

(1) The quantity of blood increases in pregnancy, but only in the latter part, after about the middle.

(2) The hæmoglobin contents of the blood vary within certain limits, depending on the maintenance of the animals.

(3) The increase of the watery constituents appears generally to be insignificant.—*Arch. f. Gyn.*, iv, 1, 1872.

2. Prof. Carlo Massarenti, in a paper on this subject, concludes that the position of the fœtus must be determined by palpation and vaginal examination, and that, without these, the auscultation of the heart-sounds is quite untrustworthy, these being heard in the normal situation in cases of transverse presentations, unusual doubling up of the fœtus, and where the head is abnormally high, as in contraction of the brim.—*Rev. Clin.*, ix, 8, 238, 1870.

The author lays down the following rules as the results of his observation: Fœtal pulsations, heard below a horizontal line dividing the uterus into two equal parts, denote vertex presentations; above it breech presentation; below the line and to the left, first position; below it and to the right, second position. When the fœtal pulsations number 144 per minute it is a female; 124 per minute male. Variations of six beats per minute from 124 upwards, or from 144 downwards, will not endanger a diagnosis, provided auscultation be practised in the ninth month of pregnancy.—*New York Med. Jour.*, July, 1872.

3. The patient in Mr. Whitehead's case had borne four children. On the last occasion there had been severe post-partum hæmorrhage. For two weeks afterwards there was a peculiar brownish watery discharge, different from the ordinary lochia. Convalescence was so protracted that for eighteen weeks she was unable to stand. From that time, although only twenty-eight years of age, the menstruation entirely ceased. On vaginal examination no trace of a uterus could be detected, and although every means of exploration was used none could be found, either by Mr. Whitehead or various other medical men by whom she was examined. The author believes that in this case the destruction of the uterus was not due to any inflammatory mischief, but to the fact that while the ordinary process of involution had proceeded to the usual extent, the subsequent reconstruction of the uterus had not taken place in consequence of the generally debilitated state of the system. He likens the event in this case to the spontaneous absorption of uterine fibroids.—*Brit. Med. Jour.*, Oct., 1872.

4. The indications in treating hæmorrhoids are stated to be to counteract the constipation or diarrhœa which accompanies them, and to stimulate and restore the tonicity of the hæmorrhoidal veins. For this Dr. Barker believes aloe to be the best remedy, and he has tried it for many years. It is generally given in doses of gr. j, morning and evening, or less, combined with a little hyoscyamus or belladonna in the last weeks of pregnancy, and sulphate of iron if the patient is anæmic. When there is an irritable rectum and frequent thin, teasing evacuations, opium should be substituted for the hyoscyamus, and less aloe given.—*Boston Journ.*

III.—LABOUR AND THE PUERPERAL STATE.

1. *The Induction of Premature Labour by Kiwisch's Method.* By Dr. KLEINWAECHTER.
2. *Impeded Labour through Enlargement of the Ureters of the Fœtus.* By Dr. AHLFELD.
3. *On Irregular Uterine Contractions.* By Dr. TRENHOLME.
4. *On a Simple Mode of Delivery in Impacted Shoulder Presentations.* By X. Y. Z.
5. *On Spendylotomy.* By Drs. AFFLECK and ANGUS MACDONALD.
6. *Case of Double Monstrosity.* By Mr. WASDALE WATSON.
7. *Case of United Twins.* By Dr. GINÉ.
8. *Case of Gastrotony in Extra-Uterine Fœtation.* By Mr. ADAMS (Brazil).
9. *Gastrotony after Rupture of the Uterus.* By Dr. FENARIS.
10. *On the Cæsarean Section in the United States.* By Dr. HARRIS.
11. *Puerperal Diseases Treated by Turpentine.* By Dr. COPEMAN.
12. *On the Causation of Puerperal Albuminaria.* By M. AUGUSTUS OLIVIER.
13. *On the Treatment of Para-metritis Puerperalis with Hydrarg. Perchlorid.* By Dr. P. GOSSMAN.
14. *On the Lymphatics of the Uterus and Uterine Lymphangitis.* By Dr. S. LUCAS-CHAMPONIERE.
15. *On the Elimination of the Puerperal Poison.* By M. HERVIEUX.
16. *A Case of Pulmonary Embolism.* By Dr. J. P. ATKINSON.

1. Dr. L. Kleinwaechter doubts the certainty and freedom from danger of this method, and even limits its use as a preparatory method within a narrow circle.

Occasionally after a single, frequently after repeated use of the douche, without any assignable cause other than from the operation, severe rigors, with or without sickness, intense pain in the abdomen, increased temperature and pulse, and severe peritonitis ensued, either before or during the labour.

In some cases the pains remained weak, but painful, in others the severe pain delayed the labour and increased the peritonitis. Out of five women in whom during the last three years, the method was employed, one died undelivered, two in the lying-in, and only two recovered, they not having previously been ill.

The death of the fœtus is more likely to occur, if weakly, from the length of the labour, the roomy disproportion of the pelvis, &c.—*Prag. Vjhrschr*, cxiii, 1872.

2. Dr. Ahlfeld relates the particulars of a case where, from distension of the abdomen of the fœtus, parturition was delayed. The child, a male, was born living, but on the third day blood and urine escaped from the navel, and the child died within forty-eight hours.

On examination both ureters were found to be enormously distended, the pelvis of the kidneys being also enlarged and the kidney tissue atrophied. The bladder was also much distended and the urachus patent up to the navel.—*Arch. für Gyn.*, iv, 1, 1872.

3. The author contends that the painful and irregular contractions of the uterus, which so often retard the first stage of labour, are due to adhesions between the opposed surfaces of the uterus and of the decidua which act either mechanically by preventing the protrusion of the membranes, or by producing undue and unequal tension of the muscular fibres at or near the point of adhesion. He proposes to treat these cases by mechanically separating the membranes round the circle of the os uteri as far as the fingers will reach, or if the adhesions are beyond the reach of the finger by rupturing the membranes at once.

When this is done the os will readily dilate, and the irregular and ineffective pains become strong and steady. Several interesting cases are given in illustration.—*Obst. Soc.*, July, 1872.

4. The author has frequently practised the expedient of amputating the prolapsed arm close to the shoulder. This, he maintains, so lessens the bulk of the child as to render version, previously impossible, of easy performance. He believes this plan to be simpler and safer than either decapitation or evisceration.—*Edin. Med. Journ.*, Oct., 1872.

5. The authors record a case of impacted shoulder presentation in a deformed pelvis, in which they found it impossible to effect delivery. Eventually the spinal column was divided by a pair of strong scissors, and delivery was then easily completed.

He speaks very highly of the facility with which the operation was completed, and believes this method to be superior to either evisceration or decapitation.—*Ibid.*, July, 1872.

6. Mr. Watson describes an interesting case of double monstrosity born at Newport, Mon. The children were fully developed to about the centre of the body, where they coalesced without any mark or indentation.

The labour was not difficult, the head of one fœtus presenting, the second being born with the head last.

One of the conjoined twins died in six hours; breathing and heart-beating stopped, and the body of the twin was cold and livid for six hours. Twenty-six hours afterwards the second half succumbed, and then a strange phenomenon occurred. Its nervous force seemed to become communicated to the twin that seemed to have first died: its livid hue passed away, it breathed regularly for twenty minutes, and cried loudly.—*Med. Times and Gaz.*, July 27th, 1872.

[This case is of peculiar interest, not only on account of the strange physiological phenomenon presented by the temporary resuscitation of one of the twins after its apparent death, but because of the rarity of the mode of junction. Out of thirty-three cases of

double monstrosity collected by the reporter ('Obstet. Trans.,' vol. viii), in which an account of the delivery was obtained, none were joined together in the peculiar way in which these children were. The comparative ease of delivery was doubtless owing to the axes of the bodies of the twins being identical, as in the class in which two separate bodies were joined by the vertex, of which two births are recorded.—W. S. P.]

7. In this case the heads were united by the occipital bones. The foot of one child presented, and the hand of the second followed. There was no great difficulty in the labour.—*Independencia Medical and Med. Press and Circular*.

8. An interesting case of gastrotomy for extra-uterine foetation is reported. The patient had been pregnant for nine months. She was in a state of extreme prostration, and greatly emaciated, and there was a fistulous opening near the umbilicus, from which a highly offensive discharge, mixed with fæcal matter, passed.

Gastrotomy was performed, the child being found enveloped in a strong adventitious fibrous sac, everywhere firmly adherent. The large intestines communicated in three places with the sac, and they were enveloped in strong false membranes. A putrid foetus was removed. The patient completely recovered.—*Gaz. Med. de Paris*, August, 1872.

9. The author adds another to the numerous instances now recorded in which gastrotomy, performed after rupture of the uterus, when the child had escaped into the cavity of the abdomen, proved successful. In this remarkable case the operation was performed four days after the accident, and in spite of very severe constitutional symptoms.—*Bull. de Therap.*, August, 1872.

10. The author contributes a valuable paper relating the particulars of all the cases of the Cæsarean section performed in the United States of which he has been able to obtain reliable accounts. He tabulates 59 cases, of which he has had full particulars. Of these 52 per cent. recovered, and 48 per cent. died. The colour of the women was noted in 57 cases, of which 30 were whites and 27 blacks. Of the former 15 recovered and 15 died; of the latter 15 recovered and 12 died. Dr. Harris insists, as many other writers have done, upon the injurious effects of long delay in performing the operation, and shows that in 17 of the cases in which the Cæsarean section was resorted to within twenty-four hours of the commencement of labour, and when the patients were not exhausted, the results were much more favorable. Of these 17, 12 or 13 (10·13 per cent.) recovered.

The comparative results of the operations in the two countries were as follows:

Great Britain and Ireland.—Cases, 106 :	Fatal, 88.	Children lived, 60.
United States	60 :	28. 27.

American Journ. of Obstet., 1872.

11. The author relates several cases in which symptoms of puerperal

septic diseases were greatly benefited by this remedy. It was given in doses of from half a drachm to one drachm every four hours, and locally as stupes. The relief obtained was in some cases very remarkable.—*Med. Times and Gaz.*, July 6th, 1872.

12. The author rejects the ordinary theories which explain the frequency of albuminuria in the puerperal state, and maintains that it is probably due to sympathetic disorder of the kidney resulting from pregnancy, similar to the disorders observed in the organs of circulation and nutrition, as shown by the physiological hypertrophy of the heart and other organs thus observed. Under this species of irritation a more or less congested state of the kidney is produced, often producing the presence of albumen in the urine. This may disappear after delivery, leaving no trace behind, or, in exceptional cases, it may persist, and lapse into confirmed Bright's disease.—*Gaz. Méd. de Paris*, August, 1872.

13. Dr. P. Gossman states that during an epidemic of this disorder, in Spiegelberg's Clinic, at Breslau, during the winter of 1871-2, many cases were observed in which bleeding, cataplasms, and sublimate pills (about one seventh of a grain dose every one or two hours for twenty-four to forty hours) were employed. Decline of the fever and diminution of the exudation took place always very rapidly, especially when the mischief had begun in the first few days following parturition; if later, somewhat longer. Some cases in which, for comparison, no sublimate was given disappeared more slowly.—*Berl. Klin. Woch.*, 1872, No. 34.

14. The author has contributed an elaborate paper on this subject to the Soc. Méd. d'Emulation. The author maintains that the lymphatics of the uterus play a much more important part in puerperal diseases than has been generally supposed. He points out that there is a well-developed lymphatic plexus with ganglia on each side of the uterus, immediately above the lateral vaginal *cul-de-sac*. He believes that puerperal peritonitis originates in inflammation of these vessels. He affirms that he has proved the existence of these inflammations in a large number of autopsies, and that the peritonitis always starts from them.—*L'Union Médicale*, October, 1872.

15. The author notes that there are numerous channels by which the puerperal poison may be eliminated. One of the most important is the gastro-intestinal tract, and he has seen many cases in which threatening symptoms have disappeared after spontaneous vomiting or diarrhœa. Then comes the lochia, the fœtidity and quantity of which often act as a safety-valve for the patient. Thus we have the surface of the skin.

In addition there are occasionally artificial channels, such as periphæric abscesses. These, he maintains, are often not merely local affections, but the effort of the system to afford an exit to morbid matter present in the system.

With regard to treatment he has found emetics and purgatives,

and more rarely bleeding and blisters, of great service in arresting the progress of threatening puerperal symptoms.

16. The case recorded is that of a patient in her ninth month of pregnancy, who was suddenly attacked with intense dyspnoea without any apparent cause. The respirations were seventy-five; the pulse was so rapid and quick that it could with difficulty be felt, and I could not count it; her countenance was expressive of the greatest anxiety with a good deal of lividity; extremities and surface cold; intellect clear. Three days afterwards a bruit was heard in the cardiac region, but its precise seat and relation were not made out. For several days there were occasional paroxysms of dyspnoea. Eventually the patient recovered, and treatment was discontinued about five weeks from the date of the first attack.—*Lancet*, Sept. 4th, 1872.

[This case is of interest as illustrating the possibility of recovery from pulmonary obstruction in connection with the puerperal state. The reporter has narrated several cases of the same sort ('*Obst. Trans.*, vol. x), and has attempted to show that they are probably more common than is generally supposed, and that pulmonary obstruction is not of necessity fatal. The symptoms in this case are too distinct to admit of much doubt on the matter. They are precisely the same as in the reporter's cases, including the cardiac bruit, and it would be difficult to explain them on any other hypothesis. It will be observed that the author has made the common mistake of confounding "thrombosis" and "embolism." There is not the slightest evidence that this was a case of true embolism, and it is much more probable that the obstruction arose *in situ*.—W. S. P.]

IV.—DISEASES OF CHILDREN.

1. *Case of Spina bifida cured by Injection.* By Dr. JENNER MORTON.
2. *On Deposits of Urates in the Kidney of New-born Infants.* By Dr. J. PARROT.
3. *On the Physiological Dyspepsia for Starchy Food in Infants.* By PROSPERO JONSINO.
4. *On Uræmic Nervous Disorders in the New-born Infant.* By M. J. PARROT.
5. *On Thoracentesis in the Empyema of Children.* By M. ROGER.
6. *On the Treatment of Scabies in Children.* By Dr. MONTI.
7. *On Retro-pharyngeal Abscess in Young Children.* By Professor ABELIN.
8. *On the Recognition of Simple Primary Meningitis.* By Dr. ROSENSTEIN.

1. The author relates a second case cured by tapping and the injection of a solution of iodine in glycerine. The tumour, situated in the lumbar region, was tapped twice, at intervals of a few

days, and about two ounces of the cerebro-spinal fluid was allowed to exude. The aperture was closed with collodion to prevent the exudation of more fluid, and on this precaution he lays great stress. On a third occasion the iodine solution was slowly injected. After this, as in the former case, similarly treated, the tumour contracted, and a complete cure was effected. — *Brit. Med. Journ.*, June, 1872.

2. Dr. Parrot disputes the opinion of Virchow and other authorities; that the deposits frequently found in the kidneys of new-born infants are normal, and physiological occurrences unconnected with any morbid state.

The author maintains that their presence indicates a deficiency of the watery element in the organism of the new-born child, and the circulation in the blood of an undue amount of unoxidized protein compounds. These conditions are speedily observed in cases of sclerema, when this phenomena in the kidneys generally occurs.— *Union Méd.*, May and June, 1872.

3. The author contributes an important paper on the dietetics of infancy, in which he contends that "in the early life of men, probably with the beginning of dentition, infants offer a true physiological dyspepsia for starchy aliments caused by the inactivity of one at least—probably of all—the humours that concur in the digestion of these aliments." The author refers to the experiments of Bidder and Schiff to prove that the saliva in man, and in most of the lower animals, does not possess the power of digesting starchy matters until some time after birth. Dr. Jonsino performed a careful series of experiments, which demonstrated the same fact with regard to the pancreatic juices. For these reasons he contends that starchy matters should be entirely excluded from the diet of infants until after the commencement of the first dentition.— *Practitioner*, September, 1872.

4. The author, in an elaborate paper, discusses the nervous disorders occurring in new-born children in which no distinct lesion of the nervous centres would account for the phenomena observed during life. In almost all cases certain marked indications of gastro-intestinal derangement preceded the nervous symptoms, resulting generally from defective alimentation and impure atmosphere. Coma is the most frequent nervous phenomenon, although it often passes unperceived. Next follow convulsions, seldom general, and often tonic in their character.

On post-mortem examination numerous morbid conditions were found, most important amongst which were those of the blood and of the kidneys. The affection of the kidneys he considers to be of primary importance, and the alteration in the blood resulting from the presence of excrementitious matters not eliminated by the urine he believes to be the proximate cause of the convulsions.

In the second portion of his paper he shows that the trismus of infants has only a superficial resemblance to the tetanus of

adults, and that it is a true form of eclampsia depending on uræmia.—*Arch. Gen. de Med.*

5. The author does not believe in the possibility of the spontaneous cure of empyema in children, and considers the evacuation of the pus indispensable. He lays down the following rules for its treatment:

(1.) In acute cases, with a considerable amount of effusion, operation should be had recourse to as soon as we are convinced that pus is present in the pleura. At first aspiration, with or without washing out of the pleural cavity, may be tried; but if the pleura refills rapidly, a pleural fistula should be immediately formed to give a continuous exit to the pus, which may best be done by placing a silver canula in the pleural cavity, through which injections should be made from time to time, until no more pus is formed.

(2.) In chronic empyema the same course should be adopted, and hence he believes aspiration to be useless.

(3.) In serous pleurisy he believes thoracentesis is generally unnecessary, and spontaneous cure almost certain to occur.—*Arch. Gen de Med.*, August, 1872.

6. Dr. Alois Monti, knowing by experiment that *Copaiva balsam* kills the itch insect, tried it in cases in children.

After previous washing, it is rubbed in two or three times a day, producing severe redness, which passes off in half an hour. The itching usually ceased after the first inunction, the irritation of the skin diminished and disappeared entirely after three to four inunctions.

The cure was in every case complete. The duration of the treatment varied between two to twelve days.

It is cheaper than Peruvian balsam, has a pleasant smell, does not soil the linen, and is, especially for infants, preferable to sulphur.

CARBOLIC ACID, in solution, fifty-six grains to the pound of water; or, as ointment, fifty-six grains to four ounces of simple ointment.

After first cleansing the skin use it as a wash, or inunction, or, in scabies purulenta, as a poultice.

It produces redness and slight burning which soon disappears. In all the cases so treated complete cure was effected, generally after six to nine inunctions, within two to four days; if eczema exist with it, it is generally longer, about twelve days.

The author never observed poisoning, it produces no eczema, is very convenient and less costly even than Canada or Peruvian balsam, and has the advantage over styrax that the linen is cleansed and disinfected.—*Jahrb. f. Kinderh., U. F.*, iv, 1871.

7. Prof. H. J. Abelin, in an able and lengthy paper, states that retro-pharyngeal abscesses often occur in young children, but are overlooked or mistaken. He thinks that too little notice is taken of the subject in works on diseases of children. Of the two different forms, (1) in consequence of inflammation and necrosis of the ver-

tebræ or their cartilaginous or ligamentous apparatus, or (2) in consequence of inflammation of the cellular tissue between the posterior wall of the pharynx and vertebral column, it is generally the latter which happens in children, and, indeed, under very varying forms, in reference to size and extent. It is either confined within narrow limits to the posterior wall of the pharynx, or extends downwards on both sides of the œsophagus, bursting sometimes outwardly. It arises secondarily from adenitis and acute exanthematous fever, especially scarlet fever.

Whether this form attacks by preference scrofulous children, as some suppose, the author cannot state. In the early months it is difficult to determine whether a child is scrofulous, because this disease is wont to appear generally later under a distinct form.

The symptoms vary, namely, in (relation to) their acuteness very markedly; either the disease comes on masked and insidiously, and pursues a long course, or it comes on suddenly and violently from the commencement, with fever, disturbed sleep, a peculiar cough, not unlike hooping-cough, and runs a rapid course. The more significant appearances of the malady are dysphagia, dyspnœa, change of the voice, hissing or whistling noise on inspiration, and inability to move the head without pain.

It is worthy of notice that the symptoms do not always increase without interruption, but often well-marked remissions occur.

Convulsions are only an accidental complication.

In every case where the dysphagia and dyspnœa exist a local examination with the finger should be made. Protrusion of the abscess between the tonsils the author has never observed, and believes the occurrence to be rare.

Confounding it with croup, catarrhal laryngitis, œdema of glottis, or other diseases, is, according to the author, certainly not rare; the mistake will, however, mostly be proved only in case of the bursting of the abscess, or by the post-mortem.

The prognosis as well as the diagnosis, if proper treatment be pursued, is tolerably favorable; if the disease, on the contrary, be left to itself, death is unavoidable, when a spontaneous opening of the abscess does not occur, but in these cases also it may happen that death by suffocation may be produced by discharge of the abscess into the air passages. Secondary lung complications increase the unfavorable prognosis. The opening of the abscess, simple as it may appear, is not always easy, being sometimes even attended with danger.

Apart from the difficulty of reaching the abscess, danger of suffocation may also be induced by discharge of the abscess downwards, and the author himself saw one case in which death followed momentarily. This disaster may be prevented by the use of the trocar and attended by rapid bending of the head downwards.

He narrates five cases, four of which proved fatal; one was opened by the trocar, and recovered.—*Nord. Med. Ark.*, iii, 4, 1871.

8. Dr. Rosenstein, from six well observed cases, concludes that

the fever stands in direct relation to the spread of the affection. The temperature is early very high, the fever is continuous. The frequency of the pulse rises and falls with the temperature, but is, in proportion to its height, relatively small.

The author especially lays stress on the almost constant presence of albuminuria, with or without mixture of casts, in the urine. Probably this may be ascribed to the abnormally high temperature, as occurs in other febrile disorders.

Hyperæsthesia of the skin of the trunk and extremities showed itself—that of the face remaining free in all cases, as in spinal meningitis. Headache and delirium, mostly maniacal, were present in all the cases. Trembling of the hands as well as slight shaking of the upper extremities were observed. Beyond twitching of the neck, contractions were not perceived. Especially worthy of notice, was a case of a child which died of cerebro-meningitis, as proved by post-mortem, where vomiting in the early stage of the disease, and especially convulsions, were not observed, these symptoms distinguishing cerebro-meningitis of children from that of adults.—*Berl. Klin. Woch.*, 1872, No. 29.

REPORT ON TOXICOLOGY, FORENSIC MEDICINE, AND HYGIÈNE.

BY BENJAMIN W. RICHARDSON, M.D., F.R.S.

Toxicological Action of Atropa Mandragora.—In the earliest part of the fourth century of the present era, Dioscorides described the atropa mandragora as a therapeutical agent. “A draught,” he says, may be made from the root of this substance, which, being taken by the patient about to undergo a surgical operation will produce deep sleep, so that the operation may be performed during the sleep without exciting pain.” Later on, in history, Pliny describes the same fact, and supplies a form for such a draught as Dioscorides names. For many centuries after this the atropa mandragora was employed as a general anæsthetic, and the poets and historians, not less than the physicians, descanted upon its potent efficacy.

Dioscorides refers also to a compound containing mandragora, which he calls morion. A drachm of this substance, taken as a draught or eaten in a cake or other food, causes infatuation, and takes away the use of the reason; the person sleeps in the attitude in which he ate for three or four hours afterwards without sense. Pliny states that the juice of the leaves is more powerful than the preparations made from the root, and that some persons even die from taking a considerable dose.

Until the close of the twelfth century mandragora continued to be in use in the form of wine. The wine made from it was called "Mandragorites," and persons who took of it were called mandrakes. It was said that during recovery from a surfeit with this wine there was wildness of the senses and fear; hence the origin of the saying "shrieking like mandrakes."

The employment of mandragora seems to have ceased with the revival of letters, and, as far as we knew, its action has not since been studied at all until the present time. We have ourselves revived this study in some recent researches, and we herewith present to our readers those parts of this most interesting topic, that relate to the toxicological action of mandragora.

For the first specimen of the root of the plant we were indebted to Mr. Daniel Hanbury, F.R.S. We cut up the root into very small parts, and essayed to make a tincture from it, with absolute alcohol. The product was so negative in its action, we were inclined at first to believe either that the root we had obtained was not true mandrake, or that all the old stories were fables. In this belief we were wrong—the error lay in our own preparation. The active principle of mandragora is most soluble in water, as is also the active principle of atropa belladonna. The ancients seem to have known this fact, for they made an infusion or decoction of mandrake, and afterwards added wine, by which the decoction was simply preserved. Recognising a possible source of error, we made a weak tincture, using only one sixth of alcohol, and letting the root, in fine powder, macerate for four weeks. The product in this case was found to possess the most active properties, properties faithfully represented by the ancients in their observations.

The tincture of mandragora may be administered either by the mouth or by subcutaneous injection, and the active principle is absorbed with great rapidity; the effects produced are those of narcotism, dilatation of the pupil, paralysis of motion and sensation, excitement during the stage of recovery, if the dose be not fatal, and sleep, and paralysis if the dose be too potent. The action extends to all classes of animals, but the dose required to induce the same effects in different classes of animals varies. In full-grown pigeons so small a quantity as five minims of a good tincture is sufficient to produce effects if the fluid be administered hypodermically. The first symptom is that of drowsiness, which soon passes into deep sleep. The sleep may last from half an hour to an hour, broken by short and peculiar paroxysms, not of waking, but of excitement, as if from a disturbed dream. The excitement may continue for several seconds, when the animal will fall back again into sleep. Recovery takes place with a successive series of these sleepings and excited awakenings, and, finally, there is always some wakeful excitement, lasting for so long as an hour, with flapping of the wings and imperfect efforts to fly. In rabbits the dose required to produce an effect must be very large by comparison; three fluid drachms, for instance, may be taken by a full-grown rabbit without danger. In these animals mandrake induces very gentle sleep, which may extend over an hour,

the awakening being attended by some degree of excitement and wandering of movement.

When in the two classes of animals named above the dose of mandragora is carried to the extent of producing fatal effects the mode of death is by continued narcotism and by failure of respiratory power. The paralysis of all the voluntary muscles is complete, and the pupil is widely dilated, showing that the paralysis has extended to the involuntary muscular fibre. The heart, nevertheless, continues in action longer than any other part, and, indeed, is found to be pulsating after the respiration has for many minutes ceased; in one instance, in the rabbit, the heart remained seven minutes in action after the perfect failure of respiration. The cause of ultimate cessation of the breathing is peculiar; the failure is not primarily due to failure of the nervous power, but to obstruction from excessive accumulation of secretion in the bronchial passages. Under the resistance thus induced the respiratory muscles flag and finally cease action. The muscular irritability of the voluntary muscles is little impaired by mandragora. We succeeded in exciting action in the muscles by a gentle electro-magnetic current so long as an hour after death. Hence the action of mandragora would appear to be purely upon the nervous centres.

The influence of mandragora upon the human subject is physiologically well marked. When the tincture is applied to the tongue it produces a sensation of numbness, which lasts for several minutes. It communicates also a singular taste and sensation of acidity and dryness, which lasts for several days. In doses not sufficient to produce actual narcotism the symptoms induced are, desire for sleep, a sense of fulness in the vessels of the head, a peculiarly enlarged and confused vision, an exaggeration of sounds and noises, an inaction of bowels, with white hard fæces when the bowels are induced to act, and with a singular restless, nervous excitability, closely akin to hysteria. These symptoms are not actually removed for two days, and they leave a lingering uneasiness and a coldness still longer.

There are yet many new facts to be learned respecting this old medicine and poison, mandragora. We have still to separate its active principle and to determine the relations of that body to atropine. Two facts are, however, now certain in regard to it, one historical, the other physiological. The historical fact is, that many of the old and discredited statements on the influence of mandragora are perfectly credible. The physiological fact is, that the active principle of mandrake is a narcotic, possessing, when carried to an undue extent, poisonous properties, and that its action is to paralyse the nervous centres that exert a controlling or resistant influence on the minute vascular circulation.—*From a Report on the Physiological Action of Organic Chemical Compounds, read before the British Association for the Advancement of Science at Brighton, 1872.*

Local Action of Crude Paraffin.—Dr. Alexander Ogston records that the Messrs. Miller's Chemical Works at Aberdeen have afforded

the opportunity for collecting the following information concerning the appearances produced on the skin of those engaged in the manufacture of paraffin.

The workmen engaged in this manufacture have the skin over portions of their bodies, more especially of the hands and arms, but also of the feet and legs, brought daily for many hours at a time into contact with the paraffin shale, and with the oily matters mixed up with it, the result being an eruption of nodules and pimples on the skin so exposed, speedily breaking out on those who are for the first time engaged in it, lasting for a few weeks or months, and then generally diminishing or disappearing. In a few exceptional individuals the eruption does not disappear, but, assuming a chronic character, produces so marked and prolonged an affection of the skin that the general health becomes impaired, and the cessation of this employment becomes a necessity. The appearances differ in the two classes of cases, acute and chronic, and, while the essential alterations in the skin remains the same, the presence of inflammatory action in the acute, and its absence in the chronic forms, leads to a marked distinction between the two, and admits of their being separately described.

In the *acute* form of the eruption, which soon appears in those exposed to the influences of crude paraffin, the skin of the hands, wrists, arms, feet, and legs becomes covered with a rash of bright red nodules, closely approximate to each other, and usually largest and most numerous on the wrists, or wherever the dress tightly embraces the skin; the dorsal aspects of the parts being most severely affected, and the palms of the hands and soles of the feet enjoying a complete immunity. Similar nodules arise, though to a less extent, on the the face, neck, and other parts of the body to which the oily matters find access.

On examining minutely the skin of those affected in this way, the following are the leading peculiarities of the eruption:—The bright red nodules, hard to the touch, tender on pressure, varying little in size, which is about equal to that of a grain of barley, are of a rounded form, and consist each of a single hair-follicle with the parts immediately surrounding it, which are inflamed, indurated, and reddened. The hair emerges from the very summit of the nodule, and the orifice of the hair-follicle is much enlarged and easily visible to the naked eye as an aperture of a magnitude similar to that of a pin-hole in a card. The dilatation extends to the deeper part of the follicle, which forms the kernel of the inflamed knot, the retention of its contents evidently contributing to the inflammatory induration around. The gaping mouth of the follicle exhibits masses of cast-off epithelial scales, dry and friable instead of greasy and tenacious; the nodule has little of the tendency to run on to suppuration observable in an ordinary *comedo*, and its contents cannot be squeezed out. On the contrary, the redness and induration, after remaining for some little time, gradually diminish, and finally disappear, leaving the hair-follicle enlarged, and its mouth gaping so as to exhibit the retained epithelial masses, these latter

being rendered more distinct by continued retention and accumulation of dirt. In fact, the *acute* form of the eruption consists of successive crops of these nodules, which are thus at the same time seen in all stages of their growth, full development, and subsidence; while the skin between them, studded with the black gaping mouths of such follicles as have already passed through or are about to undergo the process, retains, contrary to what is observed in the chronic form of the malady, its natural pliancy and elasticity.

In all paraffin-workers patency and enlargement of the hair-follicles continue to some extent so long as they are engaged in this manufacture, and the black dots in the skin of their hand and face strike the eye of the observer at once; men with dark complexions and strong hair being especially deformed in this way, while fair complexions and light or reddish hair escape comparatively unaffected.

A few exceptional individuals, with swarthy complexions and hairy skins, suffer so much from an exaggerated patency of the follicles that they are compelled to quit their occupation and seek a more suitable calling. When the disease assumes this *chronic* form it exhibits the following characteristics:—The backs of the feet and toes, the dorsum of the hand, and the backs of the fingers between, but not over, the joints, exhibit a peculiar honeycombed appearance of the skin, which is elevated, thickened, and inelastic, so as to prevent or render difficult and painful the flexion of the fingers and hand. These elevate honeycombed patches are of natural colour, and not inflamed (except where an isolated papule exhibits the appearance described under the acute form), but consist of densely-grouped arrays of hair-follicles, with the indurated cutis between and around them, the follicles packed with dry brittle accumulations of epithelial scales, so extensive as to be easily visible through the dilated mouths of the follicle, these latter being large enough to admit the extremity of an ordinary probe. The hairs themselves have disappeared from these patches, having probably become atrophic from the pressure of the epidermic masses, while cracks and bleeding fissures traverse the indurated parts, and in rare instances a follicular abscess gives variety to the picture. The knuckles of the fingers and toes, the palms of the hands, and the soles of the feet, remain unaffected by the disease. In the subjects of the chronic malady the complexion is pale and the tongue foul, while the loss of flesh betrays the effects of the sleepless nights caused by the constant irritation and pain of the skin of the affected extremities.

The *modus operandi* of the crude paraffin in producing these results seems to be as follows:—The oily matters in the shale, called “blae oil,” when separated, are both penetrating in their properties and irritating to the skin; and, coming continually in contact with the epidermis, soak into the hair-follicles, where they create an irritation soon leading to induration and increased exfoliation of epithelial scales. This exfoliation is not counterbalanced by increased expulsion of the scales owing, doubtless, partly to the large quanti-

ties cast off, and partly to the usual fatty and lubricating substances mixed up with them being dissolved out and removed by the "blae oil," thus leaving the brittle epidermic masses plugging the follicles, and increasing the inflammatory irritation. (The palms of the hands, soles of the feet, and knuckles of the fingers and toes—places supplied with sweat-glands but no hair-follicles—escape the irritation, from the watery contents of the sudariparous pores presenting an obstacle to the ingress of the oil.) After a time the hairs on the most exposed parts become atrophic and fall out, but the continued retention of the epithelial masses keeps up the process in the follicles and the induration of the surrounding skin.

The workmen are in the habit of employing "shale spirit" to wash the affected parts, whether with any beneficial effect is doubtful.—*Reprint from the Edinburgh Medical and Surgical Journal, Dec., 1872.*

The Virus of Rabies.—Mr. Fleming, in an elaborate account of the nature of this virus, holds that it is present at the beginning of the malady, and continues to be formed until the termination of life; but it does not preserve its potency long after that event, observations having proved that the disease is not transmissible to man, mammals, or birds by the usual media at a later period than twenty-four hours after the death of the rabid animal, or after the cadaveric rigidity has completely invaded the body.

According to Hertwig the infecting principle loses its potency within from twenty-four to forty-eight hours, when the body is quite cold and rigid, in the flesh and blood of dogs that have died rabid; but the period is longer in larger animals.

Eckel inoculated the blood of a man who had died from hydrophobia two days after his decease, but with a negative result. He experimented on a larger scale with the saliva and blood of rabid dogs that had been dead for more than twenty-four hours, but could not produce the disease.

Of the nature of the poison the author contends we know nothing, except that it is organic matter in a peculiar condition, capable of reproduction when transferred to other creatures, and producing specific effects in them resembling those developed in the animal from which it was originally derived. It is a fixed virus in contradistinction to some other animal contagions, which are termed "volatile." The infecting element may nevertheless be volatile, though nearly all observers and nearly all experimenters go to prove it fixed.

Up to late times it has been assumed that the poison of rabies existed only in the salival secretion, or in the mucus from the mouth. In 1841 Professor Eckel, of Vienna, undertook to inquire if the other fluids and secretions of rabid animals were changed with the poison. With the warm blood obtained from a he-goat affected with rabies he inoculated a sheep at the nose, lip, and tail. Twenty-five days afterwards this sheep became unwell, and it died on the twenty-eighth day, having exhibited symptoms which were certainly not exactly those of rabies, and yet had no analogy to those of any other known malady. Nothing was found after death to account for this

result. Eckel also inoculated the head and ears of a dog with the saliva of a hog which had become rabid from the bite of a rabid dog. Four months afterwards the subject of the experiment was still healthy; it was then re-inoculated with the blood of a locksmith who was suffering from hydrophobia. On the sixty-second day subsequent to the second inoculation, the dog was seized with unmistakable rabies and died.

"Eckel, Röhl, Haubuer, and other distinguished veterinarians, are," says Mr. Fleming, "of opinion that the virus of the disease is present in the blood, the flesh, and other blood-containing tissues and organs, and appears in them with the outbreak of the malady." Consequently, it is presumable that fresh flesh soaked in blood might also produce rabies if brought into contact with other absorbing surfaces than those of the digestive organs. The recent experiments of Chauveau have, he believes, "incontestably proved" that the virus of a contagious malady may be absorbed by the digestive organs. For ourselves, though we would not say that this view is necessarily incorrect, we must dispute that it is incontestably proved to be correct. It is unproved.

The above necessarily leads to the question, Whether the flesh of creatures that have died of rabies, or have been killed while affected with it, can communicate the malady? To the question thus put Mr. Fleming is inclined to give an affirmative answer. He evidently favours also the view that the milk of a rabid animal may communicate the disorder.

Rossi and Hertwig have come to the conclusion from their experiments that the virus exists in the nervous matter of affected animals. The latter observer has produced the disease by inoculating a healthy animal from pieces of nerve derived from an animal diseased.

Mr. Fleming adds some very useful rules for the local and general treatment of cases of poisoning from the virus of a rabid animal taken into the flesh by a fresh wound. He is hopefully of opinion that the virus is not so rapidly absorbed as many have supposed, and that up to the actual period of cicatrization of a wound from the bite of a rabid animal, local measures of treatment are deserving of application. All wounds, he says, made by a rabid animal are dangerous, but their gravity varies according to their situation. Those made in textures rich in lymphatic vessels and very vascular, as the face, head, neck, lips, eyes, are most serious. The wounds made by rabid animals whose teeth are long and sharp are most frequently followed by symptoms of the disease.

In the way of local treatment, the remedy, which on the whole is at once most ready and most effective, is the actual cautery. It destroys the saliva and the tissues tainted with it, and thus prevents absorption. There is no great skill needed to apply this cautery so long as the wounds are superficial, or should they be deep if they are confined to fleshy parts of the body. Neither is the shape of the instrument of any great moment—a bodkin, skewer, key, curtain-rod, small poker, anything in short of a likely shape, rather round and pointed than blunt and flat, will answer. "The iron should be

heated," says the author, "to bright red or white heat, and should be applied with a firm and unsparing hand thoroughly to every part." In his *resumé* of treatment, Mr. Fleming adds that the wounded surface after treatment (whether by the actual cautery, chemical caustics, or excision) should be kept open as long as possible, and should be made to suppurate freely. The wounded individual should drink large quantities of fluid to hinder the absorption of the poison.—*Rabies and Hydrophobia: their History, Nature, Causes, Symptoms, and Prevention.* Separate treatise. London: Chapman and Hall. 1872.

On Atropine as an Antidote to Opium.—Dr. James Johnston of the Chinese Hospital, Shanghai, records a series of cases in which atropine proved antidotal to opium. In all his cases he injected the atropine hypodermically. We have reported on no subject in these chronicles that has proved more attractive and practical than this one upon the antagonism of atropine to opium. We select from Dr. Johnston's cases some of the more remarkable, in which the treatment was followed by recovery.

A woman, aged 30, took four drachms of the extract of opium at 11 a.m. on June 18, 1870. On admission, at 11 a.m., she was deeply comatose, and could not be roused in the slightest degree; limbs and body powerless, pupils firmly contracted to a pin's point, face pale; lips, eyelids, and nails livid; respiration 14, stertorous; pulse 110, very weak. The contents of the stomach were evacuated by the stomach-pump, and two drachms of spt. sal volatile injected. At 11.30 a quarter of a grain of atropine in solution was injected. 12.30: Little change observed; pupils slightly dilated, pulse weaker. Injected half a grain of atropine subcutaneously, and administered coffee and brandy per rectum. 3 p.m.: Pulse 140; respiration 10, tranquil; face flushed, pupils widely dilated, extremities cold. Applied hot bottles to the limbs. 5 p.m.: Pulse 115; respiration 10, soft and regular; skin warm; sleeping tranquilly. 6 p.m.: Very drowsy, still asleep; able to swallow when raised. Discharged cured the following day.

A shopman, aged 23, took three drachms of the extract of opium at 6 a.m. on June 24, 1870. On admission, at 1 p.m., he was in a state of the most profound coma; utterly insensible to a douche of iced water; pupils firmly contracted to the smallest point; surface of cornea and conjunctiva quite insensible to touch. Pulse 120, weak; respiration 14, stertorous. The contents of the stomach were removed by the stomach-pump. 1.30: injected half a grain of atropine subcutaneously. 3 p.m.: Pulse very weak, 130; respiration embarrassed; pupils slightly dilated. Kept up artificial respiration at intervals, and injected coffee and ammonia per rectum. 6 p.m.: Pulse 120, respiration 12, lips and eyelids still livid. Injected half a grain of atropine. 7.30 p.m.: Pulse 100; respiration 9, soft and regular; skin hot, face flushed, ocular conjunctiva slightly sensitive. 8.30: Sleeping tranquilly. 10 p.m.: Very drowsy still, but could be waked up; ordered coffee every hour. 2 a.m.: Quite conscious,

complains much of fatigue, pupils very much dilated, has double vision. Discharged the following day.

A coolie, aged 24, took a drachm and a half of the extract of opium at 11 a.m. on August 26, 1870. On admission at 2.30 p.m., he was deeply comatose, and incapable of being roused. Pulse 100, weak; respiration 12, stertorous. The contents of the stomach were removed by the stomach-pump, and strong coffee and ammonia were administered by the tube into the stomach. 3 p.m.; Injected half a grain of atropine subcutaneously, and applied sinapisms to the extremities. 5 p.m.: Pulse small and weak, 115; respiration 10; pupils slightly dilated; still thoroughly comatose, but general appearance improved; breathing more tranquil, lips more florid. 8 p.m.; Pulse 100, respiration 8. 8.30 p.m.: Pulse very weak; extremities cold; respiration more embarrassed. Injected coffee and brandy per rectum, and applied hot bottles to the limbs. 9.30: Injected a quarter of a grain of atropine. 10.30: Pulse stronger, 100; face flushed; pupils widely dilated; respiration tranquil. 11.30: Sleeping, breathing soft and regular. 1 a.m.: Conscious, and able to swallow; ordered coffee every hour. Discharged cured the following day.

A woman, aged 22, the wife of a carpenter, took three drachms of the extract of opium at 9 a.m. on October 6, 1870. On admission, three hours afterwards, she was partially comatose, but capable of being roused; pupils slightly contracted, pulse regular, respiration slightly stertorous, 16. The contents of the stomach were thoroughly evacuated by emetics of sulphate of zinc, and the patient was kept moving about between two attendants. 11 p.m.: In a state of complete coma; limbs powerless; pupils firmly contracted; pulse 102, weak; respiration stertorous. Injected half a grain of atropine, and applied heat to the extremities, and administered coffee and ammonia per rectum. 3.30 p.m.: Pupils slightly dilated, respiration improved. 4.30 p.m.: Pulse very weak, lips and eyelids still livid. Injected one third of a grain of atropine. 6 p.m.: Skin hot, face flushed, pupils widely dilated, pulse 100, respiration 10, sleeping soundly. 8 p.m.: Lips florid, pulse 100, respiration 12. 10 p.m.: Able to articulate, but still very drowsy; ordered coffee every hour. Discharged cured the next day.

A shopman, aged 24, took two drachms of extract of opium at 5 p.m. on October 20, 1870. On admission, two hours afterwards, he was able to speak and walk about without difficulty, although very drowsy; pupils slightly contracted, pulse 84, respiration natural. Administered sulphate of zinc, which acted freely; kept him walking about between two attendants. 8.30 p.m.: Quite comatose, unable to move, pupils firmly contracted, respiration slow and stertorous. Injected half a grain of atropine, and made attempts to drag him about. 9.30: Further attempts to move him were useless; pulse very weak, Applied heat to the extremities and administered brandy and coffee per rectum. 10.30: Pulse very weak, 124; respiration slightly stertorous. Injected one third of a grain of atropine subcutaneously, and ammonia and coffee per

rectum. 12 midnight: Skin hot, face flushed, lips florid, respiration 9, soft; pulse 100. 1 a.m.: Sleeping tranquilly. 3 a.m.: Slightly conscious; swallowed some coffee. 5 a.m.: Awake and perfectly conscious. Discharged in the afternoon, cured.

A woman, aged 29, took two drachms of extract of opium at 5 p.m. on December 21, 1870. On admission, at 8 p.m., partially comatose, but capable of being roused up; pupils small; respiration 20, stertorous; lips slightly livid; pulse 100. The contents of the stomach were removed by the stomach-pump, the cold douche used, and the patient moved about between two attendants. 9 p.m.: Profound coma setting in, pupils firmly contracted, lips and eyelids livid, respiration slow and stertorous, pupils weak. Injected half a grain of atropine, and administered coffee and ammonia by the rectum. 10.30 p.m.: Pulse 120, weak; respiration 12, slightly stertorous; lips still livid. 11 p.m.: Injected a quarter of a grain of atropine. 12 midnight: Pupils widely dilated, face flushed, lips more florid, pulse 100; respiration 10, soft and regular; sleeping tranquilly. 1 a.m.: Ocular conjunctiva and cornea sensitive to touch; pulse 90, respiration 12. 2 a.m.: Can be aroused and made to swallow coffee. Discharged cured the following day.

A shopman, aged 28, took one drachm of the extract of opium at 5 p.m. on February 8, 1871. On admission, at 8 p.m., he was in a state of torpor, from which he was easily roused. Pupils small, face pale, pulse weak and irregular, respiration slightly stertorous. Sulphate of zinc was administered, and the stomach thoroughly washed out, as the emetic failed to act promptly. 8.30 p.m.: Injected half a grain of atropine and walked him about between two attendants. 9.30.: Very drowsy; if left for a moment he became quite insensible. 10.30 p.m.: Deeply comatose; pulse 120, very weak; pupils firmly contracted. Injected half a grain of atropine, and administered coffee per rectum. 11.30 p.m.: Pupils slightly dilated, skin hot, face flushed; respiration 12, soft. 1 a.m.: Lips florid; pulse 60, stronger; respiration 12; slightly conscious and sleeping very quietly. Ordered coffee every hour. Discharged on the evening of the same day, cured.

A woman, aged 23, took four drachms of the extract of opium at 6 p.m. on June 24, 1871. When admitted into hospital, at 8.30 p.m., she was deeply comatose, limbs powerless, pupils small, conjunctiva and cornea slightly sensitive to touch, lips livid, respiration slow and stertorous, 14; pulse 100, weak. The stomach was thoroughly washed out by stomach-pump, and half a grain of atropine injected subcutaneously. 11.30 p.m.: Still thoroughly comatose, pulse 120, respiration 14; injected a quarter of a grain of atropine subcutaneously, and administered ammonia and coffee per rectum. 1 a.m.: General appearance improved; pulse 110, respiration 12, skin hot, face flushed, pupils dilated, lips and nails florid; the patient now slept tranquilly for two hours, the respiration varying from 7 to 10. 4.30 a.m.: Slightly conscious and able to swallow a little. 6 a.m.: Able to take nourishment and sit up. Discharged, cured, on the afternoon of the same day.

A Ma-foo, aged 28, took two drachms of extract of opium at 2 p.m. on August 12th, 1871. On admission into hospital, at 7 p.m., pupils small, pulse 80; respiration 12, slightly stertorous; very drowsy, can scarcely be roused. An emetic of sulphate of zinc was administered, which acted freely, and the patient was walked about between two attendants. 8 p.m.: Deeply comatose, pupils firmly contracted, limbs powerless, ocular conjunctiva and surface of cornea barely sensitive to touch; pulse 120, weak and irregular; respiration slow and stertorous. Tried the cold douche from a height without producing the slightest effect; also galvanism without any result. Rubbed the skin dry and applied hot flannels. 8.30 p.m.: Injected half a grain of atropine subcutaneously, and kept up artificial respiration at intervals. 10.30 Still in profound coma; pupils slightly dilated; respiration still embarrassed. Injected a quarter of a grain of atropine. 12 midnight: Face flushed, skin hot, pupils widely dilated, pulse 110, respiration 10, soft; sleeping tranquilly. The patient continued in a quiet slumber until 4.30 a.m., when he was conscious, and complained of severe pains in his limbs and great lassitude. Discharged on the afternoon of the same day, cured.

A married woman, aged 37, took one drachm and a half of the extract of opium at 4.30 p.m. on September 3rd, 1871. On admission, at 6 p.m., conscious and able to move about; pupils natural, pulse and respiration normal. Sulphate of zinc was injected, and followed by copious vomiting. From 7.30 to 11 a.m. she was kept moving about and made to drink strong coffee and ammonia every hour, and during that time the symptoms were drowsiness and slight contraction of the pupils; at 1.30 coma set in severely, pupils became firmly contracted, pulse weak, 120; respiration stertorous. Half a grain of atropine was injected subcutaneously at once, sinapisms were applied to the extremities, and brandy administered per rectum. 3 a.m.: Pulse 100, respiration 12, patient sleeping quietly. 5 a.m.: Still asleep, but can be roused up. 9 a.m.: Perfectly conscious and able to take nourishment. Discharged on the evening of the same day.

A shopman, aged 31, took four drachms of the extract of opium at 6 p.m. on October 6th, 1871. On admission, at 8.15 p.m., he was able to walk about and reply to questions, and the pupils were slightly contracted. Sulphate of zinc was administered without acting freely. The stomach was then thoroughly washed out by the stomach-pump, and the patient was walked out between two attendants. 9.30.: Patient more comatose; tried the cold douche without producing the slightest effect. 10 p.m.: Injected half a grain of atropine subcutaneously; patient now in the most profound coma, insensible to everything, respirations stertorous, pulse weak and irregular. 11.30 p.m.: Pupils slightly dilated: injected a quarter of a grain of atropine. 1 a.m.: Pupils widely dilated, face flushed, skin hot, pulse 100, respiration 10, soft; sleeping tranquilly. 3 a.m.: Still asleep; respiration 12, soft. 5 a.m.: Still very drowsy, but capable of being roused, and made to swallow coffee. 7 a.m.: Complains of fatigue and lassitude. Discharged, cured, in the evening. —*Medical Times and Gazette*, September 7th, 1872.

HYGIENE.

On the Epidemic of Smallpox at Milan, and on Vaccination. 1870-72.—A report of great importance reaches us from Milan on the epidemic of smallpox prevailing in that city during the years 1870, 1871, and to June, 1872. The report is drawn up by the municipal medical office or bureau of Milan, and contains not less than 203 pages. Perhaps no document in our time is more thoroughly indicative of the rapid progress of scientific research and labour in the new kingdom of Italy.

The report is divided into two parts, one devoted to smallpox and the other to vaccination. Both portions are illustrated and followed up by a series of statistical tables, showing the exact numbers of cases, of recoveries, and of deaths, in the time named.

The cases are divided into two classes: in the first, the patients were treated at their own homes; in the second, the treatment was carried out in hospital.

The reporters, after a short historical survey of a general kind, tabulate the most extensive epidemics of the disease occurring in Milan from 1752 to 1789, from 1830 to 1843, and from 1852 to the present time. From their tables we gather that between 1752 and 1789 there were from 1000 to 2000 cases of the disease in every year; from 1830 to 1843 the average number of cases was from 300 to 400; from 1852 to 1863, in Milan and a surrounding district of two miles, the average was about 500 cases per year; from 1867 to 1869 the average was about 300 in the city proper; and from 1870 to June, 1872, the proportion for 1870 was 1287, for 1871, 4467, and for the six months of 1872, 491. The figures show that the smallpox epidemic of 1871 was more extensive than the worst epidemic in the last century of which there is record, viz., that of 1752, during which there are estimated to have occurred 4068 cases.

In the late epidemic the three distinctive forms of variola occurred much in the same proportion as in our own country. As with us, the hæmorrhagic variety was almost always fatal: thus, out of 135 cases received into the Rotunda Hospital in the full period of two and a half years, 128 died; out of 1105 confluent cases 434 died, and out of 2219 benign cases 124 died. The greatest mortality was amongst women, and especially amongst those in the gravid and the puerperal condition. Amongst these latter the hæmorrhagic form of the disease prevailed; out of 17 cases in the puerperal state only 5 recovered; 6 suffered fatally from the hæmorrhagic form of the disease, the others from the confluent disease or from the complications arising out of it. Very few pregnant women who entered the hospital came out still pregnant; almost all aborted.

The mortality amongst children was most severe; out of 394 attacked there were no less than 128 deaths; children under one year suffered most, and the male suffered in much larger numbers than the female children.

In the practice of the Rotunda, the chief hospital for the reception of patients, the most serious cases occurred in the months of August, September, and October: the largest number of cases in 1870

occurred in October, November, and December, and in 1871 in August, September, October, and November; in the middle of the epidemic the months of February and March were least severely visited with the malady.

The reporters give an unequivocal testimony to the prophylactic value of vaccination. They state that they have been able to keep a strict calculation of 243 individuals who were not vaccinated, or who, having been vaccinated, did not take from the vaccination. Out of these, all of whom suffered from smallpox, 122, or over 50 per cent., died; the majority of these were infants. Speaking of the general mortality of those who were attacked, but had or had not been vaccinated, the reporters show that the smallest number belongs to individuals who, having been vaccinated in infancy with virus from the human subject, were afterwards vaccinated from the inferior animal—the heifer; the greatest mortality, on the other hand, refers to those who were never vaccinated at all. A very valuable table is given bearing upon this subject of mortality from smallpox in relation to vaccination. The table is founded on 6245 cases of persons attacked with the malady. Of these it is shown that 1127 died. Of the 1127 cases ending fatally 50·6 per cent. had not been vaccinated at all; 16·7 per cent. had been vaccinated in infancy with lymph taken from the human subject; 8·4 had been vaccinated and revaccinated with virus from the human subject; 6·9 had been vaccinated with human virus and revaccinated with virus from the animal; 27·6 had been vaccinated and afterwards had been subjected to natural smallpox; 50·0 per cent. had not been vaccinated, but had suffered from natural smallpox. These figures lead the writers to speak in favour of vaccination from the animal direct—Jenner's original method. They add in continuation of their own views the facts collected by the learned Margotta. He has shown from the statistics of four Italian cities, viz. Genoa, Milan, Turin, and Naples, that the mortality of the unvaccinated was, in Genoa 66·08 per cent., and of the vaccinated 14·24 per cent.; in Milan, unvaccinated, 50·90 per cent., vaccinated, 16·39 per cent.; in Turin, unvaccinated, 44·31 per cent., vaccinated, 10·79 per cent.; in Naples, unvaccinated, 43·10 per cent., vaccinated, 12·90 per cent.

The immunity of the soldiery is specially dwelt upon by the writers of the report; in such cases as occurred amongst this class, the men were, as a rule, imperfectly vaccinated, and the mortality in all the vaccinated cases was very small. Speaking of other classes of the community, they observe that while the disease was most prevalent amongst the lower and in the middle classes, amongst those who are brought most into communication with the populace, one eloquent fact stands forth, viz. that, amongst the medical fraternity, including those brought most of all into contact with the disease, but at the same time are most safely protected by vaccination, not a single serious example of the affection appeared during the whole period of thirty months.

With many other curious facts there is recorded that forty-seven individuals—twenty-seven males and twenty females—were attacked

with smallpox, although they had previously suffered from it; of these thirteen died. Among them was one who had suffered three times, once in 1811, again in 1837, and now in 1871. In the course of this last attack he died. He was seized on the 23rd of October, 1871, and died on the fourth day.

From the description of the disease the reporters pass to discuss the question of the expenses forced upon the community by an epidemic like that which has attacked Milan. The expenses amounted to a net sum, during the thirty months, of one hundred and thirty thousand lire.

The reporters add to their labours a short summary, from which we extract the following passages:

“The last great epidemic in Milan was not exclusively Milanese; it was prevalent at the same time in one hundred cities of Italy and in all Europe.

“The mean rate of mortality of the epidemic was 18 per cent.

“The system adopted by the municipality of Milan for checking the epidemic, and which consisted in isolation of the sick, removal of patients from home in as many cases as possible into hospital, and the general practice of vaccination amongst both infants and adults, is, it is believed, the best practice that can be carried out.

“Another opportune element, equally indispensable, is the possession of a room of observation for the reception of cases of a doubtful character.

“Practice and observation have established that the immunity to smallpox created by vaccination performed during infancy is limited, in protective influence, by years; the limitation is ten years, and therefore between ten and fifteen years of age revaccination should be carried out. At a period of more advanced life it should be again repeated.

“Vaccinations from the human subject and from the inferior animal—the heifer—are both useful; but vaccination direct from the animal is preferable, because from this a guarantee is offered against the introduction into the human body of other human disease, especially syphilis.”

On the one most important subject, the question of the transmission of syphilis by vaccine virus, to which the reporters refer, they unfortunately offer no facts based on their own careful and able observation. They make reference to thirty-five cases of the kind, but these are compiled from various sources and from various authors, some reliable, others doubtful, but not one original. We regret this very sincerely; a single absolute fact of an original kind would have been more valuable than the whole compilation.

There is one remaining fact to which, in conclusion, we would draw the particular attention of the English reader. We mean the ease with which the vaccinators in Milan were able to carry out animal vaccination. In the thirty months of the epidemic as many as 33,778 subjects were vaccinated from the heifer. In one day no fewer than one thousand persons underwent the operation, the quality of the lymph being always of the best.—*L'Épidemia Va-*

juolosa a Milano, nel triennio, 1870-71-72. Relazione dell' Ufficio Medico Municipale:—Dottore Luigi Bono (Medico capo), Felice dell'Acqua, Fortunato Catto, Pietro Ambosoli, Ernesto Nardi. Milano, 1872.

III. SUMMARY.

Sulla Incinazione dei Cadaveri: On the Incineration of the Dead. By Professor GIOVANNI POLLI, M.D.—In this memoir the learned Professor argues in favour of cremation. He thinks that the expenses of the process and the popular prejudices against it may, for a time, stand in the way, but that both will be overcome. He shows from an experiment on the dead body of a dog that the body may be quickly reduced to ashes by the heat of incandescent coal-gas, and that the ashes represent about one twelfth of the weight of the body. In a sanitary point of view the process, the Professor maintains, is of the greatest importance, and he announces that the Royal Institute of Sciences and Letters of Lombardy, at a meeting, held on the 7th of August last, proclaimed for the quinquennial prize for the year 1877 the following subject:—"To show a method for the cremation of the dead in substitution of inhumation, in order to prepare the way for the hygienic reform proposed and accepted by the Medical International Congress of 1871. Proofs are to be given, from experiments on dead animals, that the plan suggested is innocuous, expeditious, economical, and such as will meet all civil requirements. The time for sending in the essays is February, 1877. The value of the prize is 864 lire."—*Nota del Prof. Giovanni Polli, 1872.*

REPORT ON SURGERY.

BY HENRY A. REEVES, F.R.C.S.E.,

Assistant-Surgeon to the London Hospital, and Surgeon to the East London Hospital for Children and Dispensary for Women.

In Memoriam.—ALFRED POLAND, F.R.C.S.—Since the appearance of our last report the profession has suffered a heavy loss through the untimely death of Mr. Poland. In noticing the sad occurrence, we feel we are only paying a just tribute of respect to the memory of a gentleman who so distinguished himself, not only as a surgeon, but also as an extensive, accurate, and versatile writer. Our own pages were periodically much indebted to him for able original articles on various surgical subjects and for his excellent *resumés* of foreign and British surgery. Mr. Poland was a pupil of the late Mr. Aston Key, and after having finished his course of studies at Guy's was admitted a member of the College in 1843, and subsequently, in 1849, took his Fellowship by examination.

Before obtaining the latter diploma he gained the College Triennial Prize of fifty guineas for his essay on the "Nerves of the Orbit in Mammalia and in Man." He further proved himself an able essayist by carrying off, in 1853, the Fothergillian Medal for his essay on "Injuries and Wounds of the Abdomen," and by becoming again

successful in 1857, when he won the Jacksonian Prize for his essay on "Gunshot Wounds and their Treatment."

Later on he became editor of the 'Guy's Hospital Reports,' and contributed a series of excellent papers on tetanus, stricture, hernia, &c. Mr. Holmes's 'System of Surgery' is also enriched by essays from his pen. Recently Mr. Poland was publishing, in the 'Guy's Reports,' a series of essays on the "Statistics of Subclavian Aneurism." These give evidence of extensive research and a right use of statistics, and we indulge a hope, which we trust to see realised, that from the material which we have reason to think he must have left behind him, some of his surgical colleagues will bring the series to its conclusion, *i. e.* up to the present time. Whether the subject of these remarks be considered as a practical surgeon, as an operator, as an accomplished writer, or as a gentleman, we are persuaded his name will be long held in the highest respect by the profession.

The Efficacy [and Mode of employing Collodion in Erysipelas.—M. Broca has again recommended the application of collodion in cases of erysipelas in the following manner. A layer of collodion should be applied round the margin of the erysipelatous blush for a distance of from six to eight centimètres, and also over the affected part. The object of the former is to exercise a circular compression, so as to separate the affected part from the rest of the cutaneous surface. It is necessary to examine these layers once or twice daily and to repair the fissures which occur. The collodion used must be free from oil. It is rare to see the erysipelas spread after these applications, under which it is in a short time extinguished.—*La France Medicale*, September 7th, 1872.

Collodion is extensively used in many English hospitals, and, we believe, with good results. It should first be applied to the healthy skin, in three or four layers, extending to a distance of at least three inches from the margin of the erysipelatous blush, and afterwards over the diseased surface. The object of this method of proceeding is to prevent the conveyance by the brush of any material which may possibly be of a contagious nature. At some large hospitals the ætherial solution of nitrate of silver is much used, and with fairly good results. The objections to it are twofold; first, on account of its blackening effect, which prevents one seeing if the disease be spreading; and, secondly, because of its disfigurement, especially when applied to the face. This latter effect, surgically considered, is of little importance, but the first influence on the minds of relatives is, occasionally, not a little astonishing. We cannot here discuss the questions as to whether erysipelas is purely local in its origin, in the local idiopathic sense, or requires a previous traumatism, either accidental, surgical, or pathological, which may be excessively minute; or whether it necessitates an anterior constitutional state which predisposes to its occurrence. No doubt, the solution of these problems might modify our treatment, but in the mean time experience has taught that general as well as local remedies are necessary in the large majority of cases, and topical applications are

used, while general treatment, in the way of iron, iodine, &c. &c., by those who believe in them and stimulants almost universally, are employed. Before we can say with any approach to certainty that a certain remedy or combination of remedies acts in any special or general way, we must have a much larger experience of the natural history of disease, of its duration first without, and then with certain methods of treatment, and of similar modes of medication in various individuals. Various other procedures of experiment and observation, by which we may test the value or inutility of our interference, suggest themselves to the mind, and it would be a great step in the right direction if an army of duly qualified medical observers and experimenters could be organized to undertake the examination of certain leading questions in the domain of therapeutics.

Mr. Butcher, in a paper "On Excision of the Knee," reiterates some rules which he laid down several years ago, and as these in one or two points differ somewhat from English practice, we will quote them and state in what particulars the difference occurs.

"1. *The judicious selection of the cases.*—The bones not being diseased far beyond their articular surface, which, if upon section found to be a little more than had been expected, the part should be gouged out, or an additional thin slice removed; but if to a greater extent, amputation should be at once resorted to, and as recorded in my work on 'Operative Surgery,' with a hope of excellent success. Again, amputation, as I have shown, may be performed some days after excision should any unfortunate circumstances in the management of the case demand it. I have recorded seven instances of amputation of the thigh, and all made rapid recovery save one." Taken in a general sense, these remarks are judicious, but in reference to the matter of amputation should the articular disease extend somewhat further than the usually allotted limits, we think it would be laying down too hard and fast a rule to say that in every such case amputation should be resorted to. We can call to mind two cases at least in which during the operation for excision the propriety of amputation was considered and abandoned in favour of the following proceeding:—An additional thin slice of bone was removed, and then the gouge was applied repeatedly till sound bone was found. In one case the amount of bone thus removed was considerable, yet both cases did well. These two cases, at any rate, show that limbs may be preserved even when the condition of the bones appears to demand their removal, and suffice to encourage us, other things, such as age and constitutional power, being equal, to endeavour to save the member. Secondary amputation is always open to us, and our observations are in accord with Mr. Butcher's experience as to its great success. It should be stated that the patients mentioned above were both under twenty-five years of age.

"2. *The H incision should be performed,* and the perpendicular strokes placed well back just in front of the posterior wall of the joint, so as to allow all fluids and discharges to drain off, far more effective and safer than any opening made in the popliteal space. No portions of the flaps should be curtailed, though they may be

thinned of any thickened fibrinous matter or diseased synovial membrane; the latter particularly should be clipped away with a strong scissors. All ligamentous fibres, both around and within the joint, should be cut through, and the extremities of the bones fairly freed and exposed, great caution being taken not to break up the wall of the joint. It should be set free from the bones in this way:—This fibrous structure, strengthened by the expansion of the semi-membranous muscle, should be detached with the knife from the edge of the tibia, only to about an eighth of an inch in depth, and then the fibrous structure forced down from the tibia to the required extent with the handle of the knife, and so in a similar manner it should be set free from the femur. The English practice is to adopt the semi-lunar incision, which involves less cutting and answers admirably; in other respects it is the same as Butcher's.

"3. *The patella should be taken away in all cases whether diseased or not*, and then the section of the bones, well thrust out in front, should be made with Butcher's saw from *behind forward*, due attention being paid to the axis of the thigh-bone at the time of its division that the section be strictly at a right angle with the shaft; by this means *the artery (popliteal) is safe*.

"4. All bleeding vessels should be tied, or any that have sprung or retracted should be drawn out and secured, so as to guard against intermediary hæmorrhage.

"5. *While the patient is yet on the operating table the limb should be placed in the horizontal position, either by gentle, steady traction, combined with pressure of the cut surface of the bone, or, if necessary, after the division of the hamstring tendons*. Their support behind, in every case, I look upon as of great value; therefore their section must be looked upon as a bad expedient towards straightening the limb.

"6. *During the adjustment of the bones great caution should be exercised that their surfaces should be throughout their extent in contact, and that no soft parts intervene . . .* Further on Mr. Butcher recommends the use of his "box-splint." Various forms of splint are used in London, Edinburgh, and the provinces, and answer admirably.

"7. *The limb should not be disturbed for several days*, the length of time depending a good deal on the season of the year when the operation is performed—whether it be in the heat of summer or in the cold of winter . . . If the straps be loosed for any purpose, the hand of an assistant should steadily keep the anterior splint in its position and well pressed back, until the artificial support is again brought to bear upon it and fastened.

"8. *In cases where large abscesses form in the vicinity of the excised joint or up along the thigh, Chassaignac's drainage tubes may be used with the best hopes of success*.

"9. *The free administration of stimulants and sedatives is imperatively demanded in all cases of excision*, regulated to a certain extent by age, sex, temperament, and habits. The results of his case tend to confirm the statement made by Mr. Butcher nearly twenty years

ago, that *the symmetry of the limb could be preserved, and also its usefulness.*—*Dublin Journal of Medical Science*, November, 1872.

8. *New Mode of Operating for the Radical Cure of Varicocele.*—Dr. H. B. Davison (San Francisco) says that many persons are suffering from varicocele of the spermatic cord and are ignorant of it. The examinations of military surgeons show that nearly one person in every ten was rejected on account of that lesion. He believes that it occurs oftener as a congenital defect than brought on by external causes. Dr. Davison asserts that the so-called *subcutaneous* ligature of the spermatic vein for the cure of varicocele is not strictly a subcutaneous operation. The scrotum is perforated through both walls, and the ligation is generally performed on the patient standing or in a semi-recumbent position, which will cause the varicose veins to become distended. When the ligation is completed there remains a plug or clot of blood, shut off or excluded from the circulation, which acts as an extraneous body, and greatly increases the resulting inflammation of the testicle and its coverings. The danger arising from phlebitis will be greater in proportion to the length of time that the ligature is allowed to remain, which usually is from six to ten days before the enclosed vein is separated. The method which he has adopted, and has successfully performed in all cases operated on, he describes as follows :

The patient is placed in a recumbent position, and an anæsthetic administered or not at the option of the patient and surgeon. The varicose veins are separated from the arteries and vas deferens; the testicle held up that the veins may be emptied of all blood, so that, when ligated, no plug of blood remains between the point of ligation and the body of the testicle. The next step is to pass a steel or silver needle, *curved* so that it will form a little more than a half-circle, armed with a strong silk ligature, well waxed, through but *one* fold of the scrotum, *under* the vein to be ligated. Pass the needle in and manipulate it through the walls of the scrotum, draw down far enough so as to draw in some of the ligature, then guide the point of the needle (which must not be sharp, for fear of wounding some of the vessels) *up and over* the vein, and seek to make its exit from the orifice of entrance, which will not be difficult, with a little gentle manipulation. Draw through sufficient of the ligature to pass through the two holes of the silver or ivory button. Tie down with a double loop, which may be tightened again in from twelve to twenty hours. The patient may be given a mixture of chloral hydrate and elixir of opium and left in the recumbent position, with rubefacient application to the scrotum, which should be supported by a folded towel placed beneath. In from ten to sixteen hours the inflammation will have been sufficient to cause a plug of plastic lymph to obliterate the ligated vein, and the ligature can be removed with safety in from two to three days. The better way to remove the ligature is to untie the loop and cut off one end close to the scrotum, then, by gentle traction on the remaining portion of the ligature, it will come away without cutting through the vein, which

is unnecessary, and only adds to the danger of phlebitis and retards recovery.

For this method Dr. Davison claims three great advantages over any other means yet known to the profession:

1. By perforating only one wall of the scrotum less pain, less inflammation, and less risk of adhesion of the wounded sac and spermatic cord.

2. By placing the patient in a recumbent position when the operation is being performed, so that no blood may be enclosed in that portion of the vein cut off from the circulation, the resultant inflammation will be much less and the testicles will not swell so much, and absorption will be accomplished in much less time.

3. By removing the ligature before it cuts through the vein the risk of *phlebitis* is lessened, and the patient is enabled to resume his ordinary duties much sooner.

Those who have been operated on have no return of the disease, and it would require a very close examination of the parts to discover that any operation had been performed.

In one case the patient had been wearing a suspensory bandage for over twenty years, and the left testicle was much *atrophied*. It is now about sixteen months since the operation, and the testicle has regained its normal size, the patient having a corresponding increase of sexual power.—*Pacific Medical and Surgical Journal*, May, 1872.

Salivary Calculus.—M. Bourland read the particulars of a case of salivary calculus at the Medical Society of Lyons, and remarked that it appeared to be the largest recorded. It consisted, as usual, exclusively of phosphate of lime, weighed 1 gramme 95 centigrammes, and measured 0·035 millimetres in its major axis, and 0·009 in its thickness. He had made some literary researches, and could only find three examples of salivary calculus recorded; one, examined by Dr. Bostock, of Philadelphia, only weighed 97 milligrammes. Those examined by Fourcroy and Wollaston were very small, and were composed of phosphate of lime. Fourcroy quotes a little work, bearing date 1737, by Scherer, a German physician, with the following title, 'Calculus in ductu salivati excretis.' M. Bourland could not procure it. There was nothing very unusual in the symptoms of the case except that, two hours after M. Bourland had attempted to extract it with his fingers and failed, the patient felt as if he had, to use his own expression, "spat out his bone." He soon recovered.

Parenchymatous Injections of Tumours.—In the 'Archives für Klinische Chirurgie,' Band xv, Heft i, 1872, and 'Gazette Hebdomadaire,' October 25th, 1872, is an account, by Dr. Heine, of the treatment of tumours by injections into their substance. He recounts the attempts of Thiersch, Nussbaum, Longet, Lücke, but omits to mention that similar attempts have been made in England, and also in France, by M. Luton (of Rheims), who was among the first to employ this method. The injection of acetic acid into various

tumours, more especially into those of a cancerous nature, will be familiar to our readers, and was, we believe, originated by Dr. Broadbent, but the practice was discontinued after a short trial. Dr. Heine's observations show that this method deserves a serious study and further investigation. His first case was that of a woman, *æt.* 48, affected with cancer of both breasts, and the axillary glands were affected. One of these glands was removed, and microscopic examination revealed its cancerous nature. Dr. Heine first injected a solution of chloride of zinc, 1 part in 100, and then 2 parts in 100; these injections produced no remarkable effects, and at the end of six weeks the tumour had not diminished. Then he used from five to seven drops of a weak solution of hydrochloric acid, and injected them at the periphery of the tumour, in the hope of destroying the germs of the new formation, and continued the treatment for eight months. The size of the tumour diminished from 4 to 5 centimetres in its three dimensions. In two other cases of cancer in the groin, secondary to amputation of the penis for a cancerous growth, there was also a great destruction of a great part of the tumour. Finally, Dr. Heine injected tincture of iodine in two cases of hypertrophied prostate. This he effected through the rectum, and claims to have cured them, or, at any rate, to have caused the disappearance of the symptoms. So far the facts tend to prove the destructive effect of the injections on the young elements in the periphery of cancerous growths, and their curative effect in hypertrophy of the prostate, and, further, their safety. The cases are, of course, as yet, incomplete, Dr. Heine having yet to show that the disease has been removed beyond the power of recurrence. The doses and operative indications are not accurately given in the paper.

Double Dislocation of the Clavicle.—In the 'Gazette des Hôpitaux,' No. 112, 1872, Dr. Col (of Bourg D'Oisans), relates a case of this nature. On the 29th of May, 1872, he saw a girl, *æt.* 17, ten minutes after the accident happened, who gave the following account: She was engaged in unloading a heavy cart, when, by a quick movement of the horses, she was squeezed between the shaft and a wall. Her chest was violently compressed between the shoulders (*i. e.* transversely), and, at the same time, turned or twisted from left to right, and from behind forwards, the shaft passing over the left shoulder while the right was fixed against the wall. M. Col found the left clavicle dislocated at both extremities and projecting on the sternum and acromion. The entire bone had been pushed in front. The dislocation was reduced, and three pads, one large one in the axilla and two smaller ones over each end of the clavicle, and a bandage over all, fixing the elbow to the side, was applied, and allowed to remain for two months, being occasionally made firm; and on removing it on the 3rd of July there was some difficulty of moving the arm, which disappeared by the 20th, and she now assists her father in the heavy business of a carrier. It is to be regretted that M. Col has not gone into more details in reference to the dislocation and the method he adopted for reduction, as these cases are extremely rare.

One case, supposed to be of this nature, is recorded in the 'Med. Times and Gazette' of this year. It was under Mr. Hutchinson's care, and we believe that subsequent examination showed that only one end in the acromial was dislocated, and that there was a fracture of the bone very near the sternal end with displacement upwards, and this had simulated dislocation of the sternal end. Two French cases are on record, one under the care of M. Richeraud, the other under M. Morel Lavallée; in these cases only one of the luxations was able to be completely reduced so as to permit of the arm thoroughly recovering its motions. This was in M. Lavallée's case: that of M. Richeraud was lost sight of a month after the accident. In M. Col's case there was complete restoration of motion, but this does not conclusively show that this reduction was complete at both extremities. If we mistake not a case of this nature is related in the 'British Medical Journal' of this year.

Resection of the Left Scapula.—A man, æt. 33, had received violent blows on the shoulder during convalescence from smallpox. Shortly after he suffered from pains in the left shoulder, and soon caries of the head of the humerus and body of the scapula supervened. Dr. Logan, of New Orleans, resected, first, the head of the humerus, and then the scapula. Three months after the operation the wounds had nearly healed, and the results, as regards the use of the arm, were as follows:—The patient could lift, perpendicularly, a weight of twenty-six pounds, and drag, horizontally, one of twenty-six pounds and a half; by simply flexing the forearm he could raise a weight of fourteen pounds; he could place his left hand on both ears and both shoulders, on the front of his face and chest, but not on the back of his neck, neither could he carry it backwards. The cavity left by the operation was almost entirely filled by a mass of new formation, so as to be shortly on a level with the surrounding parts.—*Medical Record*, October 1st, 1872, and *Richmond and Louisville Med. Journ.*, August, 1872.

Peri-arthritis of the Shoulder.—In the 'Archives gén. de Méd.' November, 1872, Dr. Duplay details the particulars of eight cases of this affection which were under his care, and remarks that, although the disease is very common, it has not as yet been thoroughly described. The following are his conclusions:—

1. Injuries of the shoulder, whether direct or indirect, are very frequently followed by inflammation of the tissues which surround it, and this peri-arthritis, in localising itself, more particularly in the subacromial bursa and in the cellular tissue under the deltoid, determines the thickening and induration of it and of the walls of the bursa, the formation of adhesions and fibrous bands, which impede or completely interfere with the gliding of the upper extremity of the humerus under the acromial arch and under surface of the deltoid.

2. This peri-arthritis will be distinguished from an intra-articular affection by the absence of deformity and swelling. Where this

exists in the acute period it only occupies the stump (scapular portion?) of the shoulder. Peri-arthritis is characterised by the following symptoms:

a. Difficulty in moving the shoulder, sometimes sufficiently marked to prevent the arm being raised horizontally. In all movements one can assure oneself that the relations of the humerus with the scapula do not change, and that this latter bone oscillates or swings about its clavicular articulations. In some cases these movements are accompanied by crepitation.

b. Pains provoked by movements are located, not on a level with the articulation, but below the acromion, on a level with the humeral attachments of the deltoid. Pains provoked by pressure under the acromion on a level with the coracoid process. Sometimes sensations of pricking and numbness along the arm, forearm, and hand.

c. Sometimes semiflexion of the forearm, which, on being extended, causes pain in the elbow and in the neighbourhood of the coracoid process.

3. Peri-arthritis of the shoulder should be treated with care at its commencement, if one wishes to avoid the tensions or adhesions (raîneurs) which are its consequences. Use of the member, electricity, douches and friction constitute the best treatment.

4. When one has to do with a chronic arthritis, the only way to procure a rapid and complete cure is to forcibly break down the adhesions and fibrinous bands at one sitting. If the result of this proceeding is not satisfactory, chloroform must be given and the operation repeated.

5. Finally, after the rupture of adhesions, the patient must for some time be treated by gymnastics of the member, electricity, douches, friction, &c., as before, until the shoulder has recovered the integrity of its movements.—*Lyon Medical*, November, 1872.

Treatment of Syphilitic Iritis.—Not long since there was a good deal of discussion in this country as to the necessity for the use of mercury in the treatment of syphilitic iritis, and several papers were read at the various societies on the subject. The view then enunciated was that very many cases of specific iritis get well when treated with atropine instillations alone, or combined, if necessary, with local counter-irritation. Of course there was much difference of opinion on this as on other points of treatment, the mercurialists adhering to the old plan, and the partisans of the new school bringing cases which corroborated their views. On the whole it seemed to be conclusively shown that cases of undoubted syphilitic iritis may and do frequently get well without the administration of mercury.

In the 'Journal d'Ophthalmologie,' October, 1872, M. Fournier contributes a paper on this subject, and recommends the following method of treatment, and is, as will be seen, a staunch mercurialist. He relies on *atropine* and *mercury*, the latter as a modifier of the specific poison or its effects, and atropine to dilate the pupil and prevent synechia, and perhaps as an antiphlogistic, whose action is

mechanical and diminishes the volume of the vessels of the iris. He gives the mercury in larger doses, so as to act rapidly and efficaciously on the disease. The average daily dose, for women, is from 15 to 20 centigrammes of the proto-iodide, and sometimes it is necessary to increase this dose to 25 or 30 centigrammes. M. Fournier has seen M. Ricord increase the daily quantity to from 40 to 50 centigrammes, and without evil consequences. These larger doses were given to *men*. The inunction of mercury may be had recourse to as supplementary to its internal administration, especially if the drug be badly borne by the stomach. M. Fournier much prefers the instillation of mydriatic agents to circum-orbital frictions of the extract of belladonna. The following is his formula :

Distilled water 10 grammes,
Neutral sulphate of atropine 2 centigrammes ;

and he puts two drops into the affected eye from three to five or six times during the twenty-four hours, according to the degree of the contraction of the pupil and in proportion to the result produced.

The very natural question suggests itself—May not the beneficial effects be due to the active use of the atropine, and not to the mercury? With the English cases before us we are inclined to think they may.

On the Morphology of the Female Mammary Glands.—Prof. C. Hennig, of Leipzig, gives an account in the 'Arch. für Gynäkol,' ii, p. 331, 1871, of the anatomy, physiology, and pathology of the mammary glands which will be of interest to surgeons. He gives a summary of his investigations. Of 1425 cases of disease of these glands the *right* was affected more frequently by one half. Scirrhus specially affects this side. Prof. Hennig accounts for this—1st, because the right gland projects more, in consequence of the right half of the thorax being more arched; it is thus more exposed to external injuries; 2nd, in consequence of the habit of using the right side more than the left, the corresponding gland is called into action, though in a minor degree, more frequently than the left, and becomes somewhat warmer. As regards inositis, another cause is that the right gland is somewhat larger than the left, and as sucklings, owing to the size of their liver, prefer the left breast, milk stagnation occurs more frequently in the right than left. After describing a method of measuring and weighing the mammary glands and making some interesting observations on the weight of them, and the size of the areolæ in virgins, he says that the weight and diameter increase a little at each menstruation, and that sexual intercourse develops Montgomery's glands more than the size of the areolæ. Pregnancy, especially the first, develops the areolæ and the weight. After making some observations on the proportion of the areola to the gland, the weight of the gland with and without its covering of skin, and the details of conformation, he makes two observations which have a medico-legal bearing. The first is that the virgin breast approaches the mathematical hemispheric form more after death than during life, because the areola during life gives a more pointed form to the mammæ. The second is, that women who have borne chil-

dren also preserve after death the hemispheric form. This is only an aid to the examination of the sexual organs.

Atrophy of the gland may be induced by puerperal fever, phthisis, and chronic pleurisy. In excision of the breast for cancer the superior external fringe must be removed. Professor Hennig advises the removal of the whole gland. At the base of the gland lie from six to seven rows of smooth, muscular fibres, which sometimes become partially hypertrophied, forming the "fleshy breast" (fleisch Brust).

Among the diseases met with in these numerous examinations the author mentions rigid arteries of the glands, cysts, and emphysema, due to septicæmic pneumonia and pericarditis, and also a case of *gummatous* deposits, which he says is the first that has been dissected. In the middle of the right breast a gumma 6 mm. long, 7 mm. broad, and 3 mm. thick, was found between the lactiferous ducts, displacing them but little; it was caseous in its centre. The deposit in the left breast had the same dimensions as that in the right, except that it was only 2 mm. thick. From both these nodes flat nodules proceeded towards the circumference of the breast, and were terminated by a reddish-brown, somewhat gelatinous and, in the left breast, rather œdematous connective tissue mass. The author concludes with a reference to the relation between the parotid and the mamma and testicle in inflammation of these latter organs.—*Schmidt's Jahrbucher*, B. 154, No. 4, 1872.

NOTE TO A RECLAMATION BY DR. THOMAS HAYDEN.

IN some observations on the present state of cardiac pathology in our number for July, we mentioned the names of various authors on the subject of cardiac disease, by whom the existence of presystolic murmur had been established as a pathognomonic sign of mitral obstruction. As it is only in very late years that the existence of the presystolic murmur has been ascertained, it is only fair to mention a circumstance which want of space alone prevented us from noticing in the article alluded to, namely, that Dr. Thomas Hayden, Physician to the Mater Misericordiæ Hospital in Dublin, distinctly described the presystolic murmur, and proved its relation to obstructive disease of the mitral valve, in some lectures delivered by him and published in the year 1866. Dr. Hayden then maintained that the diagnosis of mitral obstruction had been attained with precision, and he adduced the history of seven cases, in five of which the diagnosis of mitral obstruction had been confidently made. Of these seven cases four were verified by post-mortem examination, and the morbid specimens were submitted to Dr. Hayden's class for inspection. In all the cases examined after death the mitral orifice was narrowed or obstructed, the segments of the valve being thickened, rigid, cartilaginous, or even (in one case) nearly calcified. The existence of the presystolic murmur during life was detected and pointed out by Dr. Hayden, except in one instance, where the patient was in such an exhausted condition that no murmurs were heard. At the date of the publication of Dr. Hayden's lectures Dr. Gairdner had met with seven cases of presystolic murmur, and Dr. Hayden's cases were also seven in number.

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269

THE
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APRIL, 1873.

Analytical and Critical Reviews.

I.—Ovarian Tumours and Ovariectomy.¹

HYDROPS OVARII was at one time the blot of medicine, and the mocking defiant Puck of surgery. Nosologists gave it a name and place in their systems; it existed, what could they do less? In pathology and diagnosis it was dropsy; what else did they know about it? And as for the treatment that surgeons attempted with their trocars, it effected very little more towards cure than if they had run their pens through the *nominis umbra* of Cullen and Good. But the surgeons of the present generation profess to have changed all this; and the titles of the three works selected for notice in this article claim to cover a space heretofore almost as blank as a map of Central Africa, and promise to unfold all the modern revelations on the pathology, diagnosis, and treatment of ovarian tumours. The names of Atlee, Peaslee, and Wells attached to them we can respect as those of men of known experience and integrity, and are a guarantee that we may examine their statements with confidence and accept their opinions as well considered and mature. This triple simultaneous publication, at points so distant, of books of such importance, furnishes a fitting occasion to trace the progress and review the state of our knowledge on the subjects of which they treat.

Each of the books is sufficiently characteristic. They have all been written with a special reference to the operation of ovariectomy. This is openly avowed on the title-page by both Atlee and Peaslee, and though the word does not appear on that of

¹ *Diseases of the Ovaries; their Diagnosis and Treatment.* By T. SPENCER WELLS, F.R.C.S. London, 1872.

2. *General and Differential Diagnosis of Ovarian Tumours.* By WASHINGTON S. ATLEE, M.D. Philadelphia, 1873.

3. *Ovarian Tumours; their Pathology, Diagnosis, and Treatment, especially by Ovariectomy.* By E. RANDOLPH PEASLEE, M.D., LL.D. New York, 1872.

Wells, his name is so prominently associated with the operation that we are not surprised to find in his writings a tendency to drift towards the same point. But Peaslee's operative experience is comparatively limited, and his book naturally takes a wider range. The plan is very much the same as that adopted by Wells, passing from an account of the anatomy and physiology of the generative organs to a consideration of the nature and diagnosis of diseases of the ovaries, and the treatment of ovarian tumours, especially by ovariectomy, of which he gives an elaborate historical, descriptive, and comparative account. But being largely a compilation it is more discursive. Facts are accumulated from all sources, masses of far-fetched references are piled up, the most heterogeneous opinions are collected together compared and contrasted, results are tabulated with profuseness, everything is balanced with a minuteness, almost Teutonic, and "conclusions rationally based upon the aggregate experience" are heaped up in all directions. And the labour ends in leaving an immense mound of material, upon which the student can only wish the collector had been able to concentrate a more practically sifting and constructive power. Such a store-book, however, has its uses, if only every fact, calculation, and opinion recorded is duly dated and appropriated. But on a new and advancing subject it is especially misleading to quote opinions without distinctly indicating whether they are past or present, to report conclusions which have been since upset, or to represent, as habitual practices; things which may have been done only as makeshifts. A distant compiler is like a man rowing; he can only see what he has passed, and is obliged to be content to use that which is far short of the contemporary information of another hemisphere. And it unfortunately happens that on many points Dr. Peaslee could only bring his reading up to a comparatively remote stage, has had either to trust to hearsay, or has not found means to make himself aware of the latest modifications of opinions. For instance, he refers freely to Mr. Wells's way of doing things, and quotes him copiously. But Mr. Wells had not published his book at the time Peaslee was writing, and as earlier papers only could be made use of, the recent statements of Mr. Wells do not always correspond with the account of what he does and has done as set forth by Peaslee. Mr. Wells makes his deductions from the experience of his total of 500 cases; Peaslee generally stops short at the fourth hundred. In his description of the actual operation Peaslee says that "Mr. Wells prefers to perform it on the same bed which the patient is to occupy after it, in order to avoid all movements which might compromise its success," and makes a reasonable objection to such a proceeding. Whereas

Mr. Wells has never once in his life operated on a patient in her bed, and has even taken the trouble to figure the arrangement of tables which he always adopts and has found most convenient. At page 440 it is stated that "the form of Mr. Wells's clamp most used in this country at present is shown by fig. 14, whereas the fact is that this particular clamp has long been discarded and replaced by one much more manageable.

The work of Dr. Atlee is of a totally different stamp. It is a treatise on the general and differential diagnosis of abdominal tumours, and is issued as the forerunner of another comprising cases and their management. It is a mere transcript of his own clinical experience recorded at the moment, and contains the result of observations continuously pursued since the year 1843. Only such facts are selected as most clearly illustrate the points discussed, and as his own resources are ample Dr. Atlee makes no apology for utilising them in preference to compiling from the records of other writers. This he believes is what the profession in the United States demands, and it certainly is what we very eagerly accept. A chapter "On the Pathology of Cystic Tumours of the Ovary," by Dr. Mears, and another on the "Physical Properties, Chemical Analysis, and Microscopic Appearances of the Dropsical Fluids of the Abdomen," by Dr. Drysdale, are incorporated in the volume and may be viewed as original contributions in accord with the spirit of the work.

Mr. Wells is a thoroughly practical man, and the form and substance of his writings bear everywhere the stamp of his personality. With unrivalled opportunities for observation, the unparalleled experience of 500 operations of the same nature, a ripe judgment and great tact in making use of materials, the profession had every reason to anticipate from him a clear exposition of his views, a useful guide-book for those who wished to follow in his steps, a well-ordered digest of the *rationale* of his practice, and an honest representation of the results of his fourteen years' labour in this department of surgical science. All this his readers, our fellow-workers, will find condensed to its very essence, and expressed in clear and emphatic language. Every collateral subject leading up to the culminating point of this work,—the operation of ovariectomy,—is discussed with sufficient fulness, but the superabundance of original information at command, and the want of the space available for the elaboration of the purely practical instructions as to treatment, have led to the exclusion of any detailed statements of coincident or contradictory opinions, or episodial argumentations on disputed theories, or varying modes of surgical manipulation. Mindful, observant, and critical, the author has given due

consideration to all that has been tried and advanced by others working on the same subjects, and on this ground of relative and personal experience he has formed his own opinions and marked out his own plan of action. His object has now been to record these, and to let them stand out with statuesque distinctness. The consequence is that, throughout, the pages are remarkably free from quotations and references. Everywhere the author himself is speaking and telling us that which he has seen and knows, and in the parts where he runs into narrative it reads as it is, the tale of an explorer into unknown regions. Some one has said that the book is manifestly no 'green-baize production,' and we may add that it looks very much more as if it had been written *currente calamo* at the bedside and on the dissecting table.

Even in the early days of the ovariotomy question the one great difficulty was that of diagnosis. The Hunters and the Bells could find no insuperable objections, either physiological, anatomical, or surgical, to the mere act of extirpation, but they were arrested *de facto* by the consideration, "Could we know beforehand that the circumstances would admit of such treatment?" They and others were aware, by the Cæsarean section, that the abdomen could be opened with impunity. Wm. Hunter, in 1762, in a paper "On Cellular Tissue," though continuously pointing out all the dangers to be incurred and the precautions to be taken, admits that "in a case otherwise so desperate it might be advisable to do it." John Hunter lecturing in 1785 says, "I cannot see any reason why, when the disease can be ascertained in an early stage, we should not make an opening into the abdomen and extract the cyst itself. Why should not a woman suffer spaying, without danger, as well as other animals do? The merely making an opening into the abdomen is not highly dangerous. In a sound constitution, perhaps, a wound merely into the abdomen would never be followed by death in consequence of it." M. Chambon, in 1798, concludes a chapter "De l'extirpation des Ovaires," with the words "I am convinced that a time will come when this operation will be considered practicable in more cases than I have enumerated, and that the objections against its performance will cease." John Bell, too, of Edinburgh, could advocate the possibility and desirableness of it eloquently enough to make the operation an accomplished fact in the hands of his more adventurous pupil, McDowell. But since those times of doubt, speculation, and hesitancy, by a long series of more or less successful sections, long bedside studies, and after-death investigations, the art of diagnosis as applied to ovarian diseases has been almost perfected, system-

atised, and reduced to rules so comprehensible, that an expert practitioner, familiarised with them and following them out, can scarcely be egregiously at fault on any point. He may recognise the form and position of the healthy ovary itself by proper tactile examination; he may decide for himself whether any particular case of abdominal enlargement is due to ovarian disease, or to one or other of the many conditions which simulate it and have often heretofore been mistaken for it. Given an unquestionable instance of ovarian tumour, he may distinguish one kind from another, and even pronounce on the nature of the contents, not only on the broad question as to whether they are solid or fluid, but on their condition and qualities. He may go further, and in view of operative proceeding, may satisfy himself as to the presence of adhesions and their extent, and the coexistence of any other abdominal conditions disguising its identity, modifying its progress, or influencing the views as to its treatment. Dr. Atlee, whose large experience, candour, readiness to confession and self-condemnation, entitle him to full confidence, may be listened to trustfully when he says—

“I am sure that ovarian tumours can be recognised and distinguished from other abdominal enlargements as readily as can the several diseases of the brain, or of the chest, or of the heart, or of the nervous system, and, although errors of diagnosis may occasionally occur in the former, they are not more frequent than in the latter affections; and that in reviewing his pages it will be seen that in the large majority of cases where difficulties were found they did not exist so much in the cases themselves as in the want of care and tact manifested by the observer.”

Wells, with the justifiable assurance of an expert, contents himself with simply saying on this subject that—

“Men of every civilised country have contributed their share of information in the shape of hypothesis and demonstration, analysis and experiment, blunders and success, as to the anatomy and physiology of the ovary, the nature of its diseases, and the way in which they should be treated. If all be not yet disclosed, if practice be not made perfect, and we still remain at fault on some points of detail, the questions of diagnosis of ovarian tumours are, at any rate, so far advanced as to render that which was formerly obscure almost a matter of instinctive perception, and to make signs which once only led to hesitation, now the indications to confident action.”

The less practised Peaslee, who imagines that “the time for oracular utterances in our art has passed, and every magisterial assertion should be challenged,” and who thinks that a considerable amount of study of this subject for thirty-four years

past might qualify him to impart some information of value, urges with preceptorial prudence that "an examination of a case of supposed ovarian tumour must be made in the most methodical manner to be of any value for otherwise important points may be entirely overlooked;" and then proceeds to compose three most methodical chapters, into which he has compressed undeniably a great deal of "valuable information," duly sectioned, paragraphed, tabulated, and authenticated, and "not otherwise obtainable without more labour than most of the profession can devote to the subject." He then, in another place, after stating that the errors in diagnosis up to 1860 included about 7 per cent. of all the cases, sums up the result of his cautious inquiries thus:—

"In this country (America) and in Great Britain the proportioned number of diagnostic errors is not among the most experienced operators of the present time more than 1 to 2 per cent., and no instance has been of late recorded of opening the abdominal cavity, to find that there was no tumour at all; but the error has consisted in mistaking some other form of tumour—generally a uterine fibrocyst—for an ovarian cyst. Dr. Keith had not made a single mistake in diagnosis when he had operated 136 times, and Mr. Wells very seldom made one in his experience of 450 operations."

All three of our authors are agreed that the general and differential diagnosis of ovarian tumours can not only be satisfactorily made out in their hands, but that its principles and rules of practice may be explained and made easily comprehensible to others; and thus, having the same ground to traverse and the same point to reach, it is curious to observe how they severally do it. Wells goes straight and dogmatically to his mark; Peaslee zig-zags over the field, sipping at every authority, and storing up the treasures that he gathers by the way; Atlee whirls along, rotating every around the axis of a series of his own cases, and scattering everywhere his practical remarks in a short, sharp, ejaculatory fashion, as if he were dashing carnival confetti among a Roman crowd.

It is very seldom that ovarian tumours come under notice at an early period of their development, and the chapters on diagnosis have all especial reference to the advanced stages of the disease. When a woman presents herself with abdominal enlargement, three questions of primary importance immediately arise: Has she an ovarian tumour or is it something else which causes similar appearances, and may be mistaken for it? If it be an ovarian tumour of what kind is it? and is it of such a nature as to admit of palliative treatment, or does it demand surgical interference?

The first question involves the consideration of many par-

ticulars. A variety of other diseases and some natural conditions have at times misled even men of "deserved reputation." Those of the most importance and of most common occurrence are thus summarily enumerated by Wells :

"In connection with the peritoneum we have ascites, cancer and tubercle and encysted dropsy of the peritoneum, tympanites and phantom tumours, fibro-plastic tumours of peritoneum and fatty tumours of omentum and mesentery.

"Difficulties in diagnosis caused by uterine enlargements arise from pregnancy, retained menses and moles, air and fluids in uterus, fibroid tumours, cancer.

"Another miscellaneous group is this—enlargements of other viscera, such as the liver, spleen, and lumbar and mesenteric glands, hydatid cysts of the liver and peritoneum, movable kidney and cysts of the kidney, fæcal accumulations, distended bladder, hæmatocele, pelvic abscess, extra-uterine pregnancy, enchondroma, or cephaloid disease of ilium or vertebræ."

Nearly the whole of Dr. Atlee's volume is taken up with the consideration of these and a few similar subjects, and both in Peaslee and Wells they occupy about 100 pages. It is not, of course, our purpose to follow them in all their details. The general principles of ovarian diagnosis are sufficiently well understood, and those who in emergency found themselves perplexed would reasonably elect to consult one or other of the original authorities rather than any *résumé* we could make. We can only refer to one or two disputable topics in reference to the chemical and microscopical characters of the fluid found in abdominal tumours.

Can we depend on the demonstration of certain properties and elements in such fluids for determining the source whence they come? And to cite a particular instance, are fluids coagulating on exposure to air of fibro-cystic origin, and the fact of their doing so diagnostic between fibro-cystic tumours of the uterus and ovarian cysts? Hereupon on the American side we have statements with a varnish of the most positive assurance. At page 263 we find Dr. Atlee saying, after alluding to the difficulty of distinguishing between soft fibroid and multilocular ovarian tumours, "They are, however, both distinguishable and, by the same means, viz. tapping. I believe a positive diagnosis can be made only by tapping;" and at 289 he goes still further into the subject thus:—

"I regard paracentesis as the only reliable means in certain cases to be adopted in order to make out a positive diagnosis between these tumours and ovarian cysts. I consider the fluid removed from the fibro-cystic uterine tumour to be blood, *minus* the corpuscles, or true liquor sanguinis, which rapidly coagulates on exposure to the

atmosphere, and after a reasonable time separates into fibrin and serum.

“So far as my experience goes I have met with no other fluid removed from the abdominal cavity that undergoes such changes, nor have I met with any other form of tumour that furnishes such a fluid. It may, therefore, be pronounced, not only diagnostic but pathognomonic. It is true that fluids are removed from the general cavity of the abdomen, or from local cysts having an inflammatory origin, in which are formed *fibrinoid* substances. But the entire mass of these fluids does not coagulate on exposure to the air, and these fibrinoid formations usually require several hours for their production, and appear like strings suspended in a large quantity of fluid, and very different from the clot and serum referred to. It is also in accordance with my experience that when either of the above fluids is removed by tapping, we must exclude the idea that it comes from an ovarian cyst.”

Now this, like most other absolutely positive statements, is wrong and gains only a qualified support on this side of the water, notwithstanding the inadvertent admission made by Mr. Wells at a “test” consultation with Dr. Atlee during his stay in Philadelphia, where, indeed, he seems to have been regularly interviewed, led into error, and reported in the style of which this is a specimen:

“It was just at this time that the distinguished ovariologist, T. Spencer Wells, Esq., of London, was making his visit to Philadelphia, and I invited him to see the patient. I purposely withheld the history of the case from Mr. Wells until after he had made his diagnosis; and such was the understanding before I introduced him to the patient, as it was intended as a test case. The examination was made, and the decision arrived at, without much hesitation, that it was a case of *ovarian tumour*, and suitable for an operation. He also remarked that the expression of countenance was strongly indicative of ovarian disease. After his diagnosis was made I put this question to him, ‘Mr. Wells, have you ever seen fluid drawn from an *ovarian* cyst that coagulated on exposure to the air?’ ‘No.’ ‘That was the case with the fluid drawn from this patient.’ He immediately asked, ‘Is it a fibroma?’

“I was not unprepared for such a decision by Mr. Wells, and was not at all surprised that even he, with his vast and unequalled experience, and great acumen and skill to aid him, was foiled in making a correct diagnosis, as I had never seen a case better calculated, at that period of its history, to mislead.”

The foregoing episode may be amusing, but it proves nothing more than that though, perhaps, smart and sharp as an exhibition before native admirers, such expedients are of very little use in the search for truth. When compared with what Mr. Wells deliberately writes, the production of such a little bit of

clap-trap corroboration tells for nothing. What Mr. Wells really says is this:

“Nor does the presence of fibrin prove that the fluid is not ovarian, for in a dermoid tumour which I removed in June, 1869, which contained bones and hair, Dr. Schetelig made out three distinct kinds of fluid in a number of isolated cysts. In some there was an emulsion of fat and cholesterine, in others the albumenoid liquid so common in ovarian dropsy, and, thirdly, in different parts of the large tumour certain small isolated bags full of a limpid, thin serum, which, being exposed to the atmosphere, soon coagulated like any other serous fluid overcharged with fibrine.”

And he goes on to put this part of diagnosis upon its proper footing by adding this sentence:

“While it is certain, therefore, that in cases of doubtful diagnosis complete reliance cannot be placed on the chemical characters of fluids removed from the abdomen, and that the rule of paralbumen being the characteristic of ovarian fluids, and fibrin of serous fluids, and the conjoint presence of paralbumen and fibrin pointing to a mixture of the two fluids, is open to many exceptions, it is still true that the rule is sufficiently often correct to become an aid of some value in arriving at a diagnosis, and to encourage us to attain more accurate knowledge by more extensive observation and more complete research.”

There remains also a source of fallacy which Dr. Atlee has not noticed. Fibrinogen is one of the constituents of many ovarian fluids, and may be demonstrated by Dr. A. Schmidt's test, the simple addition of a few drops of blood to the fluid, when a distinct clot will form in from twenty-five to ninety minutes. In the tapping necessary to procure the fluid from an ovarian cyst for the purpose of diagnostic examination, nothing is more likely to happen than the admixture of a few drops of blood from the puncture; and the immediate consequence would, of course, be the fibrillation of the fibrinogen in any fluid that might contain that element, and, upon Dr. Atlee's assertion, the wrong assumption that it came from a soft fibroid. And, further, fibrinogen is not even exclusively found in uterine or ovarian cysts, but is occasionally present in ascitic fluids and other serous secretions.

Again, are there any microscopic elements in these ovarian fluids definite and constant enough to warrant us in accepting them as diagnostic? Even so long ago as 1846 Dr. Hughes Bennett seemed disposed to rely, to a very considerable extent, upon indications derived from microscopical examination, and thought that there could be little danger of our confounding the fluid accompanying encysted ovarian dropsy with that found in inflammatory passive dropsies. A few years later Mr. Nunn gave considerable attention to this point, and found, as

the result of many examinations of different specimens of ovarian fluid, that the most regular characteristic of such fluid is its containing a greater or less abundance of cells gorged with granules, and in addition circumambient granules having the same measurements as those encompassed by the cell-wall, but came to the conclusion that in the then state of knowledge he was not justified in asserting that the nature of the fluid could be looked upon as diagnostic of the disease which gave rise to its production, that the value of a microscopical examination laid in its giving strength to an opinion, and that alone it ought not to decide one. Eichwald describes these globular aggregations, of varying size, some having no visible envelope, others being surrounded with a delicate, dark margin, leaving a measurable space between the granular matter and the outline, but showing no nuclei when acted upon by acetic acid. Mr. Wells, following Eichwald, states that no breaking up of a cell-wall can be observed, and that the granular matter agglomerating to a granular mass is merely held together by homogeneous substance. He regards them as of no great diagnostic importance, and Peaslee acknowledges that he has not found them in the fluid of all cysts known to be ovarian. But with Dr. Atlee pathology seems to have all the charms of an exact science. For here these enigmatical bodies are cells, and more than that, cells diagnostic. He calls them cells, describes them as cells, points out how they may be distinguished from other cells, and declares with all the emphasis of italics—

“But no matter what other cells may be present or absent the cell which is almost invariably found in these fluids is the granular cell. This ovarian granular cell I consider as diagnostic of ovarian dropsy, and have seldom failed to find it in this fluid, except in some of the earlier cases, where it probably existed, but was overlooked from inexperience in the examination of these specimens.”

We do not judge these bodies to be cells at all, are not by any means satisfied of their constant presence in the fluids of ovarian tumours, and can only accord to them the secondary diagnostic importance at which they were originally estimated by Mr Nunn.

The question, what variety of tumour it is when its ovarian origin has been settled, bears a very different signification according to whether it is asked by the practical ovariotomist or by the pathologist. The one seeks to know its real nature, mode of formation, and starting point—the other its general characters as to form, size, solidity, and contents. The surgeon grasps at the attainable, while the pathologist, at any rate for the moment, clutches at something very shadowy. The lite-

nature of the subject shows how much work of investigation has been done, and that a great deal is known; but at the same time the varied nomenclature, the shifting classifications, the misty speculations, and the vague descriptions reveal the great blanks that wait to be filled up, and prove that a *terra incognita* still remains for the coming race of explorers. It seems strange to say that after men such as Rokitansky, Klob, Paget, Farre, Fox, Virchow, and Waldeyer, have been working at the subject successively for many years, the mode of origin and nature of ovarian cysts is not made out and explained. But so it is. Every one who sees much of these tumours is obliged to acknowledge to himself that though he, time after time, recognises familiar forms, and must admit the picturesqueness of some well-known descriptions, yet that he meets with so many variations of type, so many unaccountable novelties and modifications of structural development and degeneration, such strange chemical combinations and histological transformations, and the ordinary word-painting and delineative efforts so utterly fail to represent or perpetuate the realities, that he is left to despair of bringing them all into adjustment with any accepted system, or of at present reducing them to order and placing them in a position of more philosophical relation and mutual interpretation. Atlee and Wells, in treating of the cystic ovarian tumours with which they are principally concerned, in the practical parts of their writings, are satisfied with an almost identical classification of them under three heads, to which they append slightly different terms, though it would seem that they both mean to convey much the same impression, viz. that there are such things as simple unilocular cysts, that these originally simple cysts oftentimes become compound or multiple by throwing out either from the exterior or interior of some part of their walls secondary cysts with the same tendency to reproduction; and that a third class of tumours is found of a multilocular structure and enlarging by the simultaneous growth of many at first independent cysts growing and bound together in one common envelope. This classification has, at least, the merit of simplicity, and serves well as a nucleus for the arrangement of practical matter in writing, and as the starting point for the discussion of many questions which arise in reference to operative measures. Some pathologists, however, object entirely to the placing of these so-called single cysts in a separate class, and uphold the notion that originally they were all composite sacs irregularly divided by septa, which, in the progress of growth, being atrophied by the suppression of the circulation in the expanded tissues, have given way so as to open up inter-communication between the several loculi, and have

ultimately become reduced to shreds and tracings on the main cyst-wall. No doubt this happens very often as Rindfleisch describes, and may seem to be proved to demonstration by the dissection of cases so advanced as to come under post-mortem examination, or be the subjects of extirpation. But our own researches into the incipient changes in ovarian structures have long since convinced us that at first, and in the early stages of growth, many ovarian cysts are truly simple one-cavities, but that in all there is a speedy tendency to the formation of secondary, tertiary, and even further cystic progeny. In fact, so strong and so persistent is the force of developmental power in the walls of the cyst, that we have not unfrequently found, and in some cases even at a somewhat advanced age, true Graafian follicles budding out from them and from the pedicles, and presenting themselves in various degrees of perfection, with natural contents, others, at the same time, undergoing degeneration, and in more or less advanced stages of expansion into secondary cysts.

Rokitansky, so long ago as 1855, had once seen this condition, imperfectly it is true, but still sufficiently for his own conviction, but subsequently the late Dr. Charles Ritchie, with his great advantages, had repeated opportunities of observing the same fact, and in his work 'On Ovarian Physiology and Pathology,' published in 1865, states that—

"Since last August, 1864, I have succeeded in finding ova in some of the loculi of a large number of ovarian cysts. Some of the ova were perfect, with a sharply defined zona pellucida, a germinal vesicle, and a germinal spot; others were more or less imperfect, many having the appearances mentioned by Rokitansky. I have never found an ovum in a loculus larger than a cherry, and never in a loculus which contained jelly-like contents."

Many of the large cysts which Wells calls proliferous may be traced through their several phases of development as enormously distended Graafian follicles, their walls hypertrophied beyond recognition, except to the initiated, but lined for the most part with normal epithelium, and everywhere studded with germinating cells, destined when left to themselves still further to increase and multiply. The dermoid and other structures, such as teeth and bone, so often found in some parts of cysts, or occupying the whole cavity, are sometimes made the pretext for placing them apart as a separate division, but we see no just reason for this. Such cysts have no special peculiarities of origin, and the nature of their contents is an accident of development, interesting enough and having, especially when they constitute the principal bulk of the tumour, some important practical bearings. But they really occur much more fre-

quently than is supposed, and a careful examination of all the loculi in turn will often disclose imperfect formations of cartilage, bone, and other tissues, in tumours which the superficial looker-on sets down as of the ordinary multilocular description. Of all these forms of cystic tumours the multilocular is the most common, while the simple cysts arise only in small proportions, and though very properly retained on the practical list as sometimes curable by mere tapping, and very tempting to would-be ovariectomists, yet we believe that they must be before long expunged from any exact classification as really non-existent except in the primordial condition.

The very valuable diagnostic remarks made by Dr. Atlee in reference to the various kinds of cystic tumours are so disposed that it is impossible to quote them, and Peaslee has reduced what he had to offer into the objectionable form of a synopsis, so that we much prefer the summing-up on this point as given by Mr. Wells :

“As a simple cyst, especially if extra-ovarian, may be not only temporarily emptied, but emptied with the probability that the fluid will not collect again, it is interesting to ascertain if possible whether a cyst is really simple, or whether there may be one large cyst with smaller ones concealed. A simple extra-ovarian cyst may be suspected under two different conditions: 1st, when it has been of many years' duration with very little damage to the general health; and, 2ndly, when it has formed with such extreme rapidity as to be almost certainly mistaken for ascites. In the first of these two conditions the cyst is generally flaccid; in the second excessively tense. In the first there is little or no suffering beyond the inconvenience arising from the bulk of the cyst; in the second there is all the suffering which accompanies rapid abdominal distension. Both are very apt to be mistaken for ascites, but are of course distinguished by the signs already enumerated of the enclosure of the fluid in a cyst.

“When by internal and external examination no nodular hardening of the cyst-wall can anywhere be detected, where the cyst is uniformly smooth and elastic over its whole surface and extent, where the wave of fluctuation is equally perceptible in all directions, the inference is very clear that the cyst is practically unilocular; and if in a young person it is either flaccid and of long duration, or excessively tense and of recent formation, the inference is almost equally clear that the cyst is extra-ovarian and the contents limpid. There are many cysts which, although practically unilocular, have on some parts of the wall of the principal cyst, most commonly near the base, a group or groups of secondary cysts, which negative the supposition that the cyst may be extra-ovarian, and lead to the belief that the contents, instead of being limpid, are viscid.

“Multilocular cysts are often as uniform in outline as simple cysts, but more frequently their surface is more or less irregular, and the

projections of different cysts can be both felt and seen. In this case these projections vary in hardness, and the fluctuation is limited by the divisions between the cavities. A septum must be very thin which does not intercept the wave of fluctuation; but in some cases of colloid tumours, where the septa are imperfect, the wave of fluctuation is almost as distinct and instantaneous as in a true unilocular cyst.

“The solid tumours of the ovary are excessively rare, as has been already stated in the description of the fibrous tumours of the ovary. In the only two cases which I have seen, they were surrounded by fluid free in the peritoneal cavity, and it was only after removal of this fluid that the size and consistence of the hard body could be made out. But solid portions of large tumours which fluctuate in other parts are by no means rare. They can only affect the question of operation, inasmuch as it may lead to a somewhat greater length of incision being necessary than in cases where no solid portion of considerable size exists.”

In the early days of ovariectomy one of the questions looked upon as most important in view of the operation was, as to the existence and extent of the adhesions of the tumour to the abdominal parietes and to the organs with which it was in contact. Any large amount of adhesion was considered as sufficient reason for not undertaking or for abandoning the operation. It became the practice in some hands to commence every operation with a small incision just large enough to admit of exploration with the finger; and Dr. Frederick Bird adopted the still further precaution of inserting needles through different parts of the abdominal walls into the cysts, and watching the effects of the respiratory action under the supposition that he could thus decide whether there was free motion of the one upon the other. But with larger experience operators have come practically in a great measure to disregard the presence of mere parietal adhesions, and consider them rather as complicating an operation than as unfavorably affecting its results. Even omental adhesions, not much less common, are not so serious as is generally supposed, and when properly managed add but little to the other dangers. Among those who have never or rarely witnessed a practised ovariectomist, an almost unreasonable fear of meddling with this kind of adhesion still exists, and, no doubt, many operations which might safely be completed are left unfinished in consequence. Hæmorrhage from the abdominal walls seldom occurs to any great extent when the adhesions are torn through; and, at any rate, is generally under control. The fear of the ruptured tissues passing into a condition to be a cause of septicæmia is almost imaginary; and the peritoneum is already in most cases in such an altered physiological condition, and its serous character so changed that it

is no longer the tender sensitive surface of health, and but slightly prone to take on new inflammatory action. Indeed, it is surprising to see how rapidly a patient will sometimes recover after a most desperate operation with separation of adhesions in all directions. And, on the other hand, it is equally surprising to find a fatal termination sometimes following the removal of a simple non-adherent cyst which would seem to offer the best prospects of success. Most persons who have had ample opportunities of watching cases of ovariectomy will agree with us in these views, and in considering the profession at fault in magnifying the importance of such adhesions, and in dreading to encounter them. Dr. Atlee operated in one case of unilocular cyst where there had been no evidences of inflammatory action, but with signs of parietal adhesions which were attributed to tight bandaging. It required an incision of about six inches in length. The abdominal wall and cyst-wall were both thin and so intimately united by adhesions as to obscure the usual line of demarcation between them. The incision, consequently, instead of being carried through the abdominal parietes only, divided those of the cyst, and gave exit to a dense chocolate-coloured fluid. In attempting to separate the cyst from the abdominal wall, it was almost impossible to distinguish one from the other at the line of incision. He nevertheless persevered, and ultimately succeeded in stripping the cyst-wall from the whole of the inner surface of the abdomen, to which it was attached by the strongest adhesions. Other attachments also existed. The patient recovered.

There are perhaps no means of *positively* diagnosing omental adhesions, though they may generally be anticipated either limited to patches, or over every part upon which the membrane is sometimes spread out like a fan, if a large tumour is accompanied by resonance on percussion over the upper part of the abdomen, particularly when associated with epigastric distress or colicky pains. But when a small tumour has been attended during its growth by the usual signs of local or general peritonitis, and is not capable of being displaced from its bed by ordinary pressure or by changing the position of the body, there is reasonable ground for suspecting that adhesions may have occurred as the result of inflammation. In the case of a large tumour adherent to the parietes of the abdomen, we find that neither manipulation nor inspiration nor change of position in any way affects the conjoint motions of the tumour and the abdominal walls, no projection is thrown up in the umbilical region by the contractions of the recti muscles, and the abdomen is generally sore and tender under pressure and motion. The sensation of crepitus and friction sounds are not as was

formerly supposed, sure indications of adhesions. So long as friction can be felt or heard, movement must be free, though lymph may be depositing and roughening the surfaces. Adhesions stop the movement and the sound it produces, but after a time they may return again as the adhesions elongate and the deposit is partially removed. The presence of omentum between the cyst and the abdominal wall also occasions a very similar sound, though it gives a softer and more doughy feel to the tumour; with it there are generally wanting the symptoms of inflammatory action; and it is seldom that omentum is present over any part of a cyst which is not near some intestine, and this is easily recognised by its resonance on percussion, and its gurgling under pressure. With simple cysts, or symmetrical multilocular cysts, adhesions are not so common, but tumours of a malignant character and unequally developed, are prone to attach themselves to all with which they come in contact. Tapping also furnishes considerable aid in determining the existence or non-existence of parietal adhesions. A non-adherent cyst will collapse after tapping, resonance replaces, at certain spots, dulness on percussion, and a thickened cyst-wall may be felt eluding the grasp through the walls of the abdomen. The refilling of the cyst will be again first felt at its lower part, with defined boundaries, and with more easily detected mobility and surrounding resonance.

General or even partial adhesion to the viscera and to the organs in the pelvis are however of more serious import, and oppose much greater obstacles to extirpation. Nevertheless, they do not absolutely forbid it, especially as they are the very cases which run on if left to themselves most rapidly to a fatal termination. We have repeatedly seen extraordinary successes in cases where at first sight during the operation it seemed impossible to detach the adherent parts without doing irreparable mischief. Cautious, determined, persuasive manipulation has in the end effected the liberation of the tumour; and though occasionally attended with ominous bleeding and severe after-symptoms, recovery has been so frequent, that the temptation to go on is very forcible, and it requires great experience and self-control to determine when to hold the hand from what is impracticable, and where perseverance becomes unjustifiable. Of all the organs the intestinal canal is most frequently implicated, and extensive coils have been found imbedded, as it were, in the cyst-walls. Dr. Clay relates cases in which he has successfully dealt with several feet of intestine thus incorporated, leaving portions of the cyst-wall *in situ*, but denuded of the lining membrane. These intestinal adhesions are generally found on the superior, posterior, or lateral portions of the

tumour, and very rarely on the anterior surface; but when on percussion a resonant sound is detected at a fixed point in front of an ovarian tumour in every position of the body, it may safely be said that it depends on the presence of an adherent bowel. Adhesions to the liver, stomach, or spleen can never be accurately made out before operation, but are pretty surely marked by the previous symptoms of peritoneal inflammation, by the occurrence of serious functional disorders of those viscera, by the rapid emaciation and anæmia, the small irritable pulse, the distressed anxious countenance, and the inability to sleep. When the mobility of the uterus is much restricted, its natural position changed, its form as indicated by the sound abnormal, and no change in the relation of the impacted structures can be made after tapping, by firm pressure of the finger either in the vagina or rectum, it is extremely probable that such pelvic adhesions exist as would render ovariectomy very hazardous and much more than usually difficult.

But we come now to a question of much wider interest—What is to be done with these tumours? There is a world outside the profession which takes this up as the primary one, and that in which only it is really concerned. It is, no doubt, some matter of contentment, but not all that was wanted, to know that there exists a class of enthusiastic votaries of scientific research who take their exalted flights and profound plunges into the remote ethereal spaces and bottomless abysses of morbid chaos, and who bring back their accumulated treasures, sort, sift, and analyse them, weave speculations, theories, and explanations, and succeed, in some measure, in bringing to light fragments of truth, and a few thread-clues for the understanding of these mysterious vagaries of nature, and their influence on life and health. But the writings of such men as Bright and Hodgkin, Fox and West, however much we may applaud their industry, admire their ingenuity, and marvel at their wondrous power of hypothetical construction and verbal description, incorporating, as they do, the sum and substance of ovarian pathological knowledge, still furnish some of the most melancholy and shortcoming reading in the whole range of medical literature. Their elaborate observations and records, their philosophical discussions, their eager graspings at the flickering rays of truth which have dawned upon them in their intra-abdominal groping, all end in such a mournful and, for the patients, dismaying wail of despondency as we find in West's eloquent lectures on diseases of women:—"We come to the sick chamber day by day to be idle spectators of a sad ceremony, and leave it humbled by the consciousness of the narrow limits which circumscribe the resources of our art." And for a long time the echoes of these

feelings spread everywhere. Doctors were hopeless, surgeons were helpless, operative ardour in the direction of cure was chilled into negation, and the ten thousand sufferers from the disease, at all times wearing out their miserable remnant of existence among our population, were left to sink piteously one by one under the decorous attentions of the professional watchers at the deathbed. Every one whose word could be trusted agreed that medicine was useless, except in some accidental case where a cure was unexpectedly effected, as might happen by rupture of a very thin cyst during violent purging—that tapping was no better than dropping a bottomless bucket into an inexhaustible well, except, perhaps, in the rarely occurring extra-ovarian cysts of the broad ligament—and that injection of iodine only answered of late to a very limited extent in the hands of Boinet. But the words of promise uttered at the dawn of the revival of medical science smouldered on through some generations of surgeons till Bell, in the north, threw up his brilliant corruscations of eloquent inspiration and encouragement. The sparks kindled enthusiasm and resolve in a congenial spirit; the man and the time at last came, and a cry from the wilderness of the far west announced to us of the old world, convinced but not daring, hoping but incredulous, that the long-looked-for operation was done—done more than once—and, more than that, done with as good an average result as we have since been able to arrive at. All honour to McDowell, of Kentucky, who, to use the words of Hufeland, “looked upon his profession as a high and holy office, who exercised it purely, not for his own advancement, not for his own honour, but for the glory of God and the good of his neighbour, and who, long since called to give an account of it, is no doubt reaping the reward of his faithful stewardship.”

Ovariotomy has a history, it has a *status*, and it has also a *raison d'être*. The history is, as usual, a chequered one, noting slow advances, checks, reverses, times of opposition, runs of success, till at last, after a lapse of some sixty years, we find it universally accepted and established as one of the legitimate operations of surgery, except in Peru, where the chief medical officer of the state has openly denounced it and legally prohibited its practice. Every step of this progress and every publication by which it has been illustrated are so carefully traced and recorded by Dr. Peaslee, that the question how, when, where, and by whom ovariotomy originated can never, unless by the extinction of his volume, drift into the regions of mythical history, and become a subject for future “notes and queries.” More than 100 pages of his book are thus filled up, and without making omissions which would look invidious, it

would be impossible further to condense his epitome. The course of events, and especially the publication of these volumes, have brought us to a stand-point, from which it is much more to the purpose to examine the operation as it is now practised, and the circumstances which influence its success, and to glance at the results which have been accomplished, and may be anticipated hereafter.

The surgeons who have most frequently performed the operation of ovariectomy are, in America—Atlee, Kimball, and Peaslee; in Great Britain—Clay, Baker Brown, Keith, and Wells; in France—Kœberle, Boinet, and Péan; and in other parts of Europe—Billroth, Nussbaum, Spiegelberg, Sköldberg, and Krassowski. Many other practitioners have treated small batches of cases with more or less success; but as it is manifestly unsafe to make any deductions from limited experience imperfectly reported, it is not necessary otherwise to refer to them in any general notice of the operation.

There are no means of fixing the exact number of the operations which have been performed, nor would there be an advantage if we could, unless all the particulars and results were equally known. So far, however, as we can calculate from the tables of Atlee, Peaslee, and Dutoit, and from information elsewhere obtained, the number of well-authenticated cases amounts to about 1550. From among these we have accurate reports in sufficient bulk only from Atlee, Baker Brown, Wells, and Keith, and it is upon them that we have chiefly to rely for practical inferences. Mr. John Clay, in the appendix to his translation of 'Kiwisch,' includes 395 cases in his table up to the end of 1860, so that in the last twelve years there have been performed about 1150 operations, not amounting to quite 100 per year. Now, what strikes one as remarkable is, if these figures are at all near the truth, and if we are to accept an estimate founded upon the Registrar-General's returns of a floating population of 10,000 cases of ovarian disease in Great Britain only, with an average duration of life of about four years, the very small proportion in which the operation of extirpation is resorted to; and we do not see any reason to doubt the statement that ovarian dropsy exists to the extent named. It received accidental corroboration a few weeks ago, during a visit which we were making in an obscure village in the north of France. A case of ovarian tumour came under our notice, and on asking the sisters of the hospice, who were, as a matter of course, acquainted with the condition of the whole of the residents, whether they knew of any others, the reply was, "At least four." Now this, in a population of 1600, gives one to every 400; and supposing that of the four alleged

cases three might turn out to be merely ascites, then as much as one in 1600. Nor can it be supposed that the inhabitants of this little out-of-the-way place were beyond measure afflicted with this particular disease. The ratio of one in 1600, applied to the population of Great Britain, would give an aggregate of between 17,000 and 18,000, instead of 10,000.

Here we quit the volume of Dr. Atlee. Its value on the important subject of diagnosis makes us anxious to possess the promised successor on the treatment and operation. Of the other two books, as regards ovariectomy itself, Peaslee's is for the student; Wells's for the surgeon having an operation in view, or the chance of being entrusted with the after treatment. We have here just the difference between a learned summing-up and a magisterial judgment. The style of the two runs thus: in Peaslee such and such things have been done and are done, and such and such things may be done; in Wells such and such things I do and advise, or I have tried and avoid. It must be acknowledged and will be so, especially by those who like us have been much occupied with it, that the operation is, as in the language of Peaslee, "the most formidable, and sometimes the most difficult, the surgeon ever attempts," and, as Dr. Keith says, "is the last to be undertaken by any but those whose daily work it is to stop bleeding and close wounds." And it would be well for all who may be deluded by the display of skill which they sometimes witness, the apparent ease of the performance in the few rare and uncomplicated cases, and the rapidity of the recovery when all is favorable, into an ambitious longing to make an attempt upon the first victim they may meet with, to ponder upon the words of the father of ovariectomy, who, though better known in the open, rugged field of practice than in the paths of literature, was a man of broad and elevated views, and thus expresses the advanced opinions he had already formed respecting the operation he had inaugurated after years of patient waiting and zealous preparation:

"I think my description of the mode of operating, and of the anatomy of the parts concerned, clear enough to enable any good anatomist, possessing the judgment requisite for a surgeon, to operate with safety. I hope no operator of any other description may ever attempt it. It is my most ardent wish that this operation may remain, to the mechanical surgeon, for ever incomprehensible. Such have been the bane of the science, intruding themselves into the ranks of the profession with no other qualification but boldness in undertaking, ignorance of their responsibility, and indifference to the lives of their patients; proceeding according to the special dictate of some author as mechanical as themselves, they cut and tear with fearless indifference, utterly incapable of exercising any judgment of their own,

in cases of emergency, and sometimes without possessing the slightest knowledge of the anatomy of the parts concerned. The preposterous and impious attempts of such pretenders can seldom fail to prove destructive to the patients and disgraceful to the science. It is by such this noble science has been degraded, in the minds of many, to the rank of an art."

We trust the time has gone by, if it ever was, when the selection of cases for ovariectomy was made with an eye to the statistics. The cases of rejection now are comparatively few, and the general grounds for rejection are such as would apply to any other important operation, such as the presence of cancer or the coexistence of some fatal disease. The special reasons for refusing to operate are principally the recognition of close adhesions to the pelvis and pelvic viscera, and the fact that the safest time for operating has not yet arrived in many cases where the demand is made. There is a time for this as for all things, and as Mr. Wells puts the case—

"It is possible to operate too early as well as too late—to place a patient's life in peril by operation before it is endangered by disease, just as it is possible, on the other hand, to delay operation until the powers of life are so exhausted that recovery after severe operation is impossible." * * * "A woman who has become accustomed to the confinement of a sick room, has lost flesh, and has been brought by her suffering to dread the operation less than the disease, bears the removal of an ovarian tumour, even though large and adherent, better than one whose whole course of life is suddenly changed from the performance of ordinary active duties to the enforced quiet and confinement in bed which necessarily follow ovariectomy."

On the other hand, Dr. Peaslee justly remarks that "it does not follow that the experienced operator should refuse ovariectomy to one who is very much exhausted. If, in his judgment, there is even a very slight chance of recovery, he is bound to give the patient that chance if, after a clear statement of the probability, she still desires the operation." And we have known cases where urgent entreaty has induced the operator to withdraw his opposition and the operation, reluctantly and despairingly done, has saved the doomed life.

But precautions must be taken and are as essential as operative skill. The place, the appliances, the attendants, the isolation of the patient, and the exclusion of any possibility of infection, are all matters to be regarded as of more than secondary importance. There is no excuse to be made for neglect in choosing proper places and attendants, in securing cleanliness and separation, as time is always at command, and the operation may be called, except in such rare cases as the

bursting of a cyst with internal hæmorrhage, one of expediency rather than of immediate necessity. But, above all things, the patient must be made safe from infection. So many of the deaths that we have witnessed have been traceable to preventable causes of this kind, that we feel bound to express our opinions in the strongest language. We look upon the needless voluntary attendance of any one engaged in dissection or fresh from post-mortem examinations as an indulgence of criminal curiosity. We consider the performance of the operation by men subject to the ordinary casualties of an accoucheur practice as absolutely unwarrantable, and a violation of every principle of professional morality and social duty. For good reasons we should even go so far as to forbid the assistance of a menstruating nurse, and we are sure that every one would join with us in reprobating the fact of an operation being done within the walls of an hospital in which there were cases of a suspicious description, as not to be justified by any excuse or sophistry. We know that the lower type of professional mind, whose "dull morrow cometh and is as to-day is," soon falls into the habit of regarding patients as necessarily subject to an average of contingencies, as being obliged, from the nature of things, to submit to a choice of evils, of having to elect between letting life pass away unassisted or of accepting help with all its risks, and of thinking themselves, like all other agencies in nature, a mixture of good and evil, bringing misery and death to the few, life and benefits to the many. But, if against these and other social evils it be a folly on the part of the laity to neglect the use of safeguards; if it be a duty to pass sanitary laws; and if it be culpable to spread abroad contagion, it must be in those trained to professional life worse than folly, worse than a neglect of duty, and more than doubly culpable, wittingly to augment the inevitable liabilities of any under the lamentable necessity of undergoing the operation of ovariectomy.

The old controversy about the length of the incision, or the advantages of what were called the major and minor operations, is now only historically interesting. Common sense tells, and common practice now shows, among all operators, that the question is simply one of adaptation. The incision at first of moderate length, must be extended, if necessary, so as to allow of the easy extraction of the solid part of the tumour, reduced as much as possible by tapping or breaking up by hand. Long incisions of more than six inches are found to have been followed by death in the proportion of 40 to 23·4 when not exceeding six inches; and the probability of success is much greater when carrying the opening beyond the umbilicus can be avoided. But it is obvious that the result in all cases may

be affected by other considerations, and there is a growing indisposition to rest content with very short incisions and less apprehension of mischief from moderately long ones. Dr. Keith states that "his incisions are now much longer than formerly, an inch or two making no difference so far as an increase of danger is concerned." And Dr. Peaslee lays it down that—

"The practical rule should be—1, to make the opening into the peritoneal cavity, for the removal of the tumour, at least three inches long to begin with, and, of course, longer in case of large cysts which cannot be essentially diminished by tapping; and, 2, then to prolong it if necessary, and only so far as is actually required."

Adhesions are separated, hæmorrhage arrested, and the cyst extracted much in the same way by all operators; but no one need ever see the intestines, as McDowell described it, rush out upon the table, since they can be kept peacefully reposing in the abdomen by taking off pressure from them by the simple expedient of the assistant's placing the middle finger of his right hand inside the cavity, hooking up the abdominal wall at the upper angle of the incision, and then by the thumb on one side of the opening and the forefinger on the other holding the edges of the wound close together. The introduction of a flat, warm sponge will be sufficient to protect the intestines from injury.

Before the tumour is cut away the pedicle must be secured. It is on the mode of dealing with the stump that ovariectomists are most divided. Is it to be allowed to retract and adjust itself within the abdominal cavity, or is it to be retained outside the abdomen so that it may form permanent adhesions somewhere in the line of the incision? The latter is termed the extra-peritoneal and the former the intra-peritoneal method. For those cases in which the intra-peritoneal treatment is adopted Dr. Peaslee enumerates no less than nineteen ways of restraining bleeding from the divided vessels practised by different surgeons; viz. by one ligature round the pedicle, one or both ends coming out through the abdominal incision; two ligatures, one end of each coming through the incision; the arteries separately tied and the ligatures cut off short; torsion of the separate vessels; torsion of the whole pedicle; a ligature round each half of the pedicle cut close to the knot; the acupuncture needle; the *écraseur*; the figure-of-8 ligature; the flap operation; the actual cautery; the galvanic cautery; the coil-clamp; twisting off the pedicle; ligatures and a flattened tube (devised by Dr. Peaslee himself); enucleation; sub-peritoneal constriction; spring ligature, and iron-wire coils. In using the extra-peritoneal method, the pedicle has been brought out through the wound and then

fastened either by stitches or pins; or the pedicle has been stitched into the wound and covered by the skin of the abdomen; or it has been held through the lower end of the wound by some sort of clamp. Of all these schemes the greater number have been only very sparingly tried. Practically among those who use the intra-peritoneal method the question of preference lies between the cautery and a ligature cut off short. At present we do not think there is sufficient evidence to settle the point definitely. The last forty-nine cases reported by Mr. Baker Brown as treated by the cautery gave a result of 17 per cent. of deaths only, and Dr. Keith's recent experience of eight cases all recovering induces him to say, "I like the cautery, and intend to use it more; hitherto I have used it only in cases of short broad pedicle." On the other hand the late Dr. Bradford, of Kentucky, who, so far as his experience of thirty cases went, achieved the highest success yet attained, having saved 90 per cent. of his patients, always used the ligature, and Wells, Atlee, and others, only resort to the cautery when compelled to do so by the peculiarities of a case.

We must leave the main question of the relative value of the clamp as representing the extra-peritoneal method, and the ligature the intra-peritoneal method, in the hands of experts best able to decide it hereafter, simply just now stating the case as it stands. Dr. Peaslee makes out, but erroneously, by figures, that there is a slight numerical advantage on the side of the ligature, and he gives a table of 445 cases, culled from the practice of twelve surgeons, which furnishes recoveries to the amount of 75.34 per cent. This he compares with the results of Mr. Wells's first 400 cases, which he says give only 72 per cent. of recoveries. But in these 400 cases Mr. Wells treated the pedicle in a variety of ways, by ligature, by clamp in combination with ligature, by pins and ligature, by the *écraseur* as well as by the clamp singly; and on looking closer over the published notes we find that, out of his 500 cases, Mr. Wells employed the clamp in 349, with only 69 deaths, which numbers yield a proportion of recoveries of 80 per cent. So that, in fact, the conclusion arrived at by Dr. Peaslee must be reversed; though, after all, the difference between the two methods of treating the pedicle is not so great as to tempt us to adopt either one or the other exclusively; and we cordially join in the following judicious remarks by Mr. Wells, which show an unprejudiced estimate of the real state of the question, attended, as the records of his practice prove, by an equal readiness to adopt the one or the other plan as the conditions presenting during an operation may make it expedient.

"No surgeon who has had much experience of ovariectomy would

bind himself to adopt in all cases either the extra-peritoneal or the intra-peritoneal method, or any of the modifications by which either principle is carried out in practice. Every surgeon should go to an operation prepared to carry out the particular method which appears to be best adapted to the peculiar circumstances of the case which present themselves as he proceeds. If the pedicle be small enough to be securely held in a clamp of moderate size, and long enough to permit the clamp being fixed outside the closed wound, without much pull on the uterus or broad ligament, no more ready or more successful method than the clamp can be desired. When the pedicle is so short, broad, or thick that a very large clamp would be necessary to secure it, that the wound could not be closed around it, and the traction upon the uterus when the clamp was fixed outside the abdominal wall excessive, either the ligature or the cautery should be preferred to the clamp. Or if, after applying a clamp, it is found that it cannot be fixed outside without undue strain upon the uterus, either the cautery may be used, or the pedicle may be transfixed and tied, and the clamp removed after it has served its temporary purpose. In this way it often proves useful, allowing the tumour to be removed safely, and the pedicle examined more conveniently than when it is covered by a large tumour. A long piece of strong whipcord may sometimes be used with this object, but it is much more likely to slip than a clamp."

The tendency after the operation is as a rule to recovery. A woman is relieved of a crushing burden and the rebound towards health is in proportion. Many of the cases which go wrong are made to do so, or are left to do so, and the problem is how to steer between a troublesome and a neglectful management. When there are no bad symptoms most cases will thrive best if left in the hands of an intelligent trained nurse who has learnt the art of "letting alone," and will only follow up the natural indications of comforting and feeding. In the best cases, for the first eight and forty hours, the patients lie quietly enjoying the sense of freedom from the troubles that had so long harassed them and the repose which comes naturally. They suffer comparatively little pain, the countenance relaxes, and all they seem to want is to be left in undisturbed tranquillity. Convalescence and health come as by a miracle. Other patients are prostrate from the first. They have to be kept alive, and a time comes when they grow restless, have pain in the head, shut their eyes, moan and yawn, with a rapid little pulse, or a slow soft one, and the temperature falls. Champagne and good broth, or soups, turn the balance and reparation begins. Sometimes with this great feeling of exhaustion the pulse and temperature both go up, there is a flickering struggle for existence, and without the same sort of support the patient sinks, and not a few have been the victims of a mistake at this crisis. Once

poisoned by absorption of decomposing matter, as too many no doubt have been, the affair is often all but hopeless.

But when such symptoms appear as pain, vomiting, fever, with abdominal distension and elevation of temperature, the surgeon should suspect that either serum, blood, or pus is collecting in the abdominal cavity. It may be poured out in sufficient quantity to give rise to general fluctuation, or it may form only to less amount, and gravitate to the bottom of Douglas's space. Kæberlé prepares for drainage by introducing strong glass tubes, but relief is generally sufficiently obtained by a free evacuation. If not, and suppuration or decomposition goes on, septicæmia takes place, and here we touch upon the novelty of Dr. Peaslee's book—his treatment by intra-peritoneal injection. He relates seven cases in which it has been notably successful. The most remarkable of these was a case of septicæmia from two sources, decomposing blood which oozed from vessels of the omentum, and pus formed on a granulating surface. The formation of pus persisting after all the blood was removed, it was found necessary to use the injections three times daily for twenty days to keep the patient from sinking; then twice daily for twenty-one days, and once daily for thirty-three days more—making *135 injections in all for seventy-eight days*. Dr. Peaslee has contrived an apparatus for the purpose of giving these injections. His solutions are more or less antiseptic—water with the addition of liquor sodæ chlorinataæ or of carbolic acid,—and, having demonstrated the perfect safety of injecting such fluids, he suggests that they may be used by way of prevention as well as of cure, and is sanguine enough to conclude that by what they may cure and by what they may prevent, their proper use should increase the average success of ovariectomy by almost 4 or 5 per cent. In England, this practice has not been extensively tried, but we can see from such opportunities as we have had of observing it that it is rational and safe enough, and that a certain number of cases are occurring from time to time to which it may be applied with prospects of great benefit.

We cannot follow out all the interesting considerations which offer themselves to a practitioner as to the general management after ovariectomy in reference to the dressings, the temperature of the room, and the nourishment of the patient, nor is it our business to give instruction on the treatment of the special symptoms showing themselves in different cases—the shock and collapse, the vomiting, the hæmorrhage, the peritonitis, the pneumonia and bronchitis, the tympanites, diarrhœa, tetanus, phlebitis, and blood poisoning, all of them being well discussed by Peaslee, and more or less fully by Wells. But having seen that the conditions of the operation may be determined, that it

may be accomplished without unreasonable hazard, and that its success has been gradually improving and growing more encouraging, we may conclude by inquiring what are the results that have been attained, and what are the lessons that require most to be enforced.

The results may be considered from two points of view,—as they affect the condition of the patients personally, and in reference to them as a group. On the former subject we must allow Wells to speak for himself.

“Fears had been expressed that when a patient recovered after ovariectomy she would in some way or other suffer in after life, that she would not menstruate regularly, that, if she married, she would not have children, or children of only one sex, that she would become excessively fat, or lose her feminine appearance and her sexual instinct, or that her life might be shortened by some disease originating in the operation or its consequences either upon some bodily organ or upon the mind. In order to ascertain how far any of these fears were well founded, or were exaggerated, or were purely imaginary and destitute of foundation, I asked every patient who recovered to write to me once every year, on the anniversary of the operation, giving me full information as to her state. Nearly all promised compliance, and a few have written several years in succession. Many have written once or twice, some I have occasionally seen; but there were so many of whom I could obtain no information that in May and June, 1872, I sent a circular to every patient who had recovered after ovariectomy in my practice, or to the medical friend by whom she was sent to me, asking for information.

“From circulars returned to me, and from other sources, I am able to say that thirty-five women who were unmarried at the time of the operation have married since, that 14 have had one child, 6 two, 3 three, and 3 four children. Two have had twins. Of 259 women who were married when the operation was performed, 23 have had one or more children since. Of 25 I could obtain no information. The circulars were returned through the post-office, marked ‘gone away’ or ‘not known.’ 310 were in good health in 1872, many of them adding that they were well and strong, or better than they had been for many years, or some such phrase, expressive of their complete restoration. A few complain of some trifling ailment, and a few have died at various periods of disease, in some connected, in others not in any way connected, with the operation.

“When a surgeon has removed a large diseased ovary and the woman recovers, he has in very many cases the great satisfaction of feeling that his patient has been restored to perfect health. Experience has proved that the remaining ovary generally carries on its functions, and that the woman may become the mother of healthy children of both sexes. The patient is not mutilated as by the amputation of a limb, nor does the general health suffer as it frequently does after the greater amputations. There certainly is nothing like

the tendency to recurrence which there is after the removal of malignant tumours, probably by no means so frequent occurrence of disease elsewhere as after successful ligature of a diseased artery, or disease of the opposite lens after successful removal of one cataract, or formation of a second calculus after a removal of one by lithotomy or lithotripsy; and certainly no such prolonged suffering as the chronic cystitis which not unfrequently follows these operations."

And Dr. Peaslee states that—

"Double ovariectomy, as a rule, is not followed by any loss of the special characteristics of woman; the only decided physiological change being the final cessation of menstruation as well as of ovulation. Three of my own patients, married and highly educated ladies, after recovery again became splendid examples of womanhood, enjoying the most perfect health, and retaining all their former attributes of mind as well as of body, and with undiminished sensory capacities in their matrimonial relations."

We must, however, qualify what he says in regard to the cessation of menstruation, since there is full evidence to prove that, if a catamenial flow, in the true sense of the word, does not take place, there has been in several women who have lost both ovaries a regularly recurring discharge of a similar character, and accompanied with the customary constitutional symptoms.

And as regards the great mass of the patients, Peaslee asserts that "it may be shown that in the United States and Great Britain alone ovariectomy has within the last thirty years directly contributed more than thirty thousand years of active life to woman; all of which would have been lost had ovariectomy never been performed." The calculations by which he arrives at these results are elaborate but no less just, and applying them to the 500 cases of Mr. Wells, we find that nearly one third of this accrued life arises out of his 373 successful operations. The average age of all his patients was as nearly as possible thirty-eight years, at which period the Carlisle tables assign an expectancy of life for a healthy woman in this country of twenty-nine years. Without the operation it is a liberal allowance, and much below the estimate of Boinet, to say that 95 per cent. of these women would have died in less than four years, while the remaining 5 per cent. might perchance have averaged eight years each of life. The whole 500 would thus only have realised, if left to themselves, 2100 years out of the 14,500 naturally due to them.

But calculated on the basis just stated, the years added to the lives of the 373 recoveries, minus the loss of life from the 127 unsuccessful cases, yield a total gain for the 500 patients of

8817 years. The 373 survivors, however, have secured by the operation the probability of the gross amount of 10,817 years of average healthy life, instead of the 1492 years of miserable endurance which they might have passed before death without operation. If on such a representation as this comment be necessary, and the tale fails to drive home its own moral, public feeling must be extinct, and the common intellect not worth appealing to.

The first thing which reflection on such a subject as this must force us to admit is, that some modification of the hospital system is inevitable. It may be all very well to say that hospital patients cannot have everything, and must be content with a balance of advantages, which is already much in their favour, compared with the comfort, attention, and curation they could command at home. True, perhaps, for the majority of cases, but for the bulk of those whose maladies are the special affair of the surgeon, and who have to submit to his knife, it is a hardship, which will some day bring out irresistible remonstrance, that they should knowingly be deprived of a large share of their chances of recovery. If separation, fresh air, and untainted nursing, make so much difference as accepted statistics declare, they in their helplessness have right to it. The success of hospital surgery is not an honest success; it is short measure, and not what either patients, founders, or supporters can in justice demand. Take the single operation of ovariectomy as a test. What does Keith do, and what do his patients gain? He puts them apart in airy upper rooms, with windows looking over the Frith of Forth and the Pentland hills, has them nursed by attendants of his own training, and observes all the precautions that science and humanity can dictate, and he does his work with a percentage of recoveries of 81 per cent. Sköldberg, of Stockholm, not long before his death, told us that he only operated under the same conditions, and would not risk the lives of his patients by any other arrangements. How did they fare when trusting to his sagacity? He saved twenty-six patients out of thirty operated on. Look again at the figures of Mr. Wells. The rate of mortality of the private patients among his last two hundred is only 15 per cent. as against 26.66 per cent. of those treated in hospital. Can evidence of this kind be resisted, or will the excelsior spirit of the profession wait for a little indignant pressure from without? Circumstances we know were different when the greater number of our hospitals were established. Cities were not so large, and human life had not the same relative value that it has now, but even then surgeons and founders looked first of all for healthiness of site for their health-giving work. And so it ought to be now;

for what after all is the convenience or extra time of a surgeon compared with the life of a patient? or what does it profit a man if he gains the skill of a Cooper or a Brodie and loses his life in a pest-house? Better far would it be to put up with less repute and experience and secure the services of junior men who had leisure to do the work in suburban districts.

Then, too, we want fuller and complete statistics; we want to know the truth, the whole truth, and nothing but the truth, for our own guidance, and to assist in completing the report about to be made to the French Academy by MM. Boinet and Demarquay, which deserves all the co-operation that English surgeons can give to it. Hitherto the response to the appeal made for returns is scandalously deficient. Sir W. Fergusson and a few leading men have not hesitated to send in statements, but what is wanted is a report truly national, and we owe it as a debt of honour.

Note also:—it cannot be said of the surgeon as of the poet, *nascitur non fit*. He is a made creature, and for the most part self-made, out of the raw material of certain qualities, mental and physical, by long labour, great pains, and experience, which has oftentimes proved costly to those who furnished it. *Experientia docet*—and the successful surgeon and the world of his day share the benefit. But there is a double to this saying, *experientia debet*—the one as true as the other. All the wisdom and skill which give him name and fame he holds upon trust, and those who come after him, both sick and surgeons, have a claim upon him under a natural law of entail. That which he is and has himself, he can if he chooses make and impart to others better and easier than they can do it for themselves. He may write books, but that is not enough. He may show his practice, nor is that enough. We have had some experience in teaching, and know the difference between talking and showing, between demonstration and guidance. The duty that a man of great experience owes to the profession and to the public is that of training. The followers of the old masters worked in the studio; hence, if not the inspiration, the facile handiwork of a Raphael and a Titian. And it is only in the sacred and confidential relation of master and pupil that all the springs of success can be unfolded, and the mystery of their working be transmitted. The master of a craft has no more right to die with the hoarded endowments of his life unrevealed than he has to commit suicide.

And what a change in the relations between the English and Continental surgeons of the present day and those of the last generation. One cannot readily forget the contemptuous way in which English surgery was spoken of almost everywhere abroad. Now, thanks in some great measure to the impression caused by the perseverance and success with which this very

operation of ovariectomy has been forced into adoption, we have such men as Nélaton from France, Sköldberg from Sweden, Krassowski from Russia, Billroth and Stromeyer from Germany, coming over to look and to learn, returning to advise and practise what they have seen, anxious only for the wider spread of the benefits springing from the irrepressible energy of their English and American fellow-workers, and acknowledging, with the frankness of minds above the littleness of personal or national jealousy, their indebtedness and gratitude for advice, guidance, and encouragement, to the leading men of our time.

II.—*Restraint versus Non-restraint.*¹

DR. DE WOLF'S Report contains the following expressions :

“So, in the management of the insane, the total disuse of mechanical restraint is the best security against tyrannical and revolting treatment. Dr. Conolly's able and effectual advocacy of the principle of non-restraint has not only led to its being adopted in every county asylum in England, with rare exceptions, but has influenced the superintendents of German asylums to follow, in part at least, so good an example.”—page 14.

Dr. Yellowlees writes upon the same subject :

“There has been nothing unusual in the medical or general treatment, except, perhaps, that restraint has been used more frequently than in previous years; this has been the case simply because there chanced this year to be patients who needed it—either for surgical reasons, for determined suicidal attempts, or for wholesale destruction of bedding. It has been used chiefly on the female side, and generally in the form of gloves embracing the whole hand. This is regarded technically as “restraint,” and is registered as such in the ‘Medical Journal,’ although it scarcely deserves such an opprobrious name. I never hesitate to use restraint when other means fail, if I think it for the patient's good. The cases requiring it are very rare, but it is as certainly right to use it when required as it is wrong to use it when unnecessary. To condemn restraint under all circumstances merely because it has been, or might yet be, abused is as unreasonable as to forbid all use of stimulants because they have been, or may yet be, used too freely.”—page 13.

Since this statement was published Dr. De Wolf has written to a friend in England as follows :

“My advocacy of non-restraint is more requisite here than in the old country. * * * I do not regard the use of gloves, lock-buckles, in the case of denuders, as restraint. Gentle

¹ *Fourteenth Annual Report of the Provincial Hospital for the Insane, Halifax, Nova Scotia, 1872.* By Dr. DE WOLF, Medical Superintendent.

Seventh Annual Report of the Glamorgan County Lunatic Asylum, 1871. By Dr. YELLOWLEES, Medical Superintendent.

force I do not consider incompatible with the true and genuine humanity we owe to our patients." * * *

We have ventured to contrast the two first paragraphs not merely because they are antagonistic, but because they represent two currents of opinions now running, quietly and calmly, side by side, through the professional mind and even spreading beyond its narrow limits. They sufficiently indicate a disposition to reconsider the whole question, and especially the grounds upon which abstention from all coercion was advocated, the objects proposed to be secured, and the actual gains which have resulted from the practice. It is matter for congratulation that these discrepant views can now be developed and advocated in official documents of a similar character and importance, and that the whole bearings of the subject can be discussed upon the same terms and in the same temper as we estimated the success or failure of a drug, without acrimony, and without the imputation of improper motives, or of rashness, or inhumanity, to either of the contending parties. During the first twenty years after the advocacy of non-restraint, so sad and bitter was the controversy to which this proposed innovation gave rise, that medical men connected with the treatment of the insane of the present generation may well fail to realise it. Indeed, the small number of those now remaining who participated in its various stages must experience astonishment at the excitement of feeling which prevailed, at the disproportionate importance attached to the progressive steps in the experiment, and at the lack of courtesy, candour, and forbearance which characterised the great majority of the combatants. By reference to the volumes of the 'Lancet,' published between 1838 and 1848,¹ when the contest was at its height, some idea may be formed of the amount of interest existing, by the space occupied with reports, letters, replies, recriminations, &c., and ample proof will be found of the passions and prejudices involved, and of the abandonment of all the rules and refinement and delicacy which should regulate scientific discussion and distinguish scientific inquirers; but the pages of that journal do not disclose the doubts, the difficulties, the jealousies, the estrangements, which followed these angry discussions, nor the false position which many honest and humane and intelligent opponents were constrained to occupy towards each other and towards the public. It was fortunate for the school propounding the abolition of bodily restraint in insanity that the editor of the 'Lancet' suggested the designation of the "humane system" as applicable to its

Vide likewise Volumes vii, ix, x, xi, xiii, xv, xix, xx, xxii, 'British and Foreign Medical Review,' *passim*.

principal feature ; but the cognomen was unfortunate for freedom of opinion and, perhaps, for the adjudication of the real merits of the measure introduced, for very few, indeed, dared to avow themselves hostile to a plan bearing so glorious a name, professing to be an improvement, and claiming to secure further amelioration to those committed to their charge. Others, influenced by the authority and example of the able and philanthropic men who conducted and tested the experiment freely and confidently acted upon their example and experience, and carried out their recommendations at once, or tentatively. A third class likewise carried out those recommendations as faithfully, but without faith in their expediency or safety, and yielded either to the general concurrence of their brother specialists, or to the force and tyranny of public opinion. We have met a superannuated superintendent within a short time, who confessed that for twenty years he abstained from the employment of every instrument of restraint, although but partially convinced of the propriety of the course which he pursued and retaining some conscientious apprehensions that he had failed to do his duty in obeying the dictates of either genuine pity or spurious sympathy, and had exposed patients to danger, perhaps injury, in the effort to avoid exposing them to painful and what were regarded as degrading precautions.

Having before us the temper and tendency of members of the profession to revert to treatment inconsistent with what Dr. De Wolf would call the universal recognition of the principle of non-restraint, some advantage may accrue from a brief epitomisation of the causes, and concomitants, and consequences of this movement. We occupy a favorable standpoint, the noise, and the dust, and the angry incentives of the fray have all subsided ; we can look backward over a large expanse of asylum history undisturbed by a single thought or motive differing from what actuates us in investigating the benefits of a splint, or of a starch bandage, or from the disuse of such appliances ; and we can analyse the convictions and observations of the chief actors in those events precisely as we may those of a past generation with which we hold little in common. We are very apt to attribute the errors of our predecessors which we are called upon to correct, to gross ignorance, or grosser cupidity and cruelty, where it would be more generous and just to trace their proceedings to a false hypothesis, mistaken benevolence, or to motives which, from change in circumstances or social organisation, we cannot fully fathom. That those labouring under mental disease, especially under its more threatening forms, were in the eighteenth century treated after a most absurd, barbarous, and aggressive fashion cannot be gainsayed, but that this course was

invariably, or frequently, the result of the blind, and savage, and unchristian nature of their relatives, or natural protectors, is open to grave doubt. Little distinction was then made, or could be made, between the lunatic and the criminal; the former was still regarded by many as demoniacally possessed, and, by none, as diseased in the same sense as the palsied or plague-stricken, and he had not passed from the care of the jailer to that of the physician. He was feared as a wild animal, an incorrigible enemy to public order, and decency, and to life. He was feared by the community, by his legal custodians, and by his nearest and dearest friends, and was treated accordingly. To this groundless pusillanimity, rather than to gratuitous ferocity and brutality, are to be traced the absurdity and the revolting severity and duration of the coercion and confinement which existed when Pinel became the physician of Bicêtre, and existed, be it observed, certainly not with his sanction, but without any active interference on his part. We honour Pinel as a benefactor of his race, as actuated by principles of the purest benevolence and justice, and as having initiated that revolution in the management of the insane which has continued in movement ever since, and which, although like many other organic changes entailing certain difficulties, and dangers, and even evils, still exercises a healthy influence upon the provisions and arrangements made for the protection of those who cannot protect themselves. But it is to his courage and merciful disposition that we trace the ameliorations he introduced, and not to a penetrating glance into the requirements of the insane, not to an appreciation of the real, and above all the modern objections to instrumental restraint, and assuredly not to any medical theory as to its inefficacy; for coercion in what are called milder and mitigated forms was constantly resorted to in his practice, and persevered in by his successors throughout France for fifty years after his decease. We are even inclined to suspect that the excited desire for freedom which then¹ agitated the hearts of his countrymen may have roused his antipathies to bonds for whatever purpose applied, and have suggested the innovation which immortalises his name. The success of that experiment was, at least, secured by the co-operation of some of those monsters who were then flooding Paris with the blood of its bravest and best, and whose only excuse must consist in their being themselves victims of the blood-thirst of the *manie meurtrière*. It would be foreign to our present purpose to describe more minutely the steps taken by Pinel, but it may be instructive to refer our readers to the harrowing and impressive picture drawn by Dr. Conolly² of the first scenes in that drama

¹ 1793.² 'British and Foreign Medical Review,' vol. xix.

as revealing the follies, or atrocities, as they may be differently explained, from which we have escaped. The most prominent figure occupying the period following the advent of Pinel is that of the amiable and venerable Esquirol. He was a most faithful and noble disciple, advocating gently, but earnestly, all amelioration in the lot of the Insane, and treating them as imperfect and diseased fellow-creatures, but still having recourse to various means of repression, therapeutic and physical. To him we are indebted for a *catalogue raisonnée* of many of these means, and for a wholesome reprobation of the perilous or powerless character of many of the curative proceedings which were generally prevalent during the earlier part of his own career. But while we condemn the use of such heroic measures as the swing, the rotatory chair, the surprise bath, and rejoice that they have been abandoned, we are not prepared to say, as was said during the heat of the controversy in 1839 to 1843, that they were manifestations of cruelty, brute-force, apathy; that they were worthy of Torquemada, of the genius of political revenge and persecution; but would accept them as rude and questionable modes of treatment. Contemporaneously with the efforts of Esquirol the public mind in Great Britain was, from time to time, startled and scandalised by disclosures of neglect, harshness, and horror, which, if not actually proved, were supported by so much evidence as to inspire suspicion as to the internal regulation of asylums, and to demand investigation of the whole subject of the secluded insane, and such legislation as might secure rational and scientific treatment. It should be here remarked, first, that even in 1815 the medical profession was not and could not be responsible for the cure or happiness of patients placed in public or private establishments, as, generally speaking, there were no resident officers, and the only time and circumstance when the physician was brought into contact with those whom he was expected to restore to health, was a few minutes daily, or weekly, or fortnightly, as the case might be. At the same time all moral influence was unheard of and unknown, and *de facto* not merely the execution of the medical prescription, but the whole care and supervision were committed to the charge of ignorant servants and attendants. Moreover, it was precisely in such houses as were least under medical superintendence, or where no such safeguard was tolerated, that those practices and outrages which have been noticed were most flagrant and frequent. Although no moral cataclasm or triumph, such as occurred in Bicêtre, signalled the march of improvement, a gradual, but very decided, amelioration was going on wherever enlightened medical men were entrusted with the supreme government of public institutions, and going on while

abuses prevailed elsewhere, and even under the auspices of many who neither then, nor subsequently, countenanced the sweeping reformation which they could as little prevent as accelerate. The amount and multiform varieties of restraint continued to be very great and almost unintelligible until a very recent period. To those who value what may be called the curiosities of psychological literature we would recommend the study of the plates in Guislain's '*Traité sur l'Aliénation Mental*,' 1826, where many of the machines and instruments then, or recently, used in asylums are quaintly figured. To such as can recall the aspect of any of the hospitals for the insane in Paris in 1832, and for years thereafter, but especially of Salpêtrière,—where of a fine summer morning there might be seen eighteen old, grizzled, garrulous women in a row all seated or strapped in the American "Chaise de Force" claimants for snuff and generally swallowing it when it was granted, and this in addition to many individuals leglocked, confined in a camisole, or pinioned to bed by various contrivances, or plunged by dozens into hot baths and kept there for hours by a wooden or leather cover, embracing the whole body except the head, upon which a shower-bath or douche was occasionally caused to descend from a considerable height,—no engravings or illustrations can be needed to point the moral. Yet these provisions, unnecessary and preposterous as they now seem, were prescribed by medical attendants eminent for their kindness, sympathy and intelligence. In 1838 we examined in Siegburg, the scene of Jacobi's researches and success, a modification of the rotatory chair, and that curious linen wrapper in which the violent patient was rolled and rerolled until he somewhat resembled a mummy, and became so utterly helpless that he might have been suspended from a nail in the wall like an Indian papouse, which he in every respect resembled. We were not informed whether such apparatus was in use or not. In an adjoining state at Eberbach, then a prison, a penitentiary and an asylum, we found a museum filled with the chains, girth-straps, strait-waistcoats, restraint couches and beds, repression chairs, roundabouts, baths and other indescribable engines, which had been employed in the management of epileptic and lunatic inmates. The most curious of this large collection was a sort of case or sentry-box in which the excited maniac was shut, and so inclosed that he could not move, and that no part of him was visible except the eyes and nose. In Esquirol's great work,¹ published in the same year, may be met with figures of the contrivances then adopted to prevent excessive muscular exertion and extravagance, to economise

¹ '*Maladies Mentales*.'

strength, and to prevent falls and other accidents. Even in our own country, although there might not be such ingenious or complicated machinery, there were many instances of that cautious policy which pointed to extreme and constant restraint. Chaises de forces, so loudly condemned, existed in almost every asylum, not so horrible in reality as in description, for the paralytic, the infirm, the restless, and, perhaps, for many cases to which they were but ill adapted. The genial and kind-hearted Sir William Ellis, the apostle of occupation as a cure in alienation, was condemned by the equally kind-hearted Conolly for fixing all the epileptics in Hanwell to the bedstead during the night, in order to prevent falls, turning on the face, and suffocation, it being overlooked that neither perforated pillows, dwarfed bedsteads, floor mattresses, or special watching, had then been thought of. In 1840 Sergeant Adams, one of the most ardent and thorough-going pioneers of that system which now prevails, made the following statements to a meeting of the Middlesex magistrates:—"He had seen, within the last fourteen days, a man—he would not say in what asylum it was, but he had gone there on the recommendation of a gentleman, who was an acknowledged advocate of mild restraint—who was in heavy manacles. Within the last month, in another asylum, whither he had been sent by a gentleman of great benevolence, because he said the asylum was well conducted, he had seen three young women who were bound fast down to their beds, with their hands passed through rings, so that they were utterly incapable of moving, and yet such treatment was called mild restraint. He had seen, too, a man who was manacled by the legs so tightly as only to be able to shuffle along the floor, in which state he had been for no fewer than ten years. The arms of the young women were black and blue from the chains which had been placed around and upon them. He had seen, in another county asylum, said to be an asylum in which the system of mild restraint was practised, two men who had been chained to their beds for four years and a half, the one for having struck his keeper, the other because it was said that he had been tried for having stabbed a man."¹ Impedunosity or avarice, perhaps, produced the following horrors described by the Metropolitan Commissioners in 1844:—"In a small, cheerless day-room, with only one unglazed window, five men were restrained by leglocks called hobbles, and two were wearing, in addition, iron handcuffs and fetters, from the wrist to the ankle. One powerful young man, who had broken his fetters, was heavily ironed, and another was leglocked and

¹ 'Lancet,' vol. i, 1840-41, p. 290.

handcuffed, who was under medical treatment and in a weak state. One woman was leglocked by day and chained to her bed at night. Chains were fastened to the floor in many places and to many of the bedsteads. The males throughout the house slept two in a bed."

More striking examples might be discovered, but sufficient evidence has been adduced of a state of mismanagement which then existed, but which was speedily to pass into utter oblivion. But, perhaps, a still better mode of showing the extraordinary extent to which coercive measures were carried, even in treatment by distinguished physicians, and the dawning and gradual elaboration of new and better views, may be to present facts from the records of the Lincoln Asylum, about to become famous as the chief arena in the impending dispute. From these sources we learn that, in 1829, when the total population of the house amounted to seventy-two, thirty-nine were restrained upon 1727 occasions, and for a gross period of 20,423 hours. In 1834, when there were 100 inmates, it appears that forty-five were confined upon 647 occasions, and for the gross number of 6597 hours. During this somewhat gloomy period, when the amount of coercion fluctuated in rather an inexplicable manner, except we seek for a solution in the presence or absence of excited patients, or in the conflicting opinions of the medical officers, there are indications of the rise of that spirit which was producing changes elsewhere, and we find Dr. Charlesworth directing his attention to the amelioration of the instruments employed.

In June, 1838, Mr. R. G. Hill delivered a lecture at the Mechanics' Institution, Lincoln, in which he announced that he had succeeded in abolishing all restraints in the asylum under his charge. Publicity was then, and for the first time, given to the success of the lecturer's labours; but from the time of his appointment he seems to have contemplated and struggled for the result which he ultimately attained. In 1835, of 108 patients in Lincoln Asylum twenty-eight were restrained 323 times for 2874 hours. In 1836 the number of individuals restrained amounted only to twelve; the number of occasions had diminished to thirty-nine and the duration to 384 hours. In 1837 recourse to coercion may be said to have ceased. We do not regard the discontinuance of chains, bonds, &c., as an effort of genius, nor Mr. Hill as a discoverer; but we do give him infinite credit for great moral courage, for perspicacity, for his personal investigations into the supposed necessity for physical repression, for his personal association with the insane, in order to observe their habits and symptoms.

We concur with Dr. Conolly that he was the originator of

“the idea of wholly abolishing mechanical restraints;”¹ and we believe that, like Pinel, he has planted seed which has grown and flourished, but of the vast growth and fruits of which he never even dreamed. The announcement of such a revolution as that made by Mr. Hill was calculated to produce scepticism and opposition; but the intense and unreasonable forms which these natural feelings assumed could scarcely have been anticipated.

The first outburst of doubt and disunion was among the officers of the asylum of which Mr. Hill was superintendent, although it speedily spread beyond the cradle of the recent experiment. We do not, of course, propose again to raise the veil which has long since dropped over the disputes and disorganizations which for a long time disturbed the counsels and the usefulness of the Lincoln Asylum; but it is due to the memory of one of the hostile parties to present the convictions of Dr. Cookson, who may, without injustice, be identified as the advocate of “things as they were:”—“I believe that the abolition of visible restraint in the Lincoln Asylum has been followed by much secret oppression, much hidden violence, and by many revolting practices, a thousand times more dangerous than mechanical restraint, because they can neither be so easily detected nor so readily controlled; and I ground my belief upon evidence, which may be divided into the following heads:—1. The testimony of patients under treatment, supported by collateral evidence. 2. The testimony of recovered patients, sane at the time of making deposition, and who have undergone the test of at least a year’s residence in the world. 3. Of convalescents upon their leaving the house. 4. Of attendants who have been dismissed for acts of violence. 5. Of attendants who have left the institution voluntarily, and with a good character. 6. Of workmen and artisans employed upon the premises. 7. Of accidental observers. 8. The records of the house, which demonstrate the great frequency of violence towards patients. 9. The same records which show that attendants bearing a high character for humanity and good conduct have been goaded in their attempts to restrain patients to acts of violence, which could neither be justified nor pardoned.”²

The next and most important advance towards the testing and dissemination of Mr. Hill’s views was the appointment of Dr. Conolly as physician to the Hanwell Lunatic Asylum, where his previous experience, his pure and lofty character, the sincerity of his belief, and his self-devotion, secured a wider and fairer field, and a trial under more favorable circumstances

¹ ‘Asylum Journal,’ Feb. 5, 1855.

² ‘The Lancet,’ Nov. 7th, 1840, p. 230.

for the attempt which he had seen in operation at Lincoln, than was otherwise or elsewhere possible.

We can well understand the obstacles and positive enmity which he encountered from conscientious adversaries, from the indifference, the laziness, the positive selfishness, and the incompetency of subordinates, from the inertia created by long established customs and regulations, and imperfect information, and we can sympathise with the suffering inflicted upon his sensitive nature by the cold and broad front of antagonists, whom he felt were conscientious, marshalled against him, among whom were enrolled some of his personal friends and admirers, including Calmeil, Jacobi, and Guislain, and even pupils, and we have invariably awarded to him, not merely the merit of a philanthropist, but of one who put aside every tie and consideration except professional duty and his own benevolent impulses. His lectures¹ published in 1845 not only gave a new impetus to the doctrines which he promulgated, by removing them to a higher sphere and a more fitting audience, but by placing them on a scientific basis and endeavouring to propound them as a system or scheme of treatment, and with persuasive eloquence he imparted a form and consistency and importance to the matter which it had not previously possessed. But while his dogmata and practice were thus legitimately propagated, and were insensibly winning their way to the hearts, if not to the heads, of many who had reviled and revolted against them, the storm raged without; the conflicting opinions and counsels which perturbed Lincoln and Hanwell found their way rapidly and with accumulated virulence to Boards of Magistrates, Directors of Asylums, and Medical Societies, to all who were connected directly, or indirectly, with the care of the Insane. The press poured forth, not merely grave treatises but sensational works, long since forgotten, such as 'A Narrative of the Treatment experienced by a Gentleman during a State of Mental Derangement,' 'Facts Connected with the Treatment of Insanity in St. Luke's Hospital,' and many others, the authors of which had experienced the grievances of which they complained. We can now comprehend the fierceness of the struggle only by examining the weapons resorted to.

It was proposed that the use of restraint of any kind should be declared penal; that the existence of private asylums, where this offence was supposed to prevail, should be prohibited by Act of Parliament; that all mechanical means employed to accomplish what may be called a legitimate object, such as in

¹ 'Lancet,' 1845 and 1846.

compulsory alimentation, the exhibition of medicine, was pronounced brutal, atrocious, needless; that all physical interference with the morbid will, caprices, and peculiarities of patients, as in ordure eating, uncleanness, exposure to cold, was cruel and unnecessary; that such expedients were dictated by laziness, indifference to suffering, ignorance of physiology; that their use engendered callousness and cruelty in the guardians; that the mildest and most passive bands, muffs, camisoles, were detrimental to the mental condition and to recovery, and galled and injured the body;—while the advocates of such resources were denounced as purblind, stupid, obdurate, disingenuous, and unconscientious, and their objects asserted to be unattainable. Then they were reflected upon, not only as visionary, but dishonest—not merely speculative, but, by a little ingenious alteration, speculative too; and where the perfect practicability was granted the humanity was denied. On the other hand, the proselytes to the new faith were accused of insanity, rashness, precipitancy, of concealing or falsifying the real results of the practice pursued, of sacrificing the interests of their patients to pseudo-humanity and maudlin sympathy, and to the establishment of a barren dogma or crotchet, in defiance of all previous experience, and which, if generally received, tended rather to retard than promote the objects of seclusion and treatment.¹ Such were the arms and armour which strewed this battle field.

Let us now enter upon the *casus belli*, the principles contended for. Mr. Hill's formula, which long constituted the war-cry of those who concurred with him was, "that in a properly constructed building, with a sufficient number of suitable attendants, restraint is never necessary, never justifiable, and always injurious, in all cases of lunacy whatever."² But these propositions were speedily amplified in various ways and in different directions; the dispensation with bonds, or rather the substitution of manual or mural, for instrumental, repression was magnified into a mode of treatment, was advocated, not merely as a humane course, in harmony with modern thought and feeling, but as accelerating recovery and as securing quiet, order, happiness, and gentler feelings among the insane and their guardians. Whatever the more ardent and sanguine of those converted to this creed may have believed and done, its more rational supporters, although, perhaps, cherishing extravagant expectations as to the power of the engine which they wielded, did not relinquish the aid of the ordinary agents supplied by medicine, diet, hygiene. Indeed, Dr. Conolly's lectures abound in

¹ 'British and Foreign Medical Review,' vol. xi, p. 111.

² Hill's 'Lectures on Lunatic Asylums,' 1838, p. 21.

valuable observations upon the use and efficacy of drugs, exercise, and occupation. It was further urged that restraint held the place of punishment, for symptoms of disease for even involuntary and automatic acts; that it roused and aggravated the passions which it was intended to quell; that it failed even to afford the boasted protection against accidents and injuries, as patients had been strangled in and by the camisole they wore, had been crippled by hobbles and manacles, and long confinement in one position, had been subjected to bruises, wounds, boils, and bedsores, by the torturing application of wood, or iron, or leather, and that it was a mere pretext and mockery as fostering the idleness and negligence of attendants who were described as "guzzling, drinking, and playing cards." Exception was unavoidably taken by the malcontents to the condition under which abolition was declared to be practicable, as the structure of asylums was then, as it in many cases still is, so vicious, or unsatisfactory, as to mar all attempts at rigid classification or separation; and as, although except in houses for paupers, a sufficient force of attendants could be assembled to convince or cow a violent maniac, there were no guarantees afforded by their education, training, status, or salaries for discretion, good temper, or forbearance, or that their muscular power might not injure or provoke as much as any bond, or that they might not exercise as much harshness and cruelty and a more intolerable moral tyranny, than when they had the absolute control of the means and duration of seclusion. It is certain that harshness and hardness of nature might be displayed both in dispensing with as well as in applying restraint, but it may be somewhat difficult to determine in which of these proceedings the greatest amount of irritability and risk would occur. The moderate defenders of instrumental means, we shall not summon the zealots into court, protested that these were used as remedies, not as punishments, or as facilitating the administration and operation of other remedies; they represented them as disposing to calmness, rest, sleep, as calculated to conserve strength, warmth, and comfort. They adduced instances where the strait-waistcoat was petitioned for by individuals sensible of their own infirmities and destructive propensities. Such measures were affirmed to be indispensable in cases of suicide, self-mutilation, masturbation, and where insanity was complicated with acute disease, or other morbid conditions of the system. Dr. Blake and Mr. Powell, of Nottingham Asylum, both leaders in the movement against all harsh treatment, defined restraint as the restriction of certain motions of the body for beneficial purposes, recommended the use of the belt and gloves in a case where the trachea was

divided, a stuffed chair with pillows attached in a case where the patient rushed furiously to and fro, attempted emasculation by torsion and butted his head against the wall; and while they admit this step to be not merely an adjuvant, but a powerful agent in moral treatment, and as useful "as a means to check obstinate and vicious propensities in certain cases of monomania and moral insanity in which a sufficient degree of reason remains to enable the individuals to fear its reapplication," they confess that such a course is not *absolutely necessary* under the circumstances described by Mr. Hill.¹

Dr. Stilwell, the humane proprietor of one of the best conducted private asylums in England, prone to denounce those instruments which he does not employ, writes most favorably of the benefit derivable from the leg-strap in retaining restless persons in bed, and thus inducing sleep, and the strait-jacket where, after moral and all other resources have been exhausted, patients expose themselves to cold, discomfort, and sleeplessness.² A third superintendent thus condenses the views of those with whom he agreed:—"First, that restraint may be dispensed with; secondly, that the absence of restraint affords no guarantee or proof of the non-existence of cruelty; thirdly, that there should be as little restraint as possible, and as is consistent with the comfort, cure, and improvement of the patients; fourthly, that restraint is occasionally necessary and humane; and fifthly, that it should never be imposed but by the orders of the medical man."

These propositions obtained, we believe, very general concurrence; and after the lapse of a few years, and when the more active controversialists had ceased to appeal to public attention through the periodical press, the numbers of that specialty chiefly interested seem to have acquiesced in the propriety of minimising restraint, even where conviction of its unprofitable or baneful influence was not reached. The inquiry, however, at this stage assumed a new and painful phase, as suspicions arose and were propagated, that even where all restraint was ostensibly discontinued, substitutes of very doubtful or reprehensible character had been devised, and that the shower-bath, opium, antimony, the wet sheet, prolonged seclusion, and baths, and terrorism, had achieved what was attributed to the absence of fetters. Bound to mention these rumours, we dismiss them without observation, as unworthy of credit or consideration.

After a most careful consideration of all the aspects and bearings of this vexed question, and the perusal of about

¹ 'Lancet,' Dec. 19th, 1840, vol. i, p. 451.

² *Ibid.*, Dec. 5th and 19th, 1840.

ninety-five fugitive pieces and more pretentious documents, we are disposed to think that those who argued in favour of "mild restraint" had in many respects the best of the argument, although the worst in the issue; that they decidedly conducted the discussion in milder, more moderate spirit and language; and that their antagonism was not altogether without advantage in the cause of humanity. That the subject was about to be placed under higher auspices and in more prominent relation to medical ethics, became soon very obvious from the claim to originality in the proposal to abolish restraint being made on behalf of several physicians, in an especial manner of Drs. Steward, Southall, Charlesworth, and Dr. Conolly; and so recently as 1870 Dr. Hill has felt it incumbent on him, in a work which is essentially a reproduction of his 'Lectures' in 1838,¹ to protest against newspaper attacks upon himself or his system which we have not seen, and from what he regards as an unfortunate association of his name with that of the late Dr. Charlesworth by Dr. Conolly in alluding to the working out of that system in the Lincoln Asylum.

It may be instructive to turn attention, at this point, to the progress of opinion in other and adjoining countries. We have presented a glimpse of what constituted probably the maximum of coercion in the hospitals of Paris. From this time there appears to have arisen the impression that physical means had been used rather indiscriminately, and in circumstances where greater supervision or moral suasion might have sufficed. There has been latterly, at all events, a marked diminution in the application of the *gilet de force* and congeneric appliances, yet between 1840 and 1850 M. Brierre de Boismont, while awarding great admiration and respect to Conolly and Webster, expresses his unswerving allegiance to instrumental repression, as necessary and beneficial, especially in cases of suicides, mutilators, nudifiers, and in counteracting the designs and disturbances arising from malicious and perverted dispositions. M. Brierre de Boismont still survives as one of the most distinguished psychologists in Europe. Again, between 1850 and 1860 M. Renaudin, another French celebrity, after some gentle jokes as to the monopoly of benevolence in England, philanthropy run mad, &c., and quoting Damerow approvingly for the *mot* that non-restraint introduced and necessitated a still more coercive system, publishes his own practice at Maréville, where only seven camisoles could be met with in a community of 940, as true and genuine non-restraint. When we visited this establishment in 1846, and when the resident staff consisted of twenty nuns, although many defects

¹ 'Lunacy, its Past and its Present,' 1870.

could be detected, there was very little restraint, and the most perfect obedience and affection exhibited towards the band of feeble sisters. So recently as 1863 M. Bazin, addressing the Medical Psychological Society of Paris, described his impressions received during visits to the asylums in England and Scotland, declared his preference for a strait-waistcoat or gloves to the use of a strong dress, which he names a long shift, and a struggle with a group of attendants, affirmed that, under the system he criticised, Insane who refused food would be left to die of starvation; that the nymphomaniac would be unrestricted in disgusting obscenities and enormities, and that a patient suffering from disease of the uterus, with whose history he was familiar, and where cauterization was required, would not have been interfered with; whereas by recourse to restraint and the consequent use of the proper remedies she was restored to health and reason. In 1862 we saw a dwarfish female idiot wearing a camisole in Salpêtrière because she tore "her dress!!." While Moreau de Tours designates the idea of non-restraint "as entirely Britannic; that it was an impossibility in most cases, an illusion always, and the expression itself a lie,"¹ his eminent collaborateur, M. Morel, of Rouen, is understood to have fully adopted what is thus so epigrammatically condemned, but it is not in our power to quote his words.² In Sir J. Clark's memoir of Conolly it is stated that his views are now participated in by Griesinger, of Berlin, Dr. Meyer, of Göttingen, Tebaldi, of Italy, Salamon, of Malmö, Sweden. According to the authority of Casimir Pinel, and Semelaigne, the asylum of Grenada, a superb building, was superintended in 1862 by a priest, was provided with a bath but no water, contained 210 lunatics, guarded by ten attendants. These unfortunates, or many of them, were naked, chained, and shut up in niches and recesses, and treated in such a manner as to excite sympathy and indignation. To such misconceptions and mismanagement we are as unlikely to return, as to copious bloodletting or surprise baths in mania, or even to Leuret's continuous shower-bath for the removal of delusions. But we are fully aware of the caution demanded in sanctioning the exhibition of even the smallest doses of perilous and dangerous medicines, and we respect the horror with which such men as Hill and Conolly recoiled from the very name of restraint. As we have before hinted, such innovators could not have foreseen, and might have opposed the extent to which their sacred principle has been carried, and the grotesque forms which it has sometimes presented. They could not have imagined that stuffed gloves,

¹ 'Lunacy, its Past and its Present.' By R. G. Hill, p. 44.

² *Vide* 'Annales Médicale Psychologique,' *passim*.

sleeves, canvas dresses, and cunningly devised buttons and buckles, should have been held in abomination; that fire-guards, inspection-plates, even locks of a particular pattern, and every article of furniture, disagreeable or suggestive to the Insane mind, should be prohibited; that even seclusion should fall under a ban of reprobation; that the walls of airing gardens should have been levelled; that asylums should have been erected without circumvallation; that all doors should be kept unlocked; that certain gentle enthusiasts have cherished the hope that, except for acute cases, asylums themselves may be dispensed with; that a bull of excommunication has been launched against opium and other drugs, as mental, or moral, strait-jackets. These proposals may not be accepted as the legitimate, or inevitable, consequences of the abandonment of physical coercion, and it is possible that many of them may be received as Utopian; but we are inclined to connect the large amount of liberty and occupation now enjoyed by the cloistered Insane, the immunities, amusement, instruction, comprised under what is called moral treatment, and the liberality, confidence and sympathy with which they are generally treated, with the demonstration of the possibility of doing away with mechanical measures, and of the safety with which the attempt was generally accomplished. We know well that the power of music, recreation, literary exercises, and the influences of external nature were, to a small extent, utilised before the epoch of which we are writing; but these, and a thousand similar provisions, are now universally taken advantage of. It is true that the humanising effects of such benevolent devices may not prevent, may even conceal, gross abuses and harsh usage. But in the improved though still imperfect structure and domestic arrangements of existing institutions, in the watchfulness, responsibility, and professional reputation of a resident medical and civil staff, in the inspection of constituted authorities, in the higher though still partial education of guardians, in the organization of which they are the instruments, in the use of dormitories, of special and night watching, there are afforded safeguards which should not be under-estimated as elements of judicious treatment and happiness. We except excursions, residence in the country, exercise, games in the open air, lectures, readings, dramatic entertainments, balls, concerts without or within the walls, not so much as portions of treatment, although as such they are most important, and in the opinion of many paramount, than as manifestations of the enlarged views and enlightened benevolence under which such establishments are conducted. It may be that therapeutics may be overlaid by these exertions to act directly upon the intelligence and emotions, or may

hold an inferior place to resources which so obviously contribute to lessen the misery or the tedium of prolonged confinement. There are so many minor ailments, accidents, morbid peculiarities, in asylum life, which, though not perhaps impinging upon the grand object of the restoration of reason, considerably swell the sum of labour, and perplexity, and anxiety, that we always hail indications of attention to what may be called minute or even microscopic details. The list shoes, the carpeted passages, the handled doors; the blister cap, invented by Dr. Conolly, the devices to protect wounds, ulcers, local affections, even the conservative bed, as improved by Dr. Lindsay, are all worthy of consideration, and amongst these we would rank the precautions taken by Dr. Yellowlees. There can be, or there should be, no inflexible rule in the treatment of such a varying and uncertain class of diseases as that of the mind, complicated, as they always are, with affections of the body, merely on the score of an abstract principle, or because the course pursued may be abused, or exceeded, or misinterpreted. To be terrified by a word which at one time represented actions and motives now repudiated, would be poltroonery, and while we venerate the theory and practice of non-restraint, we conceive that all who advisedly, upon scientific grounds and for definite purposes, which cannot be otherwise effected, and in the effort to effect which all other means have miscarried, use mild passive restraint, are acting in the very spirit of those who sought to emancipate their patients, not merely from chains and thongs, because they were chains and thongs, but from the sufferings and the evils which they inflicted.

III.—Army Surgery.¹

WAR, by which at intervals during the past fifteen years country after country has been devastated, has afforded the military surgeon ample scope for the practice of his profession in all its branches. The campaigns in the Crimea, India, Italy, America, Bohemia, Schleswig-Holstein, and more recently the great campaign of 1870-71 in France, have each in succession taught valuable lessons; in some instances confirming rules and principles laid down by the predecessors of the present race of surgeons, in others indicating their imperfections, while in some they have afforded opportunity for the use of appliances and arrangements that were unknown early in the present

¹ *Traité de Chirurgie d' Armée.* Par L. LEGOUËST, Inspecteur du Service de Santé de l' Armée. Deuxième édition. Paris, 1872, pp. 793.

century. It will be an interesting and profitable task to trace the various changes and improvements that have been introduced in army surgery, since the time when John Hunter wrote of it, with what degree of skill it is not our task to inquire. "Practice, not precept, seems to be the guide of all who studied in this branch; and if we observe the practice hitherto pursued we shall find it very confined, being hardly reduced to the common rules of surgery." Such remarks have long since ceased to be applicable, if, indeed, they ever were so; for as the military members of our profession have since that great surgeon wrote, been foremost in determining the great principles according to which injuries received in war are now treated, their subjects accommodated and managed, and important operations undertaken, so a reference to the works of those who wrote, ere yet surgery in civil practice had become a science, indicates that even then, some facts had been noted by them, the reality of which has been more and more confirmed by all subsequent experience. Thus, so long ago as 1562, Ambrose Paré expressed his views that "all wounds made in great joints are mortal;" nor are the results of such injuries at the present day much more encouraging notwithstanding all our boasted improvements in practice and in appliances; in other instances, however, and these the vast majority, improvements of the greatest consequence have been made, and the fallacy of practice formerly in use so completely demonstrate that all who read must wonder how the errors that to us are palpable could have been so long and so generally accepted as they were. Thus the time is not far distant when scarifications so deep and extensive were practised as a matter of course in cases of wounds by firearms, that non-professional persons asked why was it necessary that because a man was unlucky enough to get shot, he should therefore get cut up; men brought from the field of battle, labouring under extensive wounds with fracture of the larger bones, and in a state of abject prostration, were bled and purged to an extent now hardly credible; time was, moreover, then lost in the performance of operations on the actual field that are now reserved for intermediate and stationary hospitals, while in regard to matters of a hygienic nature, as those having reference to ambulance establishments and administration, army surgery may be said to now hold a totally different position from what it did half a century ago. Army surgeons of all nations have in their several spheres contributed their quota to the advances which have taken place in their profession. Those of France, ever among the leaders in this as in other branches of professional knowledge, have still retained their position. To the distinguished names connected with the surgery

of earlier wars may now be added those of Chenu, of Le Fort, and of Legouest, the last of these having republished the valuable work to which the following remarks are intended more particularly to refer.

In the general plan of the work M. Legouest adopts that followed by him in the first edition published about ten years ago, but as in this interval war has been busy among nations, he has enlarged his observations by the experience gained in Bohemia in 1866, and in the gigantic campaign of 1870-71 in France, while to the illustrations of the earlier work, now repeated in that before us, he has added several of those originally given in the valuable reports of the surgery of the civil war in America published by the order of the Surgeon-General at Washington. In the opening chapter of the work the author discusses the general subject of weapons and projectiles. From them he passes to the consideration of wounds produced by each particular kind, including the various complications by which they are attended in the several forms of injuries to bones, vessels, nerves, hæmorrhage, and in those that penetrate the large cavities. Gunshot wounds are considered under the heads into which they naturally divide themselves, namely, those caused by the great projectiles and those by bullets. These are considered in reference to particular regions of the body, and then we have a full description of the various kinds of apparatus made use of in the treatment of the more severe wounds of the extremities, with fractures of the bones; and lastly, under this head the several operations that became necessary are detailed. A separate chapter is devoted to those terrible complications of wounds which have ever been the bane of army field surgery, namely, tetanus, pyæmia, and hospital gangrene; full consideration is then given to what may be described as the distant results of wounds, as they severally affect skin, muscles, bones, joints, aponeuroses, &c., the concluding part of the volume being occupied with what may be called administrative surgery, namely, the organization of the *Service de Santé* in war, the *personnel, matériel*, and rolling-stock of ambulances, the means of removing wounded from the field of battle, &c., for their subsequent transport, and the different kinds of extemporised accommodation available on service. The volume thus comprises an epitome of all that is essential for an army surgeon to know for the fulfilment of his proper duties during war.

The weapons used in battle comprise for the most part fire-arms of different kinds and *white arms*, including sword, bayonet, and lance. The conditions of modern war have considerably affected the relative proportion of wounds by these in battle. Except on very rare occasions, contending forces do not

now come to hand-to-hand conflict, as in former wars they strove to do; hence wounds by such weapons are relatively rarer than they used to be. During the late war, however, several striking exceptions to this occurred, and at Spicheren, Bourget, and some other places, fierce and deadly struggles of this nature took place, although, it must be added, few indeed of the wounded received treatment in ambulances—the fight was too deadly for that. It is true that no very complete or trustworthy statistics on the subject are available. The generally received impression, however, is that wounds inflicted by the sword-bayonet of the French soldier are more deadly than those by the German weapon of triangular shape; while in regard to wounds by the lance they also are for the most part fatal if occurring in the trunk of the body, although in the recent war, as in previous ones, recoveries have in some instances taken place in those of apparently a desperate nature, and in which important viscera have been implicated.

With reference to punctured wounds, by one or other of the weapons alluded to, M. Legouest observes that the bayonet or other arm sometimes becomes broken in the wound. In such cases it becomes necessary to search for and extract the retained fragment, and for these purposes to proceed much in the same manner as if the foreign body to be withdrawn were a bullet or fragment of shell. In regard to the general treatment, it does not appear that late experience has done more than merely confirm principles previously laid down.

Wounds inflicted by the sword may be either cuts or punctures; the latter, as a rule, more frequently delivered by the experienced trooper in the French army, as in our own, and by far the more fatal. It has been remarked, however, that in the late war the greater number of French soldiers admitted into the ambulances on account of these wounds had them in their left or *bridle* hand, and we find it asserted by military writers that the German cavalry soldier is still more partial to the cut than the thrust. In all campaigns the wounds inflicted by a cut with this weapon are frightful in their aspect. In those rare cases where death does not result at the moment, and the wounds are confined to non-vital tissues, their treatment is by no means difficult. M. Legouest recommends that a flap of tissue, so long as it remains attached by a small pedicle, shall be replaced, observing that the sooner this is done, and the cleaner the surfaces of the wound are, the better the chances of union taking place. Like most of the French surgeons, he recommends that the dressings first applied should be sufficiently thick to maintain the temperature of the part, and that they should not be removed earlier than the eighth or tenth day,

however offensive they may become from the presence of discharges. The practice is open to several objections. In the event of suppuration or sloughing taking place, the products of either are retained in contact with the wound, and the surgeon is without knowledge of the precise condition of the injury. According to our notions the French surgeons are somewhat too partial to thick dressings; compresses and bandages are used by them to a far greater extent than they are in England, but it is to be feared that in some instances, at least, however beautiful and neat may be the outside, there is much that is offensive and objectionable within. We have, indeed, heard that in some instances medical officers of our own army have enveloped limbs shattered by gunshot in fold after fold of cloth, and of bandage after bandage, more with a view to attract the notice of an inspecting military officer and be recommended for *neatness* of his handiwork, than with a view to the comfort of the patient, for whom, as a rule, the fewer rollers that are applied the better.

Inasmuch as the nature of the larger projectiles used during the recent wars is to a great extent different from those fired in battle some years previously, so various changes have been noted in reference to wounds inflicted by them. So recently as the wars in India and in the Crimea hollow shot were comparatively rare. Solid projectiles were then most generally used; the casualties produced by them, if in some instances quite as terrible in nature and aspect as those more recently met with, were of relatively unfrequent occurrence; death was, however, in some instances caused by their impact upon a vital cavity, although external appearances failed to indicate the extent of internal lesion produced. M. Legouest describes the effects of the modern projectiles of large size. These effects vary according to circumstances, such as the force and relative size of the missiles, whether they strike while unexploded or after they have burst into fragments, and so on; in many instances they produce wounds of frightful extent and aspect, often without bleeding from the mouths of torn vessels, nevertheless in all such cases with imminent risk of its occurrence after an interval more or less long. The nature and form of wounds inflicted by fragments of shells vary to any extent. They are for the most part extremely irregular in shape, and are often attended by profuse hæmorrhage, the fragments, whether of *obus* or *bomb*, not unfrequently remaining imbedded in the deep tissues. The leaden encasement, whether of shells or *mitraille*, sometimes inflict wounds in addition to those caused by their contents, such wounds having at times the characters of lacerations, in others of those caused by cutting instruments.

The observations made by the author relative to treatment are valuable.

"Perforating wounds of this nature, must be treated with care. With a view to prevent the occurrence of large and deep cicatrices, such as are liable to give rise to subsequent inconvenience, the parts must be placed and retained in a suitable position; nevertheless," he adds, "it is rare that satisfactory results are attained. All must heal by granulation, and as extensive loss of substance is common in muscular parts, such as the hips and thighs and in the vicinity of joints, the cicatrices formed after tedious delay are often imperfect, contracted, and liable to suppurate."

The distinction drawn between the severity of wounds made by small projectiles and those by large merits attention. The minimum risk to life caused by the former, and the maximum by the latter, occurs at the time of their receipt. There are various exceptions to this; for instance, a bullet, by penetrating a vital organ, may be instantaneously fatal, but probably the rule is meant to apply chiefly, or altogether, to wounds in the extremities. Contrary to what is often asserted, many of these wounds are attended by profuse bleeding, so much so that some surgeons have asserted that three-fourths of all who die upon the field of battle perish from this cause, and if such be true the fact furnishes the strongest argument in favour of regimental medical officers being near their troops in action, however great may be the risks they individually run.

Much has been written on the character of openings of entrance and of exit in reference to small projectiles. Experience indicates that the reported distinctions between them must be considered with reference to attendant circumstances. As expressed by M. Huguier,¹ both are sometimes alike; sometimes the one, sometimes the other is larger, according to the impulsion of the ball, position and density of the parts through which it passes, the fact of the projectile retaining its original form in transit, or being broken or flattened, and other circumstances. Where it is much broken there may occur several openings of exit; on the other hand, there may be only that of entry observable, the bullet, whether entire or broken, remaining in the tissues. Prior to the late war the belief was general that the injuries caused by the new description of bullets were of a more extensive nature than those produced by the older model. M. Legouest confirms this view. He observes that the spiral course given to conical-shaped bullets of the new pattern modifies their action upon the resisting tissues with which they come in contact, and certainly the surgeons employed in the war of 1870-71

¹ "Des Plaies d'armes à feu," 'Séance de l'Académie de Médecine, du 26 Sept., 1848.'

remarked that, not only were the fractures caused in the long bones by conical bullets very extensive, but fissures extended to a great comparative distance from the principal injury. Thus, treatment was rendered complicated, and, no doubt, the ultimate results were seriously interfered with.

M. Legouest is silent on the subject of explosive bullets. We deem it right to observe, however, that not only is no case of wound by any such narrated in the history of the late war, but that the fact has been placed beyond doubt that no such missiles were fired against men. It would appear that the care of a few explosive bullets was confided to certain officers, but only to be used against ammunition waggons.

The immediate complications of gunshot wounds are various. They include local inflammation, erysipelas, strangulations of deep tissues, puriform deposits, bleeding, and traumatic gangrene or mortification. The latter is of relatively frequent occurrence in cases of gunshot wounds of the extremities, even where no injury to any of the large vessels is apparent. It has been described by the elder Larrey and by surgeons of the British army, and more recently it has attracted the attention of those serving with armies. The question now, as it was a century ago, is as to the propriety of performing amputation in such cases before the line of demarcation has formed between the dead and living parts, or waiting until it has done so. M. Legouest gives their due weight to the several authors whom he quotes in favour of and against each of these alternatives, but, without expressing his own views, accepts those of Larrey in favour of the former proceeding. We may add that during the late war a similar principle of treatment was adopted, and with such success as could be reasonably expected, considering the gravity of the complication.

Gangrene is rare in the upper extremity as compared with the lower. In the latter it for the most part stops short below the knee; in some cases, however, it extends beyond that joint, especially when the limb is tumefied and gorged with fluids. In such a case M. Legouest accepts the rule laid down by Guthrie, that amputation below the knee, if performed early, will probably prevent the further extension of gangrene.

In all cases where a missile or fragment of a *white arm* lodges in a wound it becomes matter of importance to detect its position, and, if possible, to remove it without delay. Both these points were recognised and discussed by surgeons of the British army, whose military career terminated with the battle of Waterloo, nor have later observations had other effect than to confirm their order of procedure. As a rule, it may be observed that the larger the fragment or missile the easier become

its detection and withdrawal. In examining for bullets or fragments retained recent experience has confirmed the principles laid down in the days of the Peninsular war. Dr. Hennen, writing in 1818,¹ observed that "the experience of all ages has confirmed the dictates of common sense in giving preference to the finger when this means can be employed." This author also recommends that while examination is being made "the patient should, if no serious inconvenience follows, be placed, *as recommended by the older surgeons*, in the position in which he received the injury," but very properly adds, "This in many cases is impracticable." He further adds that, "Fully to answer every purpose expected from this plan, not only the posture of the wounded man but of his assailant should be determined." This is out of the question, nor was the suggestion, in all probability, seriously made, all that was needed having been to indicate certain considerations to be kept in view by the surgeon while making exploratory examinations of wounds. M. Legouest adopts the same rules. He considers position to be of great importance where search is being made in a deep wound, and recommends that, inasmuch as a patient cannot in every case be placed in the position he occupied when wounded, the surgeon should endeavour, as far as possible, to picture in his mind's eye what it had been, and conduct his examination accordingly. He directs that foreign bodies should be withdrawn as soon as possible, provided their removal can be effected, yet, like all other army surgeons of extensive experience, he deprecates the use of great force or of extensive incisions, making the remark that, although the continued presence of a foreign body, whatever be its nature, is always a source of suffering and of possible danger to a patient, yet that in some instances they become encysted, and that in others they become loosened in the tissues and present themselves at the surface, where they may often be extracted with ease, after a greater or less interval of time.

During warfare there are conditions unknown in practice of civil life which exert greater or less influence upon the healing and progress of wounds. Sometimes these conditions operate to the advantage of the soldier, sometimes to his disadvantage. On the one hand, the robust state of health, the fresh air, the ample supply of food, and the moral stimulus of victory, exercise a very powerful influence for good; on the other, inferior physique, insufficient food, continued watching and fatigue, indulgence in the vice of intoxication, and the depression consequent on defeat in battle, produce results of an

¹ 'Military Surgery,' p. 88.

opposite nature. During the late war the one set of conditions operated upon the German troops, the other upon the French; nor is it to be questioned that the results would have been equally definite had the requirements of hygiene been fully carried out among the ambulances of the more favoured nation in the reports alluded to. Taking the ordinary progress of an uncomplicated gunshot wound, M. Legouest, describes it thus :

“ Within an interval after the receipt of the injury, more or less severe inflammation attacks its seat; this increases till the third day; the wound discharges a reddish coloured serum, inodorous, or with slight sulphureous smell; about the fourth or fifth day the tissues from the interior of the wound, destroyed by the passage of the missile, begin to discharge and the wound begins to suppurate; from the eighth to the twelfth day the eschars become detached, leaving a granulating surface behind; suppuration is abundant, at the same time that the signs of inflammation disappear progressively, and the wound heals in about a month or six weeks, sometimes less; the wound of exit, whether made by the bullet itself or by the surgeon for its extraction, healing sooner than that of entry.”

He alludes to some rare instances similar to those mentioned during the American war, where gunshot wounds healed by the first intention. He, however, gives no definite instance, nor, so far as we know, does one occur in the published observations of other surgeons who served in the Franco-German war.

With all the undoubted merits possessed by the work of M. Legouest, there is one respect in which, to our thinking, it falls short of those published in this country on army surgery; namely, that it neither contains illustrative cases nor statistical records by which the success of particular lines of treatment recommended can be compared and tested. This defect is an important one. M. Chenu and some other French authors give such information in regard to previous wars, and, doubtless, some such particulars will be supplied in regard to that of 1870-71. With these remarks we would draw a hasty parallel between the instructions for the treatment of gunshot wounds as laid down by army surgeons of the Peninsular war and those by M. Legouest. Dr. Hennen writes thus on the subject :

“ There is no urgent necessity for removing the dressings that have been applied on the field for the first two or three days. In this, however, we must be guided by season, climate, constitution of the patient, and peculiarity of the wound. It will generally be sufficient to keep the dressings wet with cold water, alone or mixed with a little spirits, vinegar, or wine, either cold or warm, as the state of the patient and of the weather may require.

When the field dressings have been removed the limb should be covered with cloths moistened in an appropriate liquid or laid in emollient poultices moderately warm. Compresses dipped in simple cold water have, it is added, been much recommended by Kern and Assalini as a substitute for almost all other dressings. Where this plan is adopted *oil skins* should be employed at the same time, otherwise the beds get saturated. Purging and *phlebotomy* are recommended to be practised in the case of men who have served some months in the ranks of the army, it being added that these bear such measures better than *the recruit just taken from the plough*. The state of the skin is also an object of particular consequence. In ordinary cases I would recommend the sparing use of opiates. When lowering of the system is an object of importance and the use of the lancet must be restricted, antimonials are recommended. In the strong fasciæ of the thigh and arm, in wounds of the back and neck, we have to dread the formation of sinuses. If they do form we at once have recourse to the knife. Here, and here principally, scarifications are truly useful."

Let us now similarly analyse the principles of treatment recommended by M. Legouest, and, in fact, by all other army surgeons of the present day.

"The treatment of simple gunshot wounds should itself be simple. The local applications may consist of simple dressings or cold lotions, the former of *linge fenêtrée* or a pad of charpie supported by a light compress. This dressing should remain untouched for a few days, or until the occurrence of suppuration renders its removal easy and little painful. Water at the ordinary temperature is the best local application that can be made use of, and it is recommended to be used by means of thick compresses, pressure by bandages being condemned. The application of water is contra-indicated in cases where it gives rise to disagreeable sensations on the part of the patient. The introduction of setons into the track of gunshot wounds is condemned."

Our readers will judge for themselves the extent of improvements introduced of late years as compared to the measures adopted by surgeons a couple of generations ago. One great recommendation of water as an application is that there are few conditions in which it is not obtainable; another, that by means of it a wound can be preserved in a state of perfect cleanliness; a third, that by using it the services of attendants are economised, and a patient enabled to attend to his own wounds, at all events to some extent. By-the-by, the employment of water as a dressing is as old as the introduction of powder and shot in war. At first and for many years, however, the pure element was considered as of no use until it had undergone certain mysterious and magical ceremonies. Joubert must have been looked upon as a terrible heretic when in 1601 he directed

it to be used "sans aucun prononcement de verbes métaphoriques."

In all works on army surgery the subject of hæmorrhage necessarily holds an important place. M. Legouest considers it, not continuously, but in connection with particular injuries and conditions. We will endeavour to summarise his remarks scattered through the work before us. Like all military writers, he observes that hæmorrhage may be primary or secondary, venous, arterial or capillary. He remarks that in punctured wounds implicating large vessels the degree of external bleeding is not in all cases a true index at first of the serious nature of the injury. Spontaneous cessation of the flow sometimes takes place in all kinds of wounds, but more seldom when the veins are injured than in the case of arteries. When bleeding from a minute vessel takes place into the muscular or other deep tissues of a limb, its occurrence, although in the great majority of instances readily to be detected, may nevertheless sometimes escape notice for one or more days, whether it assume the form of a diffused or circumscribed clot. In using the term hæmorrhage the military surgeon understands that it means something altogether different from the oozing which occurs in all cases of wounds by white arms and in many cases of those by projectiles. That which arises from the capillaries, whether after a wound or operation, increases in frequency as the length of a campaign increases; in some cases it would seem to depend upon the existence of a hæmorrhagic diathesis in its subject, but in others, and by far the majority, it is, like certain forms of secondary hæmorrhage, no more than an indication that the patient is attacked by pyæmia. According to Guthrie and others of our older army surgeons, the fact is observed that where the principal artery of a limb is wounded bleeding takes place from the proximal and distal openings, thus indicating the course to be adopted in the application of ligatures. In some, but rare cases, the occurrence of syncope leads to the cessation of bleeding; a clot closes the wound in the vessel, and recovery progresses; it is nevertheless evident that such an exceptional occurrence should neither be looked for nor trusted to in war hospitals. Far more frequently the flow thus temporarily suppressed returns in the form of secondary hæmorrhage. It is obvious, also, that the character of the flow and mode of proceeding in each particular case varies according to whether a vessel has been completely or only partially divided. It by no means follows that, although cases of wounds by bullet and by fragments of shell are sometimes met with unattended at first by hæmorrhage, no risk of its subsequent occurrence exists. The contrary is the case, especially in such injuries as the ablation of a limb

or part of a limb by shot; and therefore, M. Legouest very properly warns his readers to take measures accordingly; also, that bleeding is more to be apprehended in the case of a shell wound than in those caused by an entire bullet or round shot. The latter projectiles, however, are now all but obsolete in war.

With regard to secondary hæmorrhage and the circumstances under which it occurs, M. Legouest reproduces much that we read in the pages of old authors. This is, of course, unavoidable, for the conditions of men and things remain unchanged since they wrote. He, however, adds a remark on the subject in which are embodied views only understood in recent times, but the truth of which received ample confirmation during the Franco-German war.

“Inasmuch as the troops are subjected to protracted hardships, so do their powers of resistance diminish. At the same time that the general health and constitution of the soldier are affected, his wounds heal less rapidly or take on characters of a grave nature, operations become less successful, and secondary hæmorrhages enter more and more into the insuccess of surgery practised under circumstances becoming progressively more and more disadvantageous.”

In the late war, and it may be said in all wars, the longer the campaign was protracted the greater became the mortality among the wounded, and at last few of those who were seriously injured recovered. This is very sad, but it is in accordance with experience.

The observations by our author in regard to the means for arresting bleeding are equally valuable to the military surgeon as those we have given. In the first form alluded to, whether the aneurismal tumour arises from a wound in one vessel or in both artery and vein, M. Legouest recommends the employment of pressure direct to the seat of injury, and quotes cases recorded by Vanzetti and Franzolini¹ where the employment of distant pressure was practised successfully. None of them, however, were cases of wound received in battle, nor would the treatment be of any use in such. In cases where topical means of a simple nature have been tried unsuccessfully or are obviously of no use, it becomes needful to employ more potential measures, and during the late war a great variety of such were used more or less successfully, all with the view to act as compresses, and to induce coagulation of the blood being discharged. In reality all such are only applicable where comparatively small vessels are wounded, or in those situated in positions that cannot be more directly got at. Where the flow takes place from a

¹ ‘Bulletin de la Société Chirurgicale,’ 1865, p. 474, and 1868, p. 356.

vein, if the vessel has been completely divided, it was found that it might be secured by ligature, as in the case of an artery, a measure followed during the war without any of the dangers formerly assigned to it, although it must be confessed the available statistics present only a meagre show of such cases. Why this prejudice has continued in military surgery is not apparent, for so long ago as the days of Hunter and Travers ligatures were applied to veins, not only in ordinary cases of wounds, but even in cases of gangrene, and successfully. The necessity of completely removing clots which conceal the precise nature and extent of wound to a vessel is apparent, and is pointed out by M. Legouest. He also observes that although the use of tourniquets, bandages, &c., can only be of temporary value, nevertheless all soldiers prior to proceeding on active service ought to have some instruction in their mode of application, and might well adopt the plan observed in the Prussian army, each carrying upon his own person sufficient linen cloth to form an extemporised apparatus of this nature. He points out one circumstance, however, which, although seemingly not mentioned in other works, is valuable in its way; namely, that in some instances, either from the presence of a nerve or from constitutional sensibility, pressure in whatever way applied becomes unbearable, and as a general rule it should be accepted as a fact that in all cases of battle-field hæmorrhage the application of one or more ligatures at the seat of injury or at a distant point, according to circumstances, is the shortest and safest practice to follow.

In cases of wounds into the great cavities attended by hæmorrhage, the issue is for the most part hopeless if the large vessels are injured. Nevertheless, remarkable recoveries do take place where one or both lungs have been penetrated, blood discharged profusely by the mouth and openings of the wound and partly filling the pleuræ. In such cases, the openings being closed, and suitable treatment used, recovery has in due time followed, the effused blood in the cavity of the chest being absorbed. In these severe and complicated cases of wounds in the abdomen the surgeon is as powerless over the mortality as he has ever been.

A considerable space is devoted to the consideration of gunshot wounds of the lower extremity, a class of injuries the extreme gravity of which whenever the bones or joints are implicated is well understood by army surgeons. Such injuries, he observes, for the most part require amputation of the member, yet he admits that in some, although relatively rare cases, life and limb may be saved by appropriate treatment. In cases where conservation is attempted M. Legouest recommends the extraction of splinters or bones or other foreign bodies without delay and before the occurrence of inflammation, and discusses

the views for and against this practice expressed by various authors. As a reason for their extraction, he observes that if left in the wound they are liable to become surrounded by callus, and thus be converted into irritable sequestra; that they become obstacles to union taking place, they become continual sources of irritation, give rise to extensive suppuration, and often render an operation necessary at a subsequent period, when the patient is in an unfavorable condition to undergo it. In support of his views on this point, he writes from the experience given by M. Hutin¹ during the time the latter was surgeon to the Hôtel des Invalides, and who is said to have demonstrated that the extraction of fragments as a secondary operation is always painful, often dangerous, and sometimes followed by fatal results, while their early extraction is followed by more rapid recovery. The experience gained during the late war has shown that the rule here laid down has many exceptions,, and M. Legouest admits that such is the case. It was found in not a few instances that the presence in a wound for some days, of such fragments as had not been completely detached at the time of injury gave rise to little additional complication to that which might be naturally expected to follow a gunshot comminuted fracture of so large a bone, and that such fragments after a short time became detached and thus readily removable. On the other hand, projecting angular ends of the fractured portions are always sources of danger during the progress of treatment, and how far it is necessary that they should be removed, how far that they should be left, in cases treated conservatively, is one of the most difficult points upon which the surgeon in attendance has to decide.

With regard to general principles of treating such injuries, the author observes that the two chief objects to be had in view are, in the first place, to immobilise the wounded part, and in the second to guard, as far as may be practicable, against the occurrence of violent inflammation and its consequences. For the latter purpose ice may be kept constantly applied for several days in succession, so much as ten to fifteen, after which, following M. Baudens, he recommends the employment of moist warmth in the form of cataplasms. It is not often that we are favoured in the course of this volume with statistics; we therefore on this occasion feel thankful for small mercies in this way, in regard to the results obtained in the Val de Grâce where this method of treatment was followed in seven cases of gunshot fracture of the femur. Of the number, five ended in death, at intervals from the day of their admission to the thirty-fourth after-

¹ 'Mémoires de l'Académie de Médecine,' t. xvi, p. 407.

wards, the results of the two remaining, although not definitely reported, being to all appearance unsatisfactory. Continual irrigation with cold water would seem to have no better result; and, for obvious reasons, whatever be the actual results of these applications, their use is unsuitable in other than stationary hospitals. As a rule, therefore, his two next recommendations are more suited to the conditions of war hospitals, and in both we meet with but a simple repetition of what was laid down by our older military surgeons, namely, to apply to the seat of injury a succession of compresses soaked in cold water, and to use *antiphlogistic* means, including venesection. Indeed, whatever may be the case in private practice, there is good reason to believe that rather too loud a cry has been raised against depletory means as applied to soldiers suffering from traumatic injuries. We cannot read the older works without giving the surgeons of those days credit for judgment, nor can we avoid contrasting in our own minds the remarkable recoveries detailed by them in cases of seemingly more severe wounds than those which have in later years ended fatally. Extensive incisions are often rendered necessary for the evacuation of matter in the neighbourhood of the wound, and, as often happens, operations of greater or less magnitude are required for the removal of necrosed portions of bone. At this stage of particular cases the use of cataplasms and fomentations ceases to be beneficial; on the contrary, they induce relaxation and sloughing of the parts, consequently the applications made should be dry or stimulating, the latter, for example, consisting of camphorated spirit or aromatic wine. Under all circumstances, however, the progress of such a case is extremely hazardous to the patient, especially in a crowded hospital, one containing many such cases of wounds, or where pyæmia has occurred. M. Legouest observes that in some cases union does not take place in less time than fifteen to eighteen months.

Those of our readers who have studied the surgical literature of the Franco-Prussian war have seen accounts of many appliances of different kinds that were used to immobilise fractured femurs, including plaster cases, silicated bandages, splints of various kinds, and other means, more or less ingeniously devised, of procuring extension and counter-extension by the use of pulleys and weights. It is only necessary to observe in this place that close-fitting kinds of apparatus are totally unsuited for use in hot climates, and have various disadvantages in those that are temperate, and that for all purposes of a war hospital the lighter the apparatus the easier the access to the wound, the greater the facilities for removing or replacing the apparatus, the better for the busy surgeon and for the patient.

Again, departing from his general plan of treating his subject, M. Legouest gives somewhat extensive and certainly very valuable statistics in regard to amputation, resection, and conservation, in cases of gunshot fractures of the femur. It is only by thus affording means for comparison that principles can be authoritatively laid down for the treatment of such cases, and, therefore, we commend the practice to other writers who may come after him.

So long ago as 1794 Fournier Pescay had described five cases of gunshot fracture of the femur in which recovery took place without amputation, and between 1814 and 1822 seven old soldiers in the Hôtel des Invalides were seen by Ribes to have similarly recovered. Between 1847 and 1853 Hutin, who succeeded Ribes in charge of that establishment, enumerates sixty-three pensioners in whom recovery had similarly taken place, namely, twenty where the fracture had been in the middle of the femur, nineteen below that joint, and twenty-four above it. In the same period, of twenty-one invalids whose legs had been amputated the fracture was at the middle in five and below it in sixteen, while in no case had the injury been in the upper half. In 1871 twenty-seven men, disabled by gunshot fracture of the femur, were admitted into the Invalides. Of these, twelve had been treated by amputation, namely, three for fractures in the upper third, seven in the middle, and two in the lower; the remaining fifteen had sustained fractures in the upper third, and all were treated conservatively. In January, 1872, of twenty-five invalids in the hospital, seventeen had been treated by amputation, eight by conservation; of the latter, five in the upper third, one in the middle, and two not recorded; the result of the observations made by M. Hutin being that conservatism of the limb was successfully practised in about a third of the cases of this injury which came under his observation. These particulars are increased by details that have already appeared in official reports published in this country and in America, and in the valuable article on gunshot wounds in 'Holmes's Surgery,' written by Inspector-General Longmore, as well as in the more recent work on the hygiene and surgery of the late war by Dr. Gordon. To these works we must refer such of our readers as desire further information upon this important point.

Wounds of the knee-joint necessarily command much and serious attention on the part of the army surgeon. In the great majority of instances injuries of this nature result sooner or later in the death of the individual; while in the comparatively few in which ultimate recovery takes place the patient has to undergo tedious and painful treatment, run the chances of hospital diseases in their various forms, and ultimately to be burthened

with a limb that is more a source of inconvenience than of use to him. There are, no doubt, exceptions to this, but such exceptions are few, and what is, perhaps, somewhat remarkable, their number does not appear to have increased during the later wars as compared to those at the beginning of the present century.

M. Legouest refers to some rare cases in which a small projectile passes transversely through a knee-joint without injuring any of the bones forming the articulation. Such a case occurred during the Crimean war, and similar ones are related in the works of other army surgeons. They may take place as a result of position occupied by the individual at the moment of injury, but under any circumstance must be looked upon as of the rarest possible occurrence, the rule being that in all cases of gunshot wound-penetrating the joint more or less extensive injury of the bones is present. It is only, however, in cases of relatively small injury to the bones that treatment by conservation is ever attempted. No surgeon would think of conserving a knee-joint that had been much shattered by shell, nor is it probable that such cases as were thus treated, and successfully so, in the days of the Peninsular war would be so now. Neither does it appear that the rules of treatment of these injuries then laid down have been materially added to or improved by subsequent experience. "The success attending all wounds of the knee-joint," so wrote Guthrie,¹ "depends entirely upon absolute rest, upon the antiphlogistic mode of treatment being rigidly enforced, on the healthy state of the atmosphere, and on the locality being free from endemic disease." It would appear that only three cases of this injury treated without operation of any kind came under the observation of M. Legouest during the Franco-German war, and all these terminated in death. Dr. Gordon has collected the statistics of a considerable number of cases occurring at different places in France during the war; the results have been by no means alike in all, but upon the whole, all circumstances considered, nothing has occurred to invalidate Guthrie's rule, that "wounds of the knee-joint from musket balls, with fracture of the bones composing it, require immediate amputation." And yet, if we turn to the pages of another eminent army surgeon of the same period, we meet with such cases of recovery that we ask ourselves would such things under similar conditions be possible now? Dr. Hennen² gives the case of an officer, strong and healthy, who received a wound on the day of Waterloo, the right knee being lacerated to the extent of four inches by a fragment of a shell, the patella broken

¹ 'Commentaries,' p. 83.

² 'Military Surgery,' p. 153.

into five fragments, and one of the condyles of the femur slightly grazed; nevertheless, by the observance of such means as have been already alluded to, the case was successfully treated. By the month of December "the wound of the knee had completely healed;" three pieces of the patella remained fixed, the joint completely ankylosed. In this case no extensive injury to the articular surfaces of the principal bones had taken place, nor does it appear that any such case has been successfully treated without operation. On other points the researches by Dr. Hennen are even now no less applicable than they were at the time he wrote. "Several observations made in former campaigns," he remarked, "had proved to me that wounds of the joints, attended with an extensive laceration of the surrounding skin, are not so frequently followed by fatal suppuration as those which are made by a sharp or pointed weapon, or by a small ball, which rarely opens the capsular ligament without destroying the surrounding skin to any extent."

Referring to excision of the knee-joint on account of wounds received in war, M. Legouest expresses what so many other army surgeons have of late years had occasion to do; namely, the fallacy of applying to operations performed on active service conclusions drawn from similar ones performed in well-appointed civil hospitals, on patients labouring under disease. He observes¹ that gunshot wounds of the knee-joint nearly always require amputation; for ten years he has doubted, and he still doubts, if excision can ever become a substitute for amputation in army surgery. He would hope that in future campaigns circumstances may arise to render this substitution practicable, but at the same time is little sanguine in regard to it. He quotes from Spillman that of nineteen cases of excision performed in war, of which statistics have been collected, only two ended in recovery. To this may be added the conclusions arrived at by Mr. McCormack, namely, that "although excision for wounds of the knee may be successfully performed in civil practice, it is not justifiable in military."

The arguments for and against particular periods for the performance of amputation in cases of traumatic injuries have been pretty well exhausted years ago, but now the question crops up, what are those periods, and how are they defined? M. Legouest considers that *immediate* amputations are such as are performed before the phenomena of inflammation have developed themselves; *mediate*, such as are performed during the acute stage of inflammation; and *ulterior*, such as take place when the lesion has, so to speak, become local, and assumed the charac-

¹ P. 579.

ter of a local affection. He moreover makes a proposal which well deserves the attention of all military surgeons,—that an understanding should be come to in regard to the definitions of these periods, for the purpose of more perfectly comparing different series of statistics than is at present practicable; for, as he points out, such periods must be distinguished rather by the conditions of the wound and state of the patient than according to the number of hours or days that may intervene since the receipt of the original wound. It is not necessary to follow these questions farther than to observe that the late war has amply confirmed the principle long since established that, as a rule, the sooner amputation is performed in cases where it is necessary after a wound, the better are the chances of a patient's recovery and of his escaping pyæmia. Exceptions, indeed, do occur to this rule; they are so rare, however, that, when they arise, they tax the judgment of the surgeon to the utmost.

Experience in war had many years ago pointed out the fact that although penetrating wounds of the chest must always be looked upon as having a great degree of gravity, nevertheless recoveries occasionally take place in those of a seemingly hopeless nature, and this too even where the missile is retained in the substance of one or other of the thoracic viscera. Indeed, were we to judge from the recorded results of such wounds, whether by gunshot or thrust, where no foreign body is retained, and only the tissues of the lungs implicated, it might almost be said that they are benign in their nature. Thus the late Dr. Gregory, of Edinburgh, was wont to observe that of twenty-six such wounds received in the battle near Quebec, fought nearly a century ago, only two proved fatal. It is interesting to refer to particulars of old date in connection with the more recently published works on the subject, to observe the variations indicated from time to time in treatment, and the similarity in many respects of the measures now found most successful with those that were so some three generations ago.

The great question has ever been that of closing the wounds, assuming no foreign body to have lodged, or of leaving them open. Immediate closure was recommended by the elder Larrey, but long before his day it was practised by John de Vigo. Paré also recommended this method of treatment as being founded on "reason and truth;" nevertheless he did not put it into use until two or three days after the receipt of the wound. La Motte closed all wounds of the chest, and in 1723 Belloste, while arguing strongly and successfully against the practice then sometimes followed of keeping such wounds open, acknowledges the obligations he is under to Magatus, who, nearly three

hundred years before, had advocated the measures Belloste adopted.

Guthrie is very explicit as to the treatment of penetrating chest wounds. He directs that "a bit of goldbeater's skin or dry lint should be placed upon the wound, supported by a compress covered with adhesive plaster; these dressings should not be removed for several days. The patient should lie on the wounded side as a general rule." Gunshot wounds are, however, more dangerous than those by *white arms*, although still presenting numerous recoveries; the larger the missile the more dangerous the wound, and hence, as the diameter of the needle and Chassepot bullets is considerably less than that of the musket-ball, this circumstance may account in some degree for the favorable results obtained in the late war as compared to those not only in the Peninsular and Belgian wars, but in the more recent in the Crimea and India.

M. Legouest devotes a considerable space to the consideration of this class of wounds, naturally repeating much that had been written by the older authors. Like the majority of them he advocates the immediate closure of the external wounds; also the recommendation by Guthrie that the patient be placed upon the injured side; that where the vital powers are depressed, restoratives and warm drinks be administered, after which anti-phlogistic regimen is to be observed. Adverting to wounds penetrating the heart and larger blood-vessels, he observes that, although the former are for the most part beyond the power of surgery, nevertheless instances are on record in which life has been more or less prolonged even in these, and therefore he recommends that where such are not immediately fatal, the treatment adopted should be the same as when the lung is injured, depletion by venesection being carried as far as possible. With regard to the latter he gives a short account of two cases in which even the aorta was wounded, and yet where the patient lived, in one case for a year afterwards, in a second for several years.¹ Neither of these, however, have any interest beyond that they serve to give a reply to the question—Are wounds of the aorta necessarily fatal?

Among the remote complications of wounds of the lungs the first discussed is traumatic pneumonia, regarding which M. Legouest believes that the treatment to be used differs in no way from that followed in the idiopathic form. He combats the views expressed by some writers that abstraction of blood should be employed with a view of preventing the attack, he trusting rather to the use of milder measures, such as diapho-

¹ Pages 333-4.

retics and low diet; and the results obtained in the late war justify his remarks.

With regard to traumatic emphysema, the author's experience seems to have indicated its more frequent occurrence than that of other surgeons. Unfortunately M. Legouest gives no statistics of the rate of its occurrence, and therefore, judging from reports by other surgeons whose observations have been recorded, we believe that neither in frequency of occurrence nor in actual gravity, did the complication as it occurred in the late war equal the alarming reports published regarding it by the older army surgeons.

One of the most important points in which army surgery has assuredly gained by the wars that have occurred subsequent to 1854, is in the more correct knowledge acquired in regard to the etiology of those scourges of the wounded severally known as hospital diseases; and yet it is to be feared the confession must be made that, notwithstanding such improved knowledge, the rate of occurrence of at least some of these forms is hardly less than it was at the beginning of the present century, nor less fatal in its results. The affection now so well comprehended as pyæmia can hardly be said to have been recognised by the older surgeons, although correct descriptions of it are given by them under various headings, as purulent deposits, consecutive pneumonia, consecutive fever, and so on. We may fairly assume, however, that the extent to which this form of disease prevailed during the late war arose from very different circumstances than those to which it was in earlier times attributable. In the earlier wars, although army surgeons possessed and practised correct principles of hygiene, to some extent greater than they usually get credit for, nevertheless those principles had not acquired more than a tithe of the development they have attained during the past twenty years. Under such circumstances, therefore, the occurrence of hospital diseases was chiefly due to imperfect knowledge, on the part of medical officers, of conditions upon which they depended. More recently, and particularly during the war of 1870-71, the prevalence of the diseases in question arose, not from want of necessary knowledge on the part of army surgeons, whether German or French, but from their inability to obtain the ameliorations for the wounded under their charge that they knew to be required. The ultimate cause upon which this depended was the only partial emancipation from the *Intendance* obtained by the one set of medical officers, the absolute subordination to it of the other. Since the return of peace the German medical officers have obtained full emancipation. The French still remain "as they were;" and inasmuch as it was well known that in ambulances where the sur-

geon was also director, pyæmia was at its minimum during the war, so we need hereafter have no difficulty in knowing where to find it rampant should another campaign occur and the present regulations in regard to the *service de santé* remain unaltered and unimproved.

M. Legouest at once strikes at the conditions upon which the occurrence of pyæmia depends. They are, according to him, and, it may be observed, according to everybody else whose opinion is of value, protracted delay and crowding of wounded in hospitals, exhaustion of the subjects by privations and fatigues, and the influence of moral depression; in short, the conditions that were in force during the sieges of Strasbourg, Metz, and Paris, and which must recur, to some extent, under future circumstances of a similar nature. He observes, correctly, that its period of accession is uncertain, that it may occur at a time when to all appearance the state of the patient is most favorable, that the indications of its attack first apparent are usually the suppression of suppuration in the wound, with the presence of a yellowish tinge of the face; and he adds that, although there is often pain along the course of the veins where a limb is the seat of injury, yet this is not invariably present. Another and a most important indication of the disease is often to be found in the occurrence of secondary hæmorrhage; then follow those attacks of shivering which the surgeon soon learns are so many signals that purulent deposit has taken place in some internal organ; then more symptoms of pneumonia or bronchitis, or both; then the characteristic odour, unmistakable when once perceived; and then the end is not far off.

It was observed during the late war that pyæmia occurred most frequently in permanent buildings, next in frequency in huts, and least of all in tents. It may, however, fairly be questioned if even tent hospitals were in any one instance absolutely free from it; and then the unfortunate fact presented itself that, when the disease did break out in an ambulance, its recurrence in the same place became a matter of certainty, even where the establishment had been temporarily vacated and free application of deodorants and disinfectants made use of. But really we must desist. As M. Legouest has provided a complete vade mecum for the use of the army surgeon, so it would be necessary to give an epitome of the whole range of army surgery were we to do full justice to his valuable work.

IV.—West Riding Asylum Reports.¹

WE devoted considerable space in our number for January, 1872, to an analytical review of the first volume of the 'West Riding Lunatic Asylum Reports,' inasmuch as it was a new adventure and a novelty as a literary production. Asylum reports of the usual stamp have, indeed, no novelty, but are "as plenty as blackberries," and like this common-place fruit get little consideration. They are the natural outcome of the painfully elaborate legislation applied to lunatic asylums, and are presumably addressed to the ratepayers of the county, who are supposed to be interested in the details of the sugar and the soap consumed in the establishment, and of other domestic items of expenditure. Our impression, however, is, that the ratepayers' interests would be better consulted by saving the cost of a mass of most unedifying and useless printing which is scarcely ever read even by members of the visiting committees. They contain, indeed, a medical report also, but, as a rule, few are the grains of knowledge and experience to be gathered therefrom; for the medical superintendents who write such reports have no sufficient inducement to make them what they might and should be—the records of work done, of observations made, and of lessons in management and treatment acquired. These gentlemen feel that a long medical report, worthy of them as professional men earnest in the pursuit and advancement of their speciality, would be out of place in a pamphlet addressed to non-medical readers, in which, too, the minutiae of the domestic economy of the establishment is a prominent feature, and the excellent and prudent administration of the committee a principal theme.

Entertaining these convictions we were, therefore, pleased to bring prominently under the notice of our readers the praiseworthy enterprise of Dr. Crichton Browne to record the medical work done at the large West Riding Asylum in a form likely to be useful to the profession and of lasting value. On the same grounds we are now glad to call attention to this second volume, and to find that Dr. Browne has been sufficiently encouraged to repeat his venture.

The volume consists of thirteen essays, each written, with two exceptions, by gentlemen who are, or who have been, members of the medical staff of the asylum. Now, in noting the authorship of the several papers and the general character of those papers, we are struck by a too evident tendency to

¹ *The West Riding Lunatic Asylum Medical Reports.* Edited by J. CRICHTON BROWNE, M.D., &c., vol. ii. London, 1872. Pp. 306.

depart from the announced principle and object of the volume, viz. to make it a record of the medical and scientific work accomplished in the institution. In place of this it approaches too nearly to a collection of essays to which the experience of the asylum contributes either more or less, or even nothing at all. We would warn Dr. Browne against this tendency. It is not that we fail to recognise the value of the essays submitted to us, even when destitute of teachings immediately derived from the science and practice to be encountered within the wards of the asylum in question; but by publishing such, and also by serving up theoretical rather than practical disquisitions, the editor surrenders what should be the distinctive feature of his volume, and places that publication in rivalry with journals whose business it is to give circulation to such productions. If the results of actual observation and research within the walls of the asylum are insufficient to make a book of the dimensions now before us yearly, the editor should set smaller limits to his ambition, and content himself with fewer pages.

It is time to notice the matter of the several essays before us, but our analysis must be brief. The first one is by Dr. Burman, who has experimented on the value and effects of the subcutaneous injection of conia. The conclusions he has arrived at are—1. That conia is too powerful and too irritant to be administered internally alone; but, when neutralised with acid and in bland solution, it may be so used and will produce cicutism without topical irritation. 2. *Pure* conia may be injected under the skin without other effects than those of local irritation at the site of injection. 3. Conia, neutralised with acetic or hydrochloric acid, and dissolved in spirit and water, acts very rapidly and powerfully. In doses of \mathfrak{mss} to \mathfrak{mij} in the healthy human subject, it produces well-marked cicutism. 4. Thus administered therapeutically it subdues the motor excitement of mania, wards off emaciation and exhaustion, and promotes recovery. Commencing with doses of $\mathfrak{m} \frac{1}{10}$, the conia may be gradually increased in proportion to the motor activity of the patient until decided physiological effects are produced. 5. So used the digestive functions and the circulation are not interfered with and no considerable local irritation follows. 6. The most suitable cases for the drug are those of *acute mania*, without organic brain lesion and where medicine, if given by the mouth, would require to be administered by the stomach-pump. 7. As conia acts as a sedative on the motor centres, and morphia on the sensori-motor and ideo-motor centres, these two substances may be used together, as concurring to allay maniacal excitement. 8. Conia might be very useful as a subcutaneous injection in cases of poisoning by strychnia, as well

as in tetanus, hydrophobia and other spasmodic diseases. 9. Specimens of conia obtained from different sources vary much in strength and appearance; hence the propriety of first testing the specimen to be employed. 10. The best and purest is prepared from the seeds of the uncultivated plant. 11. ℞ss of the best conia subcutaneously injected is equivalent in action to about fl. ℥j of the best succus conii administered by the mouth.

Mr. Major in the next article records the changes in the minute structure of the cortical substance of the brain in a case of chronic brain wasting, and in a subsequent paper describes a simple instrument for determining the depth of the grey matter of the convolutions. In the article first named he takes occasion to call attention to the structural variety obtaining in almost every segment of the brain, so that what may be predicated as normal or abnormal in one part is not so in another, even within the limits of the same convolution. This circumstance adds immensely to the difficulty of determining and describing changes in brain matter, and renders an attempt to give a satisfactory or exhaustive account of a post-mortem examination a work of so great labour that we cannot often look for it. However, Mr. Major has had the industry and perseverance to examine microscopically a diseased brain, and to compare it with a healthy one "to the extent of the frontal, parietal, and occipital lobes in each, by means of numerous sections," noting the appearance of each layer in succession. In so doing he has followed the method of preparation recommended by Dr. Lockhart Clarke, and has observed the effects of staining with carmine. We cannot enumerate the changes detected in the morbid brain here described, as to do so would involve the reproduction of Mr. Burman's paper, but may state generally that distinct alterations were remarked in the number and disposition of the nerve-cells, in the size, configuration and processes of those cells, in their granular and nucleated appearance, and also in the walls of the minute blood-vessels.

The essay following is "On Menstrual Irregularities," by Dr. Henry Sutherland. After some general observations he advances and then illustrates seven principal conclusions derived from notes of upwards of 500 inmates of the asylum. These conclusions are that—

"1. In idiocy and cretinism puberty is delayed or absent. 2. In epileptic insanity the fits generally increased in number, and are the patients frequently become excited at the catamenial period. 3. That in mania exacerbations of excitement usually occur at the menstrual period, and that a state of intense excitement is almost continuous in patients suffering from menorrhagia. 4. That in

melancholia a large proportion of patients suffer from amenorrhœa. 5. That in dementia the patients usually menstruate in a normal, healthy manner. 6. That in general paralysis the change of life frequently occurs early. 7. That very rarely the catamenia reappear in aged insane women after a prolonged cessation."

As Dr. Sutherland justly remarks, "some of the above conclusions have already been arrived at by various independent authors;" it is well, however, to have such confirmed.

Dr. Samuel Mitchell, now the Medical Superintendent of the South Yorkshire Asylum, follows with an account of some experiments conducted by himself with a mixture of ether and nitrous oxide, but he fails to summarise his results, except so far as to state that its inhalation, even when the profoundest anæsthesia has been produced, has not been followed by the lividity nor by the convulsive twitchings seen when nitrous oxide alone is administered, and that no vomiting ensues. He also mixed chloroform with nitrous oxide and finds that, as in the case of the mixture with ether, the sense of suffocation, induced by ether and chloroform given alone does not occur, and that there is a prolonged feeling of numbness in the extremities not present when nitrous oxide is given by itself.

But the more interesting part of his paper is that occupied with an examination of the theories of the causation of anæsthesia and of the rationale of stimulation.

A very excellent essay "On the Relations between Cranial Injuries and Mental Diseases," illustrated by some few cases, follows from the able pen of the editor, Dr. Crichton Browne, but its extent and character forbid analysis in this place. Mr. Pedler's paper "On Puerperal Mania" presents no notable features; what value it has is derived from statistics of cases of the disorder obtained from the case-books of the asylum.

Mr. Major in the next article describes an instrument, before referred to, for determining the depth of the grey matter of the cerebral convolutions, which is known to vary much in the same brain in different situations and in different brains in corresponding situations. The instrument is simple enough, being nothing more than a graduated glass tube, of equal calibre throughout, but bevelled on the outside at one extremity so as to give it the sharpness necessary for its ready penetration through the brain substance. The thickness of the grey lamina may at once be read off by means of the degrees marked on the tube. The inventor is very precise in his account of the way of using the instrument, and those who desire to test it will do well to refer to that account. The paper is accompanied by some tables of results and general conclusions.

"The Mental Symptoms of Ordinary Disease" is a general

dissertation by Dr. Patrick Nicol, which, on some points, runs parallel in its treatment with the essay by Dr. Crichton Browne; but which, except in the way of reference to a few cases that have happened, as we suppose, during the writer's former connection with the asylum, has no direct association with the experience or with the work of that institution. It is, nevertheless, a well written and instructive essay, but not one of original and novel conception.

"The Electric Treatment of the Insane" is a paper by our able contributor, Dr. Clifford Allbutt, of Leeds, based upon experiments made among the patients of the West Riding Asylum. It is, therefore, a genuine record of work carried out there, although by a gentleman not connected with the establishment. Its lesson is, that electricity is of little avail as a curative agent in insanity. A marked improvement followed in acute primary dementia; a less degree of good was found in mania, atonic melancholia, and, perhaps, in recent secondary dementia; no change occurred in chronic dementia and some cases of melancholia, and unfavorable results happened in hypochondriacal melancholia, and, perhaps, in brain-wasting.

Ophthalmoscopic observations made in cases of general paralysis, and after the administration of certain toxic agents, are placed on record by Mr. C. Aldridge, and will be read with interest and instruction. They present a continuation of the like researches made in the wards of the same asylum, by Dr. Clifford Allbutt, the general results of which are condensed in that writer's work on "The Use of the Ophthalmoscope in Diseases of the Nervous System."

"Most of his observations were made upon patients in this asylum," writes Mr. Aldridge, "but as they occurred four years ago, I have not been able to find one patient alive who was then examined." This statement is in itself curious as a commentary on the rapid fatality of general paralysis. The circumstance it represents also was fatal to the wish Mr. Aldridge had to verify Dr. Allbutt's facts, and to report any additional ones with regard to the self-same cases. The affection of the optic nerve detected is a "descending neuritis," with first increased vascularity and engorgement, subsequently replaced by absorption of the exudation and extending whiteness of the disc, and with, in most cases, atrophy. Mr. Aldridge is unable to confirm Dr. Allbutt's opinion that there is ataxy of the ocular muscles, the phenomena suggestive of that condition being due to inability to arrest or sustain the attention by reason of the excitement or fatuity of the patients.

In twenty-three of the forty-three paralytics examined there was inequality of the pupils, a circumstance known to the profes-

sion for many years as common in such patients, and now shown to depend on atrophy of the optic disc, the atrophy being most advanced in the eye where the pupil is largest.

The ophthalmoscopic condition of the optic discs as above determined has a certain pathological value, but no diagnostic importance, inasmuch as, so far as observation has yet extended, it is one that becomes manifested only when the second stage of general paralysis is arrived at, and when the general symptoms of the malady have become unmistakeable. One remarkable fact, however, emerges from the observations recorded, viz. that atrophic and white optic discs may resume gradually their capillary tint with recovery of function. This is, as Mr. Aldridge expresses it, a hopeful fact.

A valuable supplementary portion of the paper under notice is to be found in the researches of Mr. Aldridge respecting the operation of various toxic agents on the fundus oculi. In the first volume of these 'West Riding Reports' the same industrious and able observer noted the changes produced after the administration of chloral, ergot, nitrite of amyl, and nitrous oxide. He has since experimented with belladonna, hyoscyamus, and picrotoxine, and with laburnum. The three first mentioned induce hyperæmia of the retina; the last named, together with ergot, causes anæmia.

The history of his experiments and observations is preceded by an interesting discussion of the hypothesis that the changes observed by the ophthalmoscope in the vessels within the eye are to be regarded as signs of analogous events taking place within the skull, and that the drugs producing such changes exercise the like effects in the vascular system of the brain. His next attempt is to solve the question whether the changes discoverable have their origin in the nervous or in the vascular system. The conclusion Mr. Aldridge appears to arrive at is, that the origin may be in either one or the other, and that it differs in relation with the toxic agent employed. We commend this disquisition to our readers, as it opens up many important questions in physiology and pathology, and, we may add, in therapeutics.

We are very pleased to find a champion in Mr. Courtenay of the virtues of opium in the treatment of the insane, which have on theoretical grounds been of late years so mercilessly assailed. We consider this young physician has fully re-established the value of opium in melancholia. Apart from theoretical considerations and speculations which are always ready to hand to ingenious minds, and, owing to the imperfections of physiological science, are not easily disposed of, the decriers of opium in the treatment of insanity had little else to rely upon in their assault

than some experiments conducted by Dr. Clouston a few years since at the Cumberland Asylum. Mr. Courtenay well shows the faultiness and inconclusiveness of these experiments, and then proceeds to examine the physiological effects of opium and the pathological condition of the nervous system, as far as yet known in melancholia. This done he details the results of treatment by opium in forty-nine cases of the disorder, and disproves the assertions made of the damaging effects of that drug on the weight, temperature, pulse, and appetite of patients. One cause of opium getting a bad name he shows to be in the unnecessarily large doses in which it has mostly been administered, and he sums up his article in the following sentence:—"No drug at present known possesses actions which meet so well the different symptoms of melancholia."

The next essay, on "Impairment of Language the result of Cerebral Disease," is from the pen of the editor's father, the much respected Dr. W. A. F. Browne, who for many years was the energetic physician of the Crichton Asylum, Dumfries, and subsequently a commissioner in lunacy for Scotland. Knowing his sad affliction, the loss of sight, it is gratifying to find him still an earnest labourer for the advancement of science. The essay in question exhibits much thought and power of analysis. It is not merely a summary of the facts and doctrines of aphasia, but an endeavour to place that condition on a wider basis, harmonising with it various analogous states "which nullify or impair the articulate expression of thought." He moreover contends that "a very large number of different deviations from the normal use of language must be taken into consideration besides its abolition before we are in a position to generalise confidently upon the result."

The concluding paper is by Mr. G. Thompson on "The Sphygmograph in Epilepsy." It consists of tracings made with the instrument in some epileptics, accompanied by comments on the vascular condition portrayed, and constitutes a valuable chapter on the history of sphygmography.

We have devoted that extent of consideration to this volume which indicates our appreciation of the value of its contents, notwithstanding the expression of some strictures on its general features; and we are persuaded that those of our readers who will study the volume at leisure will bear us out in the good opinion we have formed of the scientific matter found in its pages. In conclusion we hope Dr. Crichton Browne will persevere with his most praiseworthy endeavours to render the large asylum over which he so ably presides a real centre of work, and to utilise it as a large storehouse of experience and observation; for it must be confessed that the generality of

lunatic asylums in this country have, to the discredit of their medical superintendents, been turned to no purpose in the advancement of psychological medicine.

V.—Cancerous and other Intra-thoracic Growths, their Natural History and Diagnosis.¹

THIS work is essentially a clinical one, and to the practitioner this will be its great recommendation. It contains reports of many very instructive cases, and the comments show a large collateral experience.

The study of morbid anatomy has shown that intra-thoracic growths are not nearly so rare as was once believed. Certainly this form of disease is by no means rare in hospital practice, and one cannot but suspect that it is more common in private practice than many suppose. In the absence of post-mortem examinations—and it is much to be regretted that such examinations are the exception rather than the rule in private practice—cases of intra-thoracic growth are, we fear, generally regarded as bronchitis, pleurisy, or phthisis.

The author's observations more especially refer to intra-thoracic cancer.

Experience shows that cancer in the chest, as elsewhere, occurs most frequently in the middle period of life. Cancerous growth is not most common in tissues which have greatly degenerated; therefore it is not so common in very old persons. Again, it does not especially occur in tissues whose "self-conservative" power is great, as in youth: it occurs in tissues which have probably begun to degenerate. In accordance with this we find that it occurs most frequently about the age of forty or fifty; and speaking generally, degeneration in tissue, which commonly begins about this period of life, seems to favour elementary growth but not development. In the author's cases the oldest patient was seventy-two, and the youngest eleven years. We may here mention that, a short time ago, we found a large mediastinal cancerous growth in the body of a boy, aged about fourteen years.

The two sexes seem about equally liable to this disease. Some observers have stated that it occurs more frequently in men than in women, but Dr. Bennett's experience does not support this opinion;

¹ *Cancerous and other intra-thoracic growths, their Natural History and Diagnosis: being the substance of the Lumleian Lectures delivered before the Royal College of Physicians of London.* By JAMES RISDON BENNETT, M.D., Fellow, Senior Censor, and Representative of the College in the General Medical Council, Consulting Physician to St. Thomas's Hospital, and Physician to the Victoria Park Hospital for Diseases of the Chest, with five plates, pp. 189.

nor does his experience show that the right lung is more generally affected with cancer than the left.

In the introductory chapter of this work the morbid anatomy of intra-thoracic cancer is briefly considered. This preliminary consideration is obviously useful, and we may therefore follow the author with advantage.

Encephaloid is the most common form of intra-thoracic cancer, scirrhus is much less frequent, and colloid is very rare. Dr. Bennett tells us that he has not met with a single case of colloid. Dr. Bristowe, in vol. xix of the 'Pathological Society's Transactions,' has recorded one case in which there was colloid cancer of the lungs. In the body of a young man we once found colloid or so-called gelatinous cancer of the peritoneum; this growth had extended into the liver and spleen through a portion of the diaphragm, and had invaded the lower part of one lung. Dr. Bennett reports no cases of epithelial cancer; but this form of malignant disease is known to occur in the lungs, although only as a secondary change. But he refers to a specimen shown by Dr. Moxon at the Pathological Society, in which the germs of an epithelial cancer, which had primarily affected the trachea, were carried along the bronchi and deposited in the centre of the lobules of the lung, where they gave rise to small rounded firm growths, which microscopically presented in very characteristic form the "bird-nest" capsules of epithelial cancer. This would seem to be a specimen of pathological grafting. We have seen the pleura and substance of the lung invaded by epithelial cancer which had extended by continuous growth from the œsophagus. A case of this kind came under our notice some time ago. In the apex of one lung there was a mass of epithelial cancer continuous with the growth in the œsophagus, and the centre of the mass had softened down into a cavity. Dr. Wilks ('Pathological Anatomy,' p. 248) says in cases of epithelial cancer of the œsophagus, he has seen in one or two instances the adjacent part of the lung involved in the disease, and in one case distinct deposits at a little distance also. Sir James Paget in his 'Surgical Pathology,' page 700, also states that epithelial cancer occurs as a secondary affection in the lungs. He mentions the case of an old man whose penis had been amputated eighteen months before death, in whose lungs epithelial cancer was found after death. He further alludes to a specimen of epithelial cancer of lung and heart, which is in the Museum of St. Bartholomew's Hospital. There are also specimens showing epithelial cancer affecting both the lung and liver in the Museums of Berlin and Wartzburg. Osteoid cancer, it is well known, also occurs in the lungs as a secondary change. In one case Dr. Wilks found bony plates on the surface of the lungs. Mr. Carr Jackson, in vol. xx of the 'Pathological Society's Transactions,' records a case of osteoid

cancer of the lung. Dr. Bennett states that there is a remarkable specimen of osteoid cancer of the lung in St. Thomas's Hospital Museum. In this case the disease in the lungs followed the removal of an osteoid tumour of the thigh in a lad by Mr. Simon. Of this form of cancer other examples might be gathered from several sources.

Secondary cancer may uniformly invade a large portion of the lung, or it may be scattered through the lungs either in the shape of small miliary bodies resembling miliary tubercle, or it may occur in larger masses of varying size. In appearance these masses differ very much. They may be grey, moderately soft, and yield a milky fluid, or they may be much firmer and less juicy. They may be deep red, hæmorrhagic looking, and not altogether unlike pulmonary apoplexy. This red appearance is seemingly due to great vascularity as well as to extravasated blood. In other cases the masses have a dark bluish pigmented appearance, which apparently indicates a longer duration.

Occasionally a cancerous growth of the breast extends through the chest wall, invades the pleura, consolidates the adjoining portion of the lung, and may advance along the bronchial tubes and vessels even as far as their finer divisions, thus forming a cancerous network throughout the lung. There is a good drawing in Dr. Bennett's work, showing this kind of change.

Secondary intra-thoracic cancer not unfrequently attacks the pleura first, and this membrane may remain the only part affected within the chest. In such cases the growth is commonly seen in the shape of small lenticular greyish masses, single or confluent, nodular or pedunculated. The patches may vary in size and thickness. In some cases the cancerous growth forms an uniform continuous layer of cancerous matter covering a large portion of the lung.

Serous effusion into the pleural cavity is very common in connection with cancer. The author states that in no less than six of thirty-nine cases that he had examined there was copious effusion into the pleural cavity. Empyema and even pneumothorax have occurred in connection with intra-thoracic cancer.

Primary intra-thoracic cancer generally begins near the root of the lungs. Dr. Wilks thinks it begins in the bronchial glands of this region. As it advances it generally extends into the lung substance and consolidates it. The cancerous growth may compress the bronchial tubes, for instance, the main bronchus or one of its smaller tubes, and in this way diminish or even exclude the air; and the portion of lung supplied with air through this bronchus will as a consequence be partially or completely collapsed. In other cases the cancerous growth extends through the walls of the bronchial tubes, and fills up their channels, and in this way also completely excludes the air. If the main bronchus be thus affected the entire

lung may be collapsed. If one of the secondary bronchi, a lobe only may be collapsed, which may be either the upper or the lower lobe of the lung according to the bronchus affected.

The cancerous growth may extend along the outer part of the bronchial tubes mainly in their connective tissue, or it may invade their walls and extend along the mucous membrane. Cancerous matter in the form of casts occasionally escapes from mucous membrane so affected. Ulceration also occasionally occurs. The vessels of the lung become involved in the progress of the malignant disease, the veins more especially. The cancerous growth either simply surrounds them or it compresses and, may be, even infiltrates their walls. Such vessels generally become plugged by fibrinous coagula into which also the cancer may grow. Sometimes, though rarely, nodular or pedunculated cancerous masses are found on the inner surfaces of the vessels. Dr. J. W. Ogle mentions that he discovered two largish pedunculated masses of cancer growing from the lining membrane of two of the otherwise healthy trunks of one of the pulmonary veins ('*Pathological Society's Transactions*,' vol. xi).

The lung substance also undergoes various alterations. Sometimes there is simply cancerous infiltration, and the cancerous material may or may not be broken down into a cavity. Or the lung is collapsed as already stated. In other cases the lung substance is riddled, so to speak, by a number of abscesses. Then on cutting into the lung a large quantity of pus escapes, and from almost every part pus is seen flowing away. It is almost impossible to wash away this pus, for it pervades the lung in all directions, and it is collected in ill-defined spaces and scarcely any healthy lung substance remains. There is also not unfrequently gangrene in the neighbourhood of the cancerous masses. In one case mentioned by Dr. Bennett (p. 53) there was a mass of soft cancer, situated chiefly on the left side, in the upper part of the posterior mediastinum. It extended into the neck, was adherent to the bodies of the vertebræ, and invaded the œsophagus. The cancerous mass pressed against the left pleura, and at the left apex of the lung there was a gangrenous cavity. In another case there were two small cavities in the apex of the right lung filled with very offensive fluid, and surrounded by an indurated, green, gangrenous-looking substance which yielded a creamy juice on pressure. A still more instructive case is referred to by Dr. Bennett in which there was cancer of a large portion of the left lung and gangrene in the lower lobe of the right lung.

The cause of such gangrene is not very evident. In some cases pressure on, or destruction of the nerves would seem to cause it; in other cases blood coagula or cancerous growth blocking up or compressing the vessels would appear to be the conditions producing it. Dr. Stokes, however, is disposed to think that, both in cases of aneu-

rism and of cancerous tumour, gangrene of a portion of the lung may ensue from pressure on the main bronchus, because, owing to the anatomical distribution of the nutritive arteries of the lung, these vessels are pressed on too. Dr. Bennett is inclined to accept the explanation given by Sir William Gull, who refers the gangrene to pressure not so much on the principal arteries or nerve trunks as on the sympathetic plexus at the root of the lung.

Dr. Bennett describes also another condition of lung which he terms "hæmoptoic engorgement." This occurred in one case only, as far as we can gather. The left lung was the part affected, and its bronchus and vessels were considerably compressed by a mediastinal cancerous mass. This lung was solid throughout and felt like an enlarged and somewhat hardened spleen; it was extremely congested, and contained also large masses of so-called "pulmonary apoplexy" in several parts, especially in the lower lobe.

Cancerous growth in the lung may be accompanied by what is known as red or grey hepatization. Dr. Bennett, however, seems to think that cancer has not the same strong tendency to excite pneumonia as tubercle has. On this point we confess we have some doubt.

Owing to the contraction of the cancerous matrix, or of adjoining fibroid tissue, or as a consequence of some general atrophic change, the lung may be smaller than natural. Its surface may be puckered or fissured, presenting, as Dr. J. W. Ogle has remarked, a considerable resemblance to the hobnailed appearance seen in cirrhused liver. A large portion of the lung may be thus contracted and the chest wall in consequence flattened and sunken.

In some cases the cancerous tumour pushes the lung outwards and backwards against the vertebral column and posterior part of the thorax; it spreads the lung over it, and in this way the air, being by degrees forced out of the air-cells, the lung becomes partially or entirely collapsed; it then looks like and lies in the same position as a lung compressed by pleuritic effusion. The heart may, at the same time, be displaced to the opposite side, as it is by pleuritic effusion, and the liver or spleen may be pushed downwards.

In the majority of cases the cancerous growth is situated near the root of the one lung, but a portion of it frequently extends across to the root of the opposite lung; the latter is, however, generally much less involved.

Instead of beginning, as above described, the cancer may originate in the upper part of the thorax. It may apparently commence in or about the œsophagus; in such cases there is not unfrequently cancerous ulceration of the œsophagus, and the growth as it increases extends into the apex of the lung; it may press upon the trachea, on the recurrent laryngeal nerve also, and even on the subclavian or other arteries.

The cancer may extend backwards through the intervertebral

substance or even through the bodies of the vertebræ into the spinal canal; usually, it only compresses the cord. Or the cancer may spread downwards through the diaphragm along the glands adjoining the vertebræ, even as low as to the pelvis. Occasionally it travels along the wall of the aorta, generally, however, without invading its channel. Dr. Fuller (Pathological Society's 'Transactions,' vol. xi) records an interesting case, in which an encephaloid mass surrounded the root of the right lung, and extended into the left auricle. The wall of this auricle was three quarters of an inch thick, and was thoroughly infiltrated by the cancerous substance. In other cases the cancerous growth seems to begin in the vicinity of the right auricle or superior vena cava, and may thence extend into and partially fill up the vena cava, and penetrate even into the auricle itself, giving rise to great venous obstruction, lividity of face, and distension of the veins of the upper extremities, neck, face, and head. The same mass of cancer may also press against the right bronchus or trachea, and thus interfere both with the admission of air into the lungs and of blood into the right ventricle of the heart.

There are other growths, more or less malignant, but "non-cancerous," which occur in the lungs, for instance, recurrent fibroid, enchondroma, osteo-sarcoma. A very instructive case of "Hodgkins's disease" or "lymph-adenoma," so called, is given by Dr. Bennett. The growth in this case occupied the thymus region, and extended downwards, invading and greatly thickening the parietal layer of the pericardium in front of the heart. From the pericardium it extended by continuity of structure into the anterior portions of the lungs. Disseminated through the lungs were some isolated masses of this growth, about the size of a shilling. Cases of this kind are not very rare. There is a drawing in the London Hospital Museum exhibiting a similar formation in the thymus and pericardium. The growth is shown extending into the lungs, as in Dr. Bennett's case; but the bodies disseminated through the lungs were different. They looked like miliary tubercle; the microscope, however, proved that they were histologically like the larger growth. A very interesting case of myeloid intra-thoracic growth, seemingly primary, has been recorded by Dr. Clifford Allbutt ('Med. Press and Circular,' July 11th, 1866). In this case the whole of the left half of the chest was found filled up with solid substance; it had pushed the heart to the right side, and the diaphragm downwards as low as the left kidney. The growth consisted of two portions, one a dense fibrous-looking portion, which was in the form of an enlarged lung, having below it, occupying the whole of the back of the left side of the chest, and in contact with the pulmonary pleura, a considerable quantity of true myeloid matter, soft and sanguineous. Both these substances contained numerous pieces of bone. The tumour seemed to

have begun in the chest-walls, and to have subsequently involved the lung.

We hope that Dr. Bennett will, in his next edition, give a place to to syphilitic intra-thoracic growths. They may occur in the lungs, as is well known, in the form of nodular masses about the size of a marble, firm and yellowish. These growths may soften and form a cavity in their centre, as shown by Dr. Wilks in vol. ix of the *Pathological Society's 'Transactions.'* In other cases they occur in nodules about the size of peas, of a reddish-grey colour, and scattered in the lungs. There is a drawing in the museum of the London Hospital showing an enlarged gland pressing upon the right bronchus. It was thought to be syphilitic from its appearance, and because there was evidence of congenital syphilis in the malformation of the teeth, as described by Mr. Hutchinson, and there was undoubtedly, also, well-marked syphilitic changes in the testicles. The patient was a boy about twelve years old. Dr. Wilks once showed us a syphilitic growth, which had involved the glands and other tissues in the lower portion of the neck and in the upper part of the chest, and had extended through the intercostal muscles and consolidated the upper part of the right lung. Dr. Hughlings Jackson once showed us the lung of a patient who had died of syphilitic disease of the brain; there was fibroid thickening around the pulmonary vessels and bronchial tubes. The lung was intersected by fibroid bands very like what are seen in syphilitic livers. The case is recorded in the *'London Hospital Reports,'* vol. iv, p. 318. Conditions other than syphilis, of course, may have produced this thickening. It is well known that syphilitic growths occur in the walls of the bronchial tubes and in the heart also. Cases of hydatid tumours in the lungs might also be included in a work of this kind, although they are not growths in the pathological sense of the word, as might also cases in which the bronchial or mediastinal glands are greatly enlarged by strumous change.

Dr. Bennett records a very instructive example of hypertrophy of the thyroid gland. The enlargement was mainly below the sternum, and by the side of the trachea. Beneath the sternum the trachea was so compressed by this enlarged gland as to be completely flattened laterally and twisted to the left.

For clinical purposes the author divides the various forms of intra-thoracic cancer into three groups.

The first group includes cases in which the cancer is arranged like tubercle, presenting numbers of small round whitish bodies, closely resembling miliary tubercle, disseminated throughout both lungs. These miliary cancerous bodies were secondary formations in all the cases mentioned except one, particulars of which are recorded by Dr. Hilton Fagge in the eighteenth volume of the *'Pathological Society's Transactions.'* It is a very rare form of cancer. Primary cancer of

the lung is very seldom met with : we have never seen an instance of it. The author, however, states, that Dr. Quain has recorded a case of primary cancer of the lung. And Dr. Walshe says, cancer in the lung forms in rare instances the solitary local evidence of the diathesis. Again, Niemeyer ('Practical Medicine,' vol. i, page 250, translated by Dr. Humphreys and Dr. Hockley) observes, the substance of the lung is scarcely ever the point at which the first traces of cancer develop themselves.

In all the cases of disseminated cancer, the symptoms and physical signs were very like to those of acute tuberculosis of the lung. In Dr. Fagge's case, the physical signs indicated capillary bronchitis. In Dr. Quain's case it is stated that the symptoms were like those of tubercular disease.

In the case of a girl, *æt.* 15, under Dr. Bennett's care, in which miliary cancer was disseminated in the lungs, the physical signs, the symptoms, the general feverish disturbance, the hectic aspect, the previous history of ill health, the age of the patient, all seemed to point to tubercular disease ; and, as Dr. Bennett remarks, there was every reason for supposing, that in this young girl the symptoms referable to the chest depended on the presence of scattered miliary tubercles. There was nothing in the physical signs or symptoms at all distinctive.

It has been said, that the thermometer enables us to distinguish cancer from tubercle. Our experience is opposed to that opinion ; in fact, we have been on more than one occasion greatly misled by assuming that the temperature does not rise in cases of uncomplicated cancer. However, Dr. Bennett perhaps expresses the received opinion when he states, that a low temperature may indeed usually be considered to attend cancer. But he further remarks, from a case which has recently occurred at the London Hospital, it would appear, however, that increase of temperature may attend the rapid growth of cancer diffused through the system. In the case referred to, a man with cancer of the testicle became the subject of acute symptoms referrible to the lungs. After death carcinoma was found in the brain, lungs, liver, and testicle, and there was no evidence of acute inflammatory change in any part of the body. There was no appreciable pneumonia, nephritis, nor inflammation of serous membranes. The cancerous deposits were exceedingly vascular, and had the character of having grown rapidly. The temperature ranged from 100 to 101.4, and this led to the inference that the changes going on in the lungs were either dependent on tubercle or broncho-pneumonia.

Great breathlessness, with few physical signs, is another symptom which has been somewhat relied upon in the diagnosis of acute tubercular disease of the lung. Niemeyer, in considering the differential diagnosis of acute miliary tuberculosis, says (page 250,

vol. i, 'Practical Medicine,' English translation), "Especially the shortness of breath, which often renders it impossible for the patient to breathe in the recumbent position, and which is in striking contrast with the absence of physical signs of disease, afford data for diagnosis." This accelerated and difficult breathing is always present a few days before death, but in the earlier period it may or may not be present in acute tuberculosis, and it occurs, as the author's cases show, when there is acute miliary cancer of lung, also in other cases where small solid masses of a totally different kind are scattered through the lungs. This was well illustrated in a case recorded by Sir James Paget, where masses of enchondroma were disseminated in the lungs. In this patient the sole symptom connected with the chest seems to have been breathlessness (see 'Walshe on Disease of the Lungs,' page 543).

It will, perhaps, be safe to conclude, when there is evidence of a cancerous tumour in any part of the body, when symptoms referrible to the lungs appear and continue many weeks, when the physical signs mainly denote general bronchial irritation, that there is secondary cancer of the lung. Of course there might be old-standing emphysema, phthisis, heart or kidney disease, the bronchial irritation occurring with one or other of these conditions being totally independent of cancer. Whilst recognising that this combination of symptoms will enable us, in the majority of cases, to make a correct diagnosis, we must remember any one of these, taken singly, may mislead. For example, the supposed cancerous tumour may be found subsequently to be an abscess. Again, the lung symptoms may continue more or less severe for two, or even three months, and yet be dependent on disseminated miliary tubercle.

Experience, moreover, has indicated that bronchial râles may be scattered through the lungs with or without signs of consolidation, attended by increasing breathlessness; and the history of the case may show that failure of health only commenced a few weeks ago, and yet the disease in the lungs may be miliary cancer, may be tubercle, small disseminated masses of pneumonia, or other morbid formations.

Experience has further shown that secondary masses of pulmonary cancer, disseminated through the lungs, may be latent, both as regards general symptoms and physical signs; at any rate, the disturbance they produce is so slight that the symptoms are overlooked. In some of these instances there may be little shortness of breath while the patient lies in bed, and very little cough. A harsh, inspiratory, and a somewhat prolonged expiratory sound may be heard, and the percussion-note may be unduly resonant; there may be no other physical signs; and yet after death an examination may show several masses of cancer in the lungs.

The author next records cases in which secondary cancerous growths had extended along the walls of the bronchial tubes and

vessels of the lungs, even as far as their very small divisions. In such cases the lung looks as if it were intersected in almost every part by a fibroid substance. A naked-eye examination would, perhaps, lead many to regard this change as a fibroid one belonging to the class of cirrhosis, or fibroid degeneration, of the lung. The microscope, however, as in the case Dr. Bennett relates, may show that the new formation is scirrhus cancer. Of these patients one was a woman, *æt.* 42. She had, before coming under Dr. Bennett's care, whilst in St. Mary's Hospital, had a tumour removed from her breast. Six months after this operation her breathing became embarrassed, and this, together with cough, continued to increase, and she also lost flesh. Whilst under Dr. Bennett's observation her breathing became more and more difficult, her face became livid, and the temperature ranged from $99\cdot3^{\circ}$ to $100\cdot2^{\circ}$. The chest was normal in form and resonant throughout. Dry bronchial râles were heard nearly all over the lungs. At last the breathing became extremely embarrassed, the cough was not troublesome, and there was little expectoration. The lividity increased, auscultation showed that little air entered the vesicular texture of the lungs, and the respiration had a short whiffing character. As regards this case, if we exclude the history of mammary tumour and the scar on the breast, the symptoms and physical signs only indicated capillary bronchitis—such bronchitis as occurs with advanced vesicular emphysema with dilated bronchial tubes, and with other morbid conditions. It was the collateral evidence of tumour which led to the diagnosis of cancer. The subsidence of cough, diminished expectoration, lessening crepitation until nothing but short whiffy respiration was heard, are all symptoms of capillary bronchitis; and similar symptoms occur, not only with cancerous, but also with other forms of capillary bronchitis.

Dr. Bennett next refers to a case in which secondary cancer having extended from the breast through the intercostal muscle, diffused itself around the pulmonary artery, and the aorta, and invaded the anterior wall of the right ventricle of the heart. The symptoms in such cases are very obscure. There was, in the case mentioned by Dr. Bennett, no cardiac murmur, no irregularity of rhythm, to indicate heart disease; but the breathing was accelerated and was much embarrassed during exertion; there were no physical signs showing that this shortness of breath was dependent on lung disease. There was also most distressing nausea and occasionally vomiting.

A case of this kind came under our observation some time ago. A man had a scirrhus tumour in the left pectoral muscle, and the post-mortem examination showed that it had extended through the intercostal muscles, and invaded the wall of the right ventricle. Nausea, in this case, also was a very distressing symptom.

Cases of mediastinal cancer are next recorded; they are very instructive, and will well repay careful examination,

In studying the diseases of any organ of the body, it is useful to remember that certain symptoms are generally present whenever that particular organ is in any way diseased. We speak of the symptoms which depend on the disturbance of the organ's functions by any cause, and not on those dependent on the particular nature of the morbid process going on.

This distinction may conveniently be made, not only with regard to disease of the lungs, but in the case of disease of the heart, the brain, the kidneys, and other organs. In many cases of mediastinal cancer invading the lungs there are symptoms which are common to various kinds of lung disease: for instance, cough, muco-purulent expectoration, hæmoptysis, shortness of breath on exertion, wandering pains about the chest; loss of flesh, loss of or varying appetite, discomfort after food and night sweats. The physical signs may indicate either bronchial, pleural, or pulmonary changes. Further the physical signs may denote consolidation or disorganisation of the lung, or imperfect respiratory action. Then the question arises, what is the nature of the material irritating, or consolidating, or the process disorganizing the lung. If with these general symptoms there be associated others indicative of excentric pressure, for instance, signs of venous obstruction, pressure on the trachea, on the bronchus, œsophagus, or recurrent laryngeal nerves, it is exceedingly probable that there is an intra-thoracic tumour. In short we have then, besides the general symptoms belonging to disturbance in the lungs, local symptoms depending on pressure on particular parts.

When individual cases are, however, examined it is found that any or several of these general symptoms may be absent, and that they may occur with varying severity. In studying the symptoms singly we observe that cough in some cases presents no peculiarity, in other instances it is paroxysmal and extremely distressing. It is generally accompanied by expectoration of frothy mucous or muco-purulent matter. Occasionally the expectorated substance is very fetid. Much stress has been laid by some writers on an appearance of the substance expectorated which is likened to red currant jelly. That such expectoration occurs in some cases of pulmonary cancer is beyond doubt, but that it is absent in not a few other cases is equally certain. Cancerous particles called casts, distinguishable by the microscope, have been discovered by some observers. Hæmoptysis is very common in intra-thoracic cancer almost if not quite as common as in phthisis. Dr. Walshe states, in reference to this symptom, in his work on 'Diseases of Lungs,' third edition, page 420, that cancer "is very frequently attended with sanguineous expectoration or pure hæmoptysis. In regard to this symptom the two diseases may be thus compared:—the percentage of hæmoptysis of all amounts in cases of cancer is 72, in phthisis 80·92, while hæmoptysis above one ounce occurs in cancer and phthisis in the ratio of about 70 to 40.

Hence 100 cases of cancer of the lung will be attended nearly as often with hæmoptysis of all amounts and greatly more often with hæmoptysis above an ounce in amount at a time than 100 cases of phthisis. But on the other hand tuberculous is so vastly more frequent than cancerous disease of the lung that the share of the population suffering at any time from cancerous hæmoptysis will form but an insignificant fraction of that suffering from hæmoptysis of tuberculous origin." A case is referred to by Dr. Bennett (the patient was under the care of Dr. Pollock in the Brompton Hospital), in which hæmoptysis took place sixteen months before death, and it recurred several times; ultimately the disease was found to be mediastinal and pulmonary cancer. Dr. Bennett says that death by hæmorrhage, as a consequence of cancer of the lung, is very rare, but he mentions a case recorded by Dr. Church in which death ensued after the patient had brought up about four pints of blood. It may here be mentioned, that it is now recognised that hæmoptysis does not cause death in any form of chest disease, so often as observers formerly supposed. Even in phthisis death by hæmoptysis is proportionately rare.

Dr. Bennett states that in several of his cases the general aspect of the patient gave no indication whatever of the nature of the disease. And perhaps many observers will agree with us when we state that the so-called cancerous physiognomy (we allude to the pale-yellow or straw-coloured condition of the face and skin generally) is of little aid in the diagnosis of cancer. It may occur with thoracic as with other forms of cancer, no doubt, but it is often absent, and when this appearance is present it is not distinctive of cancer. Some years ago whilst going round the wards of Guy's Hospital with Dr. Wilks, a woman with an abdominal tumour was pointed out to us. A physician who had formerly been attached to the hospital came into the ward, and seeing the cachectic appearance of the face remarked that she had the cancerous physiognomy. When the body was examined there was no cancer, but a suppurating ovarian cyst was found. With respect to pain, Dr. Bennett says it may or may not be severe in intra-thoracic cancer.

In studying cases of this disease, however, it is found that the symptoms as well as the physical signs vary according to the position of the growth and the direction in which it extends. Experience has shown that the initiatory symptoms may be connected with the trachea, and more frequently with the bronchi, with the pleura, with the venous side of the heart, with the œsophagus, with the recurrent laryngeal nerve, or even with the spinal canal; but as the growth extends several of the parts mentioned may become involved simultaneously; the symptoms and physical signs increase, and vary accordingly.

It has been already noticed when referring to the morbid anatomy

of the disease that cancer may begin in different parts of the thorax. Most frequently it begins about the root of the lung and it makes its way into the lung substance compressing and obstructing the bronchus or one of its primary divisions, and in this way diminishes the quantity of air entering the lung. If the patient be seen early very tubular breathing indicating pressure on the bronchus may be heard over the region of the root of the lung, and perhaps there is dulness and feeble respiratory sounds over a portion of the side. Or there may be dulness in the lower part of one lung, feeble respiration and diminished tactile vocal fremitus. These signs as the disease advances may increase more and more; the dulness rising higher and higher until nearly the whole of one side of the chest is absolutely dull; until no respiratory murmur is heard and no tactile vocal fremitus is felt. The size of the diseased half of the chest may be either natural, increased or diminished. These symptoms and physical signs, dulness, loss of respiration and of tactile vocal fremitus, rising as it were from below upwards, resemble those of pleuritic effusion; but, unlike what is seen in the latter condition, the heart in some cases is not displaced. The patient may at the same time have little cough, scarcely any expectoration, and the breathing until shortly before death may not be troublesome excepting on exertion.

In some cases, the dulness and feeble respiration are found first over the upper part of the lung, and thence descend until the region over the entire lung grows dull, as has been just described.

In other instances there may be a still greater resemblance to pleuritic effusion. We allude to cases in which there is no effusion into the pleural cavity, but a cancerous growth pushing the lung backwards and inwards to the posterior part of the chest and against the vertebræ. The side affected may be unduly prominent and of increased size, as shown by measurement. The intercostal spaces may protrude somewhat. There may be absolute dulness, with absence of respiration and of tactile vocal fremitus, over the anterior and lateral portions of one half of the chest. At the same time, there may be bronchial breathing and distinct tactile vocal fremitus over the posterior part of this side near to the spine. The heart may be greatly displaced to the opposite side. If the growth be on the left side, the heart may be displaced as far as to the right nipple, or even further. But in some of these cases, as the disease becomes more developed, the difficulty is greatly lessened, if not removed by the super-vention of other symptoms. It may be found, that after the signs indicative of pleuritic effusion have continued some time, paraplegia may appear, which at once suggests that the chest disturbance may be dependent on a growth which has extended into the spinal canal. Or great lividity of the face and distension of the veins of the neck, with or without œdema of one or both arms may supervene and

denote intra-thoracic pressure; or great dysphagia may follow, and suggest that there is a growth extending into the œsophagus; or the glands above the clavicle, or in the axilla, becoming much enlarged, suggest cancer.

Again, the cancerous growth, as we have already shown, may begin near the right auricle; it may press upon the superior cava, and coincidentally or subsequently on the bronchial tube supplying the upper lobe of the lung. In which cases, lividity is the first symptom which attracts much attention. This may appear only on exertion; as, for instance, on going up stairs, or when carrying a heavy weight, or during coughing. After a while it increases and becomes permanent; the veins of the neck become greatly distended, the face gets bloated-looking, the arms œdematous. There may be more or less dulness, with a very tubular "drawn" inspiratory sound over the first and second right intercostal space near the sternum. Moreover, one vocal chord may be totally or partially paralysed or both chords may be natural.

If the growth originates in the upper part of the thorax near the apex of the lungs the symptoms and physical signs may for some time closely resemble those of phthisis. In fact, for some months the disease may be undistinguishable from phthisis. In such cases, the early symptoms are cough, shortness of breath, debility, loss of flesh and appetite. There may also be more or less dulness at one apex of the lung, with dry or moist bronchial râles, or both these sounds together. Over the supra-scapular region of this lung, there may be harsh bronchial respiration and increased vocal resonance. These symptoms of disease at one apex of the lung, of course favour the opinion that the disease is phthisis, and most cases in which there are such symptoms and physical signs would indeed prove to be phthisis. After a while, however, other symptoms will appear, clearly showing that the morbid condition is not phthisis, but intra-thoracic tumour.

We do not attempt to refer to all the various ways in which the symptoms and signs may be arranged, for, as Dr. Bennett truly remarks, almost every case presents peculiarities of its own, "and it is this great diversity which constitutes the principal difficulty in the diagnosis."

In speaking of Diagnosis the author states—and, perhaps, all physicians would agree with him—that a careful investigation and study of the anamnesis is of the utmost importance. This, by way of exclusion, if not directly, will often lead us to a correct diagnosis, which would be impossible from a consideration of the existing physical signs and symptoms alone; and we entirely agree with Dr. Bennett, when he says that to lay down precise rules for the differential diagnosis of intra-thoracic growths, based on the physical signs alone, would be little more than waste of time.

It is only, as Dr. Stokes long since stated, by studying the combination and succession of the symptoms that we can hope to make a diagnosis.

The differential diagnosis of this form of disease is very difficult in many cases. It is often impossible, in the early period of the disease to make a correct diagnosis. Experience has shown that patients with intra-thoracic cancer have been thought, before the disease was well developed, to be suffering from phthisis, from bronchitis, from emphysema, from aneurism, pleuritic effusion, chronic pneumonia, or from cirrhosis of the lung, &c. Many mistakes of this kind have been made, and, we feel disposed to say, most of necessity continue to be made; yet whilst recognising this, it is evident, as Dr. Bennett's experience clearly shows, that the intra-thoracic cancer can be diagnosed in some cases.

It may here, perhaps, be useful to consider some of the more common pulmonary or intra-thoracic diseases which may be confounded with cancer.

With regard to the diagnosis from phthisis, it is mainly in the early stage of the disease that the difficulty is great. A careful study of the patient's history, symptoms, physical signs, especially when the latter are well developed, will, in most cases, enable the practitioner to conclude that it is not phthisis, although he may not be able to decide as to the kind of morbid change going on. Dysphagia, such as occurs with disease of the œsophagus, lividity, œdema of arms, great paroxysmal dyspnoea, and the dulness most marked in the inner half of the infra-clavicular region, are all, to say the least, very unusual features in phthisis—in common phthisis.

The diagnosis between intra-thoracic cancer and aneurism is much more difficult; and it is very important to determine this, if possible, for the prognosis (we mean more especially with respect to the duration of the disease) and treatment will probably be regulated accordingly, especially in these days, when surgeons endeavour to cure thoracic aneurism by operative means.

We wish that Dr. Bennett had shown us how to make this differential diagnosis, for his large experience gives his opinion great value. He tells us that the diagnosis is sometimes beset with difficulties; this experience has proved.

Any one wishing to study this question will find valuable observations bearing on it in Dr. Stokes's excellent paper entitled "Researches in the Pathology and Diagnosis of Cancer of Lung and Mediastina," published in the 'Dublin Journal of Medical Science,' May, 1842. Although it is many years since this paper was written, yet we are bound to admit that it contains some of the most valuable observations ever made on intra-thoracic tumours. Dr. Cockle's instructive essay on "Intra-thoracic

Cancer" shows much research, and, moreover, records facts of great value.

It is now well known to surgeons that a cancerous tumour may pulsate, that there may be a bruit, that it may have marked lateral expansions also, like an aneurism. Even where such a tumour can be handled freely the diagnosis is sometimes made with difficulty. Dr. Cockle alludes to an interesting case recorded by Cayol, in which there was a tumour near the left shoulder which pulsated strongly and synchronously with the pulse. It is stated that many of the most celebrated surgeons of Paris, including Sabatier, pronounced this tumour to be an aneurism of the subclavian artery. The treatment for aneurism, that of *Valsalva*, was adopted, but the post-mortem examination showed the disease to be cancer. Mr. Bryant and Mr. Maunder have mentioned to us particulars of cases in which there was a pulsating cancer which closely resembled aneurism.

There are, nevertheless, symptoms which usually help us to distinguish intra-thoracic aneurism from pulsating cancer.

Dr. Stokes (in his work on 'Disease of the Heart and Aorta,' p. 605), says that in pulsating cancer there is more extended dulness and the pulsation is much less in cancer than in aneurism. The signs of pressure on the bronchi and other parts are much more marked in intra-thoracic cancer than in thoracic aneurism. Dr. Stokes states that he has never seen thoracic aneurisms produce occlusion of the bronchial tubes so completely as to cause total suspension of respiratory murmur throughout the lung, but one may well conceive this might occur. With cancer complete occlusion is common.

The symptoms of pressure not unfrequently vary very much both in intensity and from day to day in aneurism. This is not so or certainly to a less extent in cancer. A double bruit heard loudest over the upper part of the sternum and its systolic portion louder than its diastolic, speaks more in favour of aneurism than of cancer. Dr. Bennett considers that severe pain more frequently occurs with aneurism; and in our experience, localised pain, and especially if it continue month by month in the region of the upper part of the sternum, of the shoulder, or of the end of the clavicle, or in the dorsal spinal region, is more common with aneurism.

Paralysis of the left vocal chord due to pressure on the left recurrent laryngeal nerve, is indicative rather of aneurism than of cancer although it does occasionally occur in the latter.

Those who have studied the clinical history of intra-thoracic cancer, and who have had considerable experience of the disease, are generally ready to admit that it is in some cases exceeding difficult by physical signs alone, to distinguish such cancerous tumours from large pleuritic effusions. Other physicians, however, state with no little manifestation of confidence that they have never experienced such difficulty. But if the morbid anatomy, the symptoms

and the physical signs, be carefully considered, we must admit that the differential diagnosis will in some cases be very difficult. We agree with Dr. Cockle that there are cases where mere physical diagnosis is utterly incompetent to decide the question. In our opinion, the only way of deciding in such cases is by passing an exploratory trochar into the pleural cavity. This we have found may be done without any appreciable injurious effects.

At the risk of repetition we may mention that a large cancerous mass may almost fill one side of the chest, flatten and push the lung backwards and inwards against the spine and posterior part of the ribs. The tumour may displace the heart until it beats under the right nipple. The affected side may be larger or more prominent than the opposite one, and the "intercostal spaces" may protrude. There may be no lividity of face, no great distension of veins, no paroxysmal dyspnoea, nor difficulty in swallowing. All the symptoms and signs may come on slowly without any very distressing pain, without any alteration in the face or condition of body, suggestive of malignant disease.

Such a case is mentioned by Dr. Bennett. It was thought to be pleuritic effusion, and the side was tapped. This patient was examined on several occasions by more than one physician. And other cases have occurred in which a cancerous tumour was supposed to be pleuritic effusion, and the side was tapped.

In the face of this experience it seems to us that we cannot but admit that the diagnosis, in some cases, may be exceedingly difficult. We have heard it stated that the bulged, prominent intercostal spaces will serve to distinguish pleuritic effusion; but these spaces are little or not at all bulged in some cases of pleuritic effusion, and, on the other hand, they may be protruded by the pressure of cancer. Again, some observers are of opinion that fluctuation may be felt when the intercostal spaces are widened by pleuritic effusion; but, independent of the difficulty in applying this test, there is the recorded fact that with soft medullary intrathoracic cancer there may be intercostal fluctuation.

With respect to treatment in cases of intra-thoracic growth, Dr. Bennett says that a considerable amount of relief may be obtained by rest and due attention to general health, by careful regulation of the digestive organs, by change of air, and other hygienic measures. Tonics, especially chalybeates, will often be useful. Special symptoms admit of considerable alleviation. Small blisters or other counter-irritants often relieve local pain, and patients, Dr. Bennett remarks, often ask for a repetition of small blisters. In other cases poultices and the external use of anodynes give more relief. Cold, he states, has not seemed to be of any service in cancer of the chest.

In bringing these remarks to a close, it only remains for us to

mention that this book has been carefully and well prepared. From a physician of Dr. Bennett's reputation good work is expected, and, as we have shown, this expectation is fulfilled. The cases given are not only very instructive, but to each are attached very valuable comments—valuable, because they are evidently the result of large experience faithfully given. The drawings are good.

We have, however, to make one critical remark: the scope of the work should be increased in the next edition, for, as we have pointed out, an account of hydatid, syphilitic, strumous, and even aneurysmal tumours might advantageously be given; and although these are not all tumours in the histological sense, they are clinically so. The material might be arranged in a more systematic form. We must conclude, however, by saying we have read this book with benefit and pleasure.

VI.—Habershon and Ward on Liver Diseases.¹

THESE two works are the productions of physicians who write from experience, and are addressed to the practitioner rather than to the student. They are neither systematic in their arrangement nor exhaustive in their mode of treating their subject-matter. Dr. Habershon takes in hand a practical survey of some diseases of the liver in their relations to the nerves, to the blood-vessels, and to the excretion and the excretory ducts of that organ, and adduces cases in illustration of the pathological and therapeutical doctrines he advances.

Dr. Ward's treatise is more discursive and varied in its contents. Not one half of it is occupied with the consideration of hepatic diseases, the greater part being taken up with remarks on intestinal obstruction, dysentery, peritonitis, ague and its sequelæ, and on malarious remittent fever, scurvy, and purpura. As physician of the Seamen's Hospital at Greenwich, he, in short, narrates his experience with regard to the most important and prevalent diseases which fall under his daily observation in that capacity. In other words, he writes on subjects upon which he is best fitted to do so, and respecting which his opinions will have the most weight. His plan has been, with case-book in hand, to sketch the ordinary features of the diseases he has had to deal with, and to illustrate them and certain departures therefrom, by the cases he has observed. His book is, therefore, a record of clinical experience.

These notes on the characteristic features of the two treatises

¹ 1. *On the Pathology and Treatment of some of the Diseases of the Liver*: being the Lettsomian Lectures for 1872. By S. O. HABERSHON, M.D., &c. London, 1872, pp. 91.

2. *On some Affections of the Liver and Intestinal Canal, &c.* By STEPHEN H. WARD, M.D. London, 1872, pp. 260.

will make it manifest that Dr. Habershon has secured to himself an opportunity for a wider survey of diseases of the liver and for arriving at some generalisations concerning the same. The grouping of diseases of an organ together according to a common agreement in pathological conditions is, indeed, well calculated to impress upon the mind a correct view of their true nature and relations, and to place treatment on a rational basis.

His first lecture opens with a protest against over-specialising in the study of disease, as a proceeding that overlooks the interdependence of organs, both in health and in disease, in the economy of the body :

“The two great means (he writes) by which this living union is rendered effectual are the blood and the nervous system; the former the medium by which fresh supplies of nourishment are afforded, or effete materials carried away from the ultimate structures, and the latter the agent which guides and controls and harmonises the mutual workings of the separate parts.”

He then proceeds with some reflections on the consequences of overstrain of the nervous energies by way of exemplifying the part played by the nerves in inducing hepatic disorders, and sensibly insists on the mistake of “treating the liver” in such instances.

With just pride Dr. Habershon, in noting the nervous supply of the liver and its connection with the respiratory tract, refers to the volume of the ‘Guy’s Reports’ for 1857, and to his paper therein on the “Ganglion of the Vena Cava, placed upon the Cava, receiving Fibres from the Pneumogastric Nerve, and bringing this Nerve into connection with the Phrenic and the Vaso-motor Nerves.” In this nexus he finds an explanation of the shoulder-tip pains in liver affections, and likewise of other severe neuroses.

Dr. Ward seems to have been unaware of Dr. Habershon’s researches, and in discussing the nature of the shoulder pain contents himself with citing authorities whose anatomy of the nerves is far less precise and satisfactory.

Glycosuria comes in for notice in connection with neuroses of the liver, and some excellent remarks follow on neuralgic hepatic pains and on atrophy of the liver. Dr. Habershon finds an explanation of the abdominal pains that occur in chronic heart-disease, in the distended cava and the gorged portal system operating upon and through the ganglion of the vena cava and its contributory nerves. The pain differs in kind and is referable to three different causes. The first kind is the sensation of fulness and throbbing and of distress at the scrobiculus cordis, due to distension of the right heart; the second may be situated across the epigastrium, and arise from gastric

catarrh; whilst the third is evidently neuralgic, and abdominal in position, usually deeply behind the first part of the duodenum. "It is severe, almost like that from gallstone, but it is without jaundice or other symptoms of calculus; it is not connected with the stomach, for it is not affected by food, but paroxysmal, and recurring sometimes with great regularity." This same severe neurosis, we may add, is not peculiar to heart disease, but may occur with duodenal disorder, where over-exertion or over-anxiety has produced nervous exhaustion. And there are other neuralgic pains, as Dr. Habershon points out, to which a similar explanation is applicable.

On the subject of shoulder-pain in hepatic maladies and its diagnostic value we have the experience of Dr. Ward. According to this physician its value is small. He particularly refers to it when examining the symptoms of abscess of the liver, and, whilst rejecting it as of moment in diagnosing that lesion generally, confesses himself unable to agree with Dr. G. Budd and Annesley in recognising it as a special indication of abscess in the upper part of the right lobe. It occurred in ten cases of the twenty-six examined by Dr. Ward, and is assuredly by no means pathognomic of abscess of the liver, for it is met with in other lesions of that organ. This much, however, may be asserted, that in hepatic diseases, and probably, more particularly when such diseases are located near the surface of the liver, pain in the shoulder-tip and adjacent parts of neck is a common phenomenon, though by no means pathognomic of them.

Atrophy of the liver in its several forms has, in Dr. Habershon's opinion, much to do with the state of innervation of the organ. Exhausted nerve-power he considers to be if not positively causative, yet intimately bound up with the production or increase of the fatty atrophy of phthisis, of that of intemperance and of cancerous disease. Of the fatty degeneration from phosphorus he will not venture an opinion, whether it be due to an altered condition of the vascular or of the nervous system; but of the hepatic disturbances noted in intermittent and remittent fevers he is sufficiently assured to say that nervous depression is a powerful cause in their production. Moreover, altered nerve-function is an important element in the so-called "bilious attacks." The irritation of the stomach is attended by weakness or paralysis of the vaso-motor nerve of the liver; hence interference with the secretion of bile, the sallow complexion, and high coloured urine.

Acute yellow atrophy of the liver comes in for fuller discussion. In it "the whole nervous system is arrested in its action, and generally from some intense emotion. The patients are nearly always young," and the majority young women. In

some instances pregnancy seems to be connected with the causation of the disease. Seven examples of this fatal malady are referred to, and the appearances after death in two of them are detailed.

Dr. Ward indulges very little in speculative pathology; he is a narrator of facts and not a disquisitionist on causation. We find, consequently, little reference to the nervous system as affording a pathological basis for liver diseases. In jaundice he notes, in common with all observers, the occurrence of "jaundice from mental exhaustion and moral emotions," but as to the mode in which such agencies operate he ventures nothing more than a general crude surmise, that it may be "by diversion of nervous influence, or by constriction of the capillaries." His illustrative case of jaundice from mental anxiety and overwork was dealt with much in the way Dr. Habershon deprecates in such cases, viz. by "treating the liver;" dosing with sulphate of magnesia, taraxacum, sweet spirits of nitre, and blue pill. Happily his patient recovered, and it is not for the critic, therefore, to decry the treatment pursued.

The next lecture by Dr. Habershon is on "The Liver and its Vessels." He premises his pathological considerations by anatomical details of the vessels of the liver. Lesions of the hepatic veins are comparatively few; passive congestion from lung and heart disease is the most common, accompanied by enlargement, altered secretion of bile, sallow complexion, and other symptoms of bilious derangement, all of which become more marked if the congestion extend to the portal venous capillaries. The portal vessels are subject to several lesions. There may be acute congestion directly invading them as a result of intemperance, of malaria, &c.; and these vessels are prone to obstruction, affecting either their exterior or their interior. Of external causes of obstruction the author enumerates coagulation of blood, thrombosis, the entrance of cancerous growth or of the contents of an abscess or cyst; and he pronounces coagulation of blood within the portal veins and its branches to be more frequent than is usually supposed, and the cause of some of the symptoms observed in great exhaustion.

"In the coronary veins of the stomach it is the cause of effusion of blood and the coffee-ground vomit, which are sometimes observed towards the termination of disease and in which no ulceration of the stomach can be found. In the mesenteric veins this venous coagulation leads to appearances closely resembling internal strangulation."

External obstruction may arise from disease external to the portal vein, or from inflammation of its coats. One of its consequences is the entire wasting of considerable portions of the gland.

This phenomenon is at times witnessed as a result of obstruction during foetal or early infantile life. The case of a woman, *æt.* 34, is recorded, in whom obstruction of the vena porta was a consequence of fibroid thickening of its walls.

The most common cause, however, of obstruction is that from inflammatory change in Glisson's capsule, the chronic form of which is called cirrhosis. Contraction of the liver is also a consequence of venous congestion and of fibroid degeneration; a form met with in old people. The author stays to examine the part played by the hepatic artery in the inflammatory changes, and details at much length the pathology and the morbid appearances of cirrhosis. He contends that this lesion is not merely a local disease, but part of a general one, wherein wasting or atrophy is a characteristic. At the same time he is prepared to admit that cirrhosis is occasionally a partial disease, limited to a portion of the liver, and sometimes associated with acute yellow atrophy of the liver.

Cirrhosis is a subject treated also at some length by Dr. Ward. Of its morbid anatomy, however, he says nothing but in loose general terms,—stating that it “consists generally in inflammation and hypertrophy of Glisson's capsule and of the connective tissue of the liver generally;” a pathological description to which exception might justly be taken. It is, however, quite clear that Dr. Ward must not be submitted to criticism as a pathologist, for in that capacity, so far as the present treatise reveals him, he could not claim attention. Where he calls for consideration is in his character of a physician recording his clinical experience. This much may be said in passing.

To return—Dr. Ward remarks that cirrhosis is not so frequent a malady among sailors as might be supposed. This circumstance he thinks may be explained by their hard-drinking being only an occasional occurrence, their life aboard ship being, in the main, one of comparative abstinence. There is force in this explanation, but we are convinced that the spirit-drinking to which Dr. Habershon, together with most physicians, would assign almost the entire causation of the malady, is only one factor, although a primary and essential one. There are in truth several conditions and circumstances that accelerate or otherwise retard the mischievous results of spirit drinking upon the liver. Dr. Ward insists on the enhanced ill-effects of spirits when taken on an empty stomach and in tropical countries. We are persuaded also that the ill-fed and ill-clad suffer more speedily than the well-fed and the well-clothed. Moreover, the kind and quality of the spirit have much to do with the pathological results. Scottish taste leads to the regular use and large consumption of spirits in the form of

whiskey, but cirrhotic patients are not found in Scotland at all in proportion to the number of consumers, nor in proportion to the victims of alcohol in London, and some other large towns in England, where the ratio of spirit drinkers to the population is much less than in Scotland. In London gin is the popular beverage among the poor, and that it makes so many victims we are inclined to attribute to its horribly adulterated character; just as the wretched corn-spirit sold in France as brandy is found far more destructive to health than brandy itself.

Another feature in cirrhosis brought prominently into view by Dr. Ward is the congestion and enlargement of the liver in the early stage of cirrhosis. This condition we do not consider has been sufficiently noticed by writers generally. It comes less frequently under the notice of physicians who write from hospital experience than of those who are the general attendants upon patients; and the former likewise see cirrhosis more commonly among the broken-down and half-starved; whilst the latter are called to treat it among persons sufficiently well off and well nourished. In this class last named, the hepatic congestion and enlargement is a well-marked condition and of very considerable duration.

In the general rules for treatment there is a pretty close agreement between the two authors under notice. Mercury is believed in by both of them as a fit and proper medicine in the early or congestive stage of cirrhosis, calculated to lessen the engorgement of the portal system and to promote the absorption of fibrin. Dr. Ward, indeed, would press its use to produce a slight specific action. We wish, however, this writer was a little more specific and positive in his directions for treatment; for it is tiresome and disappointing to a practitioner who might consult the book to strengthen his hands in the matter of treatment, to encounter the permissive phrases of "may" and "might" with regard to the medicines and other therapeutical measures mentioned.

Dr. Habershon has noted a matter with regard to the often observed failure of iodide and of bromide of potassium, of chloride of ammonium and other esteemed hepatic medicines, and also of diuretics generally, in ascites, viz. that such drugs are valueless, inasmuch as they are not absorbed, because of the distended state of the vena portæ. "In this state (he says) I have often found more benefit from quinine with mineral acids, and from those means which are likely to improve the general health of the patient, than from measures more directly calculated to promote the absorption of fibrin in the glandular texture" (p. 54).

The early performance of tapping receives the support of Dr. Habershon and, as we gather by inference, of Dr. Ward also.

When the operation is delayed till an advanced stage of the malady, there is much danger from peritonitis, which, instead of being manifested as usual by pain, is rather attended by typhoid exhaustion.

Abscess of the liver receives scant notice from Dr. Habershon, since it but imperfectly falls within the scheme adopted by him in his lectures. He notices it at the termination of his second lecture on "The Liver and its Vessels," and without any attempt to unfold its pathology, details the history of two cases, both happening in men who had lived in tropical climates. These cases, without doubt, furnish some illustration of the symptoms and course of hepatic abscess, but so bare an account of a lesion of such great importance, it was not worth his while to trouble his hearers and readers with.

On the other hand, as might be anticipated from Dr. Ward's connection with the Dreadnought Seamen's Hospital, in which so many sailors from foreign climates are admitted, of whom not a few suffer with abscess of the liver, this lesion forms one of the principal subjects of his volume,

In the matter of symptoms, Dr. Ward finds none characteristic of hepatic abscess, although this disease may be pretty conclusively determined from an aggregate of symptoms. We have before referred to shoulder-tip pain as a very uncertain sign; besides this, he enumerates, as symptoms, enlargement of the liver with possible bulging and fluctuation, a rigid state of the recti muscles, jaundice, rigors, and hectic fever. Rigidity of the recti muscles is by no means a special symptom of liver disease, as Twining represented; and although jaundice appears in the list of symptoms, it is a condition rather suggestive of some other liver disease than of abscess, for it existed in only two of the author's twenty-six cases.

Dr. Ward is satisfied that a natural process of cure occasionally takes place, by absorption of the more fluid parts of the abscess, a caseous or calcareous substance alone remaining. He observes:

"On analysing my twenty-six cases with reference to the mode of termination, I find that the abscess in twelve effected no opening, that in seven it opened into the lung, in one probably into the bowels, in one into the peritonæum, and in five pointed externally. The post-mortem examination of twenty cases revealed but single abscesses in seven, and two or more in the remainder. In all the cases in which the abscess was single, it was situated in the right lobe of the liver. . . . In six of the cases there was no evidence of dysenteric ulceration; in the remainder it was present in greater or less extent."

He reminds his readers that the abscesses under consideration

are those developed under the influence of tropical climates; he, however, makes some observations on metastatic or pyæmic abscesses, and narrates a case having, it would seem, such an origin. He then takes occasion to discuss Dr. George Budd's hypothesis of the production of abscess of the liver as a sequel to dysentery, by means of pyæmic absorption. His conclusions are in opposition to that theory:—"At the Seaman's Hospital hepatic abscess has not occurred in five per cent. of the cases of well-marked and severe dysentery."

With regard to treatment Dr. Ward's recommendations present no novelty, except happily it be in the absence of prescriptions of drugs. He is in favour of opening the abscess in well-selected cases; and although he would desire to make sure of adhesion to the parietes, he has nevertheless no excessive fear of puncture without adhesion, and where constitutional symptoms are urgent, would "puncture with a fine trocar, even when not satisfied that adhesion had taken place."

The bile and the bile-ducts is the subject matter of Dr. Habershon's last lecture. The disordered conditions he considers are, spasmodic occlusion and catarrhal obstruction of the ducts, inflammatory thickening, gall-stones, cancerous disease associated with gall-stones, and pleuritic effusion with the same, and lastly cancerous disease. He takes occasion to note also a somewhat rare condition, viz. the traction produced by old adhesion between the gall-bladder and the duodenum, or with the colon or the stomach, and which is the cause of symptoms closely resembling those of spasmodic contraction of the bile-ducts. This condition he exemplifies by a case.

We do not find any teachings calling for quotation in this place; suffice it to say they are characterised by the same good practical sense exhibited in the examination of the other morbid conditions discussed in this treatise.

In the remaining space, at our disposal, we will briefly note the chapters in Dr. Ward's book which have not yet received notice.

Hydatid disease of the liver receives illustration by two cases from Dr. Ward's own practice. The remarks accompanying them convey an outline of generally received facts and opinions concerning the lesion, but make no addition to our stock.

The subject of jaundice and functional derangement of the liver is discoursed upon in the author's usual practical style, and has the advantage of several cases in illustration. He considers jaundice under the headings of "jaundice in connection with excessive secretion, from deficient or arrested secretion, and from obstruction to the passage of bile." By this plan he passes under review all the principal varieties of the disorder,

and makes a good practical chapter which may be read and reflected on with advantage. He agrees with other physicians as to the unreliability of Dr. Harley's proposed test for obstructed bile by examining for the bile-acids in the urine. His remarks on treatment are unusually full. As before observed he is a believer in the virtues of mercury in liver disease.

In the remaining portion of his work Dr. Ward leaves the subject of liver diseases, and is rather miscellaneous in his selection of topics; a selection, however, which we can realise as dictated by his special experience. Intestinal obstruction is the subject of the fourth chapter. Various interesting cases exhibiting the leading features of each form of obstruction are detailed, and the author's comments on them are very judicious. But the chapter cannot be regarded as presenting a complete history of the lesion. Of its several sections, that on obstruction from impacted gall-stones will probably be read with most interest. In Dr. Ward's experience, the rule laid down by some writers, that pain is present in impaction from gall-stones, but absent in fæcal impaction, is fallacious. Neither is tympanitis a usual phenomenon, but early, obstinate, and at first purely bilious vomiting has a better claim to be considered diagnostic of impaction from calculi. "The vomiting early and severe, in proportion as the lodgment is high up in the intestinal canal, and the quantity of fluid thus ejected, will go far (says Dr. Ward) to explain a rule laid down by Dr. Barlow, viz. that the urine is scanty in proportion as the obstruction is high up in the intestinal canal."

Another feature of gall-stone impaction contrasting with fæcal accumulation is, the "early prostration of the vital powers, and a peculiarly haggard, pinched expression of the countenance, with sunken eyes."

A short chapter follows on dysentery, the contents of which are gathered from the wide experience of the disease, furnished the author, at the Seaman's Hospital; but neither the sketch afforded of its pathology or of its treatment possesses sufficient novelty to call for quotations. We learn, indeed, that since Dr. Ward wrote a paper in the 'Lancet' of November, 1857, on food and rest, he has become more convinced that those measures are of primary importance, and that the drug treatment he was then partial to is of secondary moment. There is one omission in his notes on treatment, viz. of reference to the plan now most successfully pursued in India, of giving frequent and large doses of ipecacuanha.

In his remarks on peritonitis Dr. Ward displays, as usual, the character of a careful and accurate bed-side observer, and of a faithful recorder of what he sees. He chiefly confines

himself to noting the features of chronic peritonitis (tubercular and non-tubercular), and, in so doing, puts before his readers an amount of instruction not commonly found in systematic treatises on medicine. For, as he justly observes, the non-tuberculous chronic peritonitis, chronic from its outset, has not received much attention from writers of systems of medicine. It is a disease that may run its course with no marked constitutional disturbance and little or no pain, although the intestines get glued together by lymph, and serum is outpoured, sooner or later, giving rise to ascites, which in extent surpasses what is met with in the tuberculous form. It also differs from the last-named variety by the absence of intractable diarrhœa.

At the termination of this chapter peri-typhlitis comes in for notice and illustration by cases.

The two remaining chapters on "Ague and the Sequelæ of it and of Malarious Remittent Fever." and on "Scurvy," we cannot now discuss, as to do so would carry us too far away from the principal subject of this article, the diseases of the liver. They contain many useful suggestions and observations, although adding little to the general stock of information. They are likewise marked by the same deficiencies as are found in the other chapters of the volume; the fact being, Dr. Ward has not advanced with the times in his pathological and therapeutical doctrines. This defect necessarily detracts from the value of his book as an exposition of modern medicine in regard to the lesions handled in it. On the other hand, the work will be appreciated as a clinical one, and as a valuable repertory of cases—many of them unusual, and highly interesting and instructive.

VII.—Pathological Histology of the Brain and Spinal Cord.¹

IN a late number of this Review we laid before our readers a short summary of recent researches into the normal histology

¹ 1. *Untersuchungen über der Normale und Pathologische Anatomie der Rückenmarks.* Von Dr. C. FROMMANN, in Wiemar. Jena, 1867.

2. *Lehrbuch der Pathologischen Gewebelehre.* Von Dr. ED. RINDFLEISCH. Leipzig, 1870.

3. *Archives de Physiologie Normale et Pathologique.* Par MM. BROWN-SÉQUARD, CHARCOT, and VULPIAN. Paris, 1871-73.

4. *Archives Générales de Médecine.* Paris, 1872.

5. *Sixth Annual Report of the Fife and Kinross District Board of Lunacy.* 1872.

6. *West Riding Lunatic Asylum Reports.* Edited by J. CRICHTON BROWN, M.D. 1872.

7. *St. Bartholomew's Hospital Reports.* 1872. 8. *St. Thomas's Hospital Reports.* 1872. 9. *Guy's Hospital Reports.* 1861 et seq.

10. *On the Pathology of Cerebral Hæmorrhage.* By M. BOUCHARD. Translated by T. J. MACLAGAN. 1872. Pp. 31.

of the nervous centres. On the present occasion we propose to give some account of the present state of pathological histology also as relating to the brain and spinal cord. We fear that we shall seem to do injustice to many zealous workers—the results of their labours being, for the most part, so widely scattered throughout the pages of periodicals and medical literature that we are limited, inevitably, to the few that have come immediately before us.

It would scarcely be deemed needful that arguments should, at the present time, be advanced in favour of the prosecution of microscopical investigation in the study of diseases of the nervous centres, yet that such are called for is to be inferred from the remark of a lecturer on insanity, at a metropolitan medical school, viz. that “the morbid change found to exist in the brains of those who die insane are very varied and uncertain. In some cases there is evidence of extensive lesion, in others there is little or no change.”² The inference that would naturally be drawn from this statement is that the time that has been bestowed upon the study of the pathological histology of the nervous centres, might have been spent in other directions with greater certainty of profitable results. Dr. Bucknill is quoted in support of this conclusion. “A large number of brains of the insane,” says that physician, “we have diligently investigated with a first-rate microscope. The results appear to us to have afforded no distinction between the sane and the insane brain.” (!) So unsatisfactory a conclusion, however, we take leave to observe is not borne out by the observations of others who have employed “first-rate microscopes” under efficient methods of examination. Thus a reference to the pages of the several hospital and lunatic asylum reports enumerated at the head of this article will show a far more hopeful prospect of great ultimate benefit from the diligent prosecution of pathological histology.

Dr. Batty Tuke gives the general results of the examinations of eighty brains of persons who had been the subjects of chronic insanity. Dr. Major has studied the changes in the grey matter of the convolutions of the brains of the insane, and Schroeder von der Kolk, who is quoted by the lecturer, “does not remember to have performed, during the last twenty-five years, the dissection of an insane person who did not afford a satisfactory explanation of the phenomena observed during life.”

Frommann, Rindfleisch, Charcot, and others, no less distinguished writers, have all contributed to promote a more exact knowledge of the changes to which the nervous substance is susceptible.

¹ ‘Med. Times and Gazette,’ Sept. 28, 1872.

Dr. Clifford Allbutt observes—

“Not only was our knowledge of the diseases of the nervous system of a very meagre sort until the use of the microscope became general, but I may add, that our method was even unworthy of our knowledge. Not only is the brain the most complex and least accessible part of the body, and, therefore, the last to benefit by the more vigorous and more philosophical mode of investigation, which may be said, within the last few years, to have changed the face of the medical art, but it is in the descriptions of the functions and of the disorders of the brain, that what has been called the metaphysical or transcendental habit of thought has most tenaciously held its ground. Where the order of phenomena is most complex and observation most difficult, there our theories most readily escape the test of experiment. Unchecked by direct reference to nature, theories which have a fair aspect, which are clothed in imposing language, and which are symmetrical and definite, there continue to command assent, although elsewhere discredited. No one would, indeed, now dream of referring the functions of the liver or the heart to an immaterial principle residing in or about these organs, yet many persons still cling to the opinion that the functions of the brain are something more than the movements and relations of the cerebral tissue; and they, therefore, not unnaturally refer diseases of the encephalon to something more than the abnormal movements of its component parts.”

Dr. Gull fifteen years ago thus wrote :

“The labours of Lockhart Clarke and Lenhossek on the minute structure of the nervous centres in health, cannot fail to give a new impulse to a more exact knowledge of the pathological changes to which they are subject. Something in this direction has been attempted.”²

Sir William Gull looking back over this short period might experience some little satisfaction at the readiness with which his lead in the direction he pointed out has been followed. Much, indeed, has been attempted, and not a little has been effected. The improved modes of investigation that are now employed enable us to scrutinise still more closely the minutest changes of the tissues and to place these on record for future reference. It would be well that microscopical pathologists should bear in mind Dr. Beale’s remarks on this one point of recording their observations.

“It may truly be said that no real advance in our knowledge of the minute structure of animal or vegetable tissues can be communicated to others, unless accurate drawings are made. . . . a truthful drawing of what a man has seen recently may be compared with drawings which may be made a hundred years hence,

¹ “On the Use of the Ophthalmoscope,” 1871, p. 2.

² “Cases of Paraplegia,” by William Gull, M.D., ‘Guy’s Hospital Reports,’ 1858.

and, although the means of observation will be far more perfect than they are at present, such comparison may be useful in many ways, and especially in preventing erroneous conclusions."

We cannot offer a more striking proof of the value of these remarks than by referring to the drawings that illustrate Sir W. Gull's cases. Although improved methods of investigation may have given us a closer insight into the nature of the pathological changes than we possessed at the date of their publication, no one can fail to recognise in the drawings that accompany it, the faithful representation of sclerosis in his examples of inflammatory degeneration of the spinal cord.

The results of researches into the pathological histology of the brain and spinal cord will not only reverse the dictum that "there is no difference between the sane and the insane brain," but will show good reason for the opinion that no mental aberration can exist without some positive lesion of brain substance, be it temporary or permanent, any more than disorder of locomotion or sensation can occur without some lesion of the central organs of nervous power in the cord.

In the following outline we shall trace these lesions of the grey matter, white substance, and blood-vessels, through the several pathological conditions of inflammation, degeneration, disintegration, and diseases of the vascular system.

Inflammation.—Pathologists have come to the conclusion that the true elements of nervous tissues are in a large degree exempt from the more pronounced and active form of disease; that acute inflammation, in particular, rarely attacks the real nervous elements, except in a secondary manner. The proper nervous substance is everywhere surrounded and supported by connective tissue, and this connective tissue is the seat of the majority of acute and chronic inflammations together with the degenerative processes succeeding to them.¹ Our own observations would confirm these remarks, more especially with reference to the structure of the spinal cord, the so-called *myelitis* being for the most part *spinal meningitis*. There is little doubt but that many of the recorded instances of acute abscess of the brain have been really examples of disintegration and loss of substance from intercepted blood supply, or perverted nutrition, ending in local patches of softening, as described by Durand Fardel, Bouchard, Charcot and others.

On this point we quote also the opinion of one of our most distinguished pathologists :

"The only exception I know which seems to show that nerve elements undergo active changes of multiplication under inflamma-

¹ Anstie, 'Lancet,' Oct. 12, 1872.

tory irritations is in the case of the congenital encephalitis, which has drawn a good deal of attention on the Continent since Virchow first described it in 1865. Softened patches are found in the brain in these infants, and in these softened patches, besides the usual "granule cells" (which represent fattily degenerated neuroglia cells), there are seen spindle-shaped, clear bodies, not provided with nucleus and nucleolus. These, Virchow says, are made by the swelling and severance of the axis cylinders of nerve tubules. Müller has seen the same kind of forms in the retina in albuminous nephritis. There is doubt in some minds whether these changes are inflammatory, but it is often, at least, associated with changes that are undoubtedly inflammatory. So far as I have seen, there is no nucleus in these spindle-like corpuscles. The presence of a nucleus is the only admissible proof of self-nourishing and reproducing power—in short, of active life—in a cell, and the absence of nuclei in these bodies, I believe, shows that the change which produces these spindle-like products of the axis cylinder is a passive breaking up of it rather than active vital multiplication.

"This, then, I believe, is only an apparent exception to the rule, that under irritation the tubular elements never multiply, but waste away or rapidly break down. The effect of the most severe acute inflammations on the proper elements of the brain you may see in this drawing of the early stage of pyæmic abscess, which shows itself as a patch of deep-red softening, very different from another so-called red softening—I mean from that pink, softened state that results sometimes from embolism of the cerebral arteries, and may be produced artificially by introducing seeds or other bodies into the arteries of the brain, when it is caused by escape of blood into passively softened brain tissue. In the red pyæmic patch you see the nerve cells and fibres breaking down into granules and dispersing. There is no attempt to multiply them, as in the case of cellular and intercellular elements under irritation. The same is true of muscular fibres."¹

More recently the same feature has been referred to by Mr. Kesteven,² who has also pointed out that the result of inflammatory processes are seldom traceable beyond the membranes of the spinal cord; that inflammation of the spinal cord is of an interstitial character leading to degenerations and disintegrations of the nerve structures, instead of the production of the epithelial elements, pus, &c.

Dr. Lockhart Clarke has given an account of the post-mortem examination of the spinal cord of a case of paralysis depending upon cerebral disease followed by acute inflammation of the cord.

This case is cited here as it affords a good example of softening of the cord from acute inflammation, and presents some

¹ Moxon, 'Med. Times and Gazette,' Dec., 1870.

² 'St. Barth. Hosp. Rep.,' 1872.

features of degeneration that are occasionally met with in cases of tetanus. "In the pons Varolii, medulla oblongata, and cervical enlargement, no alteration of structure was observable. In descending, however, to the dorsal region numerous softened excrescences of a rounded or oval form were found on the posterior surface of the cord giving it a blistered or nodulated aspect, a nearly similar appearance was observed on the *anterior* surface of the cord; but the nodules or eminences were smaller and more numerous. The lateral columns, likewise, were thickly studded with an immense number of very small nodules, in contact with each other, and presenting almost the appearance of a deposit. At the lower part of the lumbar enlargement, or rather at the conus medullaris, on separating the nerves of the cauda equina, I found that they enclosed a large mass of white pulpy substance, of about the consistence of thick cream, and streaked here and there with red. At first sight it seemed as if the whole thickness of the cord at this place had been reduced to this pulpy mass; but on carefully scraping away the latter, I was surprised to find the cord itself presenting nearly its natural appearance both in size and shape. The only remarkable alteration appreciable by the naked eye was in the anterior columns of the left side, where there was an oval, reddish, and bare surface, about the size of a pea, and out of which had oozed the softened substance which enveloped the cord. On examining this substance under the microscope, it was found to consist of broken and disintegrated nerve-fibres, interspersed with a multitude of granules and numerous granular (exudation) corpuscles, mixed with blood-globules either isolated or in groups. There were no traces whatever of pus-corpuscles. The substance on the surface of the wound or bare space had precisely the same composition, but contained a larger proportion of blood-globules."

Dr. Clifford Allbutt¹ has the following observations upon inflammation of brain substance. Interstitial cerebritis is as definite a process as interstitial hepatitis, or interstitial nephritis, but it is more difficult to demonstrate, and arises less easily. That the encephalon, as a whole, is certainly not a susceptible organ—not very susceptible, that is, to common irritations—depends mainly upon the poorness of it in the differentiated tissues, and its richness in tissues which are highly specialised. These highly specialised tissues are as little able to respond by proliferation to simple lesions as a highly specialised animal to reproduce an amputated limb.

This indisposition to take on interstitial inflammation is seen

¹ "On the Ophthalmoscope," p. 187.

in the records of a long series of cases, reported by Dr. Hallopeau, of inflammation terminating in degenerations.¹

Optic neuritis, as a symptom, or indication, in disorders of the encephalon, Dr. Clifford Allbutt shows² to be dependent upon meningitis. It is—

“A process of the very greatest interest to the student of nervous diseases. In it we see the mode of inflammatory destruction of nervous tissue, and from it we may draw some valuable inferences as to the mode, the rate, and the propagation of like changes within the cerebro-spinal cavity or in the course of other nerves. The reader is no doubt aware, for example, that secondary neuritic changes have been found in the nerves supplying the limbs in some of those cases where paralysis has been followed by contraction. In distending neuritis the connective tissue of the nerve is probably the active agent, the nervous elements suffering by implication.

“In the optic disk we find the sheath of the vessels much condensed and thickened, and evidence of interstitial inflammation in abundance. If we examine the sheath of the trunk, we find it full of proliferating nuclei and young cells of great instability. In the later periods the nerve columns may be seen to have wasted, and the connective tissue to be greatly increased. This sclerosis, which also affects the vessels of the disk, will, I think, explain the comparatively little congestion in neuritis.”

DISINTEGRATION AND DEGENERATION of the nervous centres are, as already stated, more frequently met with than the products of inflammation. Their origin is somewhat varied, in some instances they are dependent upon deficient vascular supply connected with a state of degeneration of the vessels themselves; in others doubtless from a vitiated blood supply; or again, from an excessive growth or hyperplasm of the neuroglia or connective tissue. These lesions are seen to affect both the cells and the nerve tubes.

Dr. Batty Tuke in his summary of the examination of the brains of eighty persons, the subjects of chronic insanity, remarks—

“The most common and manifest lesion observed has been fatty degeneration and atrophy of the cells: the degeneration most commonly commencing at the periphery and gradually extending inwards; it occasionally, however, has been noticed commencing at or around the nucleus, which is not generally implicated. The cell is represented by a mass of *débris* retaining in some measure its normal contour but with the angles blunted. In extreme cases (such as senile mania) the cells are mere masses of fatty globules which become diffused throughout the tissues. The connective tissue (neuroglia) is also much increased and a thinned indurated condition of the grey matter exists.”

¹ ‘Archives Générales de Médecine,’ 1872.

² Op. cit., p. 26.

This alteration is common also in the multipolar cells of the spinal cord, and often, indeed constitutes the only change appreciable by our present means of investigation. In a portion of the lumbar enlargement of the spinal cord from a man who had suffered amputation of his leg many years ago, which we have ourselves lately examined, granular degeneration of the cells in the anterior horn on the side of the amputation was the only lesion. Cells so altered in constitution become changed in their forms, and do not take the carmine dye like healthy cells.

Dr. Lockhart Clarke has shown that the structure of the grey matter of the convolutions is best shown in the posterior convolutions, that their characters are modified in different parts of the brain, and that even in the same convolution differences in the size and arrangement of the cells may be met with.¹

Dr. Batty Tuke likewise notes that all forms of degeneration are better marked on the upper surface of the cerebrum than on the lower; that, in fact, pathological lesions are rarely met with on the inferior convolutions.

Dr. Major² has directed his attention to changes taking place in the proportion of grey matter of the cortex, in various parts of the convolutions in health and in disease; and having further noticed that instances are not wanting in which a brain representing superior intellect has not only not surpassed another lower in the intellectual scale, but has even fallen below it, has set himself to explain the exception, and seeks its solution in the varying depth of the grey matter of the convolutions in different and in corresponding situations. For this purpose he has contrived a gauge, which he calls tephrylometer (*τεφρά* ash-coloured, *ἰλη* matter). This instrument consists of a glass tube open at each end and graduated to fifteenths of an inch, and being dipped into the surface of the convolution brings within it, when withdrawn, a portion of grey matter, the depth and colour of which may then be noted. The application of this instrument for pathological purposes is illustrated by tables of measurement given by Dr. Major from cases of acute chronic insanity.

Dr. Major has also given us the results of his microscopical examination of a case of chronic brain wasting.³ He found that the corpuscles in the outer layers of the convolutions, immediately beneath the pia mater, had undergone a change. The corpuscles had increased in number, the neuroglia had lost its delicate homogeneous appearance, and had a coarse fibrillated aspect. In the next layer the corpuscles of the neuroglia also were more numerous than in health, as compared with a section

¹ See 'Brit. and For. Med.-Chir. Rev.,' Jan., 1873.

² 'West Riding Lunatic Asylum Reports.'

³ *Loc. cit.*

of healthy brain. It was, however, in the next layer that the greatest amount of change was observable. The large nerve-cells seemed to be comparatively few in number, and in no case formed distinct rows, as found in a healthy organ. They appeared to be scattered in an irregular manner throughout the deeper layers. This fact, together with the circumstance that they were deficient in number, afforded evidence that some of the cells had disappeared. The intervals between the cells were filled in with nuclei and granular corpuscles, the size of blood-globules; the cells themselves had lost their sharpness of outline, while they also departed from their ordinary shape. The minute vessels were dilated, thickened, and tortuous.

In the grey matter of the brain and cord we find granular degeneration and spots of miliary sclerosis, colloid, and amyloid bodies, varying in size from $\frac{1}{5000}$ th to $\frac{1}{50000}$ th of an inch, but as they are less numerous in the grey than in the white matter we reserve further observations upon these pathological conditions to the consideration of the lesions in the medullary portions of the nervous centres.

The grey matter of the brain, Dr. Tuke remarks,

“in very advanced and long-standing cases in no manner presents its normal histological appearances. It is completely disorganised and confused; it soon becomes brittle when acted on by chronic acid or alcohol, which is not the case with normal brain tissue.”

In cases of infantile paralysis, recorded by MM. Charcot and Joffroy,¹ the wasted condition of the cord was obvious on laying open the cavity of the membranes. The lumbar enlargement had disappeared, the size of the cord in the dorsal region being continued downwards. The anterior cornu of the grey matter on one side was reduced to somewhere about one fourth the size of that on the other. The cells had disappeared in the atrophied portion. The neuroglia was represented by a translucent finely granular substance; the starting-point of these changes being, in the opinion of MM. Ollivier and Ranvier, the nerve-cells, inasmuch as in parts whence the structures have disappeared the neuroglia does not, in many instances, appear to differ from the normal condition.

M. Charcot² has found a succession of changes occurring in the nerve-cells in a case of glosso-pharyngeal paralysis. In the early stages of change the cells were filled with pigment of a yellow-ochrish colour, their processes withered, their outlines altered to a globular form; in the next step the cells had become diminished in size, and they had lost their processes;

¹ ‘Archives de Physiologie,’ 1870.

² *Ibid.*, p. 253.

lastly, they had disappeared altogether, leaving spots of yellow degenerated structure. These changes were particularly noticeable in the nucleus of the hypoglossal, pneumogastric, and facial nerves; they were, however, perceptible throughout the spinal cord. This pigmentation or degeneration of the cells M. Charcot regards as the primary change. He formed this opinion upon the results of experiments by Vulpian, in which it was seen that lesions of nerves were not followed by degeneration of cells, while, on the other hand, the nerves in connection with degenerated cells were not changed in structure.

In some cases of infantile paralysis the morbid changes consist in degeneration and atrophy of the nerve-cells,¹ which MM. Charcot and Joffroy regard as the initial element of the pathological conditions. Atrophy of the nerve-cells was also found by Vulpian² in a case of fatty muscular degeneration with paralysis, occurring in an aged man, in whose case, moreover, paralysis of one lower extremity had existed from infancy.

With reference to the above-mentioned instances and others, M. Duchenne concludes that atrophy of the nerve-cells is a common and fundamental lesion in progressive muscular atrophy, atrophic infantile paralysis, and glosso-pharyngeal paralysis, and that it occurs in two modes, the acute and the chronic, the former seen in infantile paralysis, the second in progressive muscular atrophy. Further, Dr. Duchenne distinguishes two forms of the acute nerve-cell atrophy, the one very common, the other more rare, the former belonging to the infantile paralysis, the latter to progressive muscular atrophy of after life. Again, M. Duchenne finds a division upon the localisation of these changes, viz. whether prevailing more or less in the medulla oblongata, or spinal cord, in the latter associated with atrophy of muscles, in the former with paralysis without atrophy; in some cases these two forms are found to be mixed.

Sir William Gull, foremost among those who have cultivated the pathological history of the nervous centres, recorded, in 1862, a case of hydromyelus (or, as more recently designated, hydrorachis interna), in which the most marked symptom was progressive muscular atrophy of the muscles of the hands. In this case there was large distension of the central canal of the spinal cord in the cervical region, with wasting of the grey matter. Sections of this cord that have been preserved in Canada balsam still show the exact nature of the lesions; the nerve-cells had suffered fatty degeneration, the granules of fatty matter being distinctly perceptible.

¹ 'Archives de Physiologie,' 1870.

² *Ibid.*, p. 316.

The most extensive lesions of the grey matter are met with in the spinal cord, *e. g.* disintegrations and degenerations of the structures, as the results of chronic inflammation, or of impeded or perverted nutrition. These conditions require to be carefully distinguished from post-mortem débris or breaking-up of tissue.

The form of degeneration most commonly met with is that which has obtained the name of *sclerosis*, the miliary form of which was carefully described by Drs. Tuke and Rutherford in 1868.¹ With this are often met amyloid and colloid bodies. An example of miliary sclerosis was also recorded in this Journal,² by Mr. Kesteven, who was evidently not aware at that time of its frequent occurrence or of its character. A fuller description of this pathological state has been subsequently given by the same observer.³

Drs. Tuke and Rutherford noted the presence of these miliary spots in the white matter of the corpus striatum, in that of the cerebrum and cerebellum, and in that of the pons and medulla oblongata. The diseases in which it had been discovered were chronic dementia, chronic mania, general paralysis, and epileptic insanity. They regarded the change as consisting primarily in a modification of the connective tissue.

“In the spinal cord, medulla oblongata, and pons,” they observe, “it appears that the connective tissue or neuroglia is a nucleated, finely granulated structure. In the cerebrum and cerebellum, however, we have not been able to see anything more than a nucleated, transparent, homogeneous, non-fibrillated matrix, representing the connective tissue of the spinal cord. Owing to the extreme fineness of the nerve-tubes of the brain, as compared with those of the spinal cord, an inquiry into the diseased conditions of the white matter of the former is much more difficult than in the case of the latter; but a careful inspection . . . has resulted in the demonstration that fibrillation and increase of the neuroglial matrix, together with proliferation of its nuclei, are the essential changes in grey degeneration, as Rokitsansky has already pointed out.”

The miliary sclerosis is quite distinct from the grey degeneration or diffused sclerosis of Charcot and other French pathologists. The term miliary has been adopted by Tuke and Rutherford as indicative of its form, *viz.* rounded hardened patches. These spots are thus described:

“They vary in size from one fortieth of an inch downwards, and, like grey degeneration, are almost confined to white nerve-matter. When this lesion is far advanced in its development the spots are

¹ ‘Edinburgh Medical Journal,’ Sept., 1868.

² April, 1869.

³ ‘St. Barth. Hosp. Rep.,’ 1872.

readily discernible with the naked eye. They consist of semi-opaque, molecular material, lying amid a few exceedingly delicate colourless fibres. The lesion is due to the formation of cell-like masses of molecular material, in each of which a nucleus is sometimes discernible. By the formation and growth of these cell-like bodies the nerve-tubes and blood-vessels are pushed aside, and these may, in consequence, be seen curving round the diseased tracts. We thought at first that this lesion is that described by Rindfleisch as grey degeneration, but he says that the nuclei of the neuroglia first proliferate, and then molecular material appears round each nucleus, and with the molecular material are connected numerous delicate fibres. The lesion described by us differs from that mentioned by Rindfleisch, inasmuch as no proliferation of the neuroglial nuclei can be seen in the first stages of its development. A *single* molecular cell-like body, it may be that it results from a transformation of neuroglial nucleus. Other cell-like bodies make their appearance, these resulting from division of the first, or arising close to the first one by a process similar to that which gave it origin. Fibres are not connected with the cell-like masses, nor is there any increase of the connective tissue or neuroglia, a fact which at once distinguishes it from grey degeneration as described by Rokitansky and Rindfleisch."

Dr. Moxon thus sums up his observations upon—

"*Sclerosis* of the brain and cord—to which attention is just now strongly directed, on account of the interest of the observations of Charcot, Vulpian, and others—a change which affects especially the neuroglia or proper connective elements of brain and cord tissue. The neuroglia—a substance composed of soft, faintly defined cells, and intercellular substance scarcely fibrillated—increases, and the nerve-tubes and cells waste away until the tissue, as seen by the naked eye, becomes shrunken and grey. This change may affect the nervous centres in diffused patches, and then produces a peculiar, very chronic affection, characterised by tonic spasm and paralysis; or it may limit itself to the posterior columns of the cord, when it produces the disease known as locomotor ataxia or tabes dorsalis. Here, however, the *rôle* of the nerve-fibres as to form-change is wholly passive, they waste away. It is true that the course of the disease, in spasm and pain, which characterise these affections, shows, in a way, only too much activity in the nerves; but this activity is all dynamical. The function of the nerve-tissue is excited in the irritation that causes increase of the neuroglia, but the nerve-tissue itself does not increase or multiply. There is no formative irritation of the nerve-tubules. They waste away into lines of fat-grains. This, indeed, may be taken as the usual behaviour of nerve elements under irritations."¹

What has been termed by the French pathologists *la sclerose en plaques* is a distinct form of this morbid change, as is also

¹ 'Med. Times and Gazette,' Oct. 10, 1870.

the diffused form found in cases of locomotor ataxy, the former being especially characterised during life by muscular tremors. The essential pathological condition of the grey degeneration is described by Frommann as consisting in the transformation of the amorphous neuroglia into a finely fibrillated network; the nerve-tubes, becoming subsequently compressed, thereby suffer atrophy. These changes are detailed at length in the writings of Frommann, Rindfleisch, and Charcot. The views of these and other pathologists upon the nature of the *sclerose en plaques disséminées* have been collected and published together in an essay by Dr. Meredith Clymer.¹

Sclerosis is regarded by some pathologists as the consequence of inflammation; thus, Dr. Moxon observes—

“The first sign of inflammation in solid texture is commonly loss of bulk and consistence; it is so in the brain and liver when the inflammation is acute. The question whether certain wasting of nerve-fibres in the substance of the spinal cord and brain are passive atrophies or are inflammatory is a very nice question, and one of great interest now that great attention is paid to locomotor ataxy and sclerosis. I have already noticed that the connective elements—the neuroglia—of the cord are augmented in the posterior columns in ataxy, while the nerve-fibres waste away, yet no other signs of active inflammation are present; signs of functional irritation of the affected parts are, however, present. Knowing that the neuroglia, as a connective substance, will increase from chronic irritation, and the nerve-fibres will waste from the same cause, we get double reason, from the coexistence of these changes, for thinking that the cause of the disease belongs to the inflammatory kind—that it is a slow inflammation of the posterior columns, though evidently the inflammation is in a very low degree.”²

MM. Bourneville and Guérard give the following elements as the result of their researches into the histology of disseminated sclerosis:—1. Hyperplasia of neuroglia. 2. The tissues around the vessels loaded with granular fatty matters and numerous amyloid bodies. 3. The nerve-tubes deprived of their medullary sheaths, which are lost in the hyperplasia of the neuroglia. 4. The nerve-cells have undergone degeneration and atrophy. These changes they consider are the indications of a chronic “encephalo-myelite.”³

The pathology of sclerosis is well illustrated by Dr. Muller's contribution to the pathology of the spinal cord from the record of three fatal cases of injury and disease of the cord, with the results in these cases of the microscopical examination of

¹ ‘Notes on the Physiology and Pathology of the Nervous System,’ New York, 1870.

² ‘Med. Times and Gazette,’ Dec. 10, 1870.

³ ‘Archives de Physiologie,’ tome iii, p. 525.

that organ.¹ Cases so carefully reported and so minutely investigated are of peculiar value, since, although much has been done of late years to advance our knowledge of the morbid histology of the nervous centres, yet pathologists are by no means always agreed upon the real nature of many of the post-mortem appearances that they observe.

Disseminated and miliary scleroses were observed by Dr. Müller in an instance of degeneration of the cord following upon a punctured wound which divided one side of the longitudinal columns. In another instance of pressure upon the cord from a tumour existing in the cervical region disseminated sclerosis is also described; with this change were deposits of what appear, from the author's description, to have been numerous particles of brain sand, a pathological condition which was fully considered some years back in the pages of this Journal by Dr. Arlidge.

A form of degeneration of the brain substance known as *glioma* is correctly defined by Uhle and Wagner as a *neoplasia of the neuroglia*, and consists of neuroglia in excess of the nervous structures. It constitutes the substance of tumours found externally and internally of the brain, the medullary substance of which, as to consistence, they generally resemble, although sometimes they are firmer and harder. Under the microscope gliomata are seen to consist of the connective cells and vessels and cells resembling amyloid bodies, but which give no iodine reaction. Glioma is sometimes combined with other neoplastic formations, such as myxomata, fibromata, and sclerosis.² Dr. Henry Green exhibited a tumour of this kind at a meeting of the Pathological Society. The growth was made up of small, round, and roundly oval cells, imbedded in a granular, extremely scanty, intercellular substance, which in some parts was slightly fibrillated. These cells varied from $\frac{1}{6500}$ " to $\frac{1}{2400}$ " in diameter. We have recently had an opportunity of examining an example of this form of morbid growth and found it to agree with this description, the vessels of the part being, moreover, so much enlarged as to give almost the same appearance as that of a subcutaneous nævus. In the substance of the tumour were cells of colloid matter of varying size, and most of a circular or ovoid form.

The *yellow* or *granular degeneration* of Lockhart Clarke was first observed by him in tetanus. It has been suggested that the post-mortem appearances in *tetanus* are simply post-mortem, the result of manipulation, or of the effects of the means em-

¹ "Beitrag zur Pathologischen Anatomie und Physiologie des Menschlichen Rückenmarks." Von Wilhelm Müller. Leipzig, 1871, 4to, pp. 41.

² Uhle et Wagner, 'Nouveaux Éléments de Pathologie générale,' traduit par Delstanche et Mahaux. Paris, 1872.

ployed to harden the cord, but the conclusion of those who have had most experience in the microscopical examination of the spinal cord in health and in disease are against any such inference. It is, doubtless, hard to believe that such serious structural lesions as have been pointed out could have existed in cases that have recovered; at the same time we would observe that the subsequent histories of such cases have seldom been followed out to learn what paralytic or other signs of lesion of nervous centres may have made themselves manifest in after periods. We have witnessed in one instance permanent paralysis after recovery from tetanus, not, however, of a traumatic character; it was probably owing to an extension of meningeal inflammation.

In traumatic, we have found the same lesion as in idiopathic tetanus—a disintegration or total loss of normal grey structure, and the substitution thereof of a yellow granular deposit, with varying degrees of separation of the bundles of white longitudinal columns.

Many records of examinations of the spinal cord after death from tetanus, both traumatic and idiopathic, are to be found in the pages of the French medical journals, more particularly in the 'Archives Générales de Médecine' and in the 'Archives de Physiologie.' In all these the appearances above mentioned are, with more or less variation in individual cases, described by the writers. Concerning the nature of the lesions there is a general uniformity of opinion as to the inflammatory origin of the disease. M. Michaud,¹ however, differs as to the nature of the granular deposit of Clarke, and regards it as an exudation of plasma from the walls of vessels where mortification of the nerve-structure has taken place; he likewise considers the special deposit of tetanus to consist in an aggregation of nucleated corpuscles in the transverse commissures on each side of the central canal.

Given two transparent sections of the spinal cord, one from a case of tetanus, the other from a case of paralytic disease, and he would be an acute pathologist who could point out distinctive differences between them; as will appear on comparing the above account of the lesions discovered in tetanus with published records of post-mortem appearance in other diseases of the cord. In a case of muscular atrophy Dr. Lockhart Clarke² reports disintegrated grey matter, exudation surrounding dilated vessels, with distortion of the form of the anterior horns. Dr. Bastian³ describes the alterations in the structure of the cord after death

¹ 'Archives de Physiologie,' Jan., 1872, p. 60.

² 'Med.-Chir. Trans.,' vol. li.

³ *Ibid.*, vol. l.

from muscular atrophy following on a fall—atrophied cells, granulation-corpuses and neoplastic connective tissue. Dr. Clarke also has recorded another case in which the lesions connected with muscular atrophy appear to be very similar to those found in tetanus, *e. g.* disintegration of the nervous structure and granular exudation. Dr. Hughlings Jackson, moreover, has placed on record a case presenting the like resemblances.¹

If we take the account given by Dr. Allbutt of the pathological changes observed by himself in four cases of traumatic tetanus, we shall see lesions recorded which are found also in other diseases of the cord.

“In the first case tetanus resulted from injury of the leg, and the cord was soft in many parts, diffuent in the upper dorsal region, the sheath of the posterior tibial nerve being full of pus for two thirds of its length. In Case 2 the cord was softened. In Case 3 the cord in the lower dorsal region was soft, and there was a clot under the pia mater. The posterior tibial nerve was bathed in pus for some distance from the foot. The tetanus followed Chopart’s operation. In Case 4 tetanus followed laceration of the hand, occurring together with fracture of the leg, and in this case the cord was softened throughout more or less. Submeningeal hæmorrhages were also present. Comparing the appearances in the several cases, it was seen that they were similar, only differing in degree, as regards softening; in two out of the four cases meningeal hæmorrhages were observed, the vessels of the cord were generally distended, thickened, varicose, and plugged; and in one case there was universal thrombosis, with spaces around the vessels filled with matter resulting from granular disintegration of the clots. In two of the cases there was considerable blood-staining of the cord by oozing from, if not actual rupture of, the vessels; and in two cases hæmorrhage into the cord in different places. Both in the pia mater and in the central grey matter similar vascular changes were observed. The central canal of the cord was stuffed with epithelial matter in over-abundance. There was nuclear proliferation in the connective tissue, probably in excess of health. The cells in the anterior horns were singularly wasted in a very symmetrical manner, no doubt due in part to exudation about the vessels, but also to changes in the cells themselves. The cells were the subject of yellow disintegration, beginning in the centre of the cells, and invading them from centre to periphery. Many were seen to have run together, forming an irregular and more or less fatty mass, these masses giving rise to the appearance of small yellow masses in the anterior horns. At any rate, the latter were destroyed more or less by exudation into them, and peculiar degenerate changes in the cells.”²

Dr. Lockhart Clarke described very similar changes of structure in a paper read before the Medical and Chirurgical Society, June 27th, 1865.

¹ ‘Med.-Chir. Trans.,’ vol. 1.

² ‘Lancet,’ Feb. 25, 1871.

“In that communication the author described the condition of the spinal cord in six cases of tetanus. In every one of these there was not only more or less congestion of the blood-vessels, but there were also definite, and frequently extensive, lesions of structure, such as have never yet been discovered. These lesions consisted of disintegrations of tissue in different stages of progress, from a state of mere softening to that of perfect fluidity, and were accompanied by certain exudations and extensive effusions of blood. They were found chiefly in the grey substance, which, moreover, was in many places strangely altered in shape—unsymmetrical on the opposite sides, or partially fused with the adjacent white column in a common softened mass. Although lesions of this kind existed, in one form or other, in every region of the cord, they were absent in some places; nor did they ever, for long together, maintain the same shape, size, or appearance, but were constantly and alternately increasing, diminishing, or disappearing, at short but variable intervals. These lesions in tetanus are precisely similar in character to those which the author has discovered in the spinal cords of many ordinary cases of paralysis.”

We have noticed, more frequently in cases of tetanus than in other pathological conditions of the spinal cord, that the bundles of longitudinal columns have been separated by reason of atrophy of their connective tissue. In this condition transverse sections of the cord show wide radiating fissures subdividing the columns into tracts of irregular form. In the fissures the distended blood-vessels, or extravasations, are to be seen.

Dr. Moxon has contributed a very valuable paper to the ‘Guy’s Hospital Reports’ upon “Syphilitic Disease of the Spinal Cord.” We often meet with allusions to syphilitic disease of the nervous centres, but we have, as doubtless have our readers also, often experienced a difficulty in recognising the physical characters of syphilitic alteration of structure in the brain or cord. The use of the term syphilitic, in obscure cases is too frequently made to pass for a pathological explanation. It may be a right imperial mode of cutting a knot, but it fails to unravel its nature or to account for its histological formation. Dr. Moxon is content with a less high-handed treatment of the question. The chief interest, he observes, of the relation of syphilis to spinal disease is thrown into the question whether syphilis has any influence in producing locomotor ataxia.

“I shall not enter into this question, except to say that the five inspections I have made in cases of locomotor ataxia have showed only, as usual, the well-known *sclerosis*, or grey induration of the posterior columns. This change has in it nothing characteristic of syphilis, though in the testes, and in the lung and liver probably, a diffuse induration, which, *mutatis mutandis*, is of an equivocal nature,

is ascribed by some to syphilis rather doubtfully, so that in default of evidence from morbid anatomy we must depend for evidence of the possibly syphilitic nature of locomotor ataxia upon such associations of the disease with syphilis as can be made out clinically."

The clinical history of cases of locomotor ataxy shows that syphilis has nothing directly to do with its causation, while, Dr. Moxon states, it is quite otherwise with paraplegia. The following are the histological elements of syphilitic disease in the spinal cord as described by Dr. Moxon. Intermingled with the nerve-fibres were many "granule-corpuscles," wasting and disappearance of the nerve-fibres, with the appearance of small round bodies, which seemed to graduate into the form of the more proper corpuscles of the syphilitic formation. These were nuclear bodies, the cell-walls of which were indistinct, and had apparently coalesced with the intercellular matter, so that the nuclei were the most distinguished things. These nuclei branched, and these branches joined each other, in some parts so arranged in a circular or vorticose way as to give the aspect of adenoid tissue. At some points the nuclei were freely proliferating, and were so arranged as to give rise to the appearance as of a fibrous band. These various elements at parts had lost their outlines, and presented only an irregular mass, in which, however, a thin section examined by high powers could detect the dead bodies of the cells, &c., lying in the same connection with each other as they had when living in the growing part of the disease.

[An interesting and instructive case of syphilitic disease of the nervous centres is related by MM. Charcot and Gombault, in the 'Arch. de Physiol.,' March, 1873.]

MORBID CONDITIONS OF THE BLOOD-VESSELS.—Fatty degenerations of the vessels of the brain and cord are best known as among the most frequent causes of lesions of these nervous centres. This was pointed out several years ago by Sir James Paget. M. Bouchard¹ has recently disputed this point in pathology, and asserts that the fatty change takes place outside the vessels.

"In the most simple case, that of secondary degeneration, in which the local circulation is not at all disturbed, in which there exists no disease in the tissue of the part about to change, but in which only the nerve-tubes which traverse that part, and which have been torn at a distant point, are transformed into fatty granules, because they have lost their connection with their central (*originelles*) or trophic nerve-cells, in this case fatty granules are first seen scattered about in the tissue. These granules become more and more numerous, and are seen here and there to form compact groups. These groups may have no connection with the vessels—

¹ 'On the Pathology of Cerebral Hæmorrhage.' Translated by T. J. MacLagan. 1872, p. 31.

they are the granular bodies. Others range themselves along the capillaries; this is what has been called fatty or atheromatous degeneration of the capillaries, but which, I think, would be more correctly termed atheromatous appearance. These accumulations of fatty granules, which are sometimes sufficiently numerous to form opaque tracks, concealing the vessel which traverses them are, chiefly situated in the interior of the lymphatic sheath. The vessel itself is not diseased, and its walls are not incrustated by fatty granules."

This criticism stands or falls, in the first instance, upon the question of the existence of "lymphatic sheaths;" and secondly, upon the accuracy or competency of observations. On the first point, we may add, M. Bouchard is at least in doubt, since he admits, a few lines below on the same page of his work, that the existence of lymphatic sheaths on true capillaries has not been proved. With reference to the second point, we need only refer to the chapter on fatty degeneration, with its accompanying illustrations, in Sir James Paget's work on 'Surgical Pathology.'

A tortuous condition of the minute vessels of the brain and cord is often seen in chronic disease; the adjacent structures, having been long pressed upon by repeated distension, have suffered atrophy. Thus, spaces are formed in which the tortuous vessel is to be observed sometimes so flexed as to form kinks or elbows. There may or may not be extravasations, deposits, or exudations in these spaces, but the majority are empty, presenting no kind of structure. Dr. Allbutt¹ described this condition of the minute vessels in a case of syphilitic disease. In this case the vessels were like tortuous cords in green transparent granular matter, which filled the space around them. The thickened vessels were so numerous, and in many places so crowded together, that with the indurated nerve-matter they seem chiefly to have given rise to the syphilomata in the encephalon.

In connection with these extra-vascular deposits we would refer to the observations of Dr. Batty Tuke and Mr. Fraser:²

"Fresh specimens of the grey matter of the convolutions showed a lesion on or in the coats of the vessels, consisting of very small, bright, refracting points, very like the spores of a fungus in the sheath of a hair, only very much smaller. These points were bright at one focus and dark and opaque at another; more numerous and better seen in the angle of a bifurcation, and better marked in the extremely small vessels than in the larger ones."

These appearances are regarded by the reporters as evidence of fatty degeneration of the sheaths of the vessels.

The following appearances were observed by Dr. Cayley³ in

¹ 'Pathol. Trans.,' vol. xxiii, p. 16.

² 'Sixth Annual Report of Fife and Kinross Asylum.'

³ 'Pathol. Trans.,' vol. xx, p. 4.

a case of apoplexy in a girl aged eleven years. The walls of the capillary arteries and veins were clothed with oil-globules and dark granules, and several of them were studded with round and oval nuclei, closely resembling the nuclei commonly found in tubercular deposit in the arteries of the pia mater. These were also situated in "the sheath of the vessels." There was no trace of tubercle in any part of the body.

The examination of the brain-structure in chronic Bright's disease frequently affords examples of the tortuous state of the vessels. In a recent instance which came under our notice we found the vessels lying in the spaces thus originating in atrophy of surrounding brain-substance. They were imbedded in a hyaline substance, answering closely to the condition described by Sir William Gull and Dr. Sutton. We do not venture to enter the lists on either side of this controversy, and we simply put on record a distinct observation of morbid appearances as seen in one brain.

Drs. Ollivier and Ranvier¹ have collected eight instances of cerebral hæmorrhage occurring in leukæmia, from the accumulation of white corpuscles in the capillaries and consequent rupture of distended vessels. The morbid conditions in these instances are summed up by MM. Ollivier and Ranvier in the words, "anæmia, compression, destruction by hæmorrhage."

The important part that is played by repeated distension of vessels, and consequent pressure on the brain-tissue, has been almost entirely overlooked by pathologists, and yet the results are more or less distinct in, at all events, chronic disease of the brain and spinal cord.

That dilatation of vessels and atrophy of adjacent structure is a frequent result of long-standing disease is evident from the recorded observations of Dr. Lockhart Clarke. In a paper² which contained the first account of the exact lesions of the cord connected with tetanus, Dr. Clarke points out particularly the existence of areas of disintegration around the vessels, associated with exudation into the fissures for the transmission of vessels which also themselves presented varying degrees of excessive fulness.

In another communication³ by Dr. Clarke he thus states some of the microscopic appearances seen in a case of general paralysis:

"A series of streaks or lines may frequently be seen radiating through the white and grey substances towards the surface, and in vertical sections of convolutions that have been hardened in chronic

¹ 'Archives de Physiologie,' 1870-71.

² 'Med.-Chir. Trans.,' vol. xlvi, 1865.

³ 'Lancet,' Sept. 1, 1866.

acid it is very common to perceive, in the white substance especially, what seems at first sight to be a number of vertical fissures and oval slits, which, under the microscope, however, are found to contain blood-vessels surrounded by sheaths like those already described. But the sheaths in these cases are often less delicate; they are thicker, more conspicuous, and frequently darker than in the healthy brain; and sometimes, especially when the vessels are convoluted, they appear as fusiform dilatations along their course."

Dr. Bastian first brought before the profession in this country the claims of Professor His, of Berlin, to the discovery of a system of spaces surrounding the minute vessels of the brain, quite sharply defined, furnished with an epithelial lining and communicating with the lymphatic system. We learn, however, from Stricker's 'Histology,' that His has subsequently abandoned his opinions of the nature of these spaces, the real existence of which is open to no doubt, as they may be readily seen where they exist, and as they have been made to receive coloured injection by Dr. Golgi, of Pavia.¹ The true nature of these spaces is open, nevertheless, to discussion. They are commonly recorded in minute pathological investigations as if their characters were settled points in the healthy anatomy of the brain and spinal cord.

Dr. Batty Tuke and Dr. Rutherford,² in their report on the microscopical appearances in the brains of persons who had died with various forms of chronic mania, speak of the "perivascular canals" as narrow structures that have undergone changes in appearance, the results of disease. These canals are stated to have been much dilated, the vessels lying distinctly on one side as if adherent, the difference between the calibres of the vessels and the canals being as in 1 in 8 and 1 in 12. The spaces were clear of any organized contents. In a more recent report by Dr. Tuke³ dilatation of the perivascular spaces is noticed as one of the morbid phenomena in the brains of persons who had been the subjects of chronic insanity. It should here be stated that Dr. Tuke's observations of the morbid conditions around the minute vessels were the earliest placed on record.

Mr. Wagstaffe⁴ holds that the perivascular spaces are seen, as normal structure, with the greatest ease in the fresh brain, sometimes even with the naked eye. It is, however, open to doubt how far Mr. Wagstaffe may have regarded the tunica adventitia of the arteries as a special structure belonging to the

¹ 'Virchow's Archiv,' 1870.

² 'Edin. Med. Journ.,' Sept., 1868.

³ 'Sixth Annual Report of the Fife and Kinross District Board of Lunacy,' Sept., 1872.

⁴ 'St. Thomas's Hospital Reports,' 1871.

lymphatic system, his opinion upon this point being obviously influenced by his pathological views of the origin and seat of tubercle. This deposit was cellular in one of his cases, well-marked,

“and the cells consisted of a small amount of plastic matter surrounding a single nucleus. The appearance of these nuclear bodies was similar in the sheaths of the vessels beyond They bore a close resemblance to lymph-corpuscles and to the bodies usually found in small number in the perivascular canals; but there appeared to be no resemblance to the faint corpuscles which occasionally show themselves as imbedded in the substance of the walls, and connected with the delicate fibres of that structure. . . . Moreover, this view would receive support from the fact that the disease in the brain affects almost peculiarly a system which is merely part of the general lymphatic system, if we may believe the testimony of careful observers.”

The researches of Dr. Burdon Sanderson are quoted by Mr. Wagstaffe in support of the lymphatic pathology of tubercle. These pathological views on the nature of tubercle have not yet been received as indisputable fact; for example, Dr. Moxon observes of this theory first put forward by Virchow:

“But, if so, lymph-gland-tissue itself degenerating into such caseous matter is the very type of tubercle; it is the typical change in the typical tissue itself, the type of tubercle typically degenerating in the very home, purely, of tubercle. Virchow, in his distinctions of scrofula and tubercle, does not seem to have sufficiently realised this point, nor have his followers in this country, but rather have been content to have asserted the identity of tubercle and gland (which, I must say, I never can see, except when the likeness is carried to a vanishing point by the reduction of the characters of both to a simple lymph-cell surrounded by nothing particular), without seeing that this asserts also the identity of gland and tubercle.”¹

If, then, the lymphatic nature of tubercle falls to the ground, the necessity of lymphatic canals for its localisation in the brain falls also. The description, moreover, given by Mr. Wagstaffe of these alleged canals is taken only from the appearances presented by the small arteries torn from the brain-structure in the fresh and soft condition. Thus:

“Remove a small vessel from the substance of the brain by means of a pair of fine forceps, and it will be seen, upon examining it under the microscope, that ensheathing the wall of the vessel is a very transparent membrane, broader in some parts than in others, and distinguished from the vessel by its almost structureless character, and by the absence of the ordinary contents of vessels. In some places the membrane lies close to the vessel-wall, so that it is with

¹ Lectures, loc. cit., Feb. 11, 1871.

difficulty detected; in other places a large space exists between them; and, as a general rule, it may be stated that the size of the perivascular space varies with the size of the vessel."

Mr. Wagstaffe takes very insufficiently into account the condition of the capillaries in the cerebral substance, around which, if there be lymphatics in connection with disease, the presence of lymph-corpuscles should be sought. The cell deposits in the tracts of the vessels may be the result of chronic inflammatory agencies, or of the caseous degeneration of scrofulous parts that constitute tubercle whether in the brain or elsewhere.¹

The existence, however, of "perivascular spaces," as integral parts of the lymphatic system, has been called in question by Mr. Kesteven,² who regards them as merely the results of long-continued pressure upon the brain-substance, through persistent or repeated distension of its vessels. This writer affirms that these passages are only to be met with in morbid specimens, that in their calibre and in their distribution they observe neither regularity nor uniformity, and that they generally contain pathological deposits—blood-globules, hæmatin, cells, &c. Mr. Kesteven's conclusions, we observe from his paper, are not based upon injections of the brain-substance, but from microscopical examination thereof after hardening in chromic acid. This mode of examination shows the close contact of the minute vessels with the substance of the brain in healthy subjects, and their separation from the same in morbid examples. Our confidence in this opinion would have been strengthened had Mr. Kesteven been able to give us the results of coloured injections under both conditions of health and disease.

Mr. Kesteven supports his own views upon the nature of these perivascular spaces by a reference to the experiments of Dr. Burrows and of Kussmaul and Tenner upon the cerebral circulation, but we would remark upon this argument that it will apply with equal force to any anatomical facts of brain-structure.

Rindfleisch,³ while admitting the validity of the hypothesis of the lymphatic functions of these spaces, points out that they are altogether deficient in the elements which constitute a true lymph-vessel, wanting in endothelium, and without proved connection with the lymphatic vessels.

Bearing in mind, however, the abandonment of his former views by His, and the absence of proof of the connection of these spaces with the lymphatic system, we can only conclude that the question is still open to further researches.

¹ Moxon, "Lectures on Analytical Pathology," in 'Med. Times and Gaz.,' Dec., 1870, Jan. and Feb., 1871.

² 'St. Barth. Hosp. Rep.,' 1872.

³ P. 559.

VIII.—Sanitary Work in the United States.¹

PUBLIC opinion in England has of late been much occupied with sanitary matters; even as we write, experiments in sanitary legislation are being tried on a truly national scale, and the results of Mr. Stansfeld's Public Health Act of last session are being watched with anxiety, if not with apprehension.

We are plainly in a transition state as regards public health organization, and there are good judges² who assure us that our movement is anything but progressive.

At such a time it will not be uninteresting to learn how health matters are managed across the Atlantic—to see how the same difficulties that beset us here have been met among a people unhampered by history, free from the trammels of legal precedent and of territorial traditions.

A history of the origin, progress, and present condition of public health in the United States, or even in a single state, such as New York, would be full of interest, and probably of much practical use; for its growth, although characteristically rapid, has been vigorous, and measures still hotly debated in England may be seen actually at work in the City of New York, and may be judged by their results. We cannot, however, undertake to do more on the present occasion than examine the three reports whose titles have been given at the head of this article, two of them relating to the City of New York, the third to one of the smaller states of New England, and we can strongly recommend them for closer study to all who are interested or occupied in sanitary organization.

The City of New York has not long enjoyed a local government of its own in health matters. The year 1870 was the first under a new régime, and the report before us is the first issued by the Local Board of Health, although it forms the sixth of a series of volumes which, in some respects, stand without a rival among sanitary records. The first of the series was a 'General Report in the year 1865 on the Sanitary State of New York City,' and was due, not to the Government, but to a 'Citizens' Association,' aided by the voluntary co-operation of the medical profession. The volumes for 1866 and the three subsequent

¹ 1. *First Annual Report of the Board of Health of the Health Department of the City of New York.* April 11th, 1870, to April 10th, 1871. New York, 1871, pp. 628.

2. *Tenth Annual Report of the Commissioners of Public Charities and Correction.* New York. For the year 1869. Albany, 1871, pp. 560.

3. *Third Annual Report of the State Board of Health of Massachusetts.* Jan., 1872. Boston, 1872, pp. 329.

² See Letter from Dr. Anstie, 'Spectator,' Oct., 12th, 1872.

years were issued by a Board of Health, which was the immediate result of the first report, and had jurisdiction over the whole State of New York. In these reports, which, by the way, are very well got up and form handsome volumes, the subject of public health is treated with a breadth and mastery of grasp which we rarely find elsewhere. The more scientific as well as the inspectorial aspects, so well exemplified in our late 'Privy Council Reports,' are judiciously combined with statistics, meteorological information, and special analysis of vital phenomena. There may be incompleteness in some of the details; indeed, we shall have occasion to notice some striking deficiencies in the course of our remarks, but, taking the reports as a whole, we cannot fail to be struck with the unity of purpose, completeness of organization, and mastery of details, which is secured by a central sanitary authority, from whom all officers connected with the public health receive their instructions, and to whom they owe an undivided allegiance.

By an "Act to Reorganize the Local Government of the City of New York," passed on the 5th of April, 1870, a new Health Department was created, to consist of "the Police [Commissioners of the City of New York, the Health Officer of the Port, and also four officers, to be called 'Commissioners of Health of the City of New York,' who shall be appointed by the Mayor for a term of five years, two of whom must have been practising physicians in said city for a period of five years preceding their appointment."

The sanitary government of the city is, therefore, in the hands of a board consisting of—

Four Police Commissioners.

One Health Officer of the Port.

Four Health Commissioners, with salaries of 5000 dollars (£1125) each per annum, and a Secretary, with a large staff of officials.

A City Inspector and Sanitary Superintendent, at 6000 dollars (£1350) per annum.

Ten Health Inspectors, with a like number of assistants, at about £400 a year.

A Sanitary Permit Inspector.

An Inspector of Street Cleaning.

A Registrar and Deputy-Registrar of Records.

An Attorney, an Engineer, a Chemist, and a Chief Clerk.

For convenience of work certain bureaux are established, viz.—

A Bureau of Sanitary Inspection.

Bureau of Records of Vital Statistics.

Bureau of Street Cleaning.

Bureau of Sanitary Permits.

And it is an account of the proceedings of these various bureaux that forms the staple of the 600 pages which make up the 'Annual Report for 1870.' The form of the report is, perhaps, capable of improvement; a general summary by the President, followed by a sub-summary by the Sanitary Superintendent, and that again by a medley of reports from various committees and officers of the Board, gives an impression of disorder and confusion which is barely retrieved by the very excellent index accompanying the work.

The Massachusetts Report differs widely in character and in form from that which we have just noticed. The State Board of Health being unpaid, and having received a roving commission to "take cognisance of the interests of health and life among the citizens of the commonwealth," and "to gather such information in respect to health matters as they may deem proper for diffusion among the people," have issued a blue book, consisting mainly of essays on subjects connected with the public health. Statistics find no place in the report, although they are incidentally alluded to as being published weekly in the Boston papers, and we cannot help viewing this omission as a serious fault. Vital statistics form the groundwork of sanitary science, and no health report which neglects them can be considered complete.

The articles in the Massachusetts Report deal with subjects suggested by the Board of Health, the authors being remunerated, or rather *douceured*, in proportion to the difficulty of the investigation. We may instance the papers on arsenical greens, milldams and other water obstructions, sewing machines, and smallpox in Massachusetts, as more especially deserving of notice. One on the vegetable parasites would find a more congenial place in a medical treatise; another, "An Analysis of Correspondence on the Use and Abuse of Intoxicating Drinks," in continuance of another paper on the same subject in a former report, is interesting as an endeavour to bring drinking habits under cosmic law, though we may not be prepared to agree with the conclusions of the author, as, for instance, that—

"The northern babe, by the very fact that he is born amid snow, tends more to fall into intemperate habits than his young peer of the tropics. The passion for drink lies dormant, but fiercely threatening the northern youth, while some of his other animal passions are checked by the same influences of climate. The very reverse happens to the youth of the tropics. Heat checks the love of liquor, but stimulates to unbridled licentiousness" (p. 78).

Facts may sometimes be obscured by an attempt at fine writing. The actual work done by the Massachusetts Board

seems confined to a few orders for the suppression of offending slaughterhouses and noxious trades, and some of these are disregarded—a result which is scarcely surprising when we learn that the total expenses of the board for the year are less than £700 sterling. Having thus relieved our mind on the subject of the Massachusetts Blue Book, which does not admit of a minute analysis, we will return to a closer examination of the New York Report. One remark, however, we must make, which is applicable to both, as regards the admirable promptitude with which they are issued. By an Act establishing the Board of Health of Massachusetts a report, complete to the end of December, must be handed in to the Legislature during the month of January following. The collected reports for the City of New York, including a minute analysis of the births, deaths, and causes of death, to the 31st of December, 1870, was handed in not later than the 27th of April, 1871. Any comparison of this report, elaborate as it is, with the mass of figures manipulated by the Registrar-General of England would be beside the question, but it is still worthy of remark that the abstracts for the year 1870, in England, were not ready for publication before the 26th of June, 1872.

We have already alluded to the constitution of the Board of Health in New York; the powers with which it is invested, and the preponderance of the medical element in its counsels, points which are worthy of notice at a time when, in this country, lay inspectors are being set over medical officers of health, and central bureaux, with laymen presiding, aspire to monopolise the vital statistics, and to guide, if not to initiate, the sanitary work in every town and district in the kingdom. In contemplating the self-government in health matters of a town like New York, we can but mourn for a principle which a Liberal Government seems doing its best to exterminate in England.

But, to return to the report itself, we are struck at once with the comprehensive view taken of the wide field of public health. One subject alone seems conspicuous by its absence, viz. notice of the provision made for burial of the dead, without injury to the living.

Drinking water, river pollution, drainage and sewerage, street paving, and cleansing of dwellings, scavengering, consumption of smoke, adulteration of food, suppression of causes of disease, and regulations in case of epidemics, regulation of markets, gas supply, and the registration of births and marriages, of deaths and sickness—all are noticed in more or less detail, and some of them in a scientific spirit worthy of all imitation. Where there is such abundance of matter the chief difficulty is to select.

We must content ourselves for the present with a few observations on New York in its sanitary aspects, the sanitary officers of the city, their powers, and in some particulars the method and results of their work.

The city and port of New York presents sanitary difficulties of its own, besides those which are common to all great centres of shipping and commerce. Situated on the southern extremity of Manhattan Island, near the mouth of the Hudson river, it forms the principal seaport and commercial metropolis of the United States. Its growth has been peculiarly rapid, the population having increased, during the last twenty years, from 517,849 in 1850, to 942,252 in 1870, and the corresponding extension of building has led to the usual difficulties of land drainage and proper provision of sewers. We read that—

“Along the lines and original courses of all the original drainage streams there have been placed, in the grading of streets and construction of dwellings, numerous obstacles to the free flow of water through its original channels. The consequence is an accumulation in different localities of deposits of stagnant water, which in itself is not only detrimental to health and productive of epidemics, but, by reason of accumulation, it causes the saturation of an extensive area of ground, permanently unfitting it for building sites” (p. 414).

And

“There are many places where coffer dams and pumps are absolutely necessary to enable the builders to secure proper foundations for the structures about to be erected” (p. 422).

Again, in the report of the engineer, we read—

“I made a reconnaissance of the island between Forty-second and One Hundred and Fifty-fifth streets, and observed that there was not a locality which was not exposed to the malarious exhalations of a pond or pool of stagnant water, either arising from a natural flood being disturbed or diverted from its course, or from the formation of an artificial pond by the arrest of the natural subsoil courses, or the damming up of surface water” (p. 443).

“Of the 12,000 acres comprising the superficial areas of the city, representing 150,000 building lots, one fifth of that amount, or 30,000 building lots, is, by reason of the presence, in greater or less quantities of water in the soil, rendered almost unfit to be occupied as sites for dwellings or for commercial purposes, yet no attempt has ever been made to establish a system of drainage by which these lots can be made suitable places for residences or warehouses” (p. 422).

There are upwards of 200 miles of sewers in New York, nearly all built without any regard to system; and the reckless way in which even great public improvements are carried out is likely to entail upon the future city a far weightier burden

of sanitary trouble than can be compensated for by broad avenues, splendid boulevards, or lovely parks.

Holes and vacant spaces have been filled in with organic filth, as in Liverpool,¹ and with the same result—fever and aggravation of disease.

The question of disposal of sewage, which is still the subject of such hot dispute in this country, has found no solution as yet in New York. The report of the engineer says that—

“Under existing constructions the entire sewage of this city is discharged into the north and east rivers; the solid portion filling up the docks or slips, and the liquid portion to a great extent flowing over the surface of the opposite shores and flats, to emit exhalations therefrom, to the prejudice of the health and comfort of all who reside adjacent thereto. The solid portions, in combination with such surface soil and detrital matter as is washed from the surface of the streets and soil, is dredged therefrom and transported into the upper portion of our bay, apparently under the impression that that is an effective disposal of it” (p. 443).

As many as 22,661 loads of this solid sewage from privy vaults, previously disinfected, are removed yearly by contract, and, if we can believe the report, without great offence or cause of complaint.

The streets in the city are generally well paved, and much stress is laid on the importance of street cleaning in various parts of the Report. About 597 miles are now swept weekly by contract.

Little is said of the water supply, but we learn from other sources that it is excellent, leaving little to desire either in quantity or quality; the distribution, however, is imperfect, and a lamentable deficiency exists among the tenement houses for baths, and even for drinking, one hydrant in a common yard being, in some cases, the only source from which ten to forty or sixty families can procure their supply. The Croton Aqueduct, by which the water, flowing from some thirty mountain lakes and numberless rivulets, is brought a distance of forty-five miles to New York, is a work worthy of Roman times; crossing the the Harlem river on a stone bridge of fourteen arches, and 110 feet above tide water, it discharges no less than 60,000,000 gallons daily into storage reservoirs calculated to hold nearly 5,000,000,000 gallons.

Amongst the special features of New York we must not omit to notice the very large proportion of lodging or tenement houses, no less than 14,872 of these containing nearly half the population of the city, some of them colossal in dimensions, were

¹ Reports of Dr. Parkes and Dr. Sanderson on the ‘Sanitary Condition of Liverpool.’ Pamphlet, 1871.

returned in 1870. No power of control exists over the construction of these buildings, and many are as faulty as they can well be. Much improvement, however, has been introduced in ventilation, cleanliness, and isolation of families, and there are now some new buildings of this class which, being built after plans approved and amended by officers of the Board, may justly be characterised as the model tenement houses of the city. From the special Report devoted to public charities and correction, we learn that there were, in 1869, three general hospitals, with an aggregate of 2300 beds; a smallpox and a fever hospital, with 100 beds to each; hospitals for paralytics and for epileptics, with 65 beds each; an infants' hospital, with 300, and one for incurables, with 130 beds; making an aggregate of 3060 beds. Since then much additional accommodation has been provided especially for cases of epidemic disease, but it still falls very far short of the needs of the population. The unnatural divorce of hospital management from other departments of Public Health is a defect in sanitary organisation which is justly complained of by the Central Board, but it need not have given rise to the inextricable medley of statistics relating to hospitals for the sick, asylums, penitentiaries, and workhouses, which disfigures the pages of their own Report. In the Blue Book of the Charity Commissioners there are statistics, very minute and very complete, concerning the several institutions under their care, not only as regards cost, but medical information also, of much interest and value. One institution may be noticed here as not so well known in England, viz. the Inebriate Asylum, which received 178 paying patients and 1463 poor in the course of the year. The Reports, however, do not speak very hopefully of the permanent improvement derived from a sojourn in such asylums.

The system of out-door relief to the poor would appear to be in many respects very efficient. For this purpose the city is divided into eleven districts, each of which is provided with a physician to visit and prescribe for the sick poor contained therein, and report to the Superintendent of Out-door Poor such as may require fuel, nutritious food, and other necessaries.

In the event of accident a telegram is at once sent from the nearest police station to the Bellevue Hospital, whence an ambulance and surgeon, with the necessary appliances, are at once despatched to the place. The number of those treated at dispensaries was, in 1869, 17,050, and of those relieved in kind 51,320, whilst the number receiving out-door relief in February, 1869, was 19,616 persons.

Such are a few of the sanitary aspects of New York as we have been able to gather them from the Reports. Of the staff

for the sanitary government of the city we have already spoken. The City Sanitary Inspector, though faintly shadowed in the health officers of some of our larger towns, finds no representative in our own metropolis, and for a parallel to the Registrar of Records we must go to our Registrar-General, who holds a monopoly of vital statistics, not only in London, but through the length and breadth of England.

The health officers in New York may, indeed, be compared with the able and energetic men who perform similar duties in London. They work, however, under a common head and for a reasonable, but by no means excessive, remuneration, whilst our metropolitan officers are ill paid, and hold office only at the will of vestries and local boards. For a population of 3,251,804 London has, we believe, forty-seven health officers, no less than eight of whom receive a salary of £50 per annum for discharging duties of the highest responsibility.¹

In New York, with a population of 942,252, there are ten full officers and ten assistants, with, as far as we can glean from the Report, a salary of some £400 a year.

The terms of appointment are singular, for the law does not require that they shall be medical men; the practical common sense of the Board, however, has neutralised a very manifest defect, by calling none but thoroughly educated medical men to these responsible positions. The following instructions issued to these gentlemen in the year 1866 have such an especial bearing upon our own sanitary position at the present time that we cannot forbear giving them in full.

“1. The Inspectors will keep constantly in mind the great good to society and the scientific value of the knowledge expected to be gained by the present system of health police. It is desirable that they should take especial interest in all sanitary questions, and keep themselves informed of what is done at home and abroad relative to the causes which affect health or disease. Thus, they will contribute their full share to the accumulation of knowledge which is destined to prolong life and establish the science of medicine on the most permanent foundations.

“2. So much depends on the conscientiousness, intelligence, and industry of the Inspectors, that they will be held to a strict accountability. They will be subject to the immediate control of the Superintendent or his Deputy, and obey orders with promptness, and relinquish the demands of private business, in order the better to observe the obligations imposed upon them by their office.

“3. They shall present themselves at the office of the Superintendent or his Deputy, in Brooklyn, as often as is required by them, to receive orders and to make reports; nor are they to consider that

¹ ‘Medical and Legal Aspects of Sanitary Reform.’ By Alex. P. Stewart. Pamphlet, 1865.

their duties are limited to the districts to which they may have been assigned, but must feel that they are bound to leave their districts and examine into complaints or sickness elsewhere, whenever the Superintendent or his Deputy may deem it advisable thus to employ them. They are to watch over all cases of fever or smallpox, and if the patients are removed, to follow them with their supervision.

"4. Any perversion of the truth, from fear or interest, or any disrespect to the Board or its officers, on the part of the Inspectors, will justify the Superintendent or his Deputy in suspending them from office, without pay, until action is taken by the Board, when the delinquents shall be censured or dismissed.

"5. All the forms for making reports must be filled up legibly and minutely, and any information added that will throw light on the subject under investigation.

"6. They shall wear their badges prominently displayed when engaged in their official duties; on entering any house or premises, they must announce their authority and the object of their visit; and while endeavouring to avoid giving offence, must make their investigations minutely.

"7. If resistance is offered to the performance of their duties, they are to report the fact to the nearest police station. They will likewise report all who violate the health laws, in order that offenders may be summarily dealt with.

"8. All questions of doubtful authority must be referred to the Superintendent or his Deputy for decision."¹

In New York, at all events, a health officer is held to have no leisure for private practice, and a glance at the reports of these officers is sufficient to show that the responsibilities of the public service are quite incompatible with dependence on a capricious clientèle.

The reports of the several district inspectors are admirable in tone and matter; indeed, no better models could be found for the study of our newly appointed health officers. To take but one, that of Inspector Stiles, of the Eighth Sanitary District, we find a minute description of the topography of the district, the character of its houses, the status and occupation of its inhabitants, the state of the pavements, streets, sewers, and markets; the fever nests are given in detail, each case of infectious disease having been tracked and attended to; particulars are also given of each sanitary inspection, to the number of 2858, in the year. The duties which these officers are required to fulfil are frequently of the most delicate nature.

Persuasion is often the only available lever where, in England, the force of law would be applied. Vaccination, for instance, is not compulsory, and we can only wonder at the success that has been achieved. We read that—

¹ 'Annual Report of the Metropolitan Board of Health,' 1866, p. 20.

“in marked contrast with the experience of former years, the health inspectors are now received in a friendly spirit while making house-to-house visitations among the tenement houses” (p. 50).

“It is, indeed, evident to those who, from long experience, are best able to judge, that the labours of the health inspectors during the past six years are beginning to bear their legitimate fruit in the gradual education of the people to an appreciation of the importance of ventilation, cleanliness, and light” (p. 58).

Perhaps the most full and most interesting chapters of the ‘Report’ are those which treat of the prevention of epidemic disease. The reports of the Sanitary Committees bearing on this subject are well worth an attentive reading. They hold that—

I. To render persons insusceptible to disease,
 II. To isolate the sick,
 III. To destroy the poison,
 are the three cardinal rules of preventive hygiene as applied to Infection—we may add a IVth. Timely information of the invasion of disease.

The first alludes, of course, to vaccination, and we are enabled to weigh inferentially, by the light of experience, under opposite conditions, the advantages and disadvantages of a compulsory law. We read that a free supply of lymph, house-to-house visitation, and urgent appeals on the part of the health officers were of little avail in the absence of a compulsory statute, until the panic of an epidemic brought conviction to the minds of 30,000 persons whose vaccination was recorded as the work of eighty operators within a single month of the year 1869.

Under the second head of *isolation* we have care for the sick (1) at their own homes; (2) in hospitals provided for their reception. Physicians are required by law to report *at once* to the Bureau of Sanitary Inspection the occurrence of any disease which may be included permanently or temporarily in the official list of epidemics, “on receipt of which the health inspector of the district in which it occurs is immediately notified by telegraph and thereupon visits the case and reports back by telegraph what measures are necessary.”—p. 70. Each case is thus judged upon its merits, and removal is seldom enforced where complete isolation can be obtained at home.

As a matter of course, difficulties have to be encountered, and we can readily understand that—

“If the sick remain at home the friends and physician in attendance too often consider the requirements of health officers as an unnecessary, if not an impertinent, interference and submit to them in as limited a degree as possible; the true value of preventive measures is not appreciated, and this embarrassment of sanitary

officers must be submitted to and their work be but half accomplished."—p. 405.

Public health has, indeed, lifted up its head when it can even so far invade the sanctity of the rich man's home. The rule relating to removal, however, displays a looseness and latitude worthy of the best of our sanitary enactments in England. It is as follows :

"Whenever two sanitary inspectors shall report in writing that any person is sick of any contagious or infectious disease, under such circumstances that the continuance of such sick person in the place where he or she is, is dangerous to the lives of other persons residing in the neighbourhood, the City Sanitary Inspector shall, *if he has reason to believe there is ground for so doing, in some manner* cause the removal of such sick person to the hospitals under the charge of the Commissioners of Charities and Correction."—p. 403.

Resistance is rarely made when removal is insisted upon by the health officer. Should, however, the patient refuse to leave his home, a joint report on the visit of a second health officer is made out and an order issued thereupon by the City Sanitary Inspector, and the police, if necessary, are called upon to complete the removal.

The third principle is *disinfection*, a subject which has a special report to itself and a very able one, at the hands of the assistant chemist. The directions, which are too long to quote, although admirably terse and thorough, will be found at p. 78 of the 'Report.' Some of the disinfecting fluids most commonly used may be mentioned as being slightly different from those in fashion in England. Linen, before being placed in boiling water for washing, is soaked for an hour and a half in the following:—eight ounces of sulphate of zinc, one ounce of carbolic acid, three gallons of water. The same is employed for soaking a sheet to be hung in the doorway, and for use in the sick room. Privies, drains, streets, &c., are treated with a solution of sesquichloride of iron of 1.30 specific gravity mixed with 10 per cent. of carbolic acid, which goes by the name of Metropolitan disinfecting fluid. Quicklime and chloride of lime are also used to a very large extent. Indeed, the faith in the efficacy of disinfectants and isolation would appear to be much stronger in New York than it is in England—even scarlatina, which is the despair of our metropolitan officers of health, might, it is thought, be brought under complete control if the necessary measures could be fully applied. In the case of relapsing fever thorough cleansing and disinfection were almost invariably followed by arrest of the disease in the tenements thus treated ; and it rarely happened that fever reappeared in a

cleansed and disinfected apartment. Indeed, the Sanitary Committee on contagious diseases go so far as to say—

“We are of opinion that could these measures of prevention be carried out in any community as rigidly as the necessities of public health require, that community would never number among its diseases the plagues of modern times, viz. small-pox, scarlatina, measles, typhus, typhoid and relapsing fevers, cholera, &c.”—p. 405.

The proper manipulation of vital statistics is so essential to right Sanitary Government, that we turned with some curiosity to the reports of the Registrars of Records. Our statisticians would probably regard them with disappointment—and we must acknowledge that they are indeed lamentably incomplete—still there is noticeable throughout a most laudable disposition to catch at the substance of sanitary statistics instead of the shadow, to study immediate use in place of a prospective fulness of detail, which, however admirable in itself, may be too dearly purchased at the price of long delay. The registration of births and marriages may be very deficient, but a register of still-births to the number of 2254 in the year, and a daily record with weekly publication of *all* cases of infectious disease (which are included as such in the official list) are sanitary triumphs which we look for in vain in London. One omission, indeed, is too important to be passed over in silence. Anyone who has paid much attention to vital statistics knows what an intimate relationship exists between the numbers living and the numbers born, married or deceased; the population returns of districts, even of streets and houses are often essential to a true appreciation of their sanitary condition, yet we find no details whatever in the New York Report relating to the numbers of the people. Passing to the registration of births and marriages we find that force of habit and the stolid indifference of human nature has proved too strong for a law which has rarely been enforced. 14,524 births only were returned in 1870, the deaths being 27,175, and in spite of every facility offered to clergymen and others for making returns, the recorded marriages for the year were but 7985, or less by 710 than were registered in the previous year.

The return of deaths and causes of death is, perhaps, as complete as it is possible to make it, whilst the record of cases of infection is unique and fully justifies the very reasonable boast of the sanitary superintendent that “such a record probably never has been made of the number, names, and localities, of contagious diseases occurring in any great city.”—p. 83.

The system of death certificates is not unlike that in use in

England; no burial can take place without a certificate and the physician in attendance is required by the Board of Health to supply one. The certificate itself, although more full [cf. Report, 1866, p. 169] and explicit in some respects than the English form, labours under the same verbal defects; the medical attendant, for instance, has himself to certify the date and cause of death and the duration of the disease, facts which he must obtain in a large majority of cases from observation other than his own. The examination of certificates at the Central Bureau and their rejection, if found informal or deficient, is a feature untried, as yet, in England, although often advocated by sanitary reformers; and it is interesting to find that this duty, requiring so much tact and forbearance, has apparently been performed without offence or difficulty.

“None other than a mind properly disciplined by medical training can possess the judgment essential to the prompt determination of the numerous medical or medico-legal questions arising in connection with these returns. To send back a physician’s certificate for correction or supplementary information is a matter of some delicacy, liable to be construed as impertinence by those who fail to appreciate the motive for the proceedings. Our interrogations, however, now seldom fail to elicit from respectable physicians all the points desired. In furtherance, also, of our statistical interests, the new issue of certificates of death have printed upon the back of each a list of those diseases whose definition upon certificates our experience has proven to have been the most unsatisfactory, each disease upon said list having stated opposite to it the information required. This expedient has been attended with the most favorable results.”—p. 158.

An incoherent certificate, if not satisfactorily completed when returned to the medical man, is forwarded to the coroner, and as many as seventy-one inquests were held on such cases during the year, “the autopsy in nearly all revealing the reality of an incorrect diagnosis having been made, and some of the bodies bearing evident signs of gross malpractice which led to the arrest and incarceration of the attending physicians.”—p. 285.

From the certificates thus sifted and corrected, a weekly report is printed for limited circulation giving the actual daily mortality, the most prominent causes of death and the meteorological observations for identical days of one week, together with the registered mortality of the subsequent week. Separate accounts are also kept, one of the *registered* deaths, closed on Saturday at noon; one of the *actual* mortality, completed a week later, to form in time the basis of the annual report. The tables of causes of death are arranged according to Dr. Farr’s nosology, and thus are comparable with our own.

Before concluding we must say a few words on the special causes of death. In this department we miss the able and scientific summary with which Dr. Farr adorns the Reports of our own Registrar General, still there is much to interest, and the year 1870 was in some respects a memorable year.

Yellow fever had appeared in an epidemic form after an absence of nearly half a century, and relapsing fever was introduced for the first time into New York. Very full and detailed reports on these diseases are given, which, whether we agree with the conclusions or not, are valuable as being the results of special study and exceptional opportunities for observation. Eleven cases only of yellow fever were recorded, all imported from the military post on Governor's Island, which although in immediate and dangerous proximity to the city, is in no way controlled by the Board of Health. The correspondence of the officers of the Board with the obstructive replies of a touchy commandant are an instructive commentary on hard and fast lines of sanitary districts, which our Local Government Board would do well to study.

Of relapsing fever no less than 2040 cases were treated under the Commissioners of Public Charities. The most stringent measures were taken to prevent its spread. Special hospitals were devoted to its treatment. Even assistance in kind was rendered to those who were in need, and disinfectants were applied with the happiest results.

Under the head of diarrhœa we have some remarks on the carelessness or ignorance often shown in recording causes of death; and one of those principles of tabulation is revealed, which are so essential to a just appreciation of the figures. Summer complaint or summer cholera, for instance, appears on the certificates indifferently as enteritis, gastro-enteritis, intestinal catarrh, gastro-intestinal catarrh, entero-colitis, cholera infantum, diarrhœa, cholera morbus, and even dysentery, when no dysentery existed. How are they to be classified? Cholera infantum was made to include those cases only under that head, which did not exceed a week in duration, while in the case of diarrhœa, that term was retained unless the disease had a very short duration, say from one to two days.

The mortality from sunstroke was an important feature of the year 1870 in New York city; no less than 238 deaths were registered as occurring during June, July, and August, and the particulars relating to them are thoroughly well worked out. In this country it is usual to ascribe sunstroke and heat apoplexy to exaggerated solar heat associated with atmospheric humidity; but causation and effect are not so sharply defined

and the statistics of the report can scarcely be said to favour the popular idea.

In the chart facing page 179 which gives the mortality from solar heat, the temperature, the humidity, and barometric pressure, during the four weeks ending July 23rd, July 30th, Aug. 6th, and Aug. 13th, in 1870, no connection is shown between the amount of humidity in the atmosphere and the number of deaths. The highest mortality recorded in one day, viz. thirty-nine, coincides with the highest recorded temperature, 128° F. in the sun and 96° F. in the shade; a week later, with a temperature in the sun of 120° F. and 95° F. in the shade the deaths in one day reached thirty-four. Whilst twelve days later still a temperature of 125° F. in the sun and 89° F. in the shade resulted in a single death. A sustained temperature in the shade exceeding 92½° F. would appear from the chart to be more fatal to life than the utmost intensity of the direct solar rays. Among predisposing causes intemperance undoubtedly stands foremost, and the 'Report' lays some stress on the fact that a large proportion of sunstrokes were in known and habitual drunkards.

Among violent deaths were several from hæmorrhage following the operation of circumcision upon Jewish infants by unskilful and ignorant operators.

The chemical reports on gas, milk, water-pipes, cosmetics, and petroleum, contain much valuable information which is not always easy of excess to the ordinary reader, but it would be obviously impossible in a notice of this kind to follow all the details of a report so bulky, however valuable the matter may be—we can only point out the salient features and refer our readers for further information to a volume which will well repay their search.

The report of the Attorney and Counsel shows that penalties are not allowed, as with us, to lie in abeyance. There is no compulsory vaccination it is true, but when the law can be brought to bear it is freely used, no less than 2576 separate actions having been commenced during the year for enforcing the regulations of the Board. The cost of sanitary organisation in New York is of course proportionate to the work, and we are not surprised to find some £38,000 expended upon it. of this 135,743·07 dollars or about £30,500 went in salaries, and 12,012·04 dollars, or some £2750, in the various expenses connected with the disinfecting department.

When we consider the various interests involved and the numerous departments which go to make up the sanitary organisation of New York it is a pleasure to read that—

“The new charter passed during the winter of 1869 and 1870 by

the Legislature of the State has, in its organisation of departments, achieved an harmonious co-ordination under one general system of government, that at the end of its first year has already elicited encomiums from its most bitter opponents. Each department, although governed separately by its own head, feels that it is but a part of the whole, and that its own individual interest is but a part of one common interest which all must sustain for the welfare of a well-governed metropolis."—p. 81.

Still, we cannot expect perfect harmony, and a few difficulties are noticed here and there in the Report. At p. 64, for instance, it is regretted that in carrying out public improvements the Department of Health and that of Public Works cannot go hand in hand, and it is recommended that "no contract should be given out for the opening of streets until it is first determined what measures shall be taken for securing an effective drainage." Again, at p. 560 it is mentioned that although the Board of Health had made investigations concerning the sale of dangerous oils, the Fire Commissioners claimed exclusive jurisdiction in the matter, and it was afterwards found that even they had no power to prevent their sale. In the result both bodies applied themselves to testing the oils with a view to diffusing a knowledge of the dangers attending their use, but as might be expected in such a case "the standard of safety adopted by the Fire Commissioners was ten to thirty degrees lower than that of the Board of Health," and the results of such education on the public mind could not fail to be nugatory if not disastrous.

The last instance we shall mention is one which has already been alluded to in speaking of yellow fever; we mean the partial and incomplete jurisdiction possessed by the Board over outlying portions of the city, such as Governor's Island.

"So effectually is it excluded from jurisdiction over that island that it has no knowledge of the sickness and mortality of the inhabitants except by the courtesy of the commandant or by public rumour."—p. 343. "This transient community is made up of persons from all parts of the country and taken largely from the poorer classes of cities. Such a rendezvous must necessarily be constantly liable to the reception of every form of infectious disease, and the history of that garrison shows that diseases like cholera, yellow fever, typhus, &c., have been brought from distant parts of the country and localised within the corporate limits of the city. It is apparent that such a community should be brought under the sanitary surveillance of the health authorities of the city, and be so far under their control as to be compelled to enforce necessary regulations for the protection of the public health."—p. 347.

No wonder that the Board, irritated and thwarted by a

general who seemed to consider the interest they had taken in the epidemic upon the island an unwarrantable interference, were—

“Impressed with the danger to the public health of New York of such a community located within a few hundred yards of its most populous centres, of the condition of which the Health authorities have no direct knowledge, and over which they have not the slightest control.”

But these are small blemishes and must not be allowed to blind our eyes to the great work which has been carried on in New York city; year after year a steady progress is reported from which, if rightly studied, we in England may learn much and glean no little encouragement. Our recent legislation, although imperfect and wretchedly inadequate to the wants of the country, will do much to enlighten the public mind on the subject of Public Health; new enactments will be asked for, and it will be no slight advantage to be enabled to study their working and results as exhibited in the pages of these reports from New York. Judged simply by results, New York sanitation shows no mean success, and we may well conclude these remarks by pointing to the reduction which has been brought about in the mortality of a single section of the city, viz. the tenement houses which have always been a fertile source of disease in its most virulent and active forms.

“In 1868 nine thousand six hundred and two tenement houses contributed 14,550 deaths, and the charitable institutions of the city (most of whose patients came from these dwellings) 4,314 more, being together, 75·79 per cent. of the total mortality. * * * * In 1870 eight thousand five hundred and nine tenement houses gave 13,052 deaths which, in conjunction with 4945 more in the public institutions, amounted to 66·22 per cent. of the total mortality. We thus discover a gain of $9\frac{1}{4}$ per cent. within three years, or, in other words, a saving of 2600 lives, which would inevitably have been sacrificed had they been exposed to former local insalubrious surroundings, as well as to the unfavorable natural conditions of the year.”—p. 261.

IX.—The Practice of Surgery.¹

WE have often desired to see some one do for surgery what Sir Thomas Watson has done for medicine, that is to say, write a treatise on the subject which shall be at once authoritative and attractive; and when we heard of a manual by Mr. Bryant we

¹ *The Practice of Surgery: a Manual.* By THOMAS BRYANT F.R.C.S Surgeon to Guy's Hospital. London, 1872.

hoped that our wishes might be fulfilled. But alas! they have been much disappointed. The pen of Astley Cooper, which wrote the graceful lectures that have charmed and interested every generation of students since his day, has evidently not fallen into our author's hands. Though another large work has been added to the number of existing systems and treatises on surgery, we are still without a book on the principles and practice of surgery which can be placed by the side of Sir Thomas Watson's 'Principles and Practice of Physic.' Abundance of sound instruction and hard facts are certainly to be found in the volume before us, as well as in several of the standard works on surgery that might be named; but if we look for plain instruction impressed upon the reader's mind by anecdote or illustration, and for statistics enlivened by touches of classic lore or general information, we look in vain. We have to content ourselves with a book which must be read as a task, not as a pleasure, and be only consulted when its help is needed. We shall not take it down from our shelves as a favourite in whose company we are glad to spend a leisure hour, and to whose wise and attractive instruction we are always ready to listen.

But it is not merely that there is an absence from Mr. Bryant's pages of graceful writing; his faults are faults of commission even more than of omission. We have to complain that we can hardly read a paragraph without being provoked by the slovenliness of the style and the incorrectness of the language. The shades of Lindley Murray and of Dr. Samuel Johnson must have been sorely disturbed by the publication of this volume. At times we are disposed to admire the independence of the author's statements and the originality of his work, and then our admiration is put to flight and the good effect of the teaching marred by the evident hastiness of the composition and the want of consideration with which the manual has been laid before the profession. We shall presently give examples of both these characteristics in order to justify what we have said. We shall lay before our readers passages which seem to us excellent in the freedom with which they state facts, unbiassed by the traditions of the schools handed down to us from days of less exact observation and of less widespread habits of induction; and we shall also give examples of the blunders and verbal inaccuracies into which the author has been betrayed by not allowing himself sufficient time to revise his manuscript. We do not, of course, speak of points of pathology or of practice, about which there may fairly be differences of opinion. To some of these we shall allude as we proceed. What we complain of are glaring defects of composition, which Mr. Bryant would

himself be the first to allow when they are pointed out, and which we have no doubt he regrets extremely.

A man who adds another to the list of works on surgery, which is already sufficiently large, ought to have very good reasons for the step he is taking, and ought not to suffer himself to be persuaded into hasty publication. But perhaps Mr. Bryant would say that he had sufficient reason for writing a text-book on surgery. He was asked to do so by an eminent firm of publishers, and the rich stores of Guy's Hospital museum were placed at his service. We readily admit that these must have been strong inducements to write his manual. But having determined to do so, it was due to all parties—to the publishers, to the hospital, to the profession, and to himself—not to bring out his work without that careful revision which such an important subject demands.

The outward form in which the book is presented to us suggests at once that there has been a miscalculation. It is evident that the author did not know to what length his manuscript would extend, or the publishers would never have presented us with such an unwieldy volume. And when we open it we find that the miscalculation which is betokened by the exterior is matched by the carelessness of the composition. Typographical errors abound, and there is a great want of correct punctuation. These and numerous other blemishes almost lead us to conclude that the proof sheets never had the advantage of the author's personal revision.

In his preface Mr. Bryant says that "the rightly recognised specialities of eye, ear and dental surgery, have been excluded" from his manual. Herein we think he has in the main exercised a wise discretion. It is impossible, as some have tried to do, to include all these subjects in works on general surgery. Such a course must result either in the chapters being very imperfect, or in the author calling in the aid of a specialist to help him out of his difficulties; and neither of these methods is desirable. But though we agree with Mr. Bryant that the full consideration of the surgery of the eye, ear and teeth, must be left to specialists, yet we cannot but think that he draws the line too rigidly, and that his exclusion of these subjects is too complete and sweeping. For example, though he professes to omit the ear, he very properly, as we consider, though perhaps not quite consistently, has a short chapter in which he deals with the diseases of the external auditory passage—diseases which are constantly brought under the notice of the general surgeon. But if thus much may be allowed to the ear, which is said to be excluded, why not apply the same rule to the eye? Why-not deal with the more superficial affections of that organ?

Can a manual of surgery be considered complete which takes no notice of conjunctivitis, ulcer of the cornea, or abscess of the lachrymal sac? It seems to us that there is a clear line of demarcation between such superficial diseases as these and the rarer and complex conditions which cannot be diagnosed without the aid of the ophthalmoscope. While such cases as glaucoma and choroiditis must almost of necessity pass into the hands of specialists, every village surgeon ought to be acquainted with the proper treatment for ophthalmia neonatorum or tinea tarsi.

We have said that in this volume there are many ungrammatical sentences, many faults of composition, and many defects of punctuation. To justify this assertion we shall now proceed to lay before our readers some few out of a long list of blemishes that we have noted in perusing the book.

At page 35 we read, "To keep the patient alive feeding is an essential point." What is meant is that the most careful attention to feeding is necessary, but this is not what the sentence implies. As it stands it is an absurd truism.

At page 179 Mr. Bryant says, "It has fallen to my lot to amputate a leg for two female patients aged fifteen and twenty, for gangrene." But to which of the two the leg belonged we are never informed!

At page 156 we read, "When oppression of breathing also exists it has an important signification, but this oppression says he is one of the most deceitful signs." Here, for want of the proper stops, and because the expression used is a very colloquial one, poor Trousseau is held up in ridiculous light.

At page 439, in speaking of boils, our author says, "In persons who are predisposed to their formation any local application is apt to produce them, such as rowing." Poultices and blisters are properly called applications, but to find rowing put in the same category provokes a smile.

At page 446 there is an *egregious* blunder, which needs no comment. It is there said, "Soft corns are best treated by taking away pressure by means of the introduction of cotton wool—that directly off the sheep being the best."

At page 756, in speaking of chronic induration of the mammary gland, our author says, "It is found mostly in unmarried women during the later periods of life, between thirty-eight and forty." What this means we are at a loss to understand. Perhaps when the work reaches a second edition the matter will be cleared up.

At page 842 we read, "Disease of the wrist-joint is not so common as disease of the carpal bones and joints." This is surely a distinction without a difference, for the carpal bones and joints, taken together, constitute the wrist-joint.

At page 920 there is an account of "the Bavarian mode of putting up a fracture in an immovable apparatus, which deserves a better knowledge than it possesses"—a somewhat peculiar expression.

These instances may suffice to illustrate this class of defects—gross errors of composition—and these are, as we have said, only specimens of many that might be mentioned. We have already hinted that the language is sometimes too colloquial. Other instances of the same fault may be found in the intestine which "popped" into the abdomen (p. 349), the "smasher" who swallows false coin (p. 314), and "the weed" which gives rise to irritation of the tongue (p. 260).

Besides these words, which savour rather of the slang dictionary, there are others to which we object because they are incorrect, as, for instance, when the author in his preface *tends* his thanks to those who have assisted him in various ways, and when he speaks of *hernias* at page 331, and of *parotiditis* at pages 257 and 623; and others, again, to which we take exception because they are new and uncalled for—such as *necrotic*, *pulpousness*, *testitis*, *orchocele*, *rectocele*, *mammitis*, and *sequestrotomy*.

Of the numerous woodcuts which illustrate this work some have been borrowed from familiar sources, and it would have been far better not to have reproduced them. But the greater part are new; most of these are good, and some of them, *e. g.* those which illustrate the ligature of arteries, are excellent. Even the woodcuts, however, testify to the want of finish which pervades the whole work. Some, *e. g.* Figs. 10, 52, 53, and 297, are so much too large, and trench so far upon the margin, as to suggest the idea that they were prepared for a wider page, and were never intended to be crowded into their present position. To Figs. 24 and 24a there is no distinctive reference in the letter-press, and, indeed, there is altogether considerable obscurity about this Fig. 24. We are told in the small print below the woodcut that it represents "angular curvature of the spine, the same as that illustrated in the former figure, taken from a patient *æt.* 35." But on turning to Fig. 23 we find that this represents lateral curvature in a girl *æt.* 13. There is evidently a confusion about the numbering of these woodcuts, and the result is that the reader is left to guess what is meant.

At page 121 Mr. Bryant says, "The worst case of lupus of the nose I ever saw was the one illustrated in the previous drawing." But the previous drawing is merely a representation of Bellocq's canula. It is not till we have read some lines further, and have

turned over the page, that we come to the illustration which is really referred to.

Fig. 262, which purports to show how an elongated foreskin should be removed, does not tally with the letter-press, and, moreover, gives rather a dangerous idea of the way in which the operation should be performed. At page 908 the drawings representing sections of healthy and diseased occipital bone have been transposed, so that the title is at variance with the illustration. Happily, the mistake is so obvious that it can hardly mislead any one. At page 945, Fig. 431, which is said to be copied from a paper of Mr. Moore's, in the 'Med.-Chir. Transactions,' is erroneously attributed to Mr. Travers in the small type under the woodcut.

But enough of this. To dwell upon blemishes is a task for which we have no taste. Still, it is absolutely necessary to point them out, unless we are to abandon altogether our office as critics. We pass on now, with a sense of relief, to give our readers some idea of the excellences of Mr. Bryant's book, and to discuss some of the points upon which, though we do not agree with him, there may fairly be differences of opinion.

We have already alluded incidentally to the independence which marks our author's work. He has observed and thought for himself, and the result of his observations accords with that of many other surgeons at the present day. If we mistake not, his book will do much to dissipate some old and baneful prejudices. Here is an example of our meaning. For how many generations has it been taught that there was a definite and peculiar cancerous cachexia, and that a glance at the patient's face was enough to establish the diagnosis. Yet the more exact observations of modern surgery have proved, beyond a doubt, that there is no such pathognomonic sign of cancer. Our author thus admirably sums up the argument:

"Is there any definite aspect associated with any definite disease? Is there a cancerous cachexia? I have little hesitation in stating my belief that, in practice, no such thing can be established, and that a large number of patients suffering from cancer are as healthy looking as any other class, indeed often healthier. There is no doubt that a patient suffering from cancer, which, by its discharges or development, is interfering with the important functions of life, and undermining the patient's powers, has an anxious, drawn, bloodless, and waxy look; but so has the subject of any organic disease which interferes with the functions of digestion and assimilation, and particularly so the subject of rectal disease. The patient, exhausted by suppuration, by spinal, bone or joint mischief, the man or woman who, from drink, syphilis, or mercury, separately or combined, is gradually being brought down to death's door—all of these

have a cachexia more or less peculiar, according to the organ involved in the disease and the special character of the patient, but it is merely the cachexia of looking ill. Clinically, I read the meaning of a cachexia as a looking ill, perhaps very ill, but it has no definite signification—looking ill from cancer, looking ill from abdominal, rectal, suppurative, or syphilitic disease” (p. 6).

Again, how long has it been the doctrine of the schools that no suture should be employed in lesions of the scalp? Yet there seems no good reason for this, and in these days, when so much attention has been paid to the treatment of wounds, the doctrine has been called into question. Mr. Bryant thus expresses his opinion on the subject :

“Under all circumstances and conditions scalp wounds should be carefully cleaned with tepid water, the utmost gentleness being used; their edges may then be adjusted and maintained in position. When the wound is not extensive, and can be adjusted by strips of plaster, sutures are not needed; but when any difficulty is experienced they may be as fearlessly applied as they are to other parts; indeed, in extensive lacerations of the scalp the application of sutures is far preferable to any other form of practice, for the wound can be kept clean and moist by water dressing, which is not possible when a quantity of strapping has been employed. The hair must be cut off in the neighbourhood of the wound and the head kept cool. One caution, however, must be observed in the application of the suture, and that is, not to include the aponeurosis of the occipito-frontalis muscle, for there is more danger of setting up mischief in the cellular tissue beneath this tendon when this practice is adopted than when the sutures simply pass through the skin itself. The kind of suture is unimportant, although many surgeons prefer the metallic. All sutures should be removed on the second day, as wounds of the scalp heal rapidly” (p. 42).

The question of the treatment of strangulated hernia is of so much interest, when the accident arises it is so urgent, and it has been so essentially affected by the introduction of chloroform, that the sentences in which our author sums up the whole matter well deserve attention, though his mode of expression quite confirms some of our previous strictures.

“When a hernia is strangulated nothing but its immediate reduction is to be entertained. Delay is most deleterious. In the surgeon it is criminal, for every hour of strangulation adds to the danger which it is his duty to diminish. This is to be done by manipulation or by what is technically called ‘the taxis,’ and should this fail, by ‘the operation’ of herniotomy. To aid the surgeon in the adoption of these means the use of chloroform, or any of its allies, cannot be too highly praised, for it contains within itself all the advantages of every other form of treatment that has ever been employed, without a single disadvantage. It renders the reduction of a hernia by the

taxis a gentle, and comparatively a simple, measure, and certainly a far more successful one than of old. It facilitates, also, the operation of herniotomy on the failure of the taxis. Indeed, the value of chloroform in strangulated hernia is so great that I would urge, where it can be rendered available, the taxis should never be employed without it, and that on the reduction of the hernia failing to be accomplished 'the operation' ought to be performed. The warm bath, the administration of opium, the injection of tobacco, the local application of ice, for strangulated hernia, are, in comparison, poor and unreliable remedies. They have had their day. To use them now, when we have at hand a far more valuable drug at our disposal, is trifling with life" (p. 338).

The radical cure of hernia excited a great deal of attention some ten or twelve years ago. Various operations were devised with the view of effecting it, and many patients were submitted to active treatment. These operations have now been tried and have settled into their proper places; and we think that the judgment which Mr. Bryant passes upon them, in general terms, will be accepted by our readers as expressing the opinion which has commended itself to the minds of surgeons after duly weighing the evidence for and against them.

"For my own part, I believe that where a hernia can be kept up by a truss, and the patient is likely to remain in a civilised country where trusses can be obtained, any operation for the radical cure is an unjustifiable one; to risk the life of the patient on the theory of a cure, with the probability that the patient will be rendered less liable to its descent, when a truss has to be worn subsequent to the operation as a matter of safety, is a practical delusion" (p. 358).

The way in which our author sifts the evidence relating to the excision of the knee is admirable. He is, as he frankly avows, only an advocate for the operation in a very limited class of cases. He is not one of those who would practise it at all ages and for all diseases. He plainly shows that it is in the case of young adults that the success is greatest, that in children the resulting limb is often quite useless from arrest of development, and that in elderly people the mortality is so high as not to warrant the surgeon in recommending it. The passage in which he deals with this subject is too long for us to extract, but all zealous advocates of excision of the knee should ponder it carefully. It defines clearly the proper field for the operation, and does more to establish its position on a firm and scientific basis than the lengthy essays of its more enthusiastic supporters.

The sections in which Mr. Bryant deals with the surgery of the foot are excellent. In reply to the eulogistic opinion which

Lister has passed upon Syme's operation, our author makes the following remarks, which seem to us not only to show a just estimate of that particular proceeding, but also to express the great principle which ought to guide us in all operations upon the foot and ankle.

"This view of the operation, which was held by its originator, emanating as it does from one who was so closely connected with Syme professionally and otherwise, is doubtless far too sanguine. That it is a good operation no surgeon will deny when amputation of the whole foot is called for, but to say that it will supersede entirely Chopart's operation I trust will never be true, for where Chopart's amputation is good Syme's ought not to be entertained. When the bones of the ankle-joint and the joint itself are sound no surgeon ought to take the whole foot away when any minor measure will suffice. As an amputation of the foot, where the whole foot must be sacrificed, it is an admirable operation, but under no other circumstances can it be recommended; that it is superior to amputation of the leg most surgeons will admit, upon the same principle that Chopart's is superior to it—the principle of the least possible sacrifice of parts" (p. 1061).

We have given these extracts as examples of what we consider the chief merits of Mr. Bryant's book—the soundness and independence of his surgical judgment—and to show that we are not insensible to the excellences of the volume that has been placed in our hands for review. The laborious way in which he has collected statistics, both from his own practice and that of others, and the original conclusions that he has drawn from them, deserve much praise, and when he gives sufficient attention to the details of his composition there remains little to be desired. It is the want of careful revision, the frequent repetitions—greatly increasing, as they do, the size of the work, which is already ponderous enough—and the general air of precipitation which is impressed upon the work, that obliges us to qualify our commendation.

As an example of the repetitions of which we complain—though it is only one among many—we may mention that the author gives us twice over his experience of lumbar colotomy for vesico-intestinal fistula, and there is some discrepancy between the two accounts. At page 400 Mr. Bryant tells us that he has performed this operation four times.

"One of the cases of vesico-intestinal fistula lived four months after the operation, and died with suppurating kidneys, but entirely relieved from all urinal and rectal distress. *Two* are now alive and enjoying life, suffering very little inconvenience indeed from the artificial anus."

At page 503 the same four cases are mentioned, but it is added—

“One died four months after the operation from kidney disease, and *three* are now alive in comfort and good health.”

In speaking of the feeling which is conveyed to the surgeon's fingers by the presence of fluid in the joint, or in the sheath of a tendon, the word *crackling* ought always to be employed, while *crepitus* is reserved for the grating of broken bone. In laying down this rule we differ from Mr. Bryant, who seems to use the terms indifferently, speaking sometimes of the crackling and sometimes of the crepitus of effusion, thereby tending to perplex the students, for whom his book is professedly written.

In the same way we think Mr. Bryant's use of terms is very erroneous when he says (p. 680) that—

“*Urethritis, gonorrhœa* or *clap* are terms applied to cases of inflammation of the urethra of every degree of intensity and the product of a great variety of causes.”

This is both incorrect and confusing. *Gonorrhœa*, and its corresponding vernacular *clap*, are by common consent taken to mean an inflammation of the urethra the result of one specific cause, namely, impure sexual intercourse. Other inflammations of the urethra, however similar in their manifestations, if they arise from other causes—as the passage of instruments, for example—are not cases of gonorrhœa, but are properly instances of urethritis. Nor is this a mere fanciful distinction. It is one of great practical utility, and based upon very sufficient reasons. For if a young man, when he first enters on private practice, hastily pronounces a discharge to be gonorrhœa, he may find that he has disturbed the peace of a family, that his credit is seriously damaged, and that he is placed in a very unpleasant predicament. It is much better, therefore, to call all inflammatory discharges from the urethra which arise from other causes than impure sexual intercourse *urethritis*; and this is by far the safest rule to impress upon the minds of students. In speaking of vulvitis in children, which, by an evident misprint, is said to be *far from common* (p. 651), the author very properly warns his readers against supposing that all such cases are the result of a gonorrhœal affection, and, just in the same way, the students ought to be taught that there are discharges from the male urethra which have a perfectly innocent origin, and which ought not, therefore, to be classed, even in name, with those which are the result of venereal infection.

There are many other points upon which we should have been

glad to have discussed Mr. Bryant's opinions, but space admonishes us that we can only touch lightly upon one or two of them.

Thus, at page 714 our author says—

“Tumours never change their original nature, nor pass on nor degenerate into others of a different kind. A simple tumour is simple to the end, and a cancerous tumour is cancerous from the beginning.”

This dictum is printed in italics, to draw attention to it and give it force. The writer then goes on to defend his position, for, “oddly enough, an opposite opinion is still repeated in some of the students' text-books.” To us it seems well for pupils that this is not the doctrine which is always taught them. Indeed, the chapter upon morbid growths which has been contributed to this volume by Dr. Moxon is somewhat at variance with Mr. Bryant's dogma, and conveys much sounder instruction. There can be no doubt that many tumours which are originally of an innocent formation are very apt in the course of time to break down and assume all the clinical features of a malignant sore. This is, in fact, one of the main arguments in favour of the early removal of growths which all would agree in calling benign.

Again, Mr. Bryant urges that it would be well to expunge the word *strumous* from our vocabulary, so far as joint disease is concerned (pp. 820 and 825). This he recommends, because we do not know what constitutes the essence of scrofula and we are apt to be misled by a name. Now, there is, no doubt, some truth in this. We certainly do not understand what is the intimate pathology of the strumous diathesis. But if this is admitted, if it be thoroughly understood that the term is taken to mean a constitutional state which reveals itself by certain outward signs, then it is not only an admissible, but a very convenient expression. Of course the changes in strumous diseases are essentially of an inflammatory character, only they are modified by the peculiar dyscrasia of the patient; and the treatment they require is that of the ordinary low chronic forms of inflammation, *plus* those remedies which have been found by experience to have a beneficial effect upon individuals of the strumous diathesis. A little further on, in speaking of caries, as well as in other places, Mr. Bryant finds it convenient to use the term; and if it may be allowed in the one subject, why not in the other?

But it is time for us to conclude this notice. Both the merits and demerits of Mr. Bryant's work have already led us to speak of it at greater length than we originally intended. Its excellence consists in the number of valuable facts, of well-selected

cases, and of sound opinions, which it contains. Its defects, on the other hand, are chiefly those of style and composition. When it reaches a second edition, when it has been cast in a less unwieldy form, when the repetitions and inaccuracies of which we complain have been remedied, and when the whole has received the close and careful supervision of the author, we may confidently anticipate that it will become a more readable book and an important addition to modern surgical literature.

Bibliographical Record.

Mivart on Anatomy.¹—A work on elementary anatomy and of which nearly one half is devoted to the study of the preliminary subject of osteology may appear too insignificant to notice. But the accuracy and novelty of Mr. Mivart's facts demand more deliberate examination than we could afford in the case of a mere school book.

The author's object has been to corroborate the teaching of modern comparative anatomy by reference to man, and to prove that man's body cannot be comprehended by itself. To do this, a reference to the condition and development of every separate bone which the human skeleton presents when compared with the similar answerable, or identical bones in the skeleton of animals is necessary. This investigation Mr. Mivart carries out in detail. We shall first consider his general morphological facts.

In the main, he agrees with Professor Owen, that the trunk and skull form a series of answerable segments which are to all intents and purposes "somatomes" (a word not used by him), or vertebræ. We transcribe the author's generalised ideas, respecting the development of the osseous skull.

"The cranial characters presented by man, may be indicated in the following generalised manner:—The skull may be said to consist of a central axis (formed by the basi-occipital and basi-sphenoid) to which ascending and descending arches are annexed, and in which certain structures are intercalated. We have the occipital arch, and in front of this, a second arch formed by the great alæ of the sphenoid and the parietals, and again in front, a third arch formed by the orbital alæ, and the frontal. Into the median gap, bounded by the arch of the frontal, the olfactory organ (the ethmoid) is, as it were, thrust. Into the gap left on each side, between the lateral, occipital and the great ala of the sphenoid, the auditory organ (the temporal bone) is thrust. Similarly, the much smaller lateral gap left between the great alæ of the sphenoid is related to the organ of sight, which, though not ossified in man like the olfactory and auditory organs, is protected by bony expansions (the bony orbit) round it. Beneath the basis cranii, we have (1) the great cornua of

¹ *Lessons in Elementary Anatomy.* By ST. GEORGE MIVART, F.R.S., Lecturer on Comparative Anatomy at St. Mary's Hospital. London, 1873.

the hyoid, which send up no connecting ligaments to it, but which through the basi-hyal are connected by the lesser cornua with the styloid processes. (2) In front of this hyoidean arch, we have the mandibular arch, and (3) again in front of this, the arch of the upper jaw, ending posteriorly in the pterygoid bones and amalgamated in front with the open covering of the nostrils (the nasals) and with the outer protection of the orbits (the malars) which latter send back a bony arch (the zygoma), to the bony envelope of the auditory organ."

We wish we could introduce the diagram by which this important generalisation is explained and justified.

The arrangement is not so lucid as that of Owen, but may be defended by a reference to some of the discoveries of Mr. W. Kitchen Parker. Many bones are described which are not familiar to ordinary students of human anatomy. That some of them, the epiotic undoubtedly, do not form part of the axial skeleton in any vertebrates may be admitted. They are essentially dermal bones, akin in nature to the ossifications which are found on the skull of the ganoecephalous reptiles. This confusion between the surface bones and those of the axial skeleton has before time led into serious error. Unless Mr. Mivart can demonstrate that all the ossification which bear the eccentric titles (unknown to the comparative anatomy of Owen's school) of epiotic, epibranchial, opisthotic, sphenotic, os transversum, hyomandibular, pharyngo-branchial, &c., are in all cases parts of the trunk system of bones, or at least diverging appendages from it, the classification of the bones of the skull will be embarrassed by the addition of a dozen supernumerary bones, the precise homologies of which have never been accurately determined. While giving the fullest credit to Mr. Kitchen Parker for his original researches on the skeleton of birds, as embodied in his excellent memoir on *Balaniceps rex* in the 'Transactions of the Zoological Society,' we think that the origin of the ossification of the "epiotic" bone, for example has not been shown to arise from any portion of the axial skeleton. Less light is thrown upon its affinity by the investigations which have been made with more or less scientific exactitude into the skull of fishes, as *e.g.* that of *Polypterus*. We wish Mr. Mivart had here given a table in which the diverging axial growths of the occipital bone for example had been given, and these relations shown with the intruding surface bones which form no part of the central or endo-skeleton of the vertebrate animal. There is another matter on which much confusion seems to arise, although it dates from a prior period in the history of the science than the time of the publication of Mr. Mivart's work. It was hinted at by the researches of Béclard that the upper part of the supra-occipital bone above the semi-circular curved line in man is really and not merely developmentally separate from the lower part of the supra-occipital. This is a

generalisation to which many modern thinkers are inclined to give their assent. But the homologies of the par-occipital and ex-occipital bones rest, so far as regards our certain sources of knowledge, precisely in the same state as that in which they were left in the time of Professor Owen. The researches of Professor Camille Bertrand, important as they are with relation to the homologies of the branchial arches, do not in the slightest way dispel the obscurity into which the occipital segment when considered under more complex conditions than the skull of the cod and crocodile appears to be cast. We hope that some future student guided by the light of Mr. Mivart may grapple with this bone of contention, *lapis offensiois et petrum scandali*, and enable us to solve its apparently undecypherable and enigmatic nature. But nothing will be gained by packing the bones of the outer or membranous skeleton in with those of the axial trunk vertebræ, and expecting students then to master the general and special homologies of the occipital segment. It is true Mr. Mivart has not precisely done this, yet a carelless reader of his words, or a first year's osteological student might be led to infer conclusions which the master (if we understand him aright) would probably repudiate.

Mr. Mivart's zoological classification of the class mammalia is not much in accordance with that which is generally adopted in England, and we regret that he has seen reason to place the *Hyracoidea* in a separate order, apart from the *Rhinocerine Perissodactyla*, to which the little "shaphan," or coney, is closest allied. The reasons for this change are not explained by him, but the "zonular" (*i. e.* "annular") and deciduate placenta of Hyrax, cannot be held to be a sufficient character to separate it from the rest of the order, which have the placenta diffused and non-deciduate. The character of the ribs, the simple stomach and complex cæcal structures, the form of the foot, tetradactyle on the anterior and tridactyle on the hind foot, coupled with the exact resemblance of the patterns of the molar teeth in hyrax and rhinoceros appear to give an insight into its affinity deeper than that which would assign to hyrax the value of a distinct order of mammalia. An argument resting alone on placental similarity would class the hyrax and the elephant in the same group of carnivora as bears, seals and lions.

Mr. Mivart's researches as to the shape, form and development of the appendicular skeleton in man and the lower animals are of the highest interest. He points out that the upper limbs in man are suspended from an incomplete long girdle attached to the back bone, on its dorsal aspect by soft parts only, but on the ventral aspect abutting against the median portion of the paraxial system, *i. e.* against the sternum, doing this nevertheless only with the clavicles. Man, as our author says, has but an imperfect shoulder girdle, compared with what is possible, for, in some animals this part joins the

sternum by great coracoids, to which precoracoid bones are appended as in *Echidna*, and in others as *Raia* it abuts against the neural axial canal, thus becoming a really complete shoulder girdle. This point is certainly interesting.

We may notice another passage in which the author says—

“There is never a highly developed pelvic girdle without a rudiment of a pelvic limb; but we may, as we have seen in *Anguis* have a well-developed pectoral girdle without any rudiment of a pectoral limb.

“Again, we may have (as in *Lialis*) leg bones without a foot (fig. 168), but we never meet with arm bones without a hand.”

Such are a few of the points of interest presented by Mr. Mivart's important and instructive little volume. That it is destined in the hands of the practical teacher to fulfil a high mission, there can be little doubt.

Lewis on Hæmatozoa in Blood.¹—Dr. T. R. Lewis, Assistant-Surgeon on special duty, attached to the Sanitary Commission with the Government of India, has forwarded to us a pamphlet, in which he describes a hæmatozoon that he has found in human blood, especially in cases of patients suffering from chylous urine. He first discovered it in 1870, in the case of a young and emaciated East Indian, in whom coagula rapidly formed in the milky urine soon after it was passed. On teasing these out under the microscope, filaments were seen which were at first supposed to be the mycelium of a fungus, but which were speedily recognised to be minute animal organisms resembling the anguillulæ of starch paste. Some specimens were forwarded to Mr. Busk, and the name of *Filaria Sanguinis Hominis* was applied to it. Dr. Lewis states, he has now examined the blood of not less than fifteen to twenty patients suffering from chylous urine and hæmaturia, and in all he has been able to satisfy himself of the presence of the hæmatozoon. Its numbers must be very great, one or two being visible in almost every large drop of blood obtained by a mere puncture of the finger with a needle. When examined in blood just drawn, it is found to be very active, exhibiting snake-like movements. The surface presents very fine transverse striæ on the surface, and appears to be enveloped in an extremely delicate tube closed at both ends, in which it is capable of elongating or shortening itself. Rudiments of an intestinal canal in the form of a short chain of aggregated molecules are frequently visible towards the centre, and a bright spot exists at the terminal point of the anterior portion suggestive of an oral aperture; immediately below this is a somewhat elongated vacuole. In size and form the hæmatozoon approximates more closely to the *Filaria medinensis*, or

¹ *On a Hæmatozoon Inhabiting Human Blood; its Relation to Chyluria and other Diseases.* By T. R. LEWIS, M.B. Calcutta, 1872. Pp. 50.

Guinea-worm embryo, than to the larval stage of the *Trichina spiralis*. Though much smaller than either, especially in breadth, Dr. Lewis is perfectly satisfied that they can exist in man without fatal issue for a period of more than two years and a half, and there is no evidence that they have any tendency to develop beyond a certain stage. Many interesting questions arise in relation to this subject, especially in regard to the disease with which the hæmatozoon has been found to be so frequently associated. The kidneys in chyluria, especially near the apices of the pyramids, have been found to present a smooth, tallowy appearance, suggestive of amyloid disease, though the surface does not present any reaction with iodine, and the minute blood-vessels seem to have become plugged. The filaria are crowded in every part of the organ. The urine contains much fatty and fibrino-albuminous material, with perhaps a diminution of urea, but no casts. It is of low specific gravity, 1006—1010°, and the quantity is large. The disease appears to be purely endemic in its origin, having hitherto been found only in those who have lived in the East or West Indies, some parts of Africa, Bermuda, Brazil, or the Mauritius. It would be interesting to know whether it is capable of being transmitted from the mother to the child in utero; the only case in which an opportunity for ascertaining this occurred to Dr. Lewis, was frustrated by the positive refusal of the mother to allow any blood to be drawn from her child.

Martin on Microscopic Mounting.¹—Mr. Martin states in the preface to his work that it is intended for the use of students and lovers of the science of microscopy, and as we constitute one of these latter, we opened it with some interest.

Mr. Martin commences by giving a list of the various instruments and apparatus that are likely to be required, which is fairly complete, and he observes that a very good microscope, sufficient for all the purposes of a beginner, may be obtained for £5. Detailed descriptions, with drawings, are given of section-cutters, turntable, holding-screw, finder, apparatus for drying slides, bleaching apparatus, compressorium, &c. We miss, however, any account of the construction of Strickers' warmed stage, and there is only a very short and imperfect one of those cells by means of which a current of electricity can be applied to the contained object; important omissions, since without the former the movements of many of the simple forms of animal life, as the whole group of the Protozoa, and those of the white corpuscles of the blood, may be entirely overlooked, or at least noticed only after protracted observation, and then only very indifferently; whilst the action of the latter is in many instances full

¹ *A Manual of Microscopic Mounting, with Notes on the Collection and Examination of Objects.* By JOHN H. MARTIN. London, 1872.

of interest, and supplies an important addition to the usual micro-chemical reagents.

The second chapter includes an account of the dry method of preparation of various microscopical structures. Twenty-four objects are given, and of these we shall select one, to give our readers an example of the mode in which Mr. Martin writes.

“*Wing of cabbage butterfly* (Pieris rapæ).—It is easy to catch one of these insects, as they are very common. After it is caught kill it by piercing the thorax, and if necessary apply one drop of nitric acid with the needle; one wing must then be cut off and placed under one of the wine glasses to protect it from dust, and also the chance of being blown away. Then take one of the rough edge slips and polish it, and if there is any difficulty in removing the dirt, use a strong solution of caustic soda or potass, but if either of these are used the glass must be washed in cold water to remove all traces of them. Then polish with an old silk handkerchief or wash-leather—silk is preferable; then take one of the pieces of thin glass one and a half inch by three quarters of an inch, clean with the silk handkerchief, with less pressure of the fingers, as the glass is very brittle. If any great difficulty is found in cleaning this glass without breaking it, use rubbers made thin; take two pill boxes, and cement wash leather to the bottom of each, fill the boxes with plaster of Paris to give them weight, then put the lids on, and give them a coating of sealing-wax varnish to make them look neat. When dry and ready for use place the piece of thin glass between the wash leather sides, and gently rub them together. By this plan it will be thoroughly cleansed without the risk of breakage. When perfectly clean draw a thin layer of gold size all round the piece of thin glass, on which place four narrow slips of paper. Let these dry; then place another thin layer of gold size over the paper-slips, and whilst this is drying measure the width of the wing of the butterfly; if too wide cut a small piece from each side, so as to make it about one fourth of an inch less in width than the piece of thin glass; then place it in the centre of the glass-slip, but previously rub a few of the scales off, so as to make it semi-transparent. This is necessary to show the arrangement of the scales. The exact centre of glass-slips is best taken as follows:—Draw lines on a piece of thick cardboard the exact size of a glass-slip, viz. three inches by one inch, then from each corner rule a line to the opposite corner, so that both lines may cross in the centre. This will give an exact centre for all slips. Always centre a quantity of slips at one time, by placing them over this guide, and with a pen depositing one small drop of ink in the exact centre. Now we will take the thin glass and place it over the wing, and taking the soldering-rod which has been previously made hot, either by a fire, spirit-lamp, or gas, gently touch the edge of the thin glass all round, which will cause the gold size to flow, and if well done make an hermetically sealed cell. When thoroughly dry, which will be in about two or three days, another slight coat of varnish must be put all round the edge of

the cover, but this time it is better to use the sealing-wax varnish. The slide must then be put aside for a day before it is covered with the ornamental paper covers, if these are used, if not, another thin layer of sealing-wax varnish, or what is much better, Berlin black, may be applied, and the name and date written on a small paper label, or the glass itself may be written upon with the writing diamond. It is always well to put the date of the day when mounted, as this is often a great guide in fluid and other preparations, as to the properties and quality of the various cements, fluids, &c., used in their preservation."

The third chapter deals with the mode of preparation by the Canada balsam and the Dammar processes. Amongst the objects to be thus mounted he recommends the palate of the whelk, crystals of chlorate of potash, raphides in onion, potato starch, siliceous cuticle of equisetum, fibres of wool and cotton, spiracle of water-beetle, bramble-brand, sporangia of *Pteris* and *Foraminifera* from chalk; directions being given in each instance as to the special modifications required.

In the fourth chapter the preparation of objects by the fluid and semifluid media is described. This includes an account of objects capable of being put up in glycerine and silicate of potash, castor oil, &c. The fifth chapter is supplementary to the foregoing, a brief description of the method of injection is given, but far too short.

The subsequent chapters are occupied with an account of the collection and rough preservation of specimens, with notes on the classification of objects, and the methods of examination of organic and inorganic substances, with tests for adulteration; and there is an appendix containing various useful receipts, as those for Millon's, Schultze's, and E. Schulze's staining and injecting fluids, and various minor points.

We have looked through the book in vain for any account of the method of imbedding, which is now not only very extensively practised, but without the adoption of which it is absolutely impossible to examine very soft and delicate objects; such examination, for example, as is required to trace the early stages of development of the egg. There is no allusion to M. Luy's method of decolorising fine sections which have been hardened in chromic acid, or of the means by which each section can be rendered transparent. We find no notice of Müller's or of Goadby's solutions, both of which are admirably adapted for certain objects. The engravings, again, are very badly done, and give the impression of having been executed by Mr. Martin himself. If he is intent upon adopting this plan, we would recommend him to try his hand at graphotype, from which much better results might be obtained. On the whole we regard Mr. Martin's book as one of those which will benefit immensely by a second edition.

Cappie on Causation of Sleep.¹—The opinions that have been advanced in respect to the cause and nature of sleep have been singularly discrepant, and some of them, it may also be said, have been singularly absurd. Even so late a writer as Richerand explains sleep in the following remarkable terms:—“The causes of excitation to which our organs are exposed during waking tend to increase progressively their action; the pulsations of the heart, for instance, are much more frequent in the evening than in the morning, and this motion gradually accelerated would be soon carried to a degree of activity incompatible with the continuance of life, did not sleep daily temper this energy, and bring it down to its due measure.” The facts are exactly the opposite, all evidence showing that the respirations and pulse are less frequent at night than in the morning. Carmichael, again, conceived that sleep was essentially connected with the process of assimilation, and particularly with the deposition of new matter in the brain; and, speaking generally, the earlier physiologists were of opinion that sleep depends upon the exhaustion of the animal spirits or nervous fluid, the existence of which last was very generally accepted.

The view, however, which most modern physiologists would be inclined to admit as founded on reason is that sleep is dependent on an alteration in the balance of the circulation; though some would probably agree with Haller and Hartley in thinking that there is an accumulation of blood or other fluids in the vessels of the head pressing upon the delicate structure of the brain, and impairing its function, whilst others would be more disposed to admit, with Blumenbach, that there is an impeded or diminished flow of blood to the brain. They who hold the former view would point to the comatose state into which those fall who have suffered from injuries occasioning a depression of the skull or an effusion of blood upon its surface; or those who from any other circumstance experience pressure of the cerebral substance. The holders of the latter view, on the other hand, might point to the state of exhaustion and sleep occasioned by loss of blood. Dr. Cappie thoroughly espouses the former view, and his opinions may be gathered from the following extract, of which the rest of the essay is but an expansion.

“In the first place proof can be afforded that if the surface of the brain be subjected to pressure the consciousness is so suspended that some of the more characteristic phenomena of sleep are produced. In the second place, we may find a (hypothetical) source of pressure in the venous vessels which, large and tortuous, are spread over the whole surface of the brain. These simply require to be even more distended with blood, in order to act as compressing agents. Then, to show how this possible source of pressure can be

¹ *The Causation of Sleep.* A Physiological Essay. By JAMES CAPPIE, M.D. Edinburgh, 1872. Pp. 76.

brought into play, I shall have to consider some special circumstances in the physiology of the brain. Unless the latter is to afford an exception to a very general rule, it is to be assumed that during functional activity—that is, during the period of wakefulness—its capillary circulation must be most active, and the expansive tendency of the organ, as a whole, must be at the greatest. The veins, therefore, must have their calibre reduced to a minimum. But in accordance with another general law, the nutritive energies must, by-and-by, begin to flag. As this occurs so must the forces which keep up an active state of the circulation become languid. In other organs this state is accompanied by collapse or contraction. As the skull is rigid, and as its cavity must be constantly full, any collapse of the brain must be accompanied either by an accumulation of cerebro-spinal fluid in and around it, or by an increased proportion of blood in the veins. I shall endeavour to show how the intra-cranial mechanism is peculiarly adapted to favour the latter occurrence. The pressure of the atmosphere is here directed, not, as in other parts of the body, on the external surface of the vessels, but on their internal surface. Its tendency is to retain the blood within the cranium. The movement of that fluid in the veins of the pia mater goes on, therefore, under opposing physical forces. There is a forward impulse of more blood, caused by the action of the heart and the capillary forces; opposed to this is the weight of our atmosphere transmitted through the sinuses of the dura mater; and, as an intermediate resisting force, there is the support on the external vessels afforded by the structures of the brain. The atmospheric pressure is a tolerably constant quantity; the support outside the vessels is a varying one. To find what will be the result we have only to apply the law of greatest effect being produced in the direction of least resistance. We have seen that in certain circumstances the capillary forces within the brain become weakened. Simultaneously, and as the result of this, the support to the surface veins is relaxed. When the support is relaxed, the atmospheric pressure must bear with greater effect, and distend the veins. Lastly, if distension occurs in the veins, the grey matter is subjected to an altered form of pressure, it is less from within and more from without. This takes us back to the proposition with which we started. Such pressure from without is incompatible with the contained activity of function—psychical phenomena must, for the time, cease to be manifested—sleep is induced.”;

In other words, Dr. Cappie attributes sleep to pressure on the brain, consequent upon engorgement of the veins of the pia mater. He has not adduced what is certainly a strong argument in his favour, the drowsiness, amounting ultimately to real coma, that results from exposure to cold, and which, there can be little doubt, is associated with venous congestion of the cerebral vessels. Still we are not disposed to set aside so completely as he does Mr. Durham's theory. Why may not the two conditions, diminished arterial

supply and increased venous congestion, as they certainly coexist, be cooperative in inducing sleep?

Dr. Cappie's remarks on Keller's experiments, and upon the strictures of Dr. Burrows respecting them, are well worth reading. We have always thought Keller was right in the main, and that Dr. Burrow's observations so far from controverting have really supported them.

Paton on Sounds of Heart.¹—The views advanced in this work are based, the author tells us, on a series of carefully conducted experiments on turtles, performed for several successive summers in Canada, where every opportunity was afforded of listening to the sounds of the heart, and determining the manner in which they are produced.

The views themselves are in startling opposition to those which are generally accepted, as will sufficiently appear from the following passage (the italics are ours) :

“When the ventricle contracts, it sends with an impulse the wave of blood into the aorta, distending its walls, and the aorta *simultaneously* (!) contracts from its origin, shutting the valves and rendering the arch more curved as the blood is impelled along it, the ventricle being contracted when the aorta pulsates. Synchronous with the contraction of the ventricle and pulsation of the aorta, the first sound is heard, and is produced by the blood being propelled with force through the aortic foramen, and the wave that has entered the aorta *recoiling against the valves* as it is impelled onwards. Hence the sound is dull and prolonged, and heard most distinctly over the semilunar valves as they shut. Immediately after the aorta pulsates, *the auricles contract with an impulse, and as they propel the blood into the ventricle through the ventricular foramen, the second sound is heard.* It is a short, sharp sound, and appears at a greater distance than the first sound, as the auricles are here deeper seated than the arch of the distended aorta. The first sound ascends in the course of the blood from the ventricle along the aorta. But the second sound descends in the path of the blood from the auricles into the ventricle, so that it is heard in a lower position than the first sound.”

Really Dr. Paton can hardly expect us to give up all our belief with regard to the rhythm of the heart's movements and the causes of its sounds, on the faith of his experiments on turtles, however often repeated. On reading his book, our first impression was that its author was a very young M.D., who, finding himself in Canada, had determined to avail himself fully of the opportunities of vivisection at his disposal, and to make some discovery that should

¹ *Researches on the Action and Sounds of the Heart.* By GEORGE PATON, M.D. London, 1873.

place him at once at the head of all living physiologists. He had better, we thought, have put his turtles to a more legitimate use, and eaten them. But a reference to the Medical Directory seems to show that our first impression was wrong. Dr. Paton's degree appears to date from 1840, and his residence to have been in Co. Huron. On referring back to his book, we find that the authors he quotes are chiefly Dr. Hope, Mr. Carlisle, "Mr." Bouillaud, and the Dublin Committee. We are therefore driven to conclude that his knowledge of European thought on this subject dates about thirty years back, before he went to hibernate among Canadian snows; and that, having now returned to this country, he expects to take up the discussion where he left it, forgetting that we have moved on in the mean time.

We cordially welcome Dr. Paton, and congratulate him on his safe return; but we cannot wish him success in the task he has set himself, of destroying our existing physiology, and we do hope that he will not write us any more books similar to the one before us.

Crookes's Wagner's Chemical Technology.¹—This translation of a highly valued German work is a most creditable performance. The preparation of the materials employed in many arts and manufactures is clearly and succinctly described. There are eight divisions in the volume, and these respectively treat of—(i) Chemical metallurgy, alloys, and preparations derived from metals. (ii) Crude materials and products of chemical industry, acids, alkalies, chlorine, &c. (iii) Technology of glass, pottery, lime and mortar. (iv) Vegetable fibres and other products of plants. (v) Animal substances and their industrial applications. (vi) Dyeing and calico-printing. (vii) The materials and apparatus for producing artificial light. (viii) Fuel and heating apparatus. We can accord the highest commendation to this volume. We have looked into several chapters, and have invariably found the descriptions accurate, the style easy, and the information recent.

Dr. Gladstone's Faraday.²—An admirable book about a man whose life and character were as beautiful as his genius and labours were fruitful. No student of science could have set before him a fairer model than Faraday, while the picture here presented is delineated with the pen of a faithful and appreciative biographer, and yet is here and there touched with the warm tints of an admiring friend. The life-like portrait which forms the frontispiece of the book is alone worth the cost of the volume.

¹ *A Handbook of Chemical Technology.* By R. WAGNER. Translated by W. CROOKES, F.R.S. London, 1872. Pp. xxxii and 745.

² *Michael Faraday.* By Dr. GLADSTONE, F.R.S. Second Edition. Pp. 179. London, 1873.

Junior Course of Chemistry.¹—This is a most disappointing little book, through which we have searched in vain for a single characteristic commendable feature, either in plan or treatment. We refuse to accept the volume as an adequate exposition of the junior course of practical chemistry at Owen's College. It is an ungracious task to point out defects in a manual emanating from so justly celebrated a laboratory as Professor Roscoe's, but we must give our readers the grounds upon which our criticism is based. First of all, the book consists of 170 pages of text and 80 of the publisher's advertisements, while the illustrations are few and feeble. In a junior course all new and technical terms should be explained as they are introduced, but these lessons begin with an appearance of simplicity which is soon lost as we continue our reading. If the author intended it "to supplement and not to supplant" oral teaching, surely he might have made a more judicious selection of his materials. What is hard to learn and easy to forget should be recorded in the manual for reference, while those details which actual practice alone can render familiar, must be reserved for the laboratory teaching. But if this book is lacking in the characters of plainness and completeness in its account of fundamental experiments and processes, it presents a feature which we regard as distinctly objectionable. By the introduction of some of the analytical novelties in spectrum-analysis and flame reactions, an air of finish is given to the volume, but surely it is going too far to devote several pages to the reaction of beryllium, corium, didymium, vanadium, &c., and to teach the young beginner how to get beads of *indium* before the blowpipe! We are not at all satisfied with some of the analytical schemes for the separation of the metals of some of the groups, while we are sure that some of the early lessons are defective. Who, for instance, in preparing ammonia gas would proceed as described on pages 17 and 18, and as illustrated in figure 7. The whole manipulation of this gas, as here given, is inelegant to say the least, and would either fail completely, or be abruptly terminated by some disaster. We shall justify our criticism of this lesson when we mention that, during the rapid discharge of ammonia from the heated mixture of sal-ammoniac and lime, the student is directed to dismantle the apparatus and change the delivery tube, which he is next told to plunge into a beaker of water. We observe also that the woodcut shows that a Bunsen-burner, turned on to the full, should be employed in this experiment.

Basham's Aids to Diagnosis in Kidney Diseases.²—The title of this little book is somewhat too wide. A student might expect to

¹ *Junior Course of Practical Chemistry.* By Prof. ROSCOE and Dr. JONES. London, 1872. Pp. 171.

² *Aids to the Diagnosis of Diseases of the Kidneys.* By W. R. BASHAM, M.D. 1872. Pp. 48.

find something more in the way of instruction in diagnosis than the treatise affords. The fact is, it is almost wholly occupied with depicting the objects found in the urinary sediment in cases of albuminuria, in a series of figures drawn under the microscope; one plate, indeed, is devoted to the representation of adventitious objects, and in other plates are to be found figures of many crystalline deposits as well as of blood and pus corpuscles. But the figures are not by any means exhaustive of the numerous forms of deposits to be found in urine in renal disorders.

So far as they go, however, the representations admirably and accurately convey the microscopic appearances encountered in the various kinds of albuminous urine, and will greatly aid the student and practitioner in rightly interpreting and appreciating the character of the kidney lesion he has under notice.

The plates, as the author states, afford examples of all the most typical objects found in albuminous urine, and they are accompanied by "a short, succinct account of the patient from whom the urine came, the general character of the symptoms, their duration, and, in all cases where it could be ascertained, the termination in death or recovery."

The plates are ten in number and in each are six figures. The drawing is very painstaking and expressive of the appearances met with. The letter-press notes of the objects figured are at times too brief. There is, however, no question as to the value of the book to microscopic explorers of urinary deposits in quest of the precise nature of the renal lesion associated therewith.

Creuznach Waters in Women's Diseases.¹—This is, confessedly, a brochure setting forth the virtues of Creuznach waters in the remedial treatment of the diseases of women. The book is divided into nine chapters treating respectively on catarrh of the uterus, chronic ovaritis, ovarian tumours, chronic inflammation of the womb, hypertrophy of the womb, abnormal positions, tumours, menstrual disturbances, and nervous affections. The scheme of the work is slight, but the statements propounded are in the main accurate. The author appears to think Creuznach particularly beneficial to persons of a scrofulous temperament who may happen to be the subject of uterine catarrh a supposition which is probably well founded. In the chapter on chronic ovaritis the use of compresses soaked in brine and mineral water are extolled. An eczematous eruption is said to be caused by them and this may perhaps act beneficially as a counter-irritant. Still, we are of opinion that compresses are too little resorted to in gynæcological, as in general medical practice in this country. The brief account of tumours of the ovary is good. Dr.

¹ *The Chronic Diseases of Women, with special regard to their Treatment in Creuznach.* By LOUIS MICHELS, M.D., &c. London, 1872.

Michels does not claim for Creuznach the power of removing these growths; he only says that it may diminish the tendency to the recurrence of inflammation and promote the absorption of surrounding exudations.

The account of chronic metritis is like most of the gynæcological work in the book drawn from Scanzoni, and for the most part the treatment recommended is that advised by this eminent professor. We must do Dr. Michels the justice to say that he does not vaunt Creuznach as a place for the cure of all female ills; he assigns it, however, a distinctive place. He has too the rare honesty to admit that while many cures are effected by the Creuznach waters there were many "in which we did not obtain such satisfactory results, without being able to say why." The complications only of uterine displacements are relieved by Creuznach; and as regards fibroid tumours, it is believed that their growth may be impeded, and pain, and hæmorrhage lessened. Menstrual disturbances depending on scrofulosis appear to be greatly benefited by Creuznach waters, which as the reader knows, are rich in iodine. The author claims Creuznach to be of great service in cases of benign tumours of the breast, especially those arising from chronic inflammation. He makes one valuable remark in connexion with these growths which is interesting in its bearing upon the local origin of cancer now insisted on by many pathologists, viz. :—"It is certainly advisable to proceed at an early period against these often insignificant affections as according to modern views malignant tumours may be developed out of them." Neuroses originating in disease of the sexual organs are said to be considerably benefited by Creuznach. We are glad in conclusion to say that the work is not written in a quackish spirit for the exaltation of the author and Creuznach; on the contrary it is written for the profession, and if not elaborate it is at least honest and trustworthy.

Obstetrical Transactions.¹—Were anything required in the present day to prove the rapid strides accomplished in the obstetrical department of our profession, or the high qualifications and acquirements of those who are prominently engaged in the pursuit of it, the valuable papers published in the volumes at the head of these observations would afford most ample testimony. For a very long period the practice of midwifery was thought to be low in the scale of professional standing, and its hard-worked professors were esteemed unworthy of an equality with physicians and surgeons properly so-called. As far back as early in the 17th century this state of things was complained of by Chamberlen, who says, "Fame begot me envy

¹ 1. *Transactions of the Obstetrical Society of London.* Vols. xiii and xiv, for the years 1871 and 1872.

2. *The Transactions of the Edinburgh Obstetrical Society.* Sessions 1869, 1870, 1871. Edinburgh.

and secret enemies, which mightily increased when my father added to me the knowledge of deliveries and cases of women. They cunningly allow me a transcendancy in the particular of deliveries that they may the more securely deny me my due in physic, as if the one were privitive or destructive of the other." Yet this Chamberlen "graduated as doctor of medicine at Padua, Oxford and Cambridge; became a Fellow of the College of Physicians in 1628, and was Physician-in-ordinary to three Kings and Queens of England and to some foreign Princes." So even in our own day, we have known physicians depreciated by their professional brethren on account of their combining the practice of midwifery with that of medicine, notwithstanding their perfect competency in both departments, and an equality in education and professional learning. But now circumstances are changed, and obstetrical societies take their proper stand amongst the other learned societies of the kingdom. It would be difficult to single out from the numerous papers contained in the volumes of transactions before us any requiring very special notice, for there is scarcely one amongst them that will not be found deserving of careful and attentive perusal. We therefore simply recommend those who are interested in the subject of which they treat to study them. The last volume of the London Obstetrical Society's 'Transactions' fully maintains the high character of its predecessors, and is especially interesting on account of an elaborate paper on the 'Anatomy of the Human Placenta,' by Dr. J. Braxton Hicks.

Aveling, Fly Smith and Field on Midwives and Midwifery.¹—During the past year there has been a scarcity of obstetric literature, but the three small works whose titles we have given above deserve to be briefly noticed. The first, by Dr. Aveling, is interesting inasmuch as it relates in a very readable and concise form a good deal of the history and qualifications of midwives from the 16th century to the present; and his object in publishing it, as stated in the preface, is "to arouse an interest in the midwives of this country, to shew what misery may result from their ignorance, and to gain sympathy, advice, and assistance in endeavouring to raise them to a more refined and intellectual position." It is truly lamentable to contemplate the effect of the ignorance and mismanagement displayed by midwives, not only in early times, but even in our own days, and every attempt to render them more fit for the performance of their duties must be deemed praiseworthy and deserving of encouragement. Dr. Aveling shews us by examples in former times how difficult it

¹ 1. *English Midwives, their History and Prospects.* By J. H. AVELING, M.D. London, 1872.

2. *The Handbook for Midwives.* By HENRY FLY SMITH, B.A., M.B. Oxon. London, 1872.

3. *Hints for Obstetric Clerks, with Aids for Diagnosis.* By ALBERT F. FIELD. London, 1872.

always has been, as it now is, to institute any effectual and comprehensive plan for improving the knowledge and status of midwives; but we hope the steps recently taken by the Obstetrical Society of London in offering examinations will in some degree at least accomplish this desirable object. It occurs to us that an appeal might be profitably made to the ladies of England to constitute themselves the promoters of a change so beneficial to their own sex. For this purpose they might combine in different localities and contribute funds sufficient to command the services of a competent accoucheur in every large town, who should impart to women desirous of engaging in the practice of midwifery such instruction as would fit them for all the ordinary duties of their calling. There is a wide field open for the employment of intelligent and properly educated women as midwives, although from the nature of things there must be a limit to the extent to which their services are applicable, it being next to impossible to give them such an education as would render them competent to meet all the difficulties and responsibilities connected with the art of midwifery. Nevertheless they might by such a plan be made very useful in their proper sphere; and surely such an appeal would be heartily responded to by the hearts and hands of the philanthropic ladies of our land.

Dr. H. Fly Smith's 'Handbook for Midwives' is a good little manual for the use of students of midwifery whether male or female, although probably too abstruse for the comprehension of those who have not had the advantage of a general medical education. It is an attempt in the right direction, and much useful practical information may be obtained by an attentive perusal of the work. For midwives, greater simplicity and less minuteness of detail might be desirable.

Mr. Field's 'Hints for Obstetric Clerks' is a very useful publication, very portable, and well adapted to assist the student in the study of midwifery after he has acquired some knowledge of the general principles of medicine; for which purpose the author designed it and we give it our recommendation.

Belcher on Miracles of Healing.¹—The name of the writer of this interesting little book is already known to many of our readers (especially on the other side of St. George's Channel), and some may be inclined to regret the loss of him from the ranks of our profession, a circumstance intimated in the title page, and mentioned also in a most gratifying paragraph of a short preface by Archbishop Trench.

¹ *Our Lord's Miracles of Healing considered in Relation to some Modern Objections and to Medical Science.* By T. W. BELCHER, M.D., M.A., Master in Surgery, Trinity College, Dublin; Fellow, and sometime Censor, Examiner, and Chief Librarian, Royal College of Physicians of Ireland; Curate in Charge of the Mission Church and District of Saint Faith, Stoke Newington. Oxford and London, 1872.

“I will not refuse myself” (says the Archbishop) “the pleasure of adding that the writer was for some years honorably known to me in the diocese of Dublin as doing, at such times as he could rescue from other engagements, the work of an earnest layman in the Church; until, being drawn still more closely to the Church’s work, he was content to relinquish high professional prospects, and to exchange a ministry to the bodies of men for the harder, but more excellent, ministry to their souls.” To this valuable testimony to Dr. Belcher’s worth we have only to add our belief that he will find his medical knowledge and skill far from useless in his new sphere, and our best wishes that he may never regret the change that he has made.

With respect to the little work before us we will at once say that we can honestly recommend it to our readers as one of the most valuable treatises on our Lord’s miracles of healing that we have met with, even though on some points, about which there may fairly be a difference of opinion, we should not be inclined to come to the same conclusion as Dr. Belcher, or should at any rate not express it in the same positive terms. And having thus expressed our general opinion of the worth of the book, we will proceed to mention some particulars in which we think it may be improved when it reaches a second edition. The chief fault that we have noticed is a want of the “severe accuracy” mentioned by Archbishop Trench, which shows itself sometimes in loose and exaggerated statements, sometimes in vague and insufficient references, and once or twice in positive misquotations. If Dr. Belcher will carefully revise the book with reference to these points, he will make it more worthy of the great subject which he has undertaken to treat. We will briefly give some instances of the faults we have mentioned.

He asks (p. 41)—

“Is it not perfectly true that even to the most superficial observer who walks our hospitals or visits the sick in high or low station, sin, in nine cases out of ten, is the plain cause of disease, and of disease resulting from our own evil tempers or unbridled passions, or from the sins of our forefathers? What a fearful proof of this does not ‘family history,’ in recording a hospital case, supply! Were drunkenness and unchastity unknown, would not the professions of medicine and surgery be almost unnecessary?”

This we consider to be a palpable exaggeration, which weakens instead of increasing the force of the undoubted truth contained in the sentence.

Again, Freind, in his ‘History of Physic’ (part i, p. 222), says that “St. Luke in his profession as a physician, and no doubt merely because he was one, when there is occasion to speak of distempers or the cure of them, makes use of words more proper for the subject than others do.” This is cautiously stated, and Freind refers to

several passages in St. Luke's Gospel which may probably be considered sufficient to justify the statement. But Dr. Belcher goes further, and says that "St. Luke largely uses the technical language of a physician" (p. 167); and argues that "we should have had plausible reason for doubting his testimony, had he not used technical language with as much frequency as might reasonably be expected of a medical evangelist" (pp. 16—33). On these passages we should remark, first, that we should not expect a medical historian¹ or philosopher to use technical terms without necessity, when writing for non-professional persons; and secondly, that, as matter of fact, we do not consider that St. Luke does "largely use the technical language of a physician." Dr. Belcher considers that the epithet *μεγάλω* is used in a technical sense, when applied to *πυρετώ* (St. Luke, iv, 38), and refers to "Galen² de Different. Febr. i," where the expression *τὸν μέγαν τε καὶ μικρὸν πυρετὸν* occurs. He also goes on to say that "we know quite well what was 'the great fever' of St. Luke and of the Greek medical classics," which he considers to be "substantially the same with typhus of our own time" (p. 21). We will not venture to say positively that Dr. Belcher is wrong in all this, but we may at any rate suggest that some additional evidence is required in order to prove that he is right; for we do not find in this passage of Galen any description of the fever in question, and Dr. Belcher has not referred to any other passage where the phrases *μέγας πυρετός* and *μικρὸς πυρετός* occur.

We doubt also whether his distinction between *παραλυτικός* and *παραλελυμένος* is quite correct (pp. 50, &c.); he is certainly wrong in saying³ that "in the authoritative medical literature of his day the term paralysis [*παράλυσις*] nowhere occurs" (p. 52).⁴ Neither

¹ We have referred to 'Smollett's History,' and find that his account of the deaths of William III, Prince George of Denmark, Queen Anne, George I, and George II, is very much the same as would have been given by any non-medical writer; for instance, he speaks of the "*collar-bone*," not the *clavicle*; when he uses the word "*thorax*," he adds "*or chest*" by way of explanation; and when he mentions, in the case of George II, "the pericardium," he calls it "the *surrounding* pericardium," which would have been unnecessary in a professional description of that king's remarkable death.

² This is an instance of an insufficient reference, especially considering that Galen's works occupy more than twenty octavo volumes. The passage occurs in tom. vii, p. 275. It is probable that those writers and commentators on St. Luke who have made use of this illustration have done so on the authority of Wetstein; and accordingly they give Wetstein's exact reference, but they do not all (like Alford) give him the credit of the quotation.

³ He quotes Freind as the authority for this assertion, but this is an instance of his misquotation, for Freind says that *παραλυτικός*, not *παράλυσις*, is "a word never used by the ancient Greek writers" ('Hist. of Physick,' part i, p. 222).

⁴ On this page he misspells *Aëtius*, calls Celsus "physician to the Roman Emperor Augustus," and seems to imagine that *Alexander* and *Trallianus* are two different persons.

does he appear to us to have any sufficient ground for determining positively that the paralytic man (St. Luke, v, 18, &c.) was affected by "hemiplegia" rather than paraplegia, or some other kind of paralysis. It may add to the pictorial effect of the narrative to enter into details of this sort, but they are (as appears to us) equally unauthorised and unnecessary, and in the case before us Dr. Belcher has surely stated quite enough when he says plainly and simply "The man was totally helpless" (p. 41).

In the case of the healing of a lunatic child, when he says that "St. Luke's description is even more technical than St. Mark's," simply because "he mentions the cry, *he crieth out*," Dr. Belcher seems to have overlooked the fact that neither of the evangelists relates the history of the case in his own language, but each merely repeats the account given to our Lord by the child's father (p. 129).

Into several interesting matters discussed at some length in Dr. Belcher's volume this is, perhaps, hardly the place to enter fully, and therefore we prefer to leave them altogether untouched, merely stating that, while we should ourselves have no difficulty in receiving as miraculous all the cases enumerated in his book, we think it quite possible that by those persons who reject miracles altogether some of them might be plausibly explained on natural grounds. We think also that in any account of the "possessed with devils," *δαιμονιζόμενοι*, and "lunatic," *σεληνιαζόμενοι*, it ought to be distinctly mentioned that both *δαίμων* and *σεληνιασμός* were popular names for *epilepsy*,¹ so that we might ask for some proof to be adduced in support of the assertion that the *σεληνιαζόμενοι* were "persons whose peculiar malady was chiefly mental" (p. 15).

Dr. Belcher some years ago paid much attention to the subject of the leprosy of the Hebrews,² and therefore he has a good right to state his opinion on the various obscure points connected with it. He has not added much to what was already known, but this was not, perhaps, to be expected, and we are certainly surprised that any competent person who has studied the matter should appear to find it so free from difficulties as to say that "the text of Levit. xiii is simple in meaning" (p. 89), and that "the most minute investigation on medical grounds tends to confirm the Mosaic account of this disease" (p. 104), by which we suppose he means to imply that it is easily and certainly identified with some similar disease described in ancient and mediæval writers. On this point, as on several others, we cannot but think that Dr. Belcher pronounces too dogmatically, and hardly makes sufficient allowance for what may be urged on the other side of the question. For our own part we freely confess that

¹ See Leo, "Conspect. Medic.," in Ermerins, 'Anecd. Med. Gr.,' p. 115.

² See various articles by him in the 'Dublin Quarterly Journal of Medical Science,' between 1864 and 1868.

the whole subject of leprosy, from the time of Moses down to the present day, appears to be so teeming with obscurities that we have never been able to come to any positive conclusion on the several points in dispute, and therefore should be unwilling to say whether Dr. Belcher is right or wrong in his views of the nature of the disease.

There are several other passages which we had marked for special notice, but it is an ungracious task to point out the blemishes in a book which is written in so excellent a spirit, and contains so much valuable and interesting matter. What we have said above will be sufficient to justify us in advising the author to give his book the benefit of a careful revision, which, while it is certainly deserved, is no less certainly required.

Thermic Fever or Sunstroke.¹—Dr. H. C. Wood believes that under the name of sunstroke, or *coup de soleil*, sudden cases of severe illness of very different characters have been described; but he thinks that such cases as are really dependent upon exposure to excessive heat may be classed under two or perhaps three heads, namely, acute meningitis or phrenitis (which, however, he thinks is very rare from direct exposure to the sun), heat—exhaustion, and thermic fever or true sunstroke. Hence, then, there are really only two forms, one of simple exhaustion, due to excessive labour in a heated atmosphere, and which does not differ in its pathology or symptoms from other forms of acute exhaustion, and the other is a disease *sui generis*, well marked and distinct in its clinical history and anatomical lesions.

Thermic fever, or sunstroke, thus limited in its meaning, is caused, according to Dr. Wood, by heat, solar or artificial; solar heat is not absolutely necessary, for one of the author's cases originated in a sugar refinery, and many cases in India have been reported where the patients have been seized during the night after they had gone to bed. The chief symptoms consist of total insensibility, laboured and sometimes stertorous breathing, hot skin, elevated temperature (from 108° to 109° F.), rapid pulse, becoming afterwards irregular, intermittent and thready; and the important characteristic may be summed up as intense fever with profound disturbance both of the cephalic and spinal nervous system. In the post-mortem examinations of those patients who died, the heart was found rigidly contracted, and, although this result is at variance with the reports of other observers, Dr. Wood accounts for the discrepancy by reference to the fact that other autopsies have been made many hours after death, when probably commencing decomposition may have relaxed the muscular rigidity.

¹ *Thermic Fever, or Sunstroke.* By H. C. WOOD, jun., M.D., Physician to the Philadelphia Hospital. Boylston Prize Essay. Pp. 128. Philadelphia, 1872.

With reference to the *nature* of the disease, Dr. Wood considers that it is a fever, not depending upon blood-poisoning, but upon heat. He adduces a number of experiments he has made upon the lower animals to show the effects of high temperature on the muscles and nerves, and he also alludes to the experiments and reasonings of many distinguished physiologists. It is impossible, in a short abstract, to follow Dr. Wood through his reasonings, but his conclusion is, after discussing all the theories which have been invented to account for muscular contractility, that "thermic and post-mortem rigidity are alike due to the coagulation of a plasma in the muscles." The *plasma* in question is *myosin*, and the coagulation of this substance, causing excessive rigidity of the heart, is a very pathognomonic lesion in sunstroke, although in most cases it is a post-mortem rather than an ante-mortem phenomenon, occurring directly after death. But in certain cases death is probably due to a sudden ante-mortem coagulation of the cardiac myosin and consequent instantaneous arrest of the heart's action. The muscles after death from heat-fever very soon become rigid, they sometimes do so instantly, and such rigidity is of the same nature as ordinary post-mortem rigidity. Again, however, there is another factor in sunstroke, namely, paralysis of the vaso-motor nerves.

The remedial treatment, as founded on Dr. Wood's views of the pathology of the disease, is to be directed to the abstraction of heat, an excess of which is the *materies morbi*; the patient should therefore be taken to or kept in a cool place, and cold affusions should be practised on the chest and body, and if there be any tendency to fresh rise of temperature it should be obviated by wrapping in wet sheets, or by even more powerful means of cooling the system.

A Treatise on Gout, Rheumatism, and Rheumatic Gout.¹—Dr. Meldon, in his preface, states that a sincere desire to add to the pathology and treatment of gout and rheumatism has induced him to lay his views before the profession; he also tells us that he has given, in this work, what he believes to be the true explanation of the phenomena witnessed in both these diseases, and he thinks he has supplied proofs that every case of both gout and rheumatism, where the vital organs remain undiseased, is curable, no matter in what stage the patient comes under treatment.

The execution of the work, however, scarcely fulfils the promises which appear to be held out in these preliminary announcements. If the book is intended for the profession, it must at once be stated that it is deficient in logical proof and in scientific accuracy;

¹ *A Treatise on Gout, Rheumatism, and Rheumatic Gout.* By AUSTIN MELDON, L.K.Q.C.P. and L.R.C.S.I., Surgeon to Jervis Street, Hospital, Dublin, &c. Pp. 46. London, 1872.

assertion is generally substituted for argument, and anything like an analysis of cases or of the results of treatment is ignored. If, on the contrary, it is intended for the public, then it may, perhaps, serve its purpose, for there is an abundance of dogmatic statement, and, on the principle of *omne ignotum pro magnifico*, there is a plentiful array of quasi-scientific information, and a whole catalogue of medicinal agents, or those supposed to be such, is displayed before the eye of the reader for his choice. Supposing it to be intended for the public, too, it is not a bad idea to assert that every case of uncomplicated gout is curable (of course according to scientific principles of treatment), while in the Introduction the reader is told that "about six thousand persons have died directly from gout within the last twenty years, and ten times that number would not include all those whose death is due indirectly to that affection." (p. 10). The corollary necessarily is that these sixty thousand or more deaths might have been prevented if the gout had been properly treated.

Dr. Meldon's theory of the nature of gout is, that it "undoubtedly" consists of the presence in the blood of uric acid and soda in some form (*sic*); and that the nerve-force, which in the healthy state preserves these two substances in the fluid state, allows them, when this nerve-force is lessened or removed, to unite and crystallize as urate of soda. Dr. Meldon's proofs of this theory, however, are exceedingly weak, although he states that gout is brought on generally by great nervous depression, and that "Columbus never suffered from the disease until disappointment and the ingratitude he met with depressed his whole nervous system." The disease, too, argues Dr. Meldon, generally commences at night, when both nerve-force and circulation are weakest, and the part most usually attacked is the great toe, both these facts, as he urges, favouring his theory; and the action of colchicum furnishes one more "proof," for this drug is a "nervous stimulant," as any one may convince himself who chooses to make the experiment. Dr. Meldon has repeatedly, when in perfect health, taken, fasting, doses of ten to fifteen minims of tincture of colchicum, and he has found that the effects were nausea and increased action of all the organs, his skin became moist, the secretions of the kidneys and liver were increased, and his mental faculties were invigorated. He has on some occasions experienced severe palpitation consequent on the use of colchicum. *Therefore*, we presume, colchicum is a nervous stimulant; and *therefore*, as the cause of gout is the union of uric acid and soda, colchicum is the cure for gout, because depression promotes that union and stimulation opposes it. If this is not Dr. Meldon's reasoning, we have failed to discover any other in his pages on gout.

The diminution in the nervous force, according to Dr. Meldon,

which allows the union of uric acid and soda, is the cause of gout, and depression of the nervous system is also the cause of rheumatism, and the only difference is this, namely, that in the latter case the nervous depression causes or allows the crystallization of lactic acid, "or some other chemical change (?) in its composition, which converts that which was previously a harmless constituent of the blood into an agent of irritation to almost every part of the body, producing fever, pain, and copious sweating." (p. 98).

But "chronic rheumatic arthritis," or rheumatic gout, has a different cause, for this disease is caused, according to Dr. Meldon, by an undue accumulation in the blood of salts of lime, while this vital fluid (*i. e.* the blood) is in other respects much impoverished. In this disease there is also a certain amount of nervous depression, "the balance between secretion and absorption of synovial fluid is lost, the tissues about, especially the bones, *being abundantly supplied with salts of lime*, become enlarged, thickened and stiff, and the cartilages, deprived of their proper nourishment and constantly irritated by the chalky fluid, *gradually disappear*" (p. 131). We present this passage as it stands, and confess our inability to comprehend its meaning. There is surely nothing extraordinary in the bones being abundantly supplied with the salts of lime, but we cannot conceive how the cartilages gradually disappear, even although they are constantly irritated by the chalky fluid (?). However, Dr. Meldon is quite satisfied that the causes of chronic rheumatic arthritis are the existence in the blood of abnormal quantities of the salts of lime, "or the essentials for making such," together with a certain amount of general debility. Hence, he says (though we confess we do not see the force of the reasoning), everything which can arrest the excretion from the different organs of elimination or tend to impoverish the blood will act as causes of rheumatic arthritis. He gives no proof whatever that abnormal quantities of the salts of lime have anything to do with the pathology of the disease, except the remark that "it is not unfrequent in those who have lost much blood, or who have been reduced by lengthened lactation or such like causes."

Having thus given, as far as we are able, our author's views as to the pathology of gout, rheumatism, and chronic rheumatic arthritis, we think we have sufficiently indicated the character of the volume, and it is needless to follow him through his other observations. Although his pathological notions are certainly peculiar, and indeed original, there is nothing very novel as to his treatment, which mainly consists in the use of colchicum (the efficacy of which is due, he says, to its being a nervous stimulant), opium, and aperients, the regulation of the diet, and occasionally bloodletting. A whole host of remedies, however, no fewer than fifty in number, are stated to have been used "with benefit" in chronic rheumatism, but no

attempt is made to indicate the respective value of any of them. Iodide of potassium and colchicum are jumbled indiscriminately with sassafras, horseradish, hermodactylus (?), terchloride of gold, tartar emetic, sanguinaria, &c.; mezereon appears twice in the same list, once as mezereon and once as daphne mezereon, horseradish appears as armoracia as well as under its English name, and codeia stands alone as the representative of the opium preparations.

A Year-Book of Therapeutics, &c.¹—This is a goodly volume, comprising a great amount of information, collected from various sources, American, Indian, and European, on the subjects of therapeutics, materia medica, and toxicology; it also contains a number of prescriptions and formulæ, and several general receipts, and there is a copious index of the contents.

Burman on Conia.²—Starting upon the opinion entertained by Dr. J. Harley and Dr. Neligan that the preparations of conium in the 'British Pharmacopœia' are all inert except the *succus*, which Dr. Burman states has been used successfully in some cases of mania, the writer of this pamphlet has made a series of investigations on the properties and therapeutical uses of conia, the alkaloid of the drug, which is a more stable substance than the plant itself. Conia is a fluid, which may be procured in a colourless state, looking like water, but having a strong alkaline reaction and a strong peculiar odour. It unites with acids, and Dr. Burman has found that the formula most convenient for the purpose of subcutaneous injection is a combination of conia with strong acetic acid in rectified spirit and distilled water. He has made a series of experiments on the lower animals with this injection, and in order to test its physiological action he has injected himself and twenty-two other healthy adults, the doses varying from one twelfth of a grain to two and one fifth minims of conia; the results in these latter experiments being temporary uneasiness, but no permanent or serious ill effects. One important objection to the use of conia appears to be the uncertainty of its strength, and Dr. Burman states that he has been disappointed in the expectation of obtaining uniform results. His own experiments, however, have been made with a preparation the efficacy of which he tested. Among the general conclusions drawn by Dr. Burman are the following:—The alkaloid, if pure, is too powerful and too irritant to be administered internally alone, but might be given when neutralised with an acid. Conia alone may be injected

¹ *A Year-Book of Therapeutics, Pharmacy, and Allied Sciences.* Edited by HORATIO C. WOOD, jun., M.D., Physician to the Philadelphia Hospital, &c. Pp. 360. New York, 1872.

² *On Conia, and its Use in Subcutaneous Injection.* By J. WILKIE BURMAN, M.D. Pp. 40. 1872.

under the skin in large quantities without producing any result, but when neutralised with acetic or hydrochloric acid and dissolved in spirit and water, it acts very rapidly and powerfully. In this form it may be used in some cases of mania, with the effect of subduing motor excitement. Dr. Burman conceives that conia acts upon the purely motor centres, while morphia acts on the sensori-motor and ideo-motor centres, both alkaloids exerting a sedative effect, and therefore that the combination of the two alkaloids in subcutaneous injection should lead to effects directly antagonistic to the condition of maniacal excitement, and he suggests that they may be used together with great success in the treatment of cases of mania.

Ferrand's Treatise on Pharmacy.¹—The objects of this book, as explained in the preface, are to unite the different elements of which the history of each medicine is composed; to group in a small and methodical compass the origin, the composition, the physiological action, and the numerous therapeutical applications of the substances of the French *materia medica*, and to collect together the valuable information, at present scattered in special and voluminous treatises, which may be useful to the pharmacist in detecting commercial frauds, in explaining questions of hygiene, or tracing the steps of some mysterious crime. The position of the French *pharmacien*, as is well known, is rather different from that of his British *confrère*, although the latter is improving daily in his status, owing to the efforts of the Pharmaceutical Society, and the French book now before us is a very creditable specimen of the scientific attainments of a gentleman who belongs to the pharmaceutical profession, and is a laureate of the Paris hospitals.

The contents of the volume are very various, and some of them might, perhaps, be thought unnecessary for the class to whom they are addressed, as, for instance, the pages on the nature and character and the chemical and microscopical tests of the blood and the urine; but, nevertheless, even these subjects are handled in a very able manner, and the descriptions are illustrated by well-executed cuts.

The general arrangement of the subjects is alphabetical, which perhaps is the most convenient for the reader. The pharmaceutical history of each body comprises its origin and mode of production, its physical and chemical characters, and its elementary composition, and each paragraph on the action of medicines includes both their physiological properties and their therapeutical uses. In reference to this part of the subject the editor offers a kind of apology for introducing such matters into a pharmaceutical work, inasmuch as in France the *pharmaciens* are strictly forbidden to prescribe, but he defends himself on very plausible grounds, showing that the com-

¹ *Aide-Mémoire de Pharmacie, Vade-mecum du Pharmacien à l'Officine et au Laboratoire.* Par EUSÈBE FERRAND. Pp. 687. Paris, 1873.

pounders of drugs ought to know something of the action of medicines and of poisons, in order to guard against mistakes in dispensing.

This *vade mecum* is well adapted for its purpose, and must form a very valuable manual for French *pharmaciens*.

Gallard's Clinical Lectures.¹—These lectures on clinical medicine are miscellaneous in subject, and exhibit a wider conception of what falls under the head of clinical teaching than that commonly received. Thus, along with lectures on digestive derangements consequent on the abuse of alcohol, on stricture of the œsophagus, on rheumatic chorea treated by bromide of potassium, on hepatitis and hepatic abscess, M. Gallard has introduced others on the pathological anatomy of peri-uterine inflammation to abscess, and on the absence of uterus and vagina, and gone still further afield to lecture on vaccination and on the medical history of female diseases, as set forth by the authors of the Græco-Roman period, by those of the middle ages, of the renaissance, and of the present era.

These historical lectures may be both interesting and instructive, but they seem to us to partake as little of the clinical element as can well be conceived, and to be out of place in a volume of clinical lectures.

Indeed, M. Gallard would appear to have forgotten the motto with which he sets out in his first lecture, viz.—“*Tout pour la clinique et par la clinique,*” and likewise his declaration, that he accepts nought as pertaining to true progress but what can contribute to make treatment more sure, can improve our therapeutical resources, or enable us to recognise disease more readily and proportionately to deal with it more successfully.

Apart, however, from these interpolations of non-clinical matter, M. Gallard has some very good instruction to afford. His lectures on the digestive derangements consequent on the abuse of alcohol is replete with useful reflections and suggestions. That on constriction of the œsophagus is based on a case in which there was a cancerous constriction on a level with the larynx and another below the upper half of that canal, a pouch intervening between the two. Moreover a cancerous tumour of the size of a cherry existed near the pylorus on the posterior wall of the stomach and of the great curvature. His practical suggestion is to make a fistulous opening into the stomach and so maintain life.

M. Gallard accepts Dr. Budd's hypothesis of the direct relation between dysentery and hepatic abscess, and he also recognises the formation of abscesses in the biliary ducts, multiple in character, but communicating with each other, due to obstruction and subsequent inflammation, or to interstitial hepatitis following distension and rupture of the ducts. He states that abscesses having this origin are distinct from those following simple hepatitis by their multiple cha-

¹ *Leçons de Clinique Médicale.* Par T. GALLARD, Médecin de la Pitié. Paris, 1872, J. B. Baillière.

racter, the latter being, as a rule, solitary, and if multiple do not communicate the one with the other, but have an encysting wall of greater or less thickness.

The lecture on peri-uterine abscess should rather rank as a paper illustrative of a morbid specimen. Its purpose is to show that there is a portion of areolar tissue, subjacent to the peritoneum, between the vagina and rectum, which may be the seat of an abscess. This he illustrates by a specimen.

Harley on the Urine.¹—The substance of this treatise will be familiar to many of our readers, inasmuch as it is a reprint of a course of lectures delivered first of all to a class at University College, London, and subsequently published in the 'Medical Times and Gazette.'

The honorable position Dr. Harley has earned by his researches in physiological chemistry is a guarantee for the accuracy and completeness of this volume, the subject matter of which so largely belongs to that science. It is one of the fullest works on all that relates to the urine, viewed both physiologically and pathologically, that has appeared for a considerable time.

In his first two chapters he examines the qualities and composition of urine in a state of health, the influence of various external circumstances and of food on its quantity, and instructs his readers in the way of analysing it. In subsequent chapters he discusses the chemistry, physiology, and pathology of its normal and abnormal constituents, including urea, uric acid, hippuric acid, chloride of sodium, the colouring matters, phosphoric and oxalic acid, sugar, albumen, and the several less noticed matters represented by cholesterin, creatin, inosite, &c.

In treating his several subjects he, as a physician as well as chemist, keeps in view the pathological results of derangement of this or that constituent, or of the presence of an abnormal material, noting symptoms, laying down rules for treatment, and discussing various questions arising respecting the physiological and pathological signification of each.

At this period of incessant scientific research and science-guessing, it would be quite possible for a critic read up in the very latest investigations of chemists and the speculations of physiologists and physicians to discover omissions in the facts detailed and in the hypotheses put forth, as well as in the therapeutical suggestions, but the genuine medical student and the inquiring practitioner may well rest content with the ample and skilful representation of facts and doctrines relative to the urine in health and in disease, as put forward by Dr. Harley in this present treatise.

¹ *The Urine and its Derangements, with the application of Physiological Chemistry to the Diagnosis and Treatment of Constitutional as well as Local Diseases.* By GEORGE HARLEY, M.D., F.R.S., &c. London, Churchills, 1872.

We should have read the book with more pleasure had the type been larger and less closely set; and not only might the woodcuts have been multiplied with advantage, but those given would have been more pleasing and satisfactory had they been of a better sort.

The Institutes of Medicine.¹—We have but recently been favoured with a copy of this comprehensive and bulky volume by Dr. Martyn Paine, the Professor of the Institutes of Medicine and *Materia Medica* in the University of New York, adorned also by numerous honorary distinctions, an indefatigable worker and an enthusiastic advocate of the doctrines of solidism and vitalism. The work has reached a ninth edition, and its teachings may consequently be concluded to be or to have been acceptable to a large class of students, chiefly in the United States.

A critical examination of its contents would involve the discussion of all the leading doctrines of physiology, pathology and theoretical therapeutics now generally or partially recognised, and would require a volume, instead of an article in a review, to do it justice; we must therefore be content with some indication of the general character of the treatise.

The 'Institutes of Medicine' comprehend, in the author's meaning, "the natural inductions of principles and laws from the healthy and morbid phenomena of living beings. They relate to physiology, pathology and therapeutics, and to nothing else."

The "chemical school of medicine" and "chemico-vitalism" are the modern abominations the author would annihilate; with him the philosophy of life and the philosophy of chemistry are two matters bearing no affinity. "No department of medicine has anything to hope from chemistry beyond its power of analysis." Mechanical philosophy is equally divorced from medicine; Liebig is with Dr. Paine the false prophet who has gone forth to deceive the nations and to overturn the philosophy of vitalism. Experimental physiology enjoys only a little better position in "the Institutes of Medicine" than chemistry. It has brought little to light that observation of and induction from nature's own operations had not already made out, and on the other hand it has by its meddlesome proceedings developed erroneous views. Spontaneous generation can have no place in creation, chemical agencies have no connection with the transformations food undergoes in the alimentary canal, hence to seek to indicate by chemical analysis the proper sustenance of animals is a fallacy.

The study of morbid anatomy is a vanity, for in Dr. Paine's opinion—

"It has not, in any original sense, even given us a solitary clue to the pathology of disease, any more than healthy anatomy to the natural organic functions. We revert, at last, to the vital indica-

¹ *The Institutes of Medicine.* By MARTYN PAINE, M.D., &c. Ninth Edition. 1870. New York and London. Pp. 1151.

tions, or other immediate results, for this knowledge. . It is upon the symptoms of disease, its remote causes, and the effects of remedies, that we are to depend in reaching all practical knowledge of any individual case, and, therefore, all cases of disease."

Independent nervous action in the cord or any ganglion, apart from the brain is disowned, for—

"There are no distinct, separate and independent influences, of an involuntary nature, exerted by any parts of the nervous centres in their state of integrity. They all concur more or less together."

It is useless to expand this notice by further quotations, and in vain to argue with an author who sets himself in antagonism to the science of the day, ignoring, or denying, or perversely explaining away all facts and doctrines inimical to his old-world speculations and hypotheses, usually by reference to writers and experimenters who have ceased to be authorities.

What argument can be held with a man who represents a living being as something entirely dissociated in nature and in the laws affecting its organization from everything around it; asserting that the laws that govern inorganic matter have no place in the mechanism of organised beings, and assuming for the latter laws and modes of action *sui generis*. To his own mind it is a sufficiently cogent argument in interpreting the phenomena of animal life to cite the existence of 'vitality;' to say, for instance, that "the nervous power appertains to the vital principle," that it is superadded to that principle, that it is implanted in the motor nerves as well as in the brain and spinal cord, and that "it is a vital agent to the property irritability." So, again, to his apprehension digestion is not at all a chemical process, but a vital act; the chyle is a vital organic fluid. Renal diseases are due to reflex nervous action or altered vitality, and not often to structural changes, and the examination of the urine as a means of recognising kidney mischief is little better than a delusion.

The production, or rather the republication, of such a work as an exponent of the doctrines of medicine and physiology in this the nineteenth century indicates a most determined, self-satisfied spirit; determined to ignore the scientific work of the last fifty years and to rest satisfied with the crude guesses at truth of bygone ages. It may be a valiant but it must be a losing battle to fight against physiological experiment, against chemical research, against microscopical investigation and pathological inquiry; against, in fact, every advancement of modern times made in the means of inquiring into nature, her laws and her processes; and Dr. Paine will, we doubt not, find few followers in his hopeless crusade. At the same time his book will be a monument of much labour and ingenuity, worthy of attention and regard for its vigour, its ingenuity of argument and its tenacity of purpose.

Original Communications.

I.—On the Morbid Histology of the Brain and Spinal Cord as observed in the Insane. By J. BATTY TUKE, M.D., F.R.C.P.E., Medical Superintendent of the Fife and Kinross District Asylum.

PART I.

THE number of autopsies on which the following observations have been based amounts to ninety-two, the subjects of which had in eighty-six cases been sufferers from one or other of the various forms of insanity, and in six had died from diseases in which no psychical symptoms had manifested themselves: Two of these latter were cases of phthisis, one of diabetes, one of pneumonia, one of cancer of the rectum and liver, and one of an undiagnosed form of fever, which terminated in coma before its character had been fully developed. Besides these, the brains of various animals—cats, dogs, pigs, moles, rats, &c.—have been examined, and of one human fœtus. The number of un insane brains which have been subjected to the microscope appears small, but an observer resident in the country experiences the utmost difficulty in obtaining specimens of ordinary cases sufficiently early to make the observations of any real value. I feel, however, so certain that considerable light can be thrown on pathology by microscopic examination of the brain in ordinary disease, that it is my intention to prosecute researches further in that direction. In the mean time the six cases which have been under observation must be taken for what they are worth for the purposes of comparison.

Two papers,¹ founded on the chromic acid sections made from the first thirty cases, were published in the 'Edinburgh Medical Journal' in conjunction with Dr. Rutherford, of King's College, London. It was subject of much regret to me when this distinguished physiologist expressed himself compelled to withdraw from conjoint pathological research, in consequence of the necessity of

¹ "On a New Lesion observed in the Brain of an Insane Person," 'Edinburgh Medical Journal,' September, 1868, and, "On the Morbid Appearances met with in the Brains of Thirty Insane Persons," October, 1869.

devoting himself exclusively to his special subject. The value of these further observations would no doubt have been greatly enhanced by the deductions drawn from them by one so intimately acquainted with the anatomy and physiology of the nervous system, and so deeply read in the foreign literature of the subject. It is matter of gratification to me to acknowledge here the benefit the original papers received from Dr. Rutherford's knowledge of micro-chemistry and his powers as a draughtsman.

The methods of examination have been as follows:—1st. Numerous specimens have been taken in minute portions from various parts of the fresh brain, which has been removed (with very few exceptions) not later than twenty-four hours after death. A slice having been made, or, what is better, a circular piece having been cut out with Dr. Major's tephrylometer, the grey matter has been taken in successive layers from without inwards until the white matter was reached, and squeezed out under a covering glass. 2nd. Small vessels have been dissected out from various parts and examined with water only. 3rd. The pia mater has been stripped off and carefully manipulated until clear of grey matter. No reagent has been employed in this method in the primary examinations, the only fluid used being water in the case of the vessels and pia mater. The opinion of Dr. Howden, of Montrose, that the careful examination of fresh brain matter is of the utmost value, cannot be too fully endorsed, for it reveals many conditions which are obliterated, or so changed as to be unrecognisable after the specimen has been treated with chromic acid. 4th. Specimens from various parts of the brain have been hardened in a solution of chromic acid and prepared after Dr. Lockhart Clarke's method. Sections should be made as soon as the brain is sufficiently hardened, for there is no doubt that the finer tissues suffer in some degree from too long immersion in chromic acid solutions. The demonstrations are never so definite as after from six to eight weeks' treatment with hardening agents. The parts selected were—(a) the frontal lobe at its anterior extremity; (b) the ascending frontal and parietal gyri, where the fissure of Rolando meets the great longitudinal fissure; (c) the tip of the occipital lobe; (d) the corpus striatum and optic thalamus of either side; (e) a portion of the cerebellum, including the corpus dentatum; (f) the pons and medulla; (g) tracts manifestly diseased, and (h), of late, the third frontal convolutions on either side. 5th. Recently the cervical ganglia have been dissected out, and sections made from them by means of a Valentin's knife. 6th. The spinal cord has been examined both in the fresh and prepared state.

I wish it were in my power to assert that every one of these ninety-two cases had been subjected to these various methods of examination, but it is self-evident that such a work would be far beyond the power of any one or two men who had other duties to

perform. In twenty-one cases, however, the full process has been gone through, in all of which the observations on the recent brain have been subsequently confirmed by the section of hardened specimens.

The post-mortem examination of a case of nervous disease cannot be regarded as thoroughly performed unless the recent and prepared methods of microscopical examination are employed; as by the first we arrive at a knowledge of certain conditions of the delicate vessels, membranes, and fibres which alone can be obtained by it, and by the second we can readily recognise aneurisms, dilatations, and tortuosities of blood-vessels, morbid products in the brain-substance, changes in the position of cells, and other abnormalities which require to be observed with the parts *in situ*. Either method is useful individually, but when conjoined the value of the observations is more than squared. As has been said, no one man can overtake such a labour in all the cases which come under his notice: much, however, might be done by a committee of pathologists especially interested in diseases implicating the nervous system, the individual members of which should undertake the examination of a limited number of subjects year by year, and, after comparison and collation with clinical facts, should report as a body. Such a plan would require the total abnegation of self, and contentment with the good which would accrue to science from combined action. It is the only procedure by which we can hope thoroughly to elucidate the pathology of diseases of the nervous system and systematise their nosology.

Vessels of the brain.—The following are the morbid appearances which have been noted in or on the blood-vessels, and the tissues intimately connected with them: (1) a dilated condition of the brain-substance immediately surrounding the vessels; (2) a thickened condition of the hyaline membrane; (3) deposits on the tunica adventitia; (4) hypertrophy of the muscular coat; (5) microscopic aneurisms and apoplexies; (6) abnormalities in direction, and (7) pigmentation.

1. *The dilated condition of the brain-substance surrounding the vessels* was shortly noted by Dr. Rutherford and myself in the papers already alluded to, and was then described as a "dilatation of the perivascular canals;" but as the existence in health of a space between the brain-substance and the vessel is now more than doubtful, this term must be departed from, and the following experiments and observations are put forward to indicate that the existence of a canal around a vessel is an abnormal condition. In chromic acid sections made from the brain of a cat which had been killed by cutting the throat a distinct space was seen to exist on either side of the vessel between it and the brain-substance, in breadth less than one third of the calibre of the vessel—an extent

which might have been expected from the contraction of the empty tube in consequence of the action of the hardening agent. In the brain of a cat, however, which was killed by strangulation, the full vessels may be seen in close apposition to the tissues, and in many preparations in my possession made from the brains of those who had died from various diseases in which mechanical hyperæmia or active congestion had been an ultimate condition, both arteries and veins may be seen filled with blood and closely applied to the brain-walls. In every section I have examined in which blood has remained in the vessels there is no evidence of the existence of a perivascular canal. Wherever this condition is supposed to be present, it would be well to ascertain the cause of death, for on it entirely depends the appearance in healthy subjects of a space between the vessel and the brain.

This dilatation of the cerebral tissues is best marked in epilepsy and general paresis. In prepared sections made from such brains the canals are seen from four to eight times the calibre of the enclosed vessel; if we allow one half for its contraction and shrivelling in consequence of the immersion in chromic acid (a calculation which from various observations I believe to be very nearly accurate), we arrive at the conclusion that the enclosing space is from twice to four times its normal size, and so has *become* a perivascular canal.

Although these canals are best marked in cases of epilepsy and general paresis, they are by no means confined to them. They are not uncommon in cases of chronic insanity the histories of which cannot be obtained; but in such there is always a strong presumption that congestion has at one time or another existed. Occurring as they do, however, in those forms of insanity in which congestion is a known frequent condition, it is more than suggestive of it being the immediate cause of the permanent dilatations. The *modus operandi* is probably twofold:—first, the dilatation of the congested vessel commences the expansion of its surroundings; when relieved from pressure it contracts to its original calibre, and leaves a space; which, secondly, becomes the receptacle of lymph thrown out in subsequent congestions; and so, gradually, the non-contractile brain-substance is pushed further and further from its vessel. An objection to this theory is that no indications of organised lymph can be seen in such canals; but, on the other hand, we have always associated with them a thickened condition of the hyaline membrane, an evident induration of the contiguous brain, and considerable deposits on the adventitia—all distinct evidences of exudation.

These distensions possess none of the anatomical characteristics of lymph-vessels, and their position in no way corresponds to such conduits in other parts of the body, unless we allow Dr. Goodfellow's observations on the cornea to be correct. Even supposing the

actual existence of a small lymph space around a cerebral artery, it is difficult to understand how the backward flow of its contents could be carried on against the constant counter impulse of the blood. His himself has abandoned the theory, and Key and Retzius confirm him in his departure from it. A "perivascular canal" must be regarded as a morbid condition, and in this indicative sense the term will be in future employed by me.

2. The consideration of the second morbid condition of the blood-vessels, *the thickened condition of the hyaline membrane*, opens up another interesting anatomical question, viz. whether such a membrane really exists apart from changes in the tunica adventitia. Robin, Lockhart Clarke, Rokitansky, Wedl, Kölliker, Sankey, Rindfleisch, and others have described a thin membrane as thrown out by the tunica adventitia, which invests the vessel in many forms of cerebral disease. There exists some discrepancy in the descriptions of this membrane by various authors, some speaking of it as a cellular fibroid secondary sheath, others as a hyaline fibroid, and others as a purely hyaline membrane, homogeneous and clear, which at first "is non-fibrillated, but as it goes on contracting becomes less hyaline and more fibrous like a sheath." The examination of a very large number of prepared sections and of recent specimens has convinced me of the existence of a membrane outside the adventitia, to which the two latter descriptions are applicable. I believe it is continuous with the sheath of pia mater surrounding the vessels as they enter the substance of the brain, and that it exists around every artery as its normal sheath, although in perfect health it is not easy of demonstration. Robin found it in every subject he examined, and Clarke demonstrated it in the brain of a healthy young man who had been accidentally killed, and I can show its presence in the medulla oblongata of a cat killed by cut throat. In health it is exceedingly thin, perfectly homogeneous, non-fibrillated—in fact, a pure hyaline membrane, forming a somewhat loose envelope to the vessel. At bifurcations it is not intimately applied to the angle, but forms a triangular sac, and becomes again continuous a short distance beyond it. In the same way it ensaculates abnormal tortuosities and kinks. Judging from the fact that it is invariably demonstrable in empty perivascular canals, it would appear that it is rendered thicker by being subjected to lymph exudation. It also becomes more apparent in advanced age. When in this condition it is easily recognisable in the pia mater, which has been treated with water only for the purpose of cleansing, and in squeezed-out fresh brain which has received no treatment at all. It is true that glycerine, camphor, water, and other agents render it more obvious, but their employment is by no means necessary. In its highest form of morbid development it is to be seen intimately attached to the brain-wall of a perivascular canal. So closely does

it adhere at times that it can be seen lying on the surface of the section, having been dragged out by the knife, but still clinging to the edges of the canal. In all cases where the hyaline membrane is so abnormally affected it is readily and deeply colourable by carmine, and is four or five times thicker than in health; it is occasionally fibroid in appearance, which is, I think, due to accidental puckering, as the direction of the lines is always in the circumference of the canal, but in no instance has it been noted to be in a condition warranting the application of the term "cellular fibroid."

3. *Deposits on the tunica adventitia.*—These deposits are of two kinds. The first was originally described by Dr. Sankey, and consists of a molecular material. As a rule it is composed of very fine molecules, but occasionally, and especially in the more recent cases, its particles vary in size from $\frac{1}{4000}$ to $\frac{1}{7000}$ of an inch in diameter. They are homogeneous in structure, sometimes of a pale yellow or yellowish-brown tint, but are generally colourless. The depth of the colouration seems to depend in some degree on the age of the subject. In the young the particles exactly resemble the spores of *favus fungus*. They possess slight refracting powers, which at first strongly suggested that their composition was fatty. The tests for oil, however, effected no change on them, and treatment with caustic potash, to determine their possibly granular fibrinous nature, was not followed by any result. The presence of this deposit is best marked at the bifurcations of the smaller vessels and in the neighbourhood of tortuosities. I have noted it in every brain, sane or insane, that I have examined, and have also seen it in the brain of a cat three days after death. In the case of the sane and of animals, however, it is very slightly marked, and the particles are very small and colourless. It was not present in the vessels of a pig six days old, where it was looked for immediately after death, and every succeeding day till decomposition was complete. It is most abundant in the oldest standing and most aged cases of insanity in small particles. In the case of a melancholiac whose disease was of but four months' standing, and in that of a young idiot, both of whom died slowly from pneumonia, and the vessels of whose brains were intensely congested, in common with those of other parts, very large aggregations of very large particles were found at the bifurcations, fully filling the angles for some distance. In the former case the particles measured $\frac{1}{4000}$ of an inch. The strong probability is that this deposit is the result of transudation, which in a small degree takes place during the process of death in all cases, and to a greater extent during life in subjects who have suffered from frequent congestions, or whose blood-vessels have been otherwise weakened.

The second kind of deposit, which has been described by Clarke and others, consists of masses of hæmatoidine. It exists in crystalline masses, the angles of which have been rounded by attri-

tion, varying in size from the fiftieth of an inch to small granules, which are scattered pretty equally over the whole surface of the vessel, although liable, like the other deposit, to aggregation at the bifurcations. This tendency to aggregate is caused by the ensaculation of the angles of bifurcations by the hyaline membrane, which collects and retains morbid products. In these situations the masses are so great that the wonder is no indications of local irritation caused by their presence can be detected. This deposit has not been observed on the vessels of animals or of non-lunatic subjects, except in one case, that of the fever patient who died comatose, where it was seen in very small quantities very sparsely scattered, and in very minute particles. It cannot be said to be peculiar to any form of insanity, for it has been found in every case in which it has been looked for.

The *tunica adventitia* is occasionally found thickened, in some instances giving the appearance of a separate supposititious coat, but where it was observed the true hyaline membrane was distinctly marked.

Hypertrophy of the muscular coat.—Dr. Sankey has very carefully described a hypertrophied condition of the arteries in various forms of insanity. My own experience of its existence is not so extensive as his, having as yet only observed it in two cases, one of congenital idiocy complicated with epilepsy, and in one case of rapid general paresis. In the latter case, however, the arteries throughout the whole system were peculiarly thickened as to their muscular coats, and those of the encephalon were only relatively affected. Dr. Sankey seems to hold the opinion that this hypertrophy is due to increased exercise of the vessels in consequence of an impure state of the blood, but as he failed to detect it in two cases of epilepsy, one of acute mania, seven out of eight of general paresis, and found it more particularly well marked in cases of chronic insanity,—moreover, as the impurity of the blood is merely hypothetical, it would appear that there is small foundation for the theory. I would rather suggest that the degeneration of the cells of the sympathetic ganglia (hereafter to be spoken of), so constantly noted in cases of chronic insanity, is more likely to be inductive of this change.

Atheroma.—This condition in its various stages is very frequently met with in the vessels at the base of the brain, and in the middle cerebral arteries, but has been very rarely noted in this series of examinations in the vessels which enter the brain from its superior surface.

Minute aneurisms have been clearly demonstrated in three cases; in two they existed immediately below the floor of the lateral ventricles in the corpus striatum. In a longitudinal vertical section, one inch and a half long, of the right corpus striatum of the first of these cases, five aneurisms can be distinctly seen immediately underlying the epithelium, two others are $\frac{1}{16}$ th of an inch from the sur-

face, and one large one is contiguous to the striæ. They vary in length from $\frac{1}{20}$ th to $\frac{1}{30}$ th of an inch in length, and are about one fourth as broad as their length. They are, with few exceptions, filled with blood and small deposits of hæmatoidine. The coats are throughout the greater part of the circumference of the aneurism very much hypertrophied, together measuring the $\frac{1}{100}$ th of an inch in thickness; the muscular coat has a distinct increase in the size and number of its nuclei, and the fibres of the inner and outer coat are much increased in number and thickness; the hyaline membrane is peculiarly distinct. With one exception they are fusiform, and as a rule their walls are entire. In some parts of the section, however, clots can be seen immediately external to the dilated vessel, and in two the point of rupture is distinctly visible. Clots also exist in the substance of the section apart from aneurisms. In one empty sac there is evidence of its having been of the sacculated form, and in this instance there is a deposit of organised lymph, mixed with blood-corpuscles between the fibrous coats, the intervening one being obliterated.

The history of the case in which these minute aneurisms were found is peculiarly interesting. It was that of a woman, æt. 32, who on admission to the Fife and Kinross District Asylum, was suffering from an acutely maniacal attack for the second time. She was extremely weak, face flushed, and she complained of intense shooting pains in the head and a slight loss of sensation in the left arm. A fortnight after admission paralysis of the left arm and face commenced, with ptosis of the left eyelid, an increased degree of anæsthesia of the left arm and a subjective feeling of cold. The paralysis gradually and slowly increased, and, *pari passu*, her general emotional and intellectual weakness; she was then intensely hysterical. The paralysis never became complete as regards the whole arm, the wrist and hand being chiefly affected; there was complete drop-wrist, but she could slowly and feebly lift the arm from the shoulder-joint. She was treated with iodide of potassium. In about a month the paralysis had almost entirely disappeared, her mental symptoms, however, being much aggravated. Six weeks later she fell down in a well-marked epileptic fit, which was followed by an acutely maniacal attack, during which she refused food. Eventually she died from gangrene of the lungs, but without any return of the paralysis or epilepsy.

In the second case the aneurisms are small and confined to the left frontal lobe in the neighbourhood of a large apoplectic cyst. The third occurrence of them was noted in the corpora striata of a man who died comatose and apparently paralysed after a severe paroxysm of epilepsy.

6. *The abnormalities of direction in the vessels* consist of undue straightness, tortuosity and kinking. These have been constantly

observed, and are, in all probability, due to a common cause. The internal cerebral arteries are by their natural undulations prepared to withstand a certain degree of extra pressure. When elastic pipes are subjected to a strong flow of fluid forced through them they tend to straighten. It may be almost taken for granted that this takes place in the abnormally filled artery, and that when the tax is greater than nature has provided for, an undue degree of strain is put on their fibrous coats. All fibres subjected to overstrain have a tendency to kink irregularly when it is withdrawn, more especially at their weakest points. This in a high degree is seen in the overstretched hair-line of the fisherman, and, I believe, in a less one in the resilient fibrous coats of the kinked artery on the abatement of congestion, and the local kinkings must produce a straightening of the intervening lengths.

7. *Pigmentation*.—A pigmented condition of the arterioles supplying the convolutions and the cord has been noted in six cases. The colouring material is deposited outside of the vessels, and corresponds with the fuscous pigmentation of the cells, presently to be spoken of. In such cases there is evidence of dilatation of the vessels, lymph deposits, and limited apoplexies.

Changes in or on the membranes.—The microscopic appearances in or on the membranes which have been noted in this series of examinations consists of (1) deposits of crystals of phosphate of lime, and (2) lymph deposits between the substance of the cord and the pia mater.

Crystals deposited on the membranes have been found in only one instance. J. R.—, æt. 31, died on the 3rd January, 1873, of pneumonia. He had been the subject of acute idiopathic melancholia, which had been due to great brain exhaustion. The urine had been highly phosphatic, and he had suffered severely from dyspepsia and anorexia. The body was examined twenty-four hours after death. Besides the evidence of pneumonia, the only other noteworthy appearance in the trunk was the great contraction of the stomach which did not exceed in size the transverse colon. The following is extracted from my pathological register :

“Dura mater hyperæmic, meningeal arteries thickened and adherent to the dura mater. Arachnoid in some places very much thickened, very white and corrugated, resembling an ichthyosis. At the vertex the pia mater was found much thickened and closely adherent to the grey matter, which could not be readily removed from it by manipulation and washing. This condition became less marked on the more dependent portions, until it was lost at the base. The visceral surface was found covered with immense numbers of crystals of phosphate of lime, varying in size from $\frac{1}{200}$ to $\frac{1}{300}$ of an inch in length : they were mostly of the acicular shape, a few were stellate. Under 60 diameters (Hartnack) as many as 150 crystals

were counted at once in the field. They were closely adherent to the membrane, so much so that they were not disturbed by the pretty rough brushing the pia mater was subjected to in removing from it the adherent grey matter. Their distribution was regular in whatever number they occurred; they were noted in greatest numbers where there was most thickening, becoming fewer and fewer until they entirely disappeared at the base. A few were seen on the pia mater of the inferior surface of the cerebellum, which was but slightly thickened. Scrapings from the enlarged Pacchionian bodies and ichthyotic spots contained similar crystals, which were also seen in small numbers loosely attached to the inner surface of the dura mater. The brain was examined in a perfectly fresh state, and no agent was employed but distilled water."

2. The lymph deposits between the pia mater and the substance of the spinal cord have been observed in two cases; one, the subject of severe and long-standing epilepsy, the other of chorea; both were complicated with insanity. Sections made from the cord of the former show the pia mater much thickened and somewhat pigmented, and immediately below it are numerous distinct laminae of a highly fibrillated deposit, which are arranged in waves surrounding the whole cord and dipping into the fissures, where each lamina maintains its continuity. The cut ends of vessels full of blood can be seen within the substance of this deposit. Where a section is not complete the fibrous nature of the laminae is well marked. The thickness of the deposit is in some places the $\frac{1}{60}$ of an inch. In the second case there are only two imperfect laminae next the cord, and between them and the pia mater there exists an indistinctly and irregularly arranged fibrillated structure, imbedded in which are numerous thickened and deeply pigmented arterioles. The pigmentation is seen only in the space between the cord and membrane, a distance of $\frac{1}{150}$ of an inch. The subject of this lesion was a man who exhibited constant choreic movements of the head, face, and arm.

In most insane brains the two layers of the pia mater are distinctly visible on section; not unfrequently its vessels are much thickened and dilated, and thin apoplexies are met with between the membrane and the grey matter or between the layers. In such apoplexies nodules of hæmatoidine are present and the mass generally is rusty in colour.

Granulations on the surface of the brain and floors of the ventricles.—In a former paper it was stated that these morbid products on the floors of the ventricles were mainly the result of changed epithelium. There are generally, however, considerable concomitant alterations which implicate not only the epithelium, but a considerable tract of the subjacent tissue. Wherever granulations are met with the neighbouring brain substance is always more or less indu-

rated, the distribution of fibres is irregular, the vessels are abnormally twisted and contorted, and their walls are much thickened. There is, in fact, evidence of chronic inflammatory action. Not unfrequently there are well-marked lymph exudations, which, extending upwards to the free margin, have pushed up the epithelium into bullæ. A very peculiar appearance is presented by the series of sections prepared from the corpora striata of a woman who died from general paresis; considerable deposits of phosphate of lime can be seen on the surface of the ventricle and extending for some distance inwards. On or near the surface they are stellate, and almost entirely imbedded in the brain substance, a small portion only lying exposed, and in some instances pushing up the epithelium which entirely covers them, thus forming the granulations reported in the post-mortem register, as seen by the naked eye. The more deeply seated crystals are either acicular or stellate, and occasionally the deposit is apparently amorphous. The largest of these masses is $\frac{1}{200}$ of an inch in its greatest measurement.

Granulations on the surface of the grey matter are due to changes in the outer granular layer.

Changes in the central canal.—The central canal was observed to be abnormally patent in one case of senile insanity in which great general wasting of the brain and spinal cord existed.

In two cases of epileptic insanity the canal was completely occluded by increased growths of the columnar epithelium, which extended outwards for some considerable distance besides obliterating the canal.

In three cases the central canal has been found occluded by deposits of colloid bodies; in these instances its shape is considerably changed, it becomes a long narrow slit, and the epithelium is by no means well-marked. This deposit does not always extend throughout the whole course of the canal, which at certain parts remains patent. At the cervical and lumbar enlargements the occlusion is complete and the presence of colloid bodies can be demonstrated in other parts of section from that region.

(To be continued.)

II.—The Pathology of the Pneumonic Lung. By OCTAVIUS STURGES, M.D. Cantab., Assistant-Physician to the Westminster Hospital.

THE most recent expositions of the process of inflammation seem to render necessary a reconsideration of some of the phenomena of disease hitherto ascribed to that agency. We are especially to notice that the expression in its present use is strictly a morphological one, and that some further definition is needed to enable us to classify the various forms of disease which, touching at this point, have separate histories both in the past and in the future.

Inflammation is the exudation of liquor sanguinis and the subsequent passing through of leucocytes. "The constant effect of injuring a living tissue is to divert a part of the liquor sanguinis from its natural course, and to determine its discharge from the vessels which before held it into the surrounding parenchyma."¹ This appearance, under a somewhat different nomenclature, has been long recognised as constituting the outward and visible sign of inflammation. The process itself has of late been more carefully watched with a view to determine the precise mode of the leucocytes passage, and the nature of the change which determines it. What we have to notice, however, is, *first*, the very slight amount of irritation (short indeed of that which the word "injury" suggests) which suffices unfailingly to bring about the phenomena in the normal living tissue; and, *secondly*, the very close connection that exists between excessive transudation of liquor sanguinis, and the subsequent squeezing through of leucocytes.

Now, this phenomenon of liquor sanguinis exudation with migration of leucocytes which is thus uniformly produced in a healthy organism by an irritation or injury from without is wont to occur also apart from any external cause as the material expression of some general constitutional disturbance. In certain altered states of the body the very same exudation which we are able to provoke at will at some given spot will arise as it were spontaneously, and so arising it will sometimes affect so many parts at once, or extend over so large an area, as to suggest some change in the common circulating fluid as the initial cause of the phenomenon. From the mere observation of expelled leucocytes, therefore (as long as we keep clear of the term inflammation² and its associations), we can judge very little; they may be either the local expression of a specific disorder or mere accidents of some local irritation. Inspection alone does not enable

¹ Dr. Sanderson, in Holmes's 'Surgery,' vol. v.

² I would dismiss for the time the word inflammation as inevitably suggesting a train of ideas which of themselves would go far to beg the question I wish to raise, and speak of this appearance under the symbol "exudation."

us to say which. To learn their meaning in any given case we must seek further.

It is some explanation of the confused association of these two things, and at the same time an illustration of their essential difference, that during life pyrexia is often an accompaniment of both. Any injury which is sufficiently severe will along with the exudation provoke that group of symptoms to which in the aggregate the name pyrexia is commonly applied, and in so doing will bring us a step nearer to that complex collection of phenomena by which we are taught traditionally to recognise the presence of inflammation. Yet the pyrexia which arises as the result of an exudation bears only a distant resemblance to the pyrexia that terminates in one. If by means of external irritation we succeed in imitating more or less closely some of those lesions which where they arise spontaneously constitute the outward expressions of certain diseases, yet in so doing we shall still fail, except by an accident, to call up the special symptoms and the precise form of pyrexia which are inseparable from the diseases themselves. It is impossible, for example, by irritating the bronchial tubes or the pleura, to obtain any reasonable imitation of acute bronchitis or acute pleurisy, or by wounding the lung to produce the phenomena of pneumonia. The pyrexia which follows an exudation is a simple response to the local event, but the pyrexia which precedes it has a character of its own which enables us often to predict the precise situation which an exudation is about to occupy.

And although we say that the material part in these two distinct phenomena is similar, yet that statement needs some qualification. In minute structure the likeness is perfect, the blood plasma soaks through, the leucocytes squeeze through by the same means, whatever these may be in both cases. Nevertheless, *received as a whole*, the local products arising in connexion with one or other of the special pyrexias is hardly similar to the local product which can be obtained by means of an experimental injury. It is impossible to impress upon any organ the general characters with which the blood endows it when that fluid is itself the source of offence. Our power of setting up artificially an inflammation of a particular kind, as diffuse, or suppurative, or adhesive, is extremely limited. The phenomenon may come about, and by our means, but it will be through the accident of blood of a particular quality coming to the aid of the experiment.

In the classification of disease, therefore, the meaning to be attached to these cell forms must depend very much both upon their mode of origin and their accompaniment. At one time their appearance tells of no more than some local injury or disarrangement which may be quite trivial; at another it is the exponent of an altered condition throughout the entire system. To accept the exudation by

itself and without question as a basis of nomenclature, to see in it always the indication of the "inflammatory disease," in the common acceptance of that expression, can have no other effect than that of forcing into unnatural connection a number of affections which have in fact nothing in common.¹

These remarks, for the reasons I have indicated, have a special bearing upon those affections of the lungs which, whether rightly or wrongly, are classed together under the common name of pneumonia. To argue what is and what is not pneumonia may resolve itself into a mere battle of words, unless at the outset the precise point in contention is clearly stated and extracted as far as possible from the region of conventional phrases.

It will be admitted that the word pneumonia is used in two senses, both as a pathological term and as the name of a disease. The qualifying adjectives which are applied to it refer sometimes to the anatomical and sometimes to the clinical signification used. As a pathological expression pneumonia is or means inflammation of the lung, the presence, that is, of certain formed material in the air vesicles. Wherever that appearance presents itself, there we are entitled to say that the definition of inflammation is satisfied, that pneumonia exists. And we may go further. The appearances presented may be typical of inflammation or they may not; the distinctness of cell proliferation, the physical properties of the blastema, the proportion of coloured corpuscles, and so forth, may so vary as to make the fact of pneumonia more obvious in one case than in another. Pathologically there may be pneumonia more or less according to the degree of evidence furnished by these post-mortem signs of it. Only, using the word in this sense, as merely indicative of certain shapes, we may not attach to it any epithet which has reference to the clinical features which sometimes go along with them. We may be agreed as to the typical appearance which inflammation should assume when affecting the air vesicles, but there is no suffi-

¹ It has of late been maintained, I think, somewhat too absolutely, that the pathological features of disease must always be trusted to give a truer picture of it than any of the various phenomena which in life go to make up its clinical history. Actual inspection, it is said, reveals for certain the real nature of disease, but the course of the symptoms will be likely to vary with the temperament of the individual, and many accidental circumstances. It is not sufficiently remembered, however, that no more is revealed to us at death than one stage of an extended series of phenomena; nay, more, it is often only when the disease has fully spent itself, and other secondary changes have supervened, that we are permitted to look upon the place if once occupied. At the best we learn little of the nature of antecedent conditions except by the aid of the clinical history, and this evidence of symptoms which is so lightly set aside, when in apparent conflict with pathological appearances, is in fact of every degree of validity. In diseases of the lungs especially, auscultation enables us to trace the transitions which are taking place in the physical state of the organ with hardly less certainty than if it were exposed to view.

cient warrant for associating this typical pneumonia with one set of symptoms rather than another. The qualifying terms so commonly applied to pneumonia, as "acute," and "latent," and "consecutive," refer not to the pathological but to the clinical part of it; not to what we see in the lung, but to what we are told or remember of the case. In the use of such expressions we are not aiding the anatomical description, but only forcing it into harmony with a particular set of facts.

The word pneumonia has thus acquired a meaning far beyond that which the name would convey as descriptive of certain products found within the lung; nay, it is applied most often and most imperatively in those instances where the opportunity of bringing the organ to this pathological test does not occur at all. The feature which is most insisted on as signalling true or typical pneumonia is that very crisis which decides that the patient is to live and not die. In such cases, so far from insisting upon the necessity of ocular proof after death, it is in the mode of his recovery that we recognise the unmixed character of the disease.

Pneumonia, then, according to present usage, is both the name of a disease which from its symptoms and progress is assumed to be associated with a certain condition of the minute structure of the lung, and it is, at the same time, the name given to that condition itself, apart from any consideration of its living accompaniments.

The question arises whether the use of a common name is justified by the degree of community in the things signified. There is, in the first place, a certain combination of clinical phenomena and structural changes, a combination of which the history and progress are singularly uniform and concurrent. We agree to call it pneumonia. But, besides, there are many and various conditions of the system capable of producing changes in the lung which at death are seen to resemble those which occur in the first case, although in clinical respects there is no resemblance at all. Shall we call these pneumonia, too, all of them, or shall they be variously named according to the particular circumstances of each case?

The present nomenclature (even though the reasons for preserving it should appear to be paramount) is at least inconvenient and suspicious. It makes it necessary to speak of pneumonia at one time as "true" or "simple," to asseverate that it is pneumonia verily and indeed, while we describe its kindred of the same name by various adjectives of disparagement as "low," which show that the relationship is not regarded as altogether a legitimate one.

The question is not one to be settled by a comparison of preparations; there is no room for difference as to these. It is a question of judgment as to the relative rank to be held by a number of phenomena, as to whether the points of similarity or the points of difference are the most essential. It is agreed that one and the

same appearance may be associated with a great variety of clinical phenomena; it is questioned whether the pathological or the clinical idea should have the pre-eminence. Do the diverse symptoms indicate distinct operations in the living history of the affected parts, or is identity of minute structure after death a conclusive proof of the presence of one disease, the varieties in its living aspect being accounted for by the different circumstances of individual subjects? That form of pneumonia which under the present classification it is necessary to characterise as "true" or "simple," is at all events a very distinct disease. It may be distinguished from continued fever, which it most resembles, and often recognised for what it is by the aspect and manner of the patient. The face alone, especially in thin-skinned and florid persons, often betrays an imperfect aëration of blood long before that occurrence is to be accounted for by any mechanical impediment to the circulation. Yet along with this half dusky hue there is not the heavy and listless expression of typhus, but rather one of anxiety and active distress. Taken with these appearances (to which will often be added a crop of vesicles about the lips and nostrils), the early high temperature, the dyspnoea, and, presently, the rust-coloured sputa, would suffice to suggest the disease with but little room for error. There could not, indeed, be a doubt left in the mind if (only watching the progress of such symptoms as these, and neglecting auscultatory signs altogether) the stress of the fever were observed to give way of a sudden, leaving the patient to contend only with the lingering effects of a past disease. Nor, if the same individual were watched with the ear alone, so to speak, would the character and succession of the phenomena be less distinctive. There would be recognised in turn crepitation and disappearing resonance, and tubular breathing and the reappearing coarser crepitation of reopening tubes, sounds which would indicate the several steps in the invasion of the lung by exudation, and the subsequent disappearance of new material and restoration of functional activity. Either by the physical or by the general symptoms pneumonia would thus unmistakably reveal itself, but if the two series of phenomena were observed side by side, the severe and early pyrexia along with, or even preceding, the first signal of commencing crepitation, the sharp decline of active symptoms with the ending of the process of consolidation, the characters of a typical pneumohia from the clinical point of view would appear sufficiently distinct and manifest.

If as clinical students we had to seek the very opposite of all this, we should very probably light upon that condition which we are told is to be regarded as the same disease under a modification. There must be a certain likeness, indeed, in all affections whatever which implicate the same organ, since they concur in disturbing the same functions. But excepting for that degree of similarity there are

no two diseases more different to look at than acute or simple pneumonia and the so-called secondary or latent form of it.

It is, in the first place, a very strong indication of a radical difference that the modified disease (I am not speaking at present of lobular pneumonia, but of that in which the dead organ offers a near resemblance in the vesicular portion of the lung to pure lobar pneumonia, and goes by various names, according to its clinical accompaniments), but the advent of the modified disease is so stealthy as often to pass altogether unperceived—that there is no rigor, no marked elevation of temperature, no change in the character of the sputa, no period of crisis. Add to this that the physical signs which, when detected, are supposed of themselves to announce the presence of the disease do not arise after the same manner, and are often not progressive but stationary. Let the question remain whether inherently the two diseases are the same, it is at least a misuse of language to speak of these negative symptoms as presenting any modifications of the pattern of acute pneumonia. There is no resemblance whatever. The two conditions are not related, but opposed.

Now, it may be urged that these varieties in outward phenomena, wide as they are, are no more than the several exponents of a single pathological change occurring under various conditions. There is no want of evidence to the truth of the general statement that the same morbid process in individuals of different constitution will give rise to the most various and even opposite symptoms. The fact may be explained by idiosyncrasy, by the condition and conduct of other organs, by the age and vigour of the patient, by the rate of progress of the disease itself. The mere circumstance that pneumonia has very wide associations, though it may render the recognition of the disease under certain circumstances difficult or impossible, does not destroy the essential kindred in scientific respects of all pneumonias whatever.

But there are other tests which are less liable to mislead, which are, in fact, part and parcel of the morbid process itself, and can only vary in correspondence with its variations. If pneumonia be in truth one and indivisible, we may fairly expect to encounter, on a deeper view of it, some glimpse or other of this inherent likeness in all its forms.

It will be admitted that true pneumonia (whatever theory we adopt of its origin) is not throughout an affection of the lungs merely. Of the associated changes which other organs exhibit during life the most remarkable are those indicated by the urine. The increased excretion of urea, the diminution of the chlorides, the not uncommon appearance for a while of albumen, have an intimate relation to the changes occurring within the lung. They are independent of such casual phenomena as the greater or less response of the general system under changed conditions of nutrition; they do,

in fact, supplement and so measure (as Dr. Beale has shown) the changes that are taking place in the lung.

It happens, unfortunately, with the modified forms of pneumonia, that, with the admission that they are such, these phenomena are not even expected or looked for. Every feature which distinguishes the true disease is in its turn dispensed with. What pneumonia is in its effect upon the urine or upon the sputa is to be seen from a typical case. There is no standard and no test to which the others need conform, so long as they fulfil certain post-mortem requirements. It would be too much to affirm, therefore, that in latent pneumonia the urine is not specially affected; it is seldom tested. It is not too much to affirm that in many instances it undergoes no special alteration. The condition of this secretion, which would seem to be our safest guide to the nature of the changes in the lung, so far as it speaks at all, speaks against any unity in the several forms of hepatization.

A similar remark would seem to apply, though perhaps less absolutely, to the indications afforded by the sputa. In pneumonia the exudation which makes its way into the air-cells is accompanied by more or less hæmorrhage. This blood-stained material, becoming intimately mixed with the bronchial secretion, imparts a special character to the sputa. This characteristic rust-coloured expectoration may be absent, it is true, in some few cases, or its appearances may be delayed. More or less hæmorrhage, some accidental admixture of colouring matter, a cough which is weak and ineffectual, may alter its characteristic appearance, and make it deficient as to quantity. We can readily admit such modifications. But it is the rarest phenomenon in a case of acute pneumonia to find the expectoration retaining throughout a purely bronchial character. We are entitled at least to regard the rusty sputa, or some approach to it, as one of the distinguishing features of the disease, and in its absence to scrutinise the more carefully every instance in which pneumonia is alleged.

I am speaking at present only of such signs as are available during life. So far as their evidence is valid, it points to a radical difference between primary and so-called secondary pneumonia, a difference which would be expressed somewhat as follows:—*Pneumonia is a specific disease, having its local issue in the lung, whilst the various forms of hepatization which go by the same name, and in certain respects of minute structure closely resemble it, are the accidents of some local impediment in the pulmonary circulation in which the general system takes part only secondarily.*

That pneumonia is a specific affection is rendered probable both from the character and time of access of the pyrexia, and from the relation which exists between the general and the local phenomena of the disease.

The general likeness between pneumonia and the specific fevers

will not be denied. The fever-hospitals are continually bearing witness to this similarity by receiving the one disease in the name of the other.¹ It would be unjust, however, to draw an argument from a circumstance which is due in most instances to hasty observations. The premonitory symptoms of pneumonia are in reality distinctive enough. The lumbar pains which precede the eruption of variola, the remarkable mental condition which announces the access of enteric fever, are not more suggestive than is the early occurrence of high temperature and the character of the temperature—variations which are to be noticed in true pneumonia.

It may be objected that the facts of cases are opposed to the belief that the general symptoms, specific though they be, anticipate the local inflammation. The system suffers, it may be said, as a result of the local mischief, and it suffers in this particular way because the seat of that mischief is the lung—the fever is the fever arising from lung inflammation.

The validity of this objection may be tested in two ways. 1st. By inquiring in what proportion of cases the general symptoms do actually anticipate the local ones. 2nd. In cases of lung inflammation arising traumatically, by observing to what extent the general symptoms resemble the general symptoms of pneumonia.

That there are instances in which the pyrexia precedes beyond all question the physical signs of change within the lung will hardly be denied. It may be said, however, that the thing is exceptional, that the fact often only seems so either because the inflammation is deeply seated and beyond the reach of the ear, or because we fail to recognise the *real* first stage of pneumonia, which is not minute crackling, but harsh respiration only.

The first of these assertions is of that sort which it is almost impossible to meet. It is best to exclude the class of cases to which it can legitimately refer, or even to admit the possibility of the early physical signs of the diseases being beyond discovery in some rare instances. But the fact, if fact it be, is not to be made use of indefinitely as explaining always the tardy appearance of local signs. Both from the post-mortem and the clinical evidence we know that the same delay may occur when the affection concerns the accessible parts of the lung, the base or the apex. In such cases the explanation must be sought for on the second ground, viz. that the ear fails to catch, or rather to recognise, the very earliest signs of the local disease, which is not minute crepitation, but harsh breathing. I believe that the observation of Dr. Stokes is a perfectly accurate one—that this harsh character of breathing in most cases of pneumonia precedes the minute crackling—but I do not believe that they are

¹ Of 3577 admitted to the London Fever Hospital in 1866, 120 were cases of pneumonia.

different stages of the same process, or that this harsh respiration is different from that which is quite common wherever there is a high degree of pyrexia, and depends probably upon a diminished moisture of the bronchial membrane, which may or may not be succeeded by an over-secretion. And this further event of bronchial catarrh which is so frequently an accompaniment of all acute disease may here add another circumstance to obscure the relation between the general and the local symptoms. In affections which do not immediately concern the lungs the symptoms of catarrh become quite subordinate as soon as others appear to fix the name and character of the general disorder, but in pneumonia it is taken to indicate the commencement of local mischief—the pneumonia is a development out of bronchitis. The inflammation of the bronchial tubes spreads to the parenchyma of the lung. Let it be admitted that minute crackling marks the very commencement of the local process of pneumonia, and that bronchitis has no direct connection with it, and we must admit as well the frequent priority of its proper physical signs.

If the local change in the lungs were, indeed, the starting-point in the series of events, the symptoms arising out of it should be consistent with their origin. The severity of the disease would be measured by the extent of the local deposit, while the decline of the pyrexia would correspond with the disappearance of the cause which had provoked it. But it is not so. The severity of pneumonia, as determined by its actual mortality, depends more upon the site which the disease selects than upon the extent which it occupies. Statistics on the subjects (though obscured, like all such statistics, by the admission of many cases of double pneumonia) are agreed that pneumonia of the apex is much more fatal than of the base. It is not unusual to find patients dying from the mere stress and malignity of the disease when these have found no adequate expression in the local changes. Of sixteen cases of fatal pneumonia carefully selected out of a considerable number as primary and free from other disease,¹ that was the case in at least four. It is a further illustration of the destructive and, so to speak, independent character of the pneumonic pyrexia, that it keeps no sort of time with the inflammatory product; it is when the exudation is greatest, or even before it is wholly deposited, when the respiration is the most quickened by the mechanical effect of its presence, that the fever suddenly moderates and the active history of the disease comes to a sudden end.

Now, if it could be established that the local signs are really anterior to the constitutional, and that there is a general correspondence between the two, could it even then be admitted that they stand to each other in the relation of cause and effect? It is often

¹ 'St. George's Hospital Reports,' vol. ii, "The Forms of Pneumonia."

affirmed that all the essential symptoms of pneumonia are evoked when inflammation of the lung ensues (as it does but rarely) after surgical injury, or that at least it arises in that way sometimes, but it is too difficult to find any evidence in support of this statement. A case is often quoted occurring in the practice of Mr. Hilton, at Guy's Hospital.¹ A boy, aged 11, was admitted with fractured ribs and emphysema of the whole trunk; he had also hæmoptysis, and after a few days' residence the sputa became plum-coloured. With these symptoms the temperature rose to over 103°, but four days after the change in the colour of the expectoration it suddenly fell to 99°, rising again, however, on the following day to over 100°. Subsequently extensive empyema arose and a large quantity of fetid pus was discharged. Such is the case. How far does it bear upon the point? It cannot be said that the boy had a typical pneumonia, for he only exhibited one symptom of it in the sudden fall of temperature. It can scarcely be said for certain that he had pneumonia at all; no physical signs are described, only the "plum-coloured" sputa, and the inevitable pyrexia of severe surgical injury. Upon such evidence as this it is impossible to maintain that traumatic inflammation of the lung is at all similar in its phenomena to simple pneumonia. Injuries to the chest, when they cause inflammation at all, present quite different appearances from those seen in pneumonia; the local result is "an exudation of plastic material, causing a partial hepatization, and then contraction and cicatrization."² And the symptoms are the symptoms of pyrexia together with those which betoken the special seat of the injury, as hæmoptysis and inordinate dyspnœa. In surgical practice it is as rare to find extensive consolidation of the lung and pleurisy following injury as it is to meet with the general symptoms which especially belong to pneumonia. Accident will no more produce the disease than will the various experiments which have been designed for the purpose.

But it is urged that pneumonia is not a specific disease, because it owns no specific cause. "The causes of pneumonia," it is said, "are manifold, and the disease may originate under such diverse conditions that the theory of a specific cause can hardly be maintained."³ It must be admitted that in the wide sense in which pneumonia is applied by the author whose words I quote the conditions under which it may arise are indeed various, so various that it is a point of the argument to adduce this very circumstance in proof of an essential difference. In this respect, indeed, as much as in the others, pneumonia maintains its claim to be regarded as a disease by itself. We know little enough of the origin of any disease, yet as much probably of the origin of pneumonia as of the rest; no more, indeed,

¹ 'Medical Times,' p. 444, vol. i, 1867.

² See Poland on "Wounded Lung," in 'Holmes's Surgery,' vol. ii, p. 358 et seq.

³ Fox, p. 675, vol. iii, Reynolds.

than some of the circumstances and conditions which, while they seem to favour its development, can none of them be affirmed as essential to its existence. In regard to the origin of acute pneumonia as much knowledge is attainable as in regard to the specific fevers; but it is obscured by the intrusion of irrelevant cases. That it may occur epidemically, that certain states of climates such as our own obviously favour it, that it is met with in greatest perfection in the young and healthy, that certain constitutional states are almost incompatible with it, are facts which, although admitted, are the less prominent in statistics, owing to the admixture of that statural consolidation and consolidation succeeding collapse which belong chiefly to the two extremes of life.

To these considerations in favour of the specific character of pneumonia and its claim to be regarded as a distinct disease of which the local deposit is only one part and consequence must be added the unquestionable fact that while we are powerless to produce pneumonia in its perfection we may often succeed in producing the bare phenomenon of hepatization by procuring the escape of the solid parts of the blood into the air-vesicles.

The well-known experiments of Reid¹ upon division of the pneumogastric had this result:—"The most common morbid changes," says he, "were a congested state of the blood-vessels of the lungs. The condensation was not unfrequently greater than could be accounted for by mere congestion of blood in the vessels, and probably arose from the escape of the solid parts of the blood into the tissue of the lung." In one experiment "a great part of the left lung was in a state of pneumonia, in some places approaching the third stage." In another "the left lung was almost entirely in the second and third stages of pneumonia," and in two further experiments "parts of the lungs were in the second and third stages of pneumonia."

How far this result may be regarded as a mechanical one need not now be discussed. I quote the experiments only to show that hepatization, both red and grey, may be produced apart from the agency of a *materies morbi*—that it follows almost uniformly the withdrawal of the controlling action of the pneumogastric nerve.

It is needless to dwell at length upon the influence which position and mechanical impediments exert in the same direction. Not only will prolonged decubitus with extreme feebleness determine the fact of hepatization, but by placing the patient on this side or on that, or on the face, instead of the back, we may settle beforehand the exact spot which shall become solid.²

"The influence of decubitus," says the great historian of this disease, "is so real that one can, so to speak, create secondary pneu-

¹ Reid, p. 199, 'Physiological Researches.'

² Grisolle, p. 178.

monia at will in this or that part by varying the position." The fact itself, in which all authors concur, was explained by Grisolle, by supposing "that the stagnant blood sooner or later provokes a true inflammation of the pulmonary parenchyma." An inflammation truly, if the occurrence of exudation with cells forms is always to bear that name, yet it is a mere local effect of embarrassment of the pulmonary circulation, and in no true sense entitled to be called pneumonia, or of itself to constitute a disease. It might even be maintained, I think, that the conditions which are essential to this form of consolidation (and which may be generally expressed as gradual failure of the vital powers, and the assertion by the same degrees of physical laws), are conditions where pneumonia is impossible. The process by which an exudation invades the remoter parts of the lung, encroaching bit by bit where the circulation fails, seems the very opposite to the process which by a similar method brings to a sudden term a train of active vascular changes.

And what is the evidence of morbid anatomy upon this subject?

The minute anatomy of hepatization, for reasons that have been stated, deals chiefly with typical pneumonia—pneumonia, that is, which at the time of dissection and to the microscopic eye is typical. The history of the particular case is often wanting, so that we have no certainty that the specimen really fulfilled in life the part that is attributed to it. The fact seems to be that pneumonia, when looked at through the microscope, appears more or less typical according to its age. It is at an early stage of the process that the proliferation of epithelial cells is obvious. Later on, whatever be the form of the pneumonia (I exclude certain chronic conditions of lung which are not now in question), the chief contents of the alveoli are pyoid bodies or bodies that have come to resemble them. It may be that the proliferation of epithelium is more abundant in some cases than in others, but in all alike the tendency is for the whole contents of the alveoli to assume after a time one shape, a transformation which, when completed, leaves no clue to the earlier condition. There are, it is true, certain modifications which are more permanent, yet I cannot make out or discover from others that there is any accurately ascertained bond of union between the clinical and the anatomical varieties. The points of difference upon which every one is disposed to insist as being of capital importance are the proportion of red corpuscles to pyoid bodies, and the chemical and physical properties of the material which glues the alveolar contents into a single mass. There are instances where the coloured corpuscles almost fill the alveoli, and instances where they are almost absent, while the fluid stuff sometimes comports itself like fibrin, and sometimes is a thin serum with hardly any stickiness about it. Much depends, as I have said, upon the stage of the process—much, probably, upon the particular portion of lung selected in any given case.

On the whole, though one is ready enough to suggest what should be the union between the clinical and the pathological forms of pneumonia, it is impossible to assert that minute anatomy has demonstrated what it actually is. We may subordinate the clinical to the pathological view, or *vice versa*, but we cannot say from the microscope "the former owner of these alveoli exhibited in life a typical pneumonia," nor from the bed-side "the air-cells of this patient are filled with material of a certain sort and disposed in a certain way."

The clinical observer of pneumonia must take a wider view than this of the material changes which are to be looked for, and one which corresponds with its living symptoms.

The hepatization of pneumonia, to be recognisable as such, must be accompanied by pleurisy in the form of recent lymph. In the majority of instances it will be unilateral, but when both lungs are affected they suffer unequally, and in neither will the region of consolidation correspond exactly with the parts which would suffer in purely hypostatic consolidation. If death should occur from the disease, and not from its consequences, the right cavities of the heart will be distended, and a portion of the contained clot may have extended into the pulmonary artery. I do not say that all hepatization that has not these accompaniments is not the hepatization of true pneumonia, but only that it is by these that we distinguish the affection in the post-mortem room. A lingering death may obliterate or render indistinct some of the features of the active disease. The lung engorgement of the last hours may be superadded to the pneumonic hepatization, and so blend with it as to make it appear that both lungs were affected, the distension of the right cavities of the heart may have passed away, and with it that condition of fibrinousness which so distinctly marks the active stages of pneumonia, and which is evidenced in the pleurisy, in the pericarditis, in the large and firm and often ante-mortem clots, in the sudden death, sometimes, from thrombosis.

While such are some of the signs which most signally distinguish pneumonia after death, it remains, no doubt, a point of difficulty to decide which of them are essential and invariable accompaniments of the disease. May not, for instance, a typical pneumonia have for its seat some central portion of the lung, and run its course without implicating the pleura? Such an event seems to occur sometimes, but it is extremely difficult to obtain post-mortem evidences of it. In the statistics of St. George's Hospital, extending over twenty years, I can find no such case. Again, may not a true pneumonia affect both lungs symmetrically in their most dependent portions? Such an accident must surely be possible, but the appearance of itself would argue strongly against pneumonia.

What we want most is to reach some deeper sign which shall

underlie these outward manifestations and limit the range of their variations. It has been urged, and I think successfully, that the hyperinosis of pneumonia is its consequence and not its cause. At all events, pneumonia ranks first amongst the diseases which early exhibit that phenomenon; it is the most fibriniferous of them all, and in this association, which links it with pleurisy and pericarditis and acute rheumatism, we have probably the real clue to the specific nature of the affection.

What has been said of lobar hepatization will apply in many respects to the lobular form of it, to that affection, I mean, which, belonging especially to infancy, is a frequent sequel of measles, and directly promoted by bad air and insufficient nutrition. That this so-called pneumonia is, in most cases, not pneumonia at all in any sense, but a simple collapse of outlying lobules, which is generally directly induced by mechanical means, is now generally admitted. It gives rise to no special symptoms of its own, and is rather a measure of the child's feebleness than a substantial disease. It happens, however, sometimes that the lobules which are thus obliterated and withdrawn from all share in the life of the lung swell up again and become distended with pyoid cells; the very fact of collapse brings with it a distinct liability to this further change; it is not necessarily accompanied by pyrexia, nor is it pretended that we can discover by any sign, general or physical, that the collapsed lung has undergone this change. We are invited, indeed, to attempt such a diagnosis by the observation of rise in temperature, although the author who suggests that guide¹ himself adds that no particular temperature need be reached, and admits that in children elevation of temperature occurs from very slight causes. Whatever may be the precise explanation of this filling up of collapsed alveoli, the fact of it is no more than an isolated phenomenon, occurring, often silently, in the course of a prolonged disease, in places which have already become obsolete. A similar event in the adult is seen in the hypostatic consolidation of the dying. There is another event which is apt to befall these collapsed lobules, especially as it seems when that condition is the sequel of measles—I mean the occurrence of gangrene. Now, gangrene is the rarest, if it be ever, the termination of active pneumonia, and in this association we have another illustration of the essential difference between the two processes.

As regards that lobular pneumonia which is said to be an extension of the inflammation from the bronchial mucous membrane to the tissue of the lungs, I would only remark that the explanation receives no support from the conduct of bronchitis generally. If it were the tendency of that affection to set up lung inflammation we should see that tendency, not in the lingering apyrexial catarrhs of

¹ Fox, loc. cit., p. 716.

neglected children, but in the acute bronchitis of vigorous adults. But we see nothing of the kind. There is a concurrence of testimony against the view that the disease is apt so to extend.

It is not inconsistent with the belief I have endeavoured to uphold, that pneumonia is a specific disease, to admit that there are different conditions of the system which in their several degrees may predispose to it. It does no violence to any theory which may be framed as to the essential cause of pneumonia to suppose that the particular condition of blood which predisposes to it may be either temporary or permanent. The imperfect elimination of effete products of the body which renders the system liable to pneumonia may be an accident of the moment or an abiding condition of disease. Pneumonia may thus deserve the name of a secondary or consecutive affection, because these predisposing causes have been recognised long enough to have obtained the name and status of a disease. It may be accepted, for instance, as an observed fact that albuminuria renders the system liable to pneumonia; perhaps rheumatic fever may do so also. Thus, while I believe it to be untrue and vicious to speak as we do of pneumonia grafting itself on to various diseases, and making its appearance sooner or later in a sneaking sort of way in many cases of prolonged dying, I cannot suppose that this affection more than any other is absolutely unvarying. It must occur like the rest in various associations, and the features of an antecedent or coexisting disease may help to mask its own. But the essential factors of pneumonia nothing can suppress. *In life*, besides the physical signs and their orderly succession, a sudden origin in heightened temperature, a diminution of chlorides in the urine, a change in the character of the sputa, a period of active fever followed by a sudden lull or subsiding into the ordinary run of the older disease. *At death*, solidity of the lung by the packing together of pyoid cells, with or without breaking down and liquefaction in certain portions, attending pleurisy, and indications furnished by the site of the disease that its cause and progress were independent of mechanical agency.

The conclusions to which the foregoing considerations chiefly point may be briefly summed up as follows. The appearance of expelled cell-forms and blood-corpuscles in a fluid whose characters approach more or less nearly to dissolved fibrin is a phenomenon which has far wider connections than any which would suffice to bind it to a single group of clinical facts. There needs in every case some further and more distinctive evidence to enable us to determine its mode of origin and practical significance.

In the lungs this appearance may be either the local expression of a specific disease—pneumonia—or the direct result of mechanical obstruction, or a general failure of the vital powers occurring under very various conditions. The mode of access, the progress and the

associated pathology of pneumonia sufficiently distinguish it as a disease by itself; there is no warrant (in convenience or essential likeness) for extending that name to the numerous cases which resemble it in any respect alone. These latter exhibit no likeness to pneumonia during life, and the anatomical likeness (which death alone records) constitutes no closer bond of union than that which unites all pustular diseases, or all diseases displaying some local hæmorrhage.

Chronicle of Medical Science.

REPORT ON OTOLOGY.

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PART I.—ANATOMY AND PHYSIOLOGY.

Voltolini ('*Monatsschrift für Ohrenheilkunde*, ii, No. 7) considers the auricle as a reflector, condenser, and conductor of sound, and observes that it consists of two concentric parabolas, the outer, or fossa of the concha, throwing the vibrations of sound against the tragus. [Mr. Toynbee found in a case in which the auricle had been wholly removed that the hearing was equal to that of the opposite side, which appeared normal.]

Dr. V. Urbandschitch ('*Centrablatt Med. Wissensch.*, 1872, No. 8) found that there were spots in which a vibrating tuning-fork passed in front of the ear was not heard. The tuning-fork, held perpendicularly, its upper end on a level with the lower part of the tragus, should be moved along under the margin of the zygomatic bones, backwards towards the occiput, and the perception of the sound is interrupted at two spots. The first of these is usually at the lower end of the tragus, and the second at the point in which the helix cuts the above line. Before, behind, and between these two spots the sound is heard, but gradually becomes fainter on approaching these spots, and then gradually increases. If a horizontally held fork be moved vertically upwards from the lobule this phenomenon is repeated near the crista helicis.

The areas of deafness have the form of two little triangles, the first extending forwards and upwards, the second backwards and upwards. The sides of the first diverge from their apex at the tragus as they pass upwards towards the frontal and parietal bones, so that at the level of the upper part of the helix they are 1 cm. apart, and at the level of the frontal protuberance from 2—3 cm. apart. The sides of the second triangle pass upwards and backwards from its apex at the lobules towards the frontal and occipital bones. The third deaf spot is a small surface between the crista and the helix.

¹ In this report nothing more than an outline is attempted, with no precise limit as to date. I beg to express my obligations to Dr. St. John Roosa, Dr. J. Orne Green, Dr. Busk, and Dr. C. J. Blake, for aid derived from their valuable Reports to the American Otological Society.

These phenomena remain constant if the auricle be covered by the hand or filled with wax, and also were observed in a case of considerable destruction of the membrane.

Berthold ('*Monatsschrift*,' vi, 5) ascribes these results to interference of the vibrations from the two arms of the tuning-fork, and points out that the deaf spots disappear if the fork be turned on its long axis. If a small-mouthed tube be placed in the vicinity of a vibrating tuning-fork and moved in various directions, points will be found at which the sound will cease. Or if a bottle be taken, giving the same note as the fork, and it be passed slowly across the mouth, the tone ceases when the first branch passes one inner edge and the second branch is near the other. The tick of the watch is not affected.

With this latter statement Blake ('*Trans. Amer. Otol. Soc.*,' 1872, p. 29) does not agree. A watch is most distinctly heard at a point in a direct line with the most vibratile part of the membrane—the posterior superior segment—and in which line, for the most part, the passage of sound along the meatus is uninterrupted.

Dr. Blake (late Contrib. to '*Aural Surgery*,' Boston, 1870) recommends for operations within the meatus a new form of speculum, by which the operator is released from the necessity of using a reflector.

It consists of a hard rubber speculum (Poltzer's) of the largest size, fitted with a metallic rim, to which is attached a revolving prism and an arm, bearing at its outer end a lens of about an inch focus; this arm is movable, but sufficiently firm to remain fixed at any angle at which it is placed. The prism is just within the focal distance of the lens, and its incident face is armed with a small metal shield, having an opening in the centre corresponding in its short diameter to the diameter of the pencil of light falling upon it from the lens.

The advantage of the prism over a mirror or other reflecting surface is that we have almost total reflection, and but little of the light concentrated upon the prism by the lens is lost.

In operating an assistant is required to draw the auricle upward and backward, and keep the speculum in position, with the pencil of light upon the opening in the shield of the prism. The instrument, as a whole, weighs only about 150 grains, and can be made much lighter, so that when once firmly inserted in the meatus it remains in position, and there is no necessity for holding it nor fear of its slipping out of place during the operation.

Mr. Moxhay ('*Brit. Med. Journ.*,' March 12, 1870) reports another instance of supernumerary auricles. In addition to the two perfect ears there were, on the right side, three, and on the left two, rudimentary auricles, one of those on the right being a rather perfect specimen, showing helix and ante-helix, and tragus and ante-tragus. There was deficiency, also, of the right ramus of the lower jaw.

Dr. J. Kessel (Abstract by Von Troeltsch, '*Arch. fur Ohrenheilkunde*,' v, Heft 3) reports on the *nerves and lymphatics* of the human membrana tympani. If the epithelial layer be removed from the mucous layer of the tympanum by a camel's-hair brush, a fibrous growth, bridging over the membrana propria, and described by Gruber as "dendritic structure," is exposed. This varies in its development, but

is most constant at the posterior segment of the membrane. Into the tunnel-like channels of this structure, formed by bands passing in different directions, the nerves, blood-vessels, and lymphatics enter before reaching the outer surface of the membrane through the fibrous radiating layer. A series of cavities is thus enclosed between the membrana propria and the fibrous framework in which the sub-epithelial blood-vessels, and especially the lymphatics, enter. The structure of these cavities is similar to the lymph-sacs of frogs, as they are covered with epithelium. The lymphatics, like the nerves and blood-vessels, are arranged in three layers. In the cutis they form the finest network under the rete Malpighi, gradually passing into capillaries. These frequently intercross with the blood capillaries, and finally form larger trunks, which run either backwards, upwards, or in curves towards the periphery. In the mucous layer there are also networks, with numerous swellings. These either pass towards the periphery or into the series of cavities, and there form sinus-like dilatations. The capillaries proceeding from these pass through the membrana propria, partly directly and partly through the deeper situated tunnel-like passages, so that nearly all the lymphatics of the membrana tympani communicate with those of the cutis.

The principal nerve-trunk divides into two branches, one of which supplies the front, the other the posterior and superior portion of the membrana tympani. These branches pass into numerous fibres, having the white matter of Schwann, but no axis-cylinder, and form abundant plexuses around the blood-vessels. A second kind of fibre consists of the axis-cylinder without any white matter, and presents swellings in many spots.

The nerves of the mucous layer are derived partly from the tympanic plexus, but in chief part from fibres from the cutis layer, which have passed through the membrana propria. The membrana propria thus conducts nerves, blood-vessels, and lymphatics.

In dogs the lymphatics of the membrana tympani can be most beautifully and completely filled from the tympanum. Any change in the tension of the membrane might thus exert a suction effect on the contents of the tympanum, and eventually promote the further movement of the contents of the lymphatics.

Dr. Naviloff (*ibid.*) has found in the connective tissue of the roof of the tympanum, near the membrane, a body of microscopic size, oval in outline, surrounded by a connective-tissue capsule perforated by capillaries, processes from which pass inwards, forming a kind of network, the spaces of which are filled by abundance of lymphatic corpuscles. From its striking similarity to the lymphatic glands, it must be assumed to be the lymphatic gland of the tympanum.

Dr. Burnett ('*Monatsschr.*,' Feb., 1872) found in the membrana tympani of dogs, cats, and rabbits, a series of blood-vessels, starting from the periphery, running towards the centre, and then returning, forming loops. These vessels were accompanied by nerves, which divided fork-like: a similar arrangement was seen in the vessels which started from the handle of the malleus.

As a result of this arrangement a portion of the membrane between

the handle of malleus and periphery is more without capillaries, and would be less influenced by vascular disturbance, and so, therefore, also, its vibrations less disturbed.

Dr. J. Grüber ('Wochenblatt der k. k. Gesel.,' 1867, Nos. 1 and 2) affirms that the short process and greater part of the handle of the malleus are connected with the membrana tympani by a kind of joint, to which the handle of the malleus is attached only by its anterior and posterior margins, but aside from these attachments is free, while the short process of the malleus is surrounded by a concave articular surface, situated in the membrana tympani, the articular cavity thus formed being filled with synovia.

In opposition to him, but in agreement with Prussak and Kessel, Moos ('Arch. of Ophthalmology and Otology,' vol. i, No. 1, p. 283) describes the union as not articular. The membrane, with the annulus, osseous, and cartilaginous, were laid for two hours in one per cent. chromic acid with hydrochloric acid, and then imbedded in wax or paraffin. Transverse and longitudinal sections were then made without any possible injury to the tissues. A second immersion in the acids was sometimes necessary.

In a child fourteen days old a mass of hyaline cartilage is seen in the centre of a transverse section of the handle of the malleus, representing the not as yet bony malleus, and between the perichondrium and this cartilage a most intimate connection existed—no discontinuity or space anywhere. The fibres of the perichondrium surround the handle of the malleus like a ring, and pass continuously on both sides into the fibres of the circular layer of the membrane. Inwards from the periosteum and perichondrium is the mucous covering.

In adults, also, two layers can be made out in a transverse section of the handle of the malleus. A central larger one consisting of bony substance, with very numerous blood channels, and a peripheral thinner one, passing without any sharp line of demarcation into the periosteum surrounding the handle of the malleus. The connection here, also, between the mucous membrane, periosteum, and bone, is continuous, and there are no spaces and no discontinuity.

The peripheral cartilage is a transitional tissue to be formed into bone. It arises from the growing layer of periosteum, and is found where there is any periosteal ossification.

Prussak describes the cartilage-cells as present between the osseous elements in adults, as well as children. In infants the short process is almost entirely hyaline cartilage. The centre gradually ossifies, but, as Prussak affirms, even in adults the diameter of the peripheral cartilage is the larger.

Politzer ('Wiener Med. Woch.,' 1870) describes a *System of Cavities between the Membrana Tympani and the Neck of the Malleus*.—Just above the short process of the malleus, a portion of the membrane, bounded above by the bone and below by two bands which diverge from the short process of the malleus, appears from the outside to be thinner and sunken in. These bands, described first by Prussak, form, according to him, the upper boundaries of Von Tröltzsch's pockets of the membrane, are described by Helmholtz as the upper ligaments of the malleus. They also, as Helmholtz says, bound the sound receiving

portion of the membrane. This laxer portion of the membrane is called *membrana flaccida*, and between this and the neck of the malleus is a space described by Prussak as the superior pocket of the membrane. According to him the *membrana flaccida* divides superiorly into two layers, the external passing to the superior wall of the meatus, the inner to the *crista capitis mallei*, being identical with the *ligamentum mallei externum* described by Helmholtz. Between these two layers is contained the superior pocket, bounded externally by the *membrana flaccida*, below by the short process, internally by the neck of the malleus, above by the layer extending to the *crista capitis mallei*, and which opens posteriorly into the tympanum.

Politzer's first investigations were made on carefully dried preparations. The membranes, as well as the folds and ligaments extending to the malleus, become thin, stretched, and more sharply defined, and the malleus becoming fixed, the spaces between it and the membrane and their boundaries are more easily made out than in a fresh state. In the dried condition also single ligaments and membranes can be removed without injuring other parts.

If, now, one removes from without with a sharp knife the *membrana flaccida* from its insertion into the bone, and from the short process and Prussak's bands, a cavity is seen, the walls of which can be looked over with a lens, and any opening into the tympanum discovered with a bristle. On the inner surface of the membrane, in dried preparations with a good light, the upper boundaries of Tröltzsch's pockets can be defined, and from above the *ligamentum mallei ext.*, entering between the outer wall of the tympanum and malleus can be seen. To complete the examination the incus should be removed from the malleus, and thus a side view into the space between the malleus and the external tympanic wall is obtained.

From these examinations it was shown that usually there is above the short process a space separated from Tröltzsch's pockets (Prussak's upper pocket), which communicates with the tympanum in different positions in different specimens. That this space belongs mostly to the posterior pocket of the membrane, as Helmholtz says, could not be proved. Almost without exception the separation was complete, and therefore the point of union of the upper margin of Tröltzsch's fold with the tympani *membrana* did not reach up to Rivini's segment, but was lower down, near the lower boundary of the *membrana flaccida*. Prussak's statement that the position corresponded to Prussak's band, visible on the external surface of the membrane, was not proved always correct, for in several preparations the attachments of both Tröltzsch's folds was below the boundary of the *membrana flaccida*.

The communicating opening of the space above the short process and Tröltzsch's pocket was in some cases in the spot Prussak has pointed out, viz. directed backwards in the space between the external surface of the incus and the external wall of the tympanum. Its size varied from an orifice only large enough for a fine bristle to pass to half a millimetre.

In other cases this space communicates with the anterior pocket of the membrane by a fine orifice. In two cases, besides this opening

there was a second communication of the cavity above the short process with the space above the ligamentum mallei externum, and on the outer periphery of the band, where it unites with the ligamentum mallei arterius. These results were confirmed when the calcareous salts were removed.

Immediately above the short process is a considerable cavity, and above this a series of cavities, which is bounded externally by the upper part of the membrana flaccida, above by a membrane which is an extension of the mucous membrane of the external wall of the tympanum, downwards and inwards to the neck of the malleus; the bony rim of Rivini's segment projects into it. It consists of a variable number of smaller and larger membranous cavities, roundish or oval in form, and lined with epithelium, like the larger space above the short process very often contains a yellowish transparent lymph-like fluid.

[This portion of the tympanum is often of great importance in disease: collections of matter form there and are frequently difficult thereby to cure, partly owing in all probability to the complex membranous structure present.]

Politzer ('Archiv. für Ohrenheilk.,' 1869, Heft 3) describes also *Pedunculated Structures in the Human Tympanum*.—Besides the membranous folds extending from the walls of the tympanum to the ossicula, and which form their supporting and restraining ligaments, a number of inconstant connective-tissue bands are usually found in the tympanum. These are either in the form of plates, or pass in branching bands between the walls of the tympanum and the ossicula. They also occur in the larger mastoid cells.

On microscopic examination of these membranes and bands, which are to be regarded as the residues of the gelatinous tissue which fills the middle ear in foetal life, Politzer found peculiar structures. They appear to the naked eye as little roundish or oval points, more often in the mastoid process than in the tympanum. Under the microscope they present the most varied forms. The long oval form is most frequent, constricted at one or more spots or pear-shaped, seldom triangular. They are covered with epithelium, and have a fibrous laminated structure, the fibres running parallel with the external contour; between the laminae here and there spindle-shaped cells are scattered.

A fibrous peduncle, varying in length, springing from the mucous membrane enters at the rounded end of the structure, and passing through it sharply defined, emerges at the other end, and is again inserted on a membranous base on the opposite bony wall. The peduncles, which can often be followed for some distance along the membrane, are sometimes very long, of fibrous structure, with spindle-shaped cells scattered about. On a long peduncle a roundish swelling may be found, and at its insertion a triangular expansion of its fibrous bands, presenting a similar arrangement to those on the inner surface of the membrana tympani.

In the oval form the peduncle enters the structure well-defined through a rounded end; as it passes out, however, the external layers of the structure are continued over it, so that it receives a covering which bounds the fibrous structure like a bright stripe. At times the

peduncle passes through several structures, or may itself divide into two. Sometimes I found the three peduncles of a triangular structure directly inserted into bone. Their size varies from one to nine inches. They are not found in all cases, though I have found them in more than a third of the ears examined by me, and oftener in normal than pathological preparations. Sometimes only one of these is found on a membranous band, but sometimes also on a membranous plate six or eight.

As a morbid condition in a long-standing case of deafness, Von Trötsch describes a roundish peculiar body, situated on a delicate membrane, which covered the entrance to the fenestra rotunda. It was of yellowish colour, and resembled a Pacini's corpuscle. On strong pressure its very coherent contents, finely granular in the centre, escaped, and then a flattened bladder remained. This body was of moderate size, with a magnifying power of 300, taking up a quarter of the field. Another yellowish and bulbous body of the same kind, only smaller (perhaps cystoid), was also found on the same membrane, and connected to a small peduncle. Politzer has seen similar pedunculated cyst-like formations on the inner surface of the membrana tympani; but they differ from these; consisting of a bladder with thick fluid contents, and not entirely of fibrous tissue, and further in the peduncle not passing through them and emerging at the other end.

Dr. J. Orne Green ('Trans. Amer. Otol. Soc.,' 1870, p. 10) refers to the papillæ found by Popper on the external surface of the membrane, as of interest in connection with the polypi which sometimes form in that position. He regarded them as loops of capillary vessels. Nasiloff (*ibid.*) has described also a shaggy condition of the dermoid layer as "myringitis villosa," which appears to be due to hypertrophy of these papillæ.

Dr. Rüdinger ('Monatsschrift,' March, 1872) confirms previous observations of his own on the articulations of the ossicula. The malleo-incudal and incudo-stapedial articulations are true joints, with intervening fibro-cartilages, which are attached only to the capsules, and not to the articular cartilages, agreeing in many respects with the lower jaw and sterno-clavicular articulations. Bremner's statement that they are symphyses, the fibro-cartilage being attached to the articular cartilages, he considers insufficiently based, as his observations were made on fetuses, in whom, according to Henle, "many portions of the skeleton have an uninterrupted connection, which in the mature body articulate by smooth surfaces, their complete morphological structure being attained only by their physiological action."

A. Eysell and Rüdinger (*ibid.*) agree that the connection between the fenestra ovalis and stapes belongs to the group of the symphyses, and to a great extent is similar to that of the bodies of the vertebrae. Rüdinger describes a series of spaces filled with fluid in the centre of the symphysis. Bremner says there are no hollow spaces, but describes a much finer fibrillation and more homogeneous structure in the centre than the peripheral parts, with numerous cartilage cells, and staining somewhat more with carmine. The centre part only tears on section, another sign of its greater delicacy.

The malleo-incudal articulation is described by most, and confirmed by Bremner, as a true joint, both articular surfaces covered with cartilage and in contact, and a capsular ligament loosely extended from bone to bone. Rüdinger describes the two articular surfaces as being separated by a meniscus. No doubt both are correct, but the latter form is only a variation from the normal, and extremely rare.

It is agreed by the three that the stapes, strictly taken, breaks into two principal parts, a bony basis and a cartilaginous coating, the latter looking towards the vestibule, and continuous with the cartilage, covering the margins of the bony plate described by Toynbee. The cartilage is twice as thick as the bony plate.

The mucous membrane of the tympanum, according to Bremner, consists of a thin layer of connective tissue, covered by two layers of ciliated cylindrical epithelium. The inner surface of the membrane, the ossicula, the pockets of the membrane and the mastoid cells, are covered generally only by a single layer of non-ciliated squamous epithelium. The change from cylindrical to squamous epithelium takes place close to the end of the circular fibres of the membrane. He could find no glands of any kind in the mucous membrane: fat globules at times.

Bremner considers there are many reasons for thinking the purulent aural catarrh of children, which is present in 70—80 per cent., and usually is considered a pathological condition, is rather an imperfect advance from the foetal condition. Against the contrary belief he adduces the great frequency of this condition in the fully-developed foetus, the absence of clinical symptoms, the fact that both ears shows the same condition.

Dr. Burnett, of Philadelphia ('Monthly Journal of Aural Surgery,' July, 1871), has made investigations into the mechanism of the ossicula and the membrane of the fenestra rotunda. They were undertaken at the suggestion of Helmholtz, and were carried out on fresh petrous bones taken from people of both sexes between seventeen and sixty. The chief object was to gain a knowledge of the state of the membrane of the fenestra rotunda during conduction.

To obtain as close a view as possible of the membrane on the examination, the floor of the tympanum was taken away as high as the fenestra rotunda, and also the *tube* removed. The membrana tympani with its surrounding bones, the chain of ossicula, the lining membrane of the tympanum, and the labyrinth, remained uninjured. A flute producing 140 vibrations in a second, and a reed-pipe about 50 vibrations per second, then were brought into connection with the ear by an india-rubber tube, at one end of which there was a *glass tube* for insertion into the external meatus, by means of sealing-wax.

The flutes lay on separate tables during the experiments, that no shaking might be imparted to the petrous bones. The membrane of the fenestra rotunda and the ossicula were sprinkled with starch by a brush. A microscopic magnifying power, 25 diameters, was used, and the floor of the tympanum was removed.

(1) A note was produced on one of the flutes, and on microscopic examination the starch-granules appeared as little lines, which varied

in length according to the variation of the notes. Movements of the starch-granules on the fenestra rotunda were also observed when the microscope was directed at an angle of 45° . The variation in the extent of the excursions of the membrane, corresponded in every case to the variations which were observed in the starch-granules on the stapes.

(2) In one preparation, with the same notes which in all the others produced very plainly considerable excursions, only very slight movements of the ossicula were caused, while no motion at all of the membrane of the fenestra rotunda was occasioned.

To arrive at the explanation of this appearance, and to discover whether any increased or diminished pressure within the labyrinth had given occasion for it, a small opening was made in the superior semicircular canal, and a little glass tube, about 1 cm. long, fastened over the opening.

The preparation was then put into water and set under an air-pump, to remove any air that had entered the labyrinth. After this the glass tube which communicated with the superior semicircular canal, now filled with water, was connected with a narrow caoutchouc tube, and this latter with a glass funnel, which was supported on a stand. Water was poured into the funnel.

Whenever, now, a higher or lower position on the stand was given to the funnel, and so the pressure within the labyrinth increased or diminished in like manner, the membrane of the fenestra rotunda was seen to move more or less. The ossicula and membrane were now sprinkled with starch, and observed now during the production of the same note as before. They remained *as they were*, no longer any appearance of excursions.

If pressure was increased only to a slight extent, the excursions were very considerable, and visible to the same extent on the ossicula as on the membrane of the fenestra rotunda. But if the pressure of water was very great, the visible excursions of the above-named parts disappeared, and certainly decidedly earlier at the higher than at the lower notes. The investigations agree so far completely with the theories of Ed. Weber and Helmholtz.

Dr. Berthold ('*Monatsschrift*,' i, 1872) has devised a method for rendering visible the movements of the membrana tympani, produced by the conduction of sound through the cranial bones in the living. He inserts one end of a T-shaped tube, air-tight, into the meatus, connects the second with a gas pipe by an indian-rubber tube, and so arranges the third that the gas pouring through it may burn with a small vertical flame. If a sounding tuning-fork be now held on the top of the head the sound conducted along the bones will cause the membrane to vibrate and these vibrations continued through the gas in the arm of the T tube will cause movement of the flame. The movements may be observed in a rotating mirror.

The length of the india-rubber tube much influences the sensitiveness of the flame—the shorter the better—but from four to six inches is the most convenient length with a diameter of $\frac{1}{4}$ inch. To ensure the end in the ear being air-tight sealing wax was dropped on it, and so it was

moulded accurately to the meatus; a flame of from $\frac{1}{2}$ " to $\frac{3}{4}$ " gave the best results. Care should be taken that all the air has been driven out from the tube, and that it is fitted air-tight into the meatus, or the flame may pass along to that end of the tube. In such a case compressing the tube would prevent any mischief; to prevent the possibility of this a thin membrane may be fastened over the ear end of the tube, but this will interfere with the movements.

To display the movements of the flame a four-sided prism was used, whose sides were plane mirrors, and which could be rotated quickly or slowly at pleasure by means of a mechanical arrangement. On rotation the image of the flame was now a horizontal line, and on any movement of the flame wavy lines appeared, having a character according to the height and intensity of the note.

The voice gave the best image when the lips were closed in singing (humming). The tuning-fork best when placed on the teeth. Lower notes gave undulating lines whose undulations were wider than those of higher notes. The latter often produced very beautiful tongue-shaped elevations with bright yellow point and deep blue base.

To prove that the movement of the flame was produced by movement of the membrane, and not of the walls of the meatus extending to the glass tube, the meatus was filled with lukewarm water and the tube inserted into it. This would not affect the movement of the walls of the meatus, but would diminish the movements of the membrane, and the movements of the flame were much diminished. On closing the end of the tube with sealing wax no movement of the flame at all was produced, so there remained no doubt that it was the movements of the membrane which produced the movements of the flame.

On increasing the atmospheric pressure in the tympanum by Val-salva's method the movements were diminished, and also in a much less degree by exhausting the air. It may also be possible to show the vibrations of the membrane by sound conducted through the air by connecting the ear end of the T tube with a Weber's catheter introduced into the tympanum.

Mach and Kessel ('Versam. Deut.-Naturforscher,' 1871,) by the use of a siren, have shown that the basilar membrane of the cochlea moves from the scala vestibuli towards the scala tympani when the stapes presses inwards.

Lucae ('Berliner Klin. Woch.,' No. 10, 1871).—In reference to the usual explanation of the tuning-fork placed on the skull being heard loudest in the ear which is closed, viz. that the sound waves are thus prevented escaping on that side, and that the acting force of the sound is to be measured by the constant difference between the afflux and efflux, and so must change as the efflux or afflux be disturbed; Lucae not only doubts any efflux of sound, but says that any increase of the sound depends essentially on the length of the column of air enclosed in the external meatus. If the sound of a *c'* tuning-fork be conducted into an arm of a T tube, another arm of which is connected with the ear, and the third arm measuring about an inch in length be stopped by the finger, a very considerable increase of the sound will be perceived. The result varies according to the relative

lengths of the sound wave and the arm. If the arm be twelve inches long, *i.e.* a fourth the length of the sound wave c' , Quincke's interference apparatus is formed, and a very considerable muffling of the fundamental note is effected.

Similar results are obtained with the fork on the head. The column of air enclosed in the meatus by closing the ear, being about an inch long, produces by reflection an increase of the sound, and especially of the lower notes, as was pointed out by Weber. If the meatus be lengthened [by inserting a tube about eleven inches long] to twelve inches, on stopping the free end of the tube a muffling of the fundamental note is produced, the octave plainly predominating.

With a tube twenty-three inches long a very marked increase of the fundamental note is produced, as in this case the to-and-fro movement of the reflected wave measures a whole wave length of the note c' .

To show the effect the direction of the vibrations propagated along the bone had upon the vibration of the membrane, Lucae, after opening the roof of the tympanum, and fastening, a lever along the handle of the malleus on the inner surface of the membrane, screwed on the petrous bone to the handle of a low-toned tuning-fork thrown into steady electro-magnetic vibrations. By rotating the bone different positions could be given to it, so that the vibrations conducted longitudinally along the handle of the fork to the ear, at one time fell more horizontally, at another at perpendicularly to the plane of the membrane. The lever showed the most marked vibrations in the latter case, as in this position the membrane was thrown into strong transverse vibrations.

By making transverse sections of the frozen skull through both meatuses and membranes the relative position of the latter is exhibited. In adults the inclination of the membranes to the horizontal line is such that the prolongations of their planes downwards meet at right angles about 2 cm. below the foramen magnum. It follows from this that the vibrations of the tuning-fork on the head must fall virtually on the right membrane when the handle of the fork is placed on the left temporal bone directed diagonally towards the opposite ear.

A loud tuning-fork placed on the top of the head is heard equally on both sides, if both meatuses be stopped up, but if the fork be held in the above position the sound will be very loud and almost entirely in the opposite ear.

Helmholz ('Die Mechanik der Gehörknochelchen und des Trommelfell's,' Bonn, 1869) discusses minutely the mechanical relations of the ossicula and membrane, and the mathematical theory of their action in conduction of sound; and a few points can be extracted from this splendid work. He first establishes the position that the ossicula and fluid of the labyrinth must be considered to vibrate as a rigid mass (as first urged by Weber) on the ground that the motions possible in them are infinitely small as compared with the waves of sound. In respect to the structure of the membrane, Helmholz lays stress on the inextensibility of the fibrous layers, which resemble tendon rather than elastic tissue. Like tendon, also, it was quickly dissolved by boiling in dilute alkali, leaving a remnant, partly composed of vessels and

partly consisting of a very thin continuous membrane, apparently the basis of the mucous layer. The reflection of light from its surface is due to a fatty condition of the epidermic cells. The malleus, besides its other attachments, has a special ligament, or rather portion of two ligaments running anteriorly and posteriorly, which form a strong axis-band on which it rotates. The other ligaments prevent a too strong traction on this band in any direction; and even the passive tension of the tensor tympani gives a very tense poise to the bone, and by its action all the ligaments of the ossicula, except the lig. mallei superius, are placed in active tension. The malleo-incudal joint suffers the malleus to move outwards considerably without carrying the incus with it, being furnished with "cogs" which clench only on the inward motion. So the stapes is preserved from excessive outward traction; the membrana tympani guards it from pressure inwards. Its greatest natural motion is $\frac{1}{13}$ mm. If the ossicula lie firmly together each excursion of the long process of the incus will equal only $\frac{2}{3}$ rds of that of the malleus-handle; but the force it transmits to the stapes will be $1\frac{1}{2}$ times as great as that which acts on the extremity of the handle. The arching of the radial fibres of the membrane is very important in respect to their reception of sound, and has the effect that a very small air pressure on them is equivalent to a great force acting on the malleus; its movement being proportionately less also, they guard against excessive external pressure on the stapes, because beyond the point at which they are made straight, force applied would bend them inwards and so draw the malleus outwards.

Politzer ('Arch. f. Ohrenkeilk.', B. iv, H. i), treats again of physiological acoustics with a view to pathology. Any ordinary tense membrane is thrown into the strongest vibrations by notes similar to its own note when struck, and the vibrations generally diminish with notes either higher or lower than this. The membrana tympani, on the contrary, can transmit notes of the most varying pitch, not only one after the other but simultaneously.

This eminent conducting power has been ascribed partly to the peculiar structure of the membrane, and partly to its state of tension. On the one hand it was said that the varying density and power of vibration in certain spots produced by the arrangement of its radiating or circular fibres rendered the excitement of the membrane at the same time by different notes possible. On the other hand the different tension of the anterior and posterior segments of the membrane produced by the traction of the handle of the malleus was looked upon as the cause of this vibratory power; as it was assumed that the anterior part was especially affected by high, the posterior part by low notes. Helmholtz, however, had shown that curved membranes have a much greater resonating power than flat ones, the resonance extending over the greater part of the scale.

By means of an apparatus to represent the tympanum on a large scale Politzer found that the notes of high and low tuning-forks, scarcely perceptible when the membrane was flat, became immediately distinct as soon as the membrane was made concave by pulling on the malleus. Besides being concave at the umbo the membrane is

convex near the periphery, and so the stretched radial fibres present convex arches which Helmholtz considers favorable points of reception for the various sound waves.

From his experiments Politzer found, however, that whether the membrane was concave or convex towards the sound waves its resonance was equally increased, and he considers the different tension of the individual parts of the membrane between the handle of the malleus and the periphery produced by the inward bulging of the membrane to be an important factor for the simultaneous reception of different notes.¹

The obliquity of the membrana tympani towards the axis of the meatus diminishes the effect of the sound waves upon it, a portion of them being reflected. The anterior lower half of the membrane, however, by the traction of the handle of the malleus is almost at right angles to the axis of the meatus, and here the full effect of the sound waves is produced. The loss of intensity is, however, partly compensated for by their being reflected into the front part of the floor of the osseous meatus.

The ossicula form a lever apparatus by which the vibrations of the membrane are transmitted to the labyrinth. The several bones vibrate as one mass. By attaching glass threads to the bones and causing the membrana tympani to vibrate, the glass lever of the malleus was seen to make much greater excursions than that of the incus, and that attached to stapes the least. In this way it was proved that the axis of the ossicula was not fixed but movable, and that on conducting sound waves from the membrane to the labyrinth the vibrations of the malleus were greater than of the incus, and of the incus than the stapes.

Dr. Buck by measuring with a micrometer the little lines into which starch-granules scattered over the ossicula, and examined by the microscope appeared to be drawn out by the vibrations of the membrana tympani, has proved more recently that the vibrations of the malleus are twice as large as those of the incus, and four times as large as those of the stapes.

The intensity of the sound waves is thus diminished on their passage from the membrane to the labyrinth, and in this sense Ludwig's view, that the ossicula, besides acting as a conductor of sound, at the same time are *damping organs*, is correct. On the other hand, condensation of the sound waves must take place on their way to the labyrinth as they pass from the greater surface of the membrana tympani to the smaller one of the stapes.

By the arrangement of the malleo-incudal joint the ear is protected against any violent concussion from within the tympanum. On any violent concussion affecting the membrane by sudden condensation of

¹ According to Prof. Stern, the less bodies are capable of themselves giving musical notes the better do they conduct vibrations of sound. Catgut and membranes give musical notes by means of transverse vibrations, which are only possible when they are on one plane, impossible when stretched in curved lines or surfaces, and so in the latter case they strengthen the notes of every tuning-fork, in the former they do not.

the air in the meatus, the whole chain of ossicula is, indeed, driven quickly inwards, but the violent shock which would injure the labyrinth is diminished by the radiating fibres of the membrane being arched outwards; the arch thus will be entirely flattened by any force acting upon its convex surface before the malleus will be driven with violence against the incus.

In the same way the labyrinth is protected on any sudden condensation of the air within the tympanum, by the very slight movement of the incus and stapes, which accompanies even extensive movements of the handle of the malleus outwards.

The resistance to the vibrations of the ossicula produced partly by their ligaments, and partly by the ligaments and folds of mucous membrane between them and the walls of the tympanum, are of the greatest importance for the reception and conduction of sound waves of such varied lengths. They also maintain a sufficient degree of firmness in the ossicula by which the necessary relation between the tension of the membrane and bones is preserved. If this be altered by pathological processes the conduction of sound must be interfered with. Increased tension of the membrane as in Eustachian obstruction will produce diminished tension of the ossicula.

Politzer used minute glass beads instead of starch. His conclusions are—

1. That with notes of equal intensity falling upon the membrana tympani the vibrations of the ossicula were less intense with low notes than with high ones; the intensity diminishes, however, with very high notes.

2. On words being spoken into the meatus the ossicula showed as many vibrations as there were syllables in the word, the greatest movement occurring with the vowels, that with the consonants very slight in comparison.

With little pieces of wax attached to different parts of the membrane and the ossicula to imitate the products of the disease, it was found that the intensity of the vibrations of the ossicula was but little diminished when the membrane was thus encumbered, but very considerably if the malleus or one of the other bones was thus treated. High notes in this case also produced stronger vibrations than low ones, and musical notes than words.

These results agree with those observed in disease. Changes in the membrana tympani—as scars, calcareous deposits, perforations—less affecting the hearing than pathological products (adhesions, anchyloses, &c.), on the ossicula, and in these cases also the higher notes are better heard than the lower, and musical notes than speech.

3. In artificial destruction of the membrane the vibration of the malleus will be less; but if an artificial membrane be inserted and its caoutchouc plate brought into contact with the handle of the malleus the vibrations will again become more intense. This result confirms the view that the artificial membrane (Toynbee's) improves the hearing, not only by pressure, but also by acting as a vibrating plate.

4. The clinking sound in the ear produced by vibrations is not caused, as Helmholtz asserts, by the striking together of the teeth of

the malleo-incudal articulation, but by the whizzing of the membrane and ligaments of the ossicula. These clinking notes can be produced in the dead subject even when the malleo-incudal articulation is artificially anchylosed.

Dr. Oscar Wolff ('Sprache und Ohr,' Braunschweig, 1871) enters at length into the reception of the various elements of speech by the ear. Among the consonants *sch* is heard loudest and *h* least loud, the force of any letter depending very much upon the harmonics which accompany its ground-note. The vowels range as follows:—*a, o, ei, e, i, eu, au, u*, pronounced as in German. In cases of partial destruction of the membrane the vowels were heard disproportionately better than the consonants, which were worse heard in proportion to the size of the defect, and the better in proportion to the pitch of their ground-tone and the number of their harmonics; a rhythmical utterance diminished the difficulty. On experimenting with an artificial meatus and membrane it was found that the resonance was much greater for the voice than for a violoncello, and that partial destruction weakened it and raised the pitch of the resonance. This was more diminished by hindrances to the propagation of the vibrations than by losses of substance. It must be held, Wolff thinks, that sounds are conveyed both by movement of the stapes in the fenestra and by its molecular movements also. In cases of defect of the membrane the last syllable of a word was often heard as if prolonged, especially with an *l* added. This he ascribes to an unchecked motion of the stapes in the fenestra, and so infers a limiting function also of the ossicula, a function in which the Eustachian tube participates by permitting escape of vibrations; probably the contraction of the tensor tympani aids this effect by rendering it more open. That increased tension of the membrane occurs as a protection against very loud sounds is proved by the fact that loud sounds, as of an organ-pipe, are heard as much as half a tone *higher* when close than at a distance. In a case of defective palate the Eustachian tube was seen visibly to open during swallowing, and in the act of retching it could be felt by the finger forcibly to close. Persons with small oral and nasal cavities and narrow meatus are apt to have narrow tubes, and so are disposed to deafness. The question as to the habitual closure or slight patency of the tube probably depends on individual structure. The scale of audible tones extends from 28 to 10,240 (double) vibrations in the second.

Dr. Blake ('Trans. Amer. Otol. Soc.,' July, 1872) examined the limits of hearing for high notes, and the effect of perforation of the membrane. He found that in health it diminished with age from 40,960 (single) vibrations in a second at twelve years to 32,768 at fifty, the sound being the vibrations of a suspended steel rod, and the distance thirty-four feet; any thickening of the membrane lowered the limit; perforations, as a rule, raised it, especially when situated in the posterior superior segment. Size did not make so much difference as situation and the degree of retraction of the tensor tympani. An experiment was happily afforded by a case of disease

of the membrane, in which an incision, followed by the introduction of Politzer's ring, greatly improved the hearing, and especially raised the limit of sound from 35,000 to 80,000 vibrations in the second.

Magnus ('Arch. für Ohrenheilk.,' B. 6, H. 4) reports his observations on a man in whom not only the soft palate but the nose had been destroyed and the mouth of the Eustachian tube freely exposed. The lips did not move on swallowing, which was probably due to the injury (see Wolf's statement, above). A small catheter (Von Troeltsch's No. 1) could be introduced half its curve into the tube. On swallowing, a bulging forward of the posterior wall of the pharynx was visible, forming a distinct transverse ridge, which helps to close the palate.

A. Schapringer ('Sitzb. d. k. Acad. d. Wissensch.,' Oct., 1870) is able to contract at will the tensor tympani. He confirms the now accepted view that the cracking sound sometimes ascribed to this cause is due to contraction of the tensor veli. Contraction of the tensor tympani produces a loud muscular sound, and renders inaudible all vibrations below seventy in the second. If another observer connected his ear with the reporter's by a tube and closed his other ear, he heard all notes above *e* louder when the tensor tympani was contracted; this is ascribed to the increased vibrations of the membrane; which are not perceived by the subject, owing to the rigidity of the ossicula and the subjective sound. He found (as Mach also) that on listening to sounds of different pitch there was no action of the tensor tympani appreciable to the manometer. The natural resonance of the meatus is to tones of about 5340 vibrations; on contracting the tensor tympani it sank to 3700. The proper tone of the membrane (Helmholz)—produced when air is fanned towards the meatus or is gently blown in through a broad elastic tube—evidently lost its deeper constituent sounds.

Dr. Prout ('Boston Med. and Surg. Jour.,' Feb., 1872) proposes to record, not the distance the surgeon's watch is heard, but the *proportion* of the ordinary distance. And Dr. Lucae ('Arch. der Ohrenheilk., vi, 4) describes a phonometer to test the sound of the voice. It consists of a papier mache tube closed at one end by a thin plate of caoutchouc on which a lever moves, the surgeon speaking into the other end.

REPORT ON MATERIA MEDICA AND THERAPEUTICS.

By ROBERT HUNTER SEMPLE, M.D.,

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On the Employment of Hydrate of Chloral in Traumatic Tetanus.
By Dr. VAN SOMEREN, of Madras.—Dr. Van Someren has recently observed some very favorable results from the use of the hydrate of

chloral in cases of traumatic tetanus occurring in the Madras Hospital. Even when recovery did not follow the employment of the drug, the tetanic spasms were manifestly controlled. Dr. Van Someren relates four cases, of which two were cured. In the first case the tetanus supervened upon a severe burn in a boy, aged 14. The hydrate of chloral was given in the dose of eight grains at frequent intervals, and its administration was followed by decided relief of the tetanic symptoms, but eventually the patient died of pulmonary disease and diarrhoea. The second case followed an injury to the eyebrow. Trismus supervened five days after the accident, and after a purgative had been given, hydrate of chloral was administered in doses of fifteen grains every six hours. The patient rapidly improved, and, four days after, the commencement of the treatment, he left the hospital. The third case was that of a child, aged 3, who was run over and sustained an injury to the toes, followed by tetanus. After the bowels had been opened by purgatives, hydrate of chloral was given every three hours in three-grain doses. The treatment was only partially successful and the child died, but it is stated that tetanus had existed two or three days before the treatment was commenced. The fourth case was that of a man who had received an injury in the foot, fracturing four metatarsal bones. Some days after the accident tetanus supervened, and after free purging, hydrate of chloral was given in fifteen-grain doses every three hours. Although the symptoms were obstinate, yet, by a continued use of the remedy, the tetanic rigidity gradually diminished and finally disappeared. Dr. Van Someren thinks that a more heroic administration of the drug than that which is usually recommended would decrease the chances of a fatal issue in tetanus.—*Madras Monthly Journal*, May, 1872.

On the Employment of Hydrate of Chloral by Intra-venous Injection. By Dr. ORÉ, of Bordeaux.—Dr. Oré has lately communicated to the Société de Chirurgie of Paris, a paper containing some remarks on the effect of chloral hydrate injected into the veins. The author has made a number of experiments on the lower animals with this substance, and he draws the following conclusions:—1. The injection of chloral hydrate into the veins produces much more rapid and permanent effects than those which follow its introduction by the digestive canal. 2. Chloral hydrate, employed by injection into the veins in tetanic symptoms caused by strychnia, neutralises the action of this alkaloid so as to render it inert. 3. Chloral hydrate is the antidote to strychnia. 4. It is probable that the injection of chloral hydrate into the veins will constitute an efficacious remedy in tetanus. 5. Employed in the manner described by Dr. Oré, chloral hydrate may afford unexpected results in the treatment of convulsive affections and even in hydrophobia. 6. The injection of remedies into the veins is quite harmless. These conclusions of Dr. Oré, it should be mentioned, were not very favorably received by the Société de Chirurgie, to whom they were addressed, and various objections were made to the suggestions offered. Dr. Verneuil, in particular, who has recommended the employment of chloral hydrate in tetanus, stated that the antagonism

of strychnia and chloral hydrate had been long known, and therefore the experiments of Dr. Oré taught nothing new in that respect, and he (Dr. Verneuil) did not believe that the method of intra-venous injections could ever be applicable in the human subject. Tetanus, when it is cured, lasts from a month to six weeks, and it would be necessary, during the whole of that time, to keep the patient under the influence of chloral, and would it be possible to inject the drug five or six times a day into the veins? He thought not. It was necessary, therefore, to find some other mode of introducing it into the system, as, for example, by the skin. Dr. Verneuil announced that he had succeeded in five recent instances in curing traumatic tetanus by chloral hydrate, and Dr. Boinet stated that out of four cases of the same disease he had saved three by the same drug.—*L'Union Médicale*, June, 1872.

On the Use of the Monobromide of Camphor in Nervous Diseases. By Dr. W. A. HAMMOND, New York.—The monobromide of camphor consists of one equivalent of camphor and one of bromine. It is a white crystalline substance, having the smell of camphor, and to a slight extent that of bromine. Dr. Hammond, having learned that a Belgian physician had been employing this substance for more than ten years in delirium tremens and analogous nervous diseases, had some of the preparation manufactured for him, and employed it in his practice. His experience of its use, although at present limited, he states to be eminently satisfactory. In two cases of infantile convulsions due to the irritation of teething it prevented the further occurrence of paroxysms, which had been very frequent before its administration. In each case a grain was given every hour, rubbed up with a little mucilage of acacia. In a severe case of hysteria occurring in a young married lady, in the form of paroxysms of weeping and laughing, alternating with epileptiform and choreiform convulsions, Dr. Hammond gave the monobromide in doses of four grains every hour. The influence was distinctly marked after two doses were taken, but ten were necessary to cure the attack. The result was very favorable, as all previous seizures had lasted from five to eleven days and resisted all treatment. Dr. Hammond has also employed it with excellent effect in several cases of headache occurring in women and young girls, and due to mental excitement and excessive study; one dose of four grains was generally sufficient to cut short the attack. In cerebral hyperæmia the monobromide of camphor appears to be greatly superior to the other bromides. It is apparently indicated in delirium tremens, and Dr. Hammond, although he has not yet tried it, would administer it in five-grain doses in that affection. The dose of the bromide for adults generally ranges from two to five grains.—*New York Medical Journal*, May, 1872.

On the Use of Iodoform in some Venereal Affections. By Dr. IZARD, of Paris.—Dr. Izard has employed iodoform in the treatment of infecting chancre, and of some secondary and tertiary symptoms of syphilis, of soft chancre and consecutive bubo, of phagedenic chancre and of mixed chancre. He claims for this substance only a local action, and he thinks it has but little influence on the indurated

chancre, except in certain conditions of that form of sore. In syphilitic inflammation of the glands, iodoform is very usefully employed either as a pommade or in a solution of alcohol and ether, and if the gland suppurates in scrofulous or lymphatic subjects, and if a number of openings are formed, the iodoform will cause them to heal. Ulcerated forms of syphilitic disease, rupia, and gummata have yielded rapidly to the employment of iodoform, but with the addition of internal constitutional treatment. When the soft chancre is very painful, the anæsthetic properties of iodoform render its employment advisable. In simple bubo a pommade of iodoform applied for a few days has sometimes caused the absorption and disappearance of the swelling. In the chancreous bubo iodoform is not equally efficacious in the different stages of inflammation, suppuration, and ulceration. In the first stage, if the swelling is painful, the iodoform pommade will be useful; in the second, it is useless; in the third, after the purulent matter is evacuated, and there still remain openings in the sore, repeated injections of iodoform will cause the ulcerated openings to close. Phagedenic sores, when once their true nature is revealed, are not benefited by iodoform, but the mixed chancre may be advantageously treated by this agent. A case is recorded in which the action of iodoform was beneficially exerted in a very complicated case of venereal disease, and Dr. Izard declares of this new therapeutical application, that venereal sores, so treated, are cicatrised ten, fifteen, or twenty days sooner than when other methods are employed.—*Bulletin Général de Thérapeutique*, April, 1872.

On the Employment of Chromic Acid as a Caustic in Affections of the Throat and Larynx. By Dr. ISAMBERT, of Paris.—Dr. Isambert having found the application of chromic acid beneficial in various affections of the gums, mouth, palate, and pharynx, has applied the same remedy to the larynx itself, by means of the laryngoscopic sponges. His first object in this application was to destroy some epithelial vegetations and small warts, which are often observed at the inter-arytænoid commissure and in the neighbourhood of the vocal cords. The solutions he used were at first rather weak, but he was able to use stronger ones rather frequently, in the dose of 1 gramme (about 15 grains) to 8 grammes of water, and sometimes he used them even stronger. Dr. Isambert found that the patients bore the application very well, although at first it caused a little local irritation. He considers that one of the most valuable results obtained by this treatment is the rapid repression of œdematous conditions of the glottis, so as to render it unnecessary in some cases to perform the operation of tracheotomy, where this measure seems to be urgent. The chromic acid applied directly to the œdematous parts of the larynx reduces the volume of the swollen tissues, relieves the feeling of suffocation, and postpones, even if it does not supersede, the necessity for tracheotomy. In other cases, such as syphilitic contractions of the larynx, the specific nature of which might not have been evident at first sight, Dr. Isambert has been able to avoid tracheotomy, to gain the time necessary for recognising the specific nature of the disease, and to cure the patient by the

use of internal remedies, aided by mercurial inunctions to the surface of the body. In polypous diseases of the larynx, and epithelioma and cancer, the chromic acid treatment is useless or injurious.—*Bulletin Général de Thérapeutique*, July, 1872.

On the Use of Mineral Waters in Chronic Metritis. By Dr. DURAND-FARDEL, of Vichy.—Dr. Durand-Fardel states that the successful use of mineral waters in chronic metritis must depend—first, on their due classification and special qualities, and, secondly, on the pathogeny of the chronic maladies for which they are employed. He therefore gives a sketch of the different morbid conditions which may be included under chronic metritis and the causes which may lead to this affection, and he enumerates the different kinds of mineral water which may be suitable to each category of cases. Thus, chronic metritis may be associated in different females with lymphatic disease, or with scrofula, herpes, or rheumatism, or it may depend only upon anæmia or atony, in consequence of unfavorable hygienic or constitutional conditions. But when once established, it causes great suffering, not only from the local symptoms, but also by giving rise in its turn to constitutional maladies. Dr. Durand-Fardel, therefore, recommends that those mineral waters should be selected which are adapted to remedy the constitutional peculiarities which have caused the metritis, and only such waters as cannot excite the tendency to leucorrhœa or to nervous suffering in the uterine system. Dr. Durand-Fardel divides the mineral waters into the *sulphureous*, the *chlorinated*, the *sodic bicarbonated*, the *ferruginous*, and what he terms the *indeterminate waters*, by which he means those waters which possess only negative characters, and are either scarcely mineralised at all or contain only common-place ingredients. Each of these mineral waters is respectively suited to the various constitutions giving rise to chronic metritis, and even the last-named waters, the *indeterminate*, play an important part in certain cases. It is impossible, in a brief sketch, to reproduce the whole of the indications laid down by the author, but we may observe that he attaches great importance to the use of mineral waters generally in the female affection referred to, but insists upon due care being taken as to the special peculiarities of each case. Thus the sulphureous waters are adapted to lymphatic subjects, the chlorinated waters to the scrofulous, the sodic bicarbonated to the arthritic and gouty, the ferruginous to the anæmic, while even the *indeterminate* waters, by their sedative action, diminish and tranquillise the congestive, inflammatory, or nervously excited condition of the uterus.—*Ibid.*, June, 1872.

On the Use of Apomorphin as an Emetic. By Dr. M. LOCH, of Worms.—Apomorphin, a substance produced by the action of hydrochloric acid on morphia, was employed by Dr. Loch in the case of a youth who had poisoned himself by drinking some oil of bitter almonds dissolved in spirits of wine, supposing it to be a cordial. When he was first seen, his face was livid, but he gave rational answers, and stated that he had gone on with his work some minutes after drinking the poison, but that he was soon unable to stand on his legs. Dr. Loch thought that

an emetic was indicated, and he injected $\frac{1}{1000}$ of a gramme (a gramme is about 15 grains) of a fresh solution of apomorphin in the vicinity of the stomach. In eight minutes, after frequent yawning, there was copious vomiting of matter smelling of bitter almond oil, and this was repeated in five minutes more. The patient was now able to see the hands of his watch and soon recovered altogether. But the action of apomorphin is not always the same, for Dr. Loch states that it failed to produce vomiting in a strong working man affected with acute gastric catarrh, in whom $\frac{1}{1000}$ of a gramme were injected, and as this produced no effect $\frac{1}{1000}$ were injected ten minutes afterwards. Dr. Loch did not venture to inject any more, as the patient could not stand on his legs. In most cases $\frac{1}{1000}$ of a gramme were sufficient to produce one or more emetic effects in adults. It also appears that the use of apomorphin in injection is sometimes followed by disagreeable consequences, for in a case where the injection was employed in a robust youth, affected with gastric catarrh, there was nausea in ten minutes, and in three minutes more the patient was so giddy that he fell on the ground and was with difficulty removed to a sofa near him. He became suddenly pale, broke out into a cold sweat and appeared as if he was dying, but he eventually vomited copiously and recovered. Dr. Loch recommends especial caution in the employment of apomorphin in children, and he relates a case in which he injected $\frac{1}{1000}$ of a gramme into a child affected with capillary bronchitis, and in two minutes there was violent vomiting, which was often repeated, but the patient became as pale as wax, and began to rattle in the throat, so that the greatest apprehension was excited for some time. Dr. Loch has not observed abscesses to follow injections of apomorphin, but sometimes there were rather painful nodes, lasting more than a week, as after injections of corrosive sublimate.—*Schmidt's Jahrbücher der Gesammten Medicin*, November 12, 1872.

On the Use of Propylamine and Trimethylamine in Acute Articular Rheumatism. By Dr. DUJARDIN-BEAUMETZ.—Dr. Dujardin-Beaumetz began some investigations into the therapeutical action of propylamine and trimethylamine in acute rheumatism in September of last year, and he was surprised at the favorable results, for he thought that it was almost impossible to arrest the progress of that disease by medical treatment. It appears, however, that a Russian physician has met with great success in the treatment of 250 cases of acute rheumatism by this substance between the years 1854 and 1856. The chemical relations of propylamine and trimethylamine (called also respectively *tritylia* and *trimethylia*) are very curious, and, in a scientific point of view, very interesting, for, although different bodies, they are obtained from the same source and are isomeric. Propylamine is an ammonia, consisting of one equivalent of nitrogen with two of hydrogen and one of propylene ($N + 2H + C_6 H_7$), and trimethylamine is also an ammonia in which one equivalent of nitrogen is combined with three of methyle ($N + C_2 H_3 + C_2 H_3 + C_2 H_3$), and on comparing these formulæ it will be observed that although the arrangement of the substances is different, the number of the elements

is the same, or in other words, the bodies are isomeric, both containing NH_3 , C_6 . Propylamine and trimethylamine are both disengaged from some bodies in a state of decomposition, especially from fish, and hence it is explained why the brine in which herrings have been placed contains both these substances in large quantity, especially trimethylamine. But they are both also contained in certain plants, especially in the common weed called *Chenopodium vulvaria*, and also in ergot of rye, and a few other vegetable substances. The propylamine, or rather trimethylamine, used in Dr. Dujardin-Beaumetz's experiments was obtained from herring-brine, and is an alkaline substance. It is a limpid, colourless liquid, very volatile, and having a very strong smell of decaying fish, with a specific gravity somewhat less than water. It seems that the substance is at present very dear. An objection to its use is its very disagreeable smell, but it is stated that this does not prevent the patients from taking it, even when it is given in large doses. Dr. Dujardin-Beaumetz gives the history of seven cases of acute articular rheumatism, all of which were cured in a very short time by the use of propylamine. The first case was one of a subacute character, which had resisted all kinds of treatment for five months, but under the use of the propylamine, improvement was very soon manifest, and the patient completely recovered. In this instance the propylamine had been given for three weeks in the dose of a gramme (about 15 grains). The second case was more decisive, for although the patient had had former attacks, which had lasted for four or five weeks, he now recovered, under the new treatment, in six days. In the third case there was a complete cure after an illness of seventeen days; in the fourth, after twenty days; in the fifth, in six days; in the sixth, in eight days; and in the seventh, in ten days.

The improvement in general was very rapid, and sometimes only twelve hours after the administration of the medicine, the patient experienced great relief. When occasionally the dose was stopped, or when, to deceive the patient, a draught was given containing no propylamine, there was a return of the articular symptoms, and the patient urgently requested the resumption of the medicine. The results, then, were at first diminution of the pain, and afterwards of the articular swelling; the rheumatism seemed to cease at the spot where it had commenced; and although sometimes it appeared to be breaking out elsewhere, yet when the propylamine was continued, this tendency was counteracted. The feverish symptoms abated at the same time as the joint affections, the perspiration was slightly increased, and the appetite rapidly returned. There were no relapses and no brain symptoms. The heart, in some of the patients, had been previously attacked, but in all the seven cases no fresh complications were observed in this respect.

Dr. Dujardin-Beaumetz does not profess to explain the reason of this action of propylamine in acute rheumatism, and the experiments he has made with it on the lower animals have not at present established its physiological operation. He states, in conclusion, that the method of treatment he describes appears to act in acute rheumatism with greater efficacy than all other methods hitherto employed, and he re-

commends its general adoption with a view to future therapeutical results.—*L'Union Médicale*, January 18th and 21st, 1873.

On the Therapeutical Effects of Aconite. By M. G. SÉE, of the Hôpital de la Charité, Paris.—Aconite, according to Dr. Sée, should be ranked among the agents which paralyze the nervous system. The active principle has been lately isolated in France in a crystalline form, the aconitine previously obtained in Germany and England being the amorphous alkaloid. The crystallizable aconitine is sparingly soluble in water, but soluble in alcohol and ether, and especially in chloroform it acts on the motor system in the dose of $\frac{1}{20}$ of a milligramme (the $\frac{1}{1000}$ of 15 grains), for when injected under the skin of a rabbit in this very small dose, it produces paralysis in a very short time. Dr. Sée considers that the physiological operation of aconitine resembles that of the woorara poison, for it acts on the peripheric extremities of the motor nerves at their terminations in the muscles. Aconitine administered in therapeutical doses by the mouth causes, after preliminary tingling of the tongue, a sensation of stiffness in the chest, followed by dyspnoea, and afterwards anæsthesia, which is the commencement of asphyxia. It is a medicine which should be given with great caution in consequence of its dangerous effects on the respiration. It has been principally employed in neuralgia, especially of the fifth pair of nerves, and of the sciatic and intercostal nerves. It has also been recommended in gout, acute rheumatism, septicæmia, and erysipelas, but although it has been extolled by some distinguished French practitioners, Dr. Sée does not admit its utility. It has been supposed to exert a beneficial effect in catarrh and bronchitis, and the result seems to be due to its property of diminishing the mucous secretions. It appears to be useful to singers, who often suffer from painful contraction of the larynx, which is cured by aconite. On the whole Dr. Sée, who writes from the results of experience in a large hospital, does not seem to be much impressed with the therapeutical virtues of aconite or aconitine.—*L'Union Médicale*, May, 1872.

On the Hypodermic Use of Strychnia. By Dr. J. J. CHISOLM, of Baltimore.—Dr. Chisolm states that he is in the daily habit of using strychnia by hypodermic injection in nervous affections of the eye, and although the results are not always strikingly beneficial, in no case have they been injurious. He has found that by increasing daily the quantity injected, a much larger amount than is mentioned in books may be administered with good results. He formerly commenced with the one sixtieth of a grain, and slowly increased the dose to one thirtieth, but he now usually commences with one fortieth of a grain. The strength of the solution he uses is 4 grains of sulphate of strychnia to one ounce of distilled water, each minim containing the $\frac{1}{20}$ th of a grain of the alkaloid. He usually commences the strychnia treatment by injecting three minims of the solution, equal to one fortieth of a grain. If no marked symptoms of poisoning ensue he increases the amount of the solution every day by one minim, until a maximum dose is reached, which is frequently one sixth, and often one fifth of a grain. In one case, one fourth of a grain of sulphate of strychnia was

injected at a dose, and continued daily, without causing any special annoyance. In some cases Dr. Chisolm has found that good results are not attained until large doses are reached. When the dose of strychnia has attained its maximum, that is to say, as much as can be comfortably borne, it should be steadily persevered in at this strength as long as any improvement shows itself. He states that he has continued the injection of one sixth of a grain doses for three months, but he gives a warning that, as with all potent medicines, cases will now and then be met with in which even the commencing dose of one fortieth of a grain will prove too powerful, and he has heard of a case of marked idiosyncrasy, in which one fiftieth of a grain of strychnia, used hypodermically, caused convulsions and insensibility which lasted several hours. He himself had a case in which, the patient being a young lady of nervous temperament, an attack of convulsions of short duration was brought on by the use of one twentieth of a grain. The place where the injection is practised is of no great importance, and in the cure of eye and ear diseases there is no advantage in injecting the solution near the affected organ, as the remedy acts only on the nerves of sight and hearing through the instrumentality of the nerve-centres and by means of the circulation. The most convenient place, according to Dr. Chisolm's experience, is the loose skin near the outer surface of the shoulder, or in the outer and upper third of the arm. Care should be taken not to inject more than the quantity required, and accidents may be prevented by not putting into a syringe more than the medicinal dose. The cases in which Dr. Chisolm has found the hypodermic use of strychnia most serviceable are hemeralopia, muscular asthenopia from overwork, amblyopia, and tobacco amaurosis.—*American Journal of the Medical Sciences*, October, 1872.

On the Therapeutic Action of Crystallized Digitalin. By Dr. WIDAL, of Paris.—The crystallized digitalin, prepared by M. Nativelle, is said to possess very great activity, and a series of experiments were made with it on the human subject by Dr. Vidal, who, however, states that he employed it with the greatest circumspection, and even fear. He visited the patients three or four times a-day, examining their temperature in order to obviate any serious result, which, however, as it turned out, never supervened. He gave the drug to two classes of patients, namely, those suffering from typhoid fever and those suffering from palpitation, whether attended or not with organic heart-disease. In the first class Dr. Vidal's object was to suppress the fever, in the second, to retard the increased action of the heart. Digitalis has been employed both in France in Germany in order to lower the pulse and the temperature in fevers, and Dr. Vidal states that he has always succeeded in cutting short the fever when the digitalis was of good quality, but he has often failed when the plant was otherwise. If, then, he argues, crystallized digitalin is the true active principle of digitalis, and its activity is always the same in a given dose, its introduction into medicine might be highly useful. Dr. Vidal gives only two cases of typhoid fever treated by digitalin, and the results were—lowering of the temperature and of the pulse,

dilatation of the pupils, and general improvement. He gave it in doses of a quarter of a milligramme (a milligramme is the thousandth of a gramme, a gramme being about 15 grains) every half hour, and he thinks that it might be given at once in doses of one milligramme, or two, or even more. Dr. Widal also relates four cases of heart-disease treated by digitalin, but the results were not very satisfactory as to the relief of the symptoms. It was found, however, that doses of 1 milligramme to $1\frac{1}{2}$ milligramme of digitalin retarded the pulse, but double the last-named dose was necessary to lower the temperature. On the whole, Dr. Widal considers that the crystallized digitalin, although very energetic in its action, is not so to such an extent as to contra-indicate its use, for it may be administered with safety and without producing symptoms of poisoning; in the cases recorded it was found that the quantity of urine was not increased, but, on the contrary, it was diminished in half of the cases.—*L'Union Médicale*, October, 1872.

On the Therapeutical Action of the Crystallized Digitalin of Homolle. By Dr. WIDAL, of Paris.—Dr. Widal having been supplied with only a small quantity of the crystallized digitalin of Nativelle, was unable to extend its use beyond the cases just before described, but he pursued his inquiries with the digitalin of Homolle. He gave it as an antipyretic in order to reduce febrile action in such maladies as pneumonia, typhoid fever, articular rheumatism, &c., or to diminish the action of the heart in diseases of that organ. Thirteen patients were treated by the administration of the digitalin of Homolle, and the results are recorded. He divides the cases into the categories of (A) Acute rheumatism. (B) Pneumonia. (C) Pulmonary phthisis with hectic fever. (D) Affections of the heart. The first case of rheumatism seems to have been improved by the use of the drug, for 19 to 20 milligrammes sufficed to abate the fever and relieve the pains in the joints; but in the two other cases the remedial effects were by no means so well marked, for the temperature was not lowered and the pain was not relieved although the pulse was reduced. In the cases of pneumonia (three in number) the fever, the temperature, and the pulse, were all lowered, but the results, nevertheless, were not very satisfactory, for in one of the cases it was necessary to change the treatment, and one of the cases died before the digitalin produced any effect. The cases of phthisis, with hectic fever, were not much improved by the use of the digitalin, but they showed that the greater was the temperature the larger was the dose of digitalin required, and the better was it tolerated. Dr. Widal thinks that in such cases the dose of the drug might be 15 milligrammes at the outset. In the cases of heart-disease no great improvement was observed, although, for a time, the pulsations of the heart were diminished in number. On the whole, Dr. Widal considers that the digitalin of Homolle uniformly retards the action of the heart in the dose of 3 to 10 milligrammes according to the nature of the cases, and that the crystallized digitalin (of Nativelle) acts in the same manner in the dose of 1 or $1\frac{1}{2}$ to 3 milligrammes; that both these kinds of digitalin almost always

affect the pulse before the temperature ; that the action of both on the temperature is less energetic than that of digitalis, and less frequently causes symptoms of poisoning ; and that their therapeutical effects on the increased beatings of the heart are transient and incomplete, even when its pulsations have been considerably lowered.—*L'Union Médicale*, Oct. 22nd, 1872.

On the Therapeutical Uses of Electricity. By Dr. S. WILKS.—Dr. Wilks, in a practical lecture lately delivered at Guy's Hospital, gives a general view of the progress of electricity as a therapeutical agent, of the different modes in which it is applied, and of the cases to which it appears especially suited. It was in 1836 that the late Dr. Golding Bird fitted up a room at the hospital with an electrical apparatus consisting of a cylinder machine, a Leyden jar, and an insulating stool. The application of electricity was then made by drawing sparks from the body of the patient at any spot where it was desired to employ the agent. After the introduction of electro-magnetism, however, or faradisation, as it is called, frictional electricity fell into disuse, but Dr. Wilks thinks that the new is less efficient than the old method, although he would approve it as a supplement. By frictional electricity he says that paralysis of the legs, chorea, and neuralgia were cured, but they are little benefited by the induced current, but are again often cured by the primary battery current. The electricity of the machine was thrown into the shade, as a therapeutic agent, by the brilliant discoveries of electro-dynamics, and two forms of application have lately come into use, namely, the magneto-electric and the volta-electric apparatus, one depending, as is well known, on the action of a permanent magnet, and the other on the production of temporary magnetism by a galvanic battery. Dr. Wilks admits the obligation due to Dr. Duchenne for introducing faradisation as a therapeutical agent in various forms of paralysis. But Remak has more recently shown that the simple continuous battery current is often superior in its operation to the induced or secondary current, and he has also shown that in experiments on the lower animals the effects of the two forms of galvanism are very different. The authorities at Guy's Hospital therefore placed in their electrifying room a galvanic battery of a hundred cells, which could be used of any strength, and which was found to produce very beneficial effects in cases where faradisation had failed. Dr. Wilks points out that the simple transmission of the current along the spine or limbs produces no apparent effect, but that it is necessary the current should be broken or closed in order that contraction of the muscles should ensue. Dr. Wilks has found this application of electricity of special service in the treatment of lead paralysis, but in cases of paraplegia he has also found it very efficacious, even where, from the intensity and duration of the symptoms, it was feared that some degeneration of the posterior columns of the cord must have existed. Dr. Wilks, however, has often found the method to fail, and he rather deprecates the empi-

rical use of galvanic or electro-magnetic machines as a popular remedy.—*British Medical Journal*, January 11, 1873.

On Modern Electro-Therapeutics, and on Leclanché's Galvanic Battery.—In a recent report in the 'British Medical Journal' on "Modern Medical Electric and Galvanic Instruments and Recent Improvements in their Application," a very useful *résumé* is given of the real value of electricity in the treatment of disease, and of the most convenient methods of applying it, together with a description of several of the most modern machines used for the purpose. As to the value of electricity as a therapeutic agent, the reporters condemn the neglect of this agent as a remedy on the part of many medical practitioners, on the one hand, and the fanatical encomiums lavished upon it in some quarters, on the other. It is stated by men who know nothing of physiology or medicine, or of electricity in relation to either, that electricity is life and that all diseased conditions of the human system, being caused by deficiency of vital power, are cured by electricity and by that alone. The reporters point out that electricity is simply an agent, which may be made to produce tonic, stimulating, or sedative effects, according to the form in which it is used and the mode in which it is applied, and that in the treatment of a number of nervous and muscular affections it cannot be replaced by any other remedial agent. The applications of electricity are of four kinds, namely frictional, or that produced by the machine; galvanic, produced by the continuous current; electro-magnetic; and magneto-electric; the latter two being also called faradism, and acting by the induced current. Of all these, however, the constant or continuous current, or that produced by galvanism, is the best. The reporters describe, as one of the most interesting of the recently invented batteries, that of Leclanché, which has not been previously described with accuracy. It consists of a cylinder of zinc immersed in a concentrated solution of chloride of ammonium, and a rod of gas-carbon packed with coarsely powdered gas-carbon and pyrolusite (native peroxide of manganese) in a porous cell. The principle of action is that the chloride of ammonium is decomposed, the zinc uniting with the chlorine, hydrogen is absorbed by the oxygen of the peroxide of manganese, and ammonia is set free. The reporters state that Leclanché's battery is the most constant known, as far as the length of time is concerned, during which action is still perceptible; they saw one in Paris which had been charged four years before, and had never been touched since, but still gave signs of considerable galvanic activity.—*British Medical Journal*, Jan. 11, 1873.

On the Use of Quinia in Hypodermic Injection (Discussion at the Société Thérapeutique of Paris).—M. Limousin read a communication on the sulphovinate of quinia, a form which he recommended as especially suitable for hypodermic injections, in consequence of its great solubility in water. He presented two specimens of the sulphovinate, one obtained by the double decomposition of the sul-

phovinate of baryta and the sulphate of quinia, and the other obtained without the use of baryta. M. Bourdon, in speaking on M. Limousin's paper, remarked that he had found, in his experiments on the employment of quinia in hypodermic injections, that solutions of sulphate of quinia in water, acidulated with tartaric or citric acid, would answer the purpose in view, and that this preparation of quinia was not irritating. M. Bourdon observed that, in his experiments in conjunction with M. Dodenie, he had never found any abscess or local irritation to ensue from the hypodermic injections of sulphate of quinia. They had found in the urine traces of the salt twenty or thirty minutes after the injection, and the symptoms of quinism an hour afterwards. M. Bourdon had recommended this mode of administration in intermittent fevers, when the paroxysm was approaching, in patients who were suffering from disorders of the stomach or the intestine. M. Paul observed that he had personally had but little experience in the use of hypodermic injections of quinia in fevers, but that he knew several physicians who did not think much of their efficacy, the failure in some cases being probably due to the small doses employed. Strong doses are required, and they necessitate several punctures in consequence of the great quantity of liquid employed. In reference to the use of the hypodermic injections of quinia in acute rheumatism, M. Paul referred to the experiments of M. Potain, who injected pure water in this disease round the affected joints, and obtained results as satisfactory as when an alkaloid was injected. M. Bourdon, however, stated, as the result of his experience, that the subcutaneous injection of quinia in rheumatism caused reduction of the pulse and the cessation or diminution of the pain, and that the dose required was much less than when given by the mouth.—*Gazette Médicale de Paris*, March 1, 1873.

REPORT ON PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY.

BY A. H. CHURCH, M.A.,

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Digestion-products of Fibrin.—The experiments of J. Mohlenfeld on the solution of fibrin by means of artificial gastric juice have hardly led to very definite results. The composition of the products formed remains obscure, so far, at least, as regards the albuminoid and other complex derivatives of the fibrin; but at the same time it is evident that processes of hydration and oxidation do occur, by which the fibrin is transformed, not only into peptones on the one hand, and into such bodies as tyrosine and leucine on the other, but also into products of an intermediate character ('Pflüger's Archiv,'

v, 381). With reference to the processes and conditions of digestion, our knowledge seems to be acquiring precision. Von Wittich finds ('Pflüger's Archiv,' v, 435) that there is a definite quantitative relation between the fibrin, the pepsine, and the acid employed. He used a glycerine extract of the minced stomach of the pig, rejecting the pyloric part on account of the mucus which abounds in it: the extract does not acquire energetic peptic properties until the membranes of the stomachs used have been in contact with the glycerine for several days. Von Wittich ascertained that, although fibrin from blood absorbs pepsin eagerly, digestion does not occur except through the conjoint action of pepsin and acid, which form, as he thinks, a kind of unstable combination. So great is the attraction of fibrin for pepsin that if some additional fibrin be put into a solution of fibrin in artificial gastric juice, the pepsin which has already exerted its proper action upon the first portion of fibrin used will be absorbed by the second portion, and may be sufficient to dissolve it. To effect this it is better to remove the undissolved fibrin into a fresh portion of dilute hydrochloric acid free from pepsin. Von Wittich finds that, though digestion of fibrin in artificial gastric juice is most active at a temperature of between 95° and 112° F., it does not completely cease at 40° F. Pepsin itself is a remarkably stable body, considering its peculiar rôle as a ferment and its apparently near relationship to the albuminoids. Its action is impeded by the accumulation of its products in the digestive fluid; these products, the so-called peptones, may be prepared also, though very slowly and partially, by the unassisted action of hydrochloric acid upon fibrin. The further changes of peptones after absorption have been investigated by Goldstein under the direction of A. Fick ('Pflüger's Archiv,' iv, 40). Peptones in the blood do not seem to be reconverted into albumen and complex combinations of the same order, but to be split up into highly nitrogenous waste products on the one hand, and into non-nitrogenous combustible substances on the other, these latter substances being the main source of the energy and heat of the body, as they are consumed in the muscles and other organs. The changes of peptones in the liver are a conspicuous element of the process. Some experiments made on rabbits, the kidneys of which had been removed, confirmed these conclusions of Fick, showing that the waste nitrogenous matters of the blood were largely reinforced shortly after the injection into the veins of albumen and of peptonic substances. The above-given conclusions of Fick may serve to throw some light on the interesting observations on a case of almost complete fasting recorded by J. Seegen ('Wien. Akadem. Ber.,' 2, lxiii, 429). A woman, aged 24, was suffering from a tumour over the cardiac orifice of the stomach, and became unable to take any food save a little milk. During a period of twelve days the total amount of nitrogen consumed in the food amounted to but 3·4 grammes, while in the urea alone excreted during the same period there were no less than 49·8 grammes. The difference between these numbers, or 46·4 grammes, represents the nitrogen lost at the expense of the body. That this nitrogen was wholly obtained from the meta-

morphosis of muscle cannot be affirmed; it is more probable that a great part of it was derived from the peptonic constituents of the blood. We may here introduce an additional observation concerning the digestive process and the production of peptones. M. Eichhorst finds ('Pflüger's Archiv,' iv, part 12) that the succus entericus both of the large and small intestine is destitute of any peptic principle, although the succus entericus of the small intestine does furnish a diastatic ferment. Amongst the substances absorbed in the large intestine he classes various peptones, muscular flesh, casein of milk, salified egg-albumen, and gelatine. On the other side, amongst the substances not so absorbed he ranges pure egg-albumen, coagulated fibrin, and preparations of syntonin and myosin.

Coagulation of Fibrin.—A. Schmidt, of Dorpat ('Pflüger's Archiv,' v, vi, parts 8 and 9) gives some points of difference, as to source and properties, between the fibrinoplastic and fibrinogenous substances. The former is precipitated from the diluted serum of the blood by carbon dioxide, and may also be obtained from chyle and lymph; it is soluble in neutral salts of the alkalies and in very dilute acids and alkalies. As the author precipitates this fibrinoplastic substance by means of the exact neutralization of an alkaline solution with dilute acetic acid, it cannot, however, be soluble in alkaline acetates. The fibrinogenous substance is precipitable from the fluids of serous cavities by dilution and addition of acetic acid. For coagulation both substances must be present, as well as a ferment, perhaps derived from the white corpuscles, but only out of the body.

Gases of the Blood.—The attention of physiological chemists has been much directed to the subject of the changes in the blood brought about by natural and artificial conditions. Mathieu and Urbain record (Brown-Séguard's 'Archives de Phys.,' No. 5, 1872) their observations on the effects of altered pressure and temperature upon the dissolved oxygen of the blood. They conclude that, in animals which normally maintain a fairly constant temperature, the diminution of the external temperature increases the amount of oxygen absorbed by the blood, while a diminished pressure lessens it. They conclude that the former fact is precise enough to admit of being expressed in the following way:—The quantity of oxygen absorbed by the blood varies inversely with the temperature of the air inspired. By a new method of experimenting S. Wolffberg ('Pflüger's Archiv,' iv, part 10) has endeavoured to determine the tension of the gases in the blood, dogs being the subjects of his trials. He found that the tension of the oxygen in the blood entering the capillaries of the lung amounted to 27 millimètres of mercury, that of the carbonic acid gas (carbon dioxide) being 24 millimètres. The tension of the carbon dioxide of the blood in the pulmonary artery equalled that of an atmosphere containing from 3.6 to 5.1 per cent. of that gas. In normal respiration the expired air from the lungs of the dog contains 2.8 per cent. CO₂, and 16.6 per cent. of oxygen. G. Strassburg ('Pflüger's Archiv,' iv, part 10) has made some new experiments on the influence of

acids upon the hæmoglobin of the blood, so far as regards its attached oxygen. It appears that acids (such as phosphoric) facilitate the decomposition of hæmoglobin, and in so doing give rise to the oxidation of some of its changed products at the expense of the loosely combined oxygen. The quantity of this loosely combined oxygen naturally united with the hæmoglobin of blood varies with the variations of pressure and temperature, as already noted, and so the action of acids becomes more or less rapid and complete. The investigations of Bert ('Comptes Rend.,' lxxiii, lxxiv, lxxv, lxxvi) show, amongst numerous other important facts concerning the influence of gradual and of sudden alterations of pressure upon the gases of the blood, that the amount of oxygen absorbed by the blood rapidly diminishes with diminished pressure, though, on the other hand, it increases but slightly with increase of pressure. This observation seems to indicate that the hæmoglobin of the blood is pretty nearly saturated with oxygen under normal circumstances, and will serve to strengthen the conclusions of Mathieu and Urbain as to the sensitiveness of the dissolved oxygen of the blood under variations of temperature. Gréhaut, however ('Comptes Rend.,' lxxv, 495), concludes, from experiments on the arterial blood of a dog, that its hæmoglobin is not saturated with oxygen. For while the normal percentage of oxygen in volumes was but 16·3, this rose to 23·3 after artificial respiration of oxygen, and could be further raised to 26·8 by passing oxygen itself into the blood. Gréhaut is of opinion that the absorption of oxygen by the blood stands in direct relation to the amount of hæmoglobin present, and may even be used to estimate that substance, though he prefers carbonic oxide for this purpose. According to Zuntz, however, the absorption of the latter gas by hæmoglobin had not been thoroughly understood. He finds ('Pflüger's Archiv,' v, 584) that carbonic oxide can be removed from the blood by the entrance of other gases as oxygen, and not by oxidation into carbon dioxide. In cases, therefore, of poisoning by carbonic oxide, energetic artificial respiration, if maintained long enough, removes this noxious gas. We are indebted to Mathieu and Urbain for the following analysis of the gases in the blood of arteries, the numbers representing gaseous volumes in 100 vols. of blood:

	Oxygen.	Nitrogen.	Carbon dioxide (CO ₂).
Carotid artery	20·45	1·64	48·18
Crural artery	18·03	1·60	44·23

The authors observe that oxygen is more abundant in the large arteries than in the small (Brown-Séguard's 'Archives des Phys.,' 2, 1872). A spectroscopic search for hæmoglobin in the blood and muscles of many animals has been carried out by Mr. E. R. Lankester ('Proc. Roy. Soc.,' xxi, 70).

Iron of the Blood.—Although many derivation- or decomposition-products from the colouring matter of the blood contain no iron, this metal is an essential constituent of the unchanged hæmoglobin. Boussingault has been lately studying the relations of iron to the colouring matters of blood and to chlorophyll. He has, moreover,

accurately determined the quantities of iron taken in the food and discharged in the excreta of man and of animals. He finds, also, the invariable presence of iron in milk. The estimated amount of iron daily taken by man in his food and drink amounts to from '06 to '11 of a gramme. He finds potatoes to contain '0016 per cent. of iron, and Beaujolais wine '0011 per cent. ('Comptes Rend.,' lxxiv, 1355). In the blood of dogs Jarisch finds ('Ann. Chem. Pharm.,' clxiii, 236) '066 per cent. of iron, while Boussingault's determination of this metal in the blood of the ox gave but '038 per cent.

Chemistry of the Liver.—Brücke describes the preparation of glycogen from the liver ('Wien. Akad. Ber.' (2), lxiii, 214). After the liver has been boiled in water, pounded to a paste, again boiled, and the whole mass filtered, the filtrate is to be rapidly cooled, and when cold treated with a reagent which Brücke finds competent to separate any remaining uncoagulated albuminoids, &c. This reagent is a solution of mercuric iodide in potassium iodide. This liquid and hydrochloric acid are to be alternately added to the cooled filtrate obtained as above described so long as a precipitate falls. Presently the liquid is filtered again, and rather more than half its volume of alcohol added to the clear filtrate. The precipitate of glycogen is to be next washed with alcohol containing some glacial acetic acid, and finally with ether. If thoroughly dried its characteristic reaction with iodine solution is somewhat modified. Brücke obtains glycogen from muscle by the same process; he has detected it also in the spleen and kidneys, but could obtain but scanty evidence of its existence in the mammary gland, a fact which negatives the supposed transformation of glycogen into milk-sugar. So Weiss has also made some experiments ('Wien. Akad. Ber.' (2), lxiv) by the use of Brücke's process, and finds that muscular activity is associated with a most marked decrease in the percentage of glycogen, in the case of frogs amounting to a quarter of the total normal quantity. The heart was found to be supplied, in spite of its constant activity, with two thirds as much glycogen as ordinary muscular flesh in the case of a dog, while in experiments made with fowls the destruction of the glycogen of the muscles was found to be more gradual and less complete than that of the liver. The origin of the glycogen of the liver and of the sugar of diabetic urine has been further studied by Dock ('Pflüger's Archiv,' v, 571), who confirms the earlier investigations as to the almost complete removal of glycogen from the liver by starvation, adding, however, the interesting fact that if sugar solution be then injected into the stomach large quantities of glycogen reappeared, after a few hours, in the liver. Injections of albumen did not reproduce this substance. The experiments were performed on rabbits. By some ingenious contrivances Dock further endeavoured to answer the question whether this diabetic sugar originates from glycogen or is formed by the direct passage of the sugar of the food into the urine. In artificially induced diabetes, caused by *curara*, in starved animals, injection of sugar into the stomach produced sugar in the urine, but

not glycogen in the liver. But neither phenomenon was caused where artificial diabetes had been produced by puncturing the floor of the fourth ventricle. On the whole, the author inclines to think that the muscles may have been the agencies by which the sugar or glycogen is retained, to reappear, under suitable conditions, as diabetic sugar. That the muscles retain glycogen more tenaciously than the liver is in strict accordance with the previously noticed results of Weiss (see also, on this subject, a paper by Tiegel in 'Pflüger's Archiv,' vi, 249). The sugar-producing power of the bile has been definitely ascertained by Von Wittich ('Pflüger's Archiv,' vi, 181), who secured ample supplies of perfectly fresh bile from a patient suffering from a biliary fistula which opened externally. From this source the average flow of bile was 533 cubic centimètres in the twenty-four hours. It was found that twenty to thirty drops of this bile gave a marked sugar indication with the copper test after the lapse of one hour, while the diastatic ferment itself could be partly obtained in the form of a glycerin solution. The subject of the diastatic and other animal ferments has also been investigated from a more chemical stand-point by Hüfner ('Journ. prakt. Chem.' (2), v, 372). Researches on the bile-pigments and their derivatives, especially in relation to their spectra, have been made by R. Maly ('Chem. Centralbl.,' 1872, 180), by A. Heynsius and J. F. F. Campbell ('Pflüger's Archiv,' iv, 497), and by B. J. Stokvis ('N. Rep. Pharm.,' xxi, 123, also in 'Deut. Chem. Gesell. Ber.,' v, 583).

Chemistry of Urine.—From some experiments of Wanklyn ('Pharm. J. Trans.,' 3, ii, 705) it would appear that in many forms of renal disease we may be able to diagnose it by determining the ratio of fixed to combustible matter in the urine by a very simple and rapid method of analysis. In five experiments with healthy urine, though the total percentage of dried residue varied greatly (from 0.6 to 2.0 per cent.), yet the ratio of ash or fixed matter to carbonaceous or volatile matter oscillated between much narrower limits, varying from 100:120 to 100:169. On the other hand, some urine from a patient suffering from a kidney disease contained 2.66 per cent. of solid matters, the ratio of these being no less than 322 of volatile to 100 of fixed or ash. The analysis should be performed with the precautions and by the method used in the similar determination of the constituents of a water residue. The alterations in the constituents of urine effected by a long retention in the bladder has been examined by Treskin ('Pflüger's Archiv,' v, 324), who concludes that the contents of the bladder may in some measure be modified by diffusion into and from the blood and lymph of its walls. Thus, urea may on the one hand enter the blood, while the urine itself becomes more dilute by the entrance of water, and more saline by additions of common salt. The experiments were made upon dogs, but as they involved serious operations (such as lithotomy and the securing of small tubes to the ureters direct) the results may have been abnormally modified. As to the origin of the urea of the

organism numerous theories have been propounded. One of these supposes that urea is a direct product of the breaking up of albumen. Three substances obtainable from albumen do seem, however, to be capable of transformation into urea in the body. These are glycocine, leucine and tyrosine, according to the experiments of Schultzen and Nencki ('*Zeitschrift für Biol.*,' viii, 124), the two former substances being more completely transformed than the third. Salkowski has made trials with taurine as a supposed source both of urea and of sulphates in the urine, but his results do not go far towards establishing this idea ('*Deut. Chem. Gesell. Ber.*,' v, 637). The experiments of R. de Luna on some of the substances formed or separated by the action of cupric sulphate on urine promise to yield interesting results, but are at present too incomplete to throw much light upon the chemistry of this excretion ('*Comptes Rendus*,' lxxv, 542). The question of the occurrence of traces of sugar in normal urine has been made the subject of several investigations. Of these the most conclusive appear to be those of Seegen ('*Pflüger's Archiv*,' v, 359 and 375). He considers that Trommer's test for sugar—alkalized copper tartrate—does not give decisive indications because it is also affected by uric acid if that substance be present in large quantities. This difficulty is overcome, though merely for qualitative testing, by filtering the urine through animal charcoal several times. If pure water be then poured upon the charcoal the filtrate may give a still more decisive sugar-reaction than the filtered urine itself—sugar being to some extent retained by the charcoal, though again partly removable by washing. Seegen also criticises the fermentation test for sugar as employed by Bence Jones. Any one who has attempted to make accurate determinations of sugar by means of its conversion into alcohol and carbon dioxide through the action of yeast will be able to endorse Seegen's objection to this method, as applied to the small and doubtful traces of sugar to be sought for in so complex a solution as urine. On the whole, the experiments negative the presence of sugar in healthy urine. The acids of urine, phosphoric included, are increased, according to the elaborate experiments of Sawicki ('*Pflüger's Archiv*,' v, part 8), rather by the quantity and quality of the food taken than by exercise.

Physiological Chemistry of Phenol, &c.—The extreme medicinal value of carbolic acid or phenol is now thoroughly recognised. The present reporter, nearly twenty years ago, urged the desirability of making trials of this substance in dental practice, in hooping-cough, in certain affections of the respiratory tract, in some forms of dyspepsia, and for disinfecting purposes. He further devised a method by which the disagreeable odour of even the purest commercial phenol may be greatly diminished. This method is coming into general use. It consists in shaking up the purest obtainable phenol with a quantity of distilled water, insufficient for complete solution (say, one pound of phenol to two gallons of water), adding a little sweet almond oil, agitating the mixture, filtering, and then satu-

rating the filtrate (which must be absolutely clear) with common salt or chloride of calcium. Thus the phenol is separated, and may be siphoned off and purified completely by distillation. Husemann ('Chem. Centr.,' 488, 1872) finds, indeed, that the pure product obtained by this process is possessed of the toxic properties of commercial phenol when administered in solution, either by the mouth or by means of subcutaneous injection; but still it must be regarded as presenting points of superiority to the nauseous-smelling ordinary crystallized product. It has an odour not unlike that of the scented geranium leaf, though less agreeable. By adding a drop or two of geranium oil to an ounce of phenol, purified as above directed, a very suitable preparation for medical use may be obtained. One part of this phenol dissolves in twenty-five parts of water, but for administration by the mouth this solution must be diluted with eight times its volume of water. A 2-per-cent. solution is useful for administration in the form of spray, while the substance is employed admixed with oils and ointments, in much more concentrated states, for external application. But Hoppe-Seyler ('Pflüger's Archiv,' v, 470) has recorded the danger sometimes attending upon the use of phenol in this manner, as it tends to produce dilatation of the blood-vessels, weak respiration, muscular twitches, and reduction of the temperature of the body. Salkowski (ib., 335) has experimented in the same direction upon frogs and rabbits, and finds that phenol produces convulsions like those caused by strychnine. He finds phenol to be absorbed unchanged, so that it can be detected in the blood. Part of it is subsequently oxidized, and part, according to Salkowski and others, is excreted unchanged in the urine; with this statement, however, Hoppe-Seyler does not agree, considering that the phenol obtainable by distillation, &c., from the urine, is produced in the chemical treatment with sulphuric acid to which the liquid is submitted; but as tartaric acid seems to be capable of setting free phenol from its combination in urine, this idea—that phenol does not exist as such in the urine, but is a derivation-product of indican or some similar body—can hardly be exact. Plugge gives (ib., 538) some further contributions to the history of phenol as a disinfectant, and as preventing fermentation and putrefaction. Salkowski contributes the important observation that the sulphophenates or sulpho-carbolates do not decompose into phenol, &c., in the organism, and that they do not possess the antiseptic and other characteristic properties of phenol ('Pflüger's Archiv,' iv, 91).

According to Dr Subbotin ('Zeitschrift für Biol.,' vii, Heft 4), when alcohol is administered to rabbits it is not completely eliminated by the lungs, skin, and kidneys, and so some of it must be consumed in the body. He regards its chief action in fattening to be similar to that of arsenic, in retarding the metamorphosis of tissues. Dr. Geltowsky ('Practitioner,' June, 1872) writes concerning the action of quinine in diminishing the activity and retarding the development of the white corpuscles of the blood. Kleimann and Simonowitsch ('Pflüger's Archiv,' 281) record the interesting fact that after injection of tartar emetic into the jugular

vein antimony made its appearance in the first matters vomited from the stomach. H. von Böck ('Zeitschrift für Biol.,' vii, Heft 4) has determined the distinct reduction in excreted nitrogen caused by the daily administration of small doses of morphia and of larger doses of quinine. The action of caffeine on different animals has been examined by Dr. H. Aubert ('Pflüger's Archiv,' Heft xii, 1872). In coffee there is less than 1 per cent. of caffeine, most of which is generally extracted in the preparation of the beverage. Caffeine, when given either by subcutaneous injection or by injection into the jugular vein, produces excitability of the spinal cord and transitory tetanus. It accelerates the heart's action, but diminishes the blood-pressure.

REPORT ON PHYSIOLOGY AND HISTOLOGY.

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HISTOLOGY.

1. STRICKER. *Manual of Histology*. (American translation, edited by ALBERT H. BUCK. New York, Wood & Co., 1872. One large volume, pp. 1106.)
2. M. PIERRE BOULAND. *Recherches anatomiques sur les Courbures normales du Rachis chez l'Homme et chez les Animaux*. (Robin's 'Journal de l'Anatomic,' 1872, pp. 359—382.)
3. HEITZMANN. *Ueber den Bau der Knorpel*. ('Wiener Med. Zeitung,' 1873, p. 38.)
4. HYRTL. *Die doppelten Schäfenlinie der Menschen-schädel und ihre verhältniss zur Form der Hirn-schale*. ('Denkschriften d. K. Akad. der Wissenschaften zu Wien,' Band xxxii, Math.—Nat. Class, 1872, pp. 39—51.)
5. MM. MOLESCHOTT and FUBINI. *De la Chondrine*. (Robin's 'Journal de l'Anatomic,' 1872, pp. 327—336. A long and careful abstract of the original paper.)
6. WILLIAM MARSHALL. *Ueber die Knochernen Schädelhöcher der Vögel*. (Emil Selenka's 'Niederlandisches Archiv für Zoologie,' Band i, Heft ii, 1872.)
7. HERMANN WOLFERMANN. *Beitrag zur Kenntniss der Architectur der Knochen*. ('Reichert und Dubois-Reymond's Archiv,' 1872, pp. 312—346.)
8. Dr. GILLETTE. *Description et Structure de la Tunique musculaire de l'Esophage chez l'Homme et chez les Animaux*. (Robin's 'Journal de l'Anatomic,' 1872, pp. 617—644.)
9. Dr. GOLTZ. *Studien ueber die Bewegungen der Speiseröhre und des Magens des Frosches*. (Researches on the movements of the

œsophagus and stomach of the frog. 'Pflüger's Archiv,' Band vi, 1872, pp. 616—641.)

M. Bouland finds as the result of his researches that the normal human spine at the period of birth presents—(A) a cervical curvature with its convexity looking forwards, the mean length of the chord of which is 42 mm., and the perpendicular to the chord 2·5 mm.; (B) a dorsal curvature with the concavity looking forwards, formed by the ten or eleven upper dorsal vertebræ, having a chord of 78·5 mm., and a perpendicular of 4·25 mm.; (C) lastly, and occasionally only, a lumbar curvature with convexity looking forwards. These curvatures are formed by the bodies of the vertebræ; the apophysary column is completely straight in the horizontal position. The peripheric and the yellow ligaments do not in any way contribute to their formation.

Heitzmann points out that when a thin section of articular cartilage is removed from the living animal, placed in a half per cent. solution of common salt, and examined with a power of from 600 to 800 linear, the tissue is by no means so simple as was formerly supposed. He found finely contoured cells provided with nuclei, from which processes were given out in all directions into the matrix. The matrix was a finely granular protoplasmatic substance, traversed in all directions with a meshwork of delicate tubules continuous with those given off from the cell-bodies. These cells, therefore, do not possess or govern (Virchow's view) a definite cell territory, but they rather form collectively a cell colony, all the component elements of which act and react as a whole upon external agents and conditions. During ossification the cell processes and fine network alluded to alone disappear, but at a later period the cells and the nuclei also. There remains only indifferent protoplasmic fluid, a gelatinous substance out of which the bone-cells are excreted, whilst loose cells form, resembling the original cells of the cartilage. The vessels of cartilage first develop in the centre of the cartilaginous by the formation soon after the sixth week of uterine life of what he terms hæmatoplastic substance; this gradually breaks up into blood-corpuscles, and these become surrounded by sheaths which form the rudiments of the future blood-vessels.

Hyrtl shows that there are two semicircular lines in the temporal region, of which one—the lower—corresponds to the origin of the temporal muscle, whilst the other and superior one must be regarded as the line of demarcation between the temporal and parietal region. Sometimes one, sometimes the other, alone exists, though this is rare, sometimes both are absent, but this is very rare; more frequently both exist, unequally well marked.

DIGESTION.

1. J. JUKES. *Beiträge zum histiologischen Bau der Labdrüsen.* (Inaugural dissertation, Göttingen, 1872. Abstract in 'Centralblatt,' No. 47.)
2. V. WITTICH. *Zur Physiologie der menschlichen Galle.* ('Pflüger's Archiv,' Band vi, 1872, p. 181.)
3. V. WITTICH. *Weitere Mittheilungen über Verdauungs-fermente.*

- Das Pepsin und seine Wirkung auf Blutfibrin.* ('Pflüger's Archiv,' Band v, 1872, p. 435. Abstract by Salkowski in 'Centralblatt.')
4. M. E. RITTER. *Recherches cliniques sur la Composition des Calculs Biliaires humains.* (Robin's 'Journal de l'Anatomie et de la Physiologie, &c.,' No. 1, 1872, p. 60.)
 5. S. L. SCHENK. *Beitrag zur Lehre vom Stickstoffgehalt des Fleisches.* ('Anatomisch Physiologisch Untersuchungen,' Wien, 1872.)
 6. W. BOGOSLOWSKY. *Physiologische Studien über die Wirkung der Fleischbrühe des Fleischextractes, der Kali salz mid des Kreatinins.* ('Reichert und Dubois-Reymond's Archiv,' 1872, p. 347.)

The investigations in regard to the parotid gland made under W. Krause's directions corroborate in all essential points the results obtained by Heidenhain and Rollet. The differences between these two observers have been thus tabularised by Jukes:—

1. Do investing cells (Belegzellen) form a layer beneath the columnar cells that line the excretory duct of the peptic glands? Heidenhain and Rollet both found such cells in this situation in man, the dog, rabbit, hedgehog, mole, and in the mouse. Jukes calls the proper peptic cells (Heidenhain's Belegzellen, Rollet's delomorphous cells) polygonal cells, whilst Heidenhain's chief cells (Hauptzellen)—Rollet's adelomorphous cells—Jukes calls conical cells. The former, Jukes, in opposition to Heidenhain's statements, finds are *not* present in the excretory duct.

2. Are the large cells lining the *neck* of the gland analogous to Heidenhain's Belegzellen or peptic cells? To this question Jukes replies in the affirmative, since they are similar in form and in their reaction to colouring agents.

Jukes further maintains that Heidenhain's Hauptzellen line both the outer and inner portion of the intermediate part of the gland-duct; and that the membrana propria of the peptic glands contains Henle's stellate cells, a point that is denied by Rollet, but strongly insisted upon by Boll.

- v. Wittich had the opportunity of examining the fresh bile of man flowing from a fistula opening into the duct of the gall-bladder. This possessed a decided fermentative power of converting starch into sugar. He was even able to isolate it by precipitating it with alcohol and making an extract with glycerine of the dried precipitate. The amount of bile discharged per hour amounted to about 22·2 cubic centimètres. On filtering the undiluted bile through animal charcoal v. Wittich observed that the filtrate was quite free from the biliary acids. These were consequently retained by the charcoal, but they could not be obtained from it by washing it with alcohol.

- v. Wittich adduces several interesting observations in regard to gastric digestion. In most of his researches Grünhagen's plan of estimating the quantity of peptone formed in a given time was adopted as a means of comparing the strength of solutions of pepsin. The

macerated and swollen fibrin was placed upon a number of filters, and the pepsin solution poured over them. Fibrillation at once commenced, and the activity of the pepsin solution was determined by the amount of filtrate obtained in a given term and the amount of peptone it contained, which was again determined by circular polarization. The conclusions at which he arrived were—1. That the terminal product of gastric digestion is always peptone, all the other analogous compounds being only intermediate products, and becoming ultimately converted into peptone. The pepsin remains unaltered throughout the process, and can recommence its action as soon as the peptone has been removed by diffusion, so that there is some resemblance to the process of the formation of ether by the action of sulphuric acid upon alcohol. 2. The activity of a solution of pepsin is not weakened by exposure to a temperature of -5° C. for three hours, but it is rapidly diminished by exposure even for a few minutes to a temperature of 60° C., and the deteriorating action of a high temperature is more marked in proportion as the solution is weak. In strong solutions the power is not wholly lost, even when the temperature has been so high as to be above that requisite to coagulate albumen. 3. Pepsin *per se* is not diffusible, but readily becomes so on the addition of acids. 4. Fibrin is capable of absorbing pepsin from its neutral and acid solutions, *i. e.* of decomposing its acid compounds.

M. Ritter possesses a collection of above 6000 biliary calculi; of these—

3920 weigh less than	0.1 gramme.
108 " "	0.1 to 0.5 gramme.
160 " "	0.5 — 1.0 "
270 " "	1.0 — 2.0 grammes.
230 " "	4.0 — 6.0 "
22 " "	6.0 — 10.0 "
9 " "	10.0 — 12.0 "
3 " "	12.0 — 14.0 "

He divides them into eight classes, according to their physical characters. The general analysis was—

Cholesterine	62.3
Biliary compounds soluble in water	18.3
Inorganic matter	3.9
Bilirubin	1.2
Bilifuscine	0.4
Biliprasine	0.8
Bilibrumine	1.5
Organic matter (mucus) and loss	12.3

100.0

Schenk finds that the amount of nitrogen in meat depends essentially on three factors—the quantity of water, the quantity of fat, and the proportion of connective tissue that it contains. The first two

factors can be eliminated, but this cannot be done with the third. Schenk shows from analysis of connective tissue, taken from the most various parts of the body, as the fasciæ of muscles, the periosteum of long bones, the pericardium, the tunica adventitia of arteries, and the mesentery, that this tissue contains 5 per cent. or more of nitrogen. Hence it is obvious that the more connective tissue a given specimen of meat contains the larger is the proportion of nitrogen. In fact, in portions of meat which contained much connective tissue Schenk found the proportion of nitrogen to be 3.76 and 3.92 per cent., which considerably exceeded the average proportion—3.4 per cent.—given by Voit.

RESPIRATION—ANIMAL HEAT.

1. M. N. GRÉHAUT. *Détermination quantitative de l'Oxyde de Carbon combiné avec l'hémoglobine, Mode d'Élimination de l'Oxyde de Carbon.* ('Comptes Rendus,' No. 4, Janvier 27, 1873.)
2. MM. MATTHIEU et URBAIN. *Gaz du Sang.* (Brown-Séguard's 'Journal de l'Anatomie,' 1872, pp. 447-469, 573-587, 710-731.)
3. DR. A. HORVATH. *The Physiology of Animal Heat.* ('Centralblatt für die Med. Wiss.,' 1872, Nos. 45 and 46.)
4. EDWARD CASEY, M.D. Lond. *On the Diurnal Variations of the Temperature of the Body.* ('Lancet,' Feb. 8, 1873, p. 200.)
5. N. SOCOLOFF. *Versuche über des Ueberziehen der Thiere mit Substanzen welche die Hautperspiration Verhindern.* ('Centralblatt für die Med. Wiss.,' No. 44, 1872.)
6. WOLFFBERG. *Ueber die Athmung der Lunge.* ('Pflüger's Archiv,' 1872, Band vi, p. 23.)
7. STRASSBURG. *Die Topographie der Gasspannungen im thierschen Organismus.* (Idem, p. 65.)
8. PFLÜGER. *Ueber die Diffusion des Sauerstoffs, dem Ort und die Gesetze der Oxydation-processes in thierischen Organismus.* (On the diffusion of oxygen, together with an account of the place and laws of the oxidation processes in the animal organism. Idem, p. 43.)

M. Gréhan concludes from his experiments that the gaseous oxide of carbon is eliminated naturally by the lungs—that is, by the same organ through which it gained entrance into the body. This result is important from the general physiology point of view, because it separates oxide of carbon from those substances which can undergo combustion in the body. He strongly recommends, as a practical point, the adoption of artificial respiration in severe cases of asphyxia from carbonic acid.

Dr. Horvath states he has long had in view the investigation of the phenomena of hibernation, especially as the opinions that have been advanced in regard to it are of so conflicting a nature. He has lately lived in a part of Russia where abundant opportunities presented themselves of examining marmots (*Spermophilus citillus*), and he has turned them to practical account. He first set himself to determine in

what respects a warm-blooded hibernating animal differed from one that did not hibernate when both were wide awake. It is generally believed that marmots sleep throughout the whole winter, but in none of Dr. Horvath's stock was this the case. In most instances they slept for four days and were awake for about four days alternately. The animals, when caught, were fed on grain, bread, meat and potatoes. The weight in winter amounted to about 150 to 206 grammes. The length of the animal without head and tail was about 155 millimètres. All temperatures were taken with the same thermometer. The temperature was taken by thrusting the thermometer bulb into the rectum to a depth of about 36 millimètres. In summer the temperature does not differ from that of other warm-blooded animals, viz. from 35° to 37° C., but during hibernation it approximates that of the surrounding air. Dr. Horvath has had opportunities of seeing marmots run about with liveliness which a few hours before had been kept in a state of hibernation in a room, having a temperature of 2° C., and whose temperature, as measured in the rectum, did not then exceed 2° C. This, he says, was the first idea he had that a warm-blooded animal could survive after having been kept so near the freezing-point. The temperature always rose rapidly after the animal awoke from the state of hibernation, the rise during the first hour being about 2°, during the second hour about 5°, and in the next half hour about 15°. This rise of temperature is much quicker than that produced by the most violent muscular exertion, such as that produced in animals tetanized with strychnia. Nor can the rise of temperature be explained by attributing it to very greatly augmented activity of the respiratory process. Dr. Horvath professes himself unable to give any explanation except that in the lower fourth of the body of the marmot circulation is arrested or extremely small during hibernation, recommencing when the temperature rises to 17° C.

Dr. Casey states that in his experiments the most scrupulous care was taken to ensure accuracy and to exclude the influence of any disturbing cause, such as muscular exercise, exposure to cold, and the like. The observations were taken in the cooler months of the year, but always in a warm room, and while he himself felt comfortably warm. The thermometer used for the most part was a new and delicate one by Casella. It was placed under the tongue and held there for from six to ten minutes. His health was good. The total number of observations was 154, and extended over eighteen days, at considerable intervals. His mean temperature during the day was 98·07° F., the mean range of temperature 1·61° F., the greatest range 2·5° F. The law in his case was this:—In the morning before getting out of bed the temperature is below the mean of the day; a rise then begins, continuing till midday. From this time until 7.30 p.m., at which hour the maximum is reached, the temperature is considerably above the mean height. Then it falls rapidly till bedtime, when the minimum occurs. But there are minor fluctuations of pretty constant occurrence, of which the explanation is not certain, but should probably be sought in the influence of the function of digestion. Thus, there was a fall at 2.30, and a reaction an hour after, which he thinks may be ascribed to the midday meal, and

the high temperature observed in the evening might be the effect of the tea taken shortly before. The averages given by Dr. Casey for the morning and afternoon accord closely with Dr. Davy's figures, and do not differ much from Dr. Ogle's. But the evening readings are remarkably low. In twenty-two observations after 11 p.m. the temperature never exceeded, and only twice reached, 97·8° F., seventeen times it fell below 97·5° F., and five times below 97° F. On all these occasions he was sitting by a warm fire, reading or smoking.

Socoloff, in his provisional communications to the 'Centralblatt' on the effects of painting and investing animals with substances suppressing the perspiration, states, as the results of his experiments made in Bötkins Laboratory (St. Petersburg), that—(1) A few hours before the death of the animals experimented upon chronic and tetanic convulsions occurred, affecting the several groups of muscles, while the temperature in the rectum fell considerably. (2) Enclosing an animal in wool did not cause any material rise of temperature in the large intestine, nor did it prevent the occurrence of death in the painted animal. (3) Death could not be staved off by compelling the animal to breathe oxygen. (4) Ulcers were observed in the stomach, consequent upon profound extravasations. (5) Albumen speedily appeared in the urine after the skin had been painted with the lacquer. (6) A diffused parenchymatous inflammation of the kidneys (sometimes as swelling of the cell-elements, sometimes as fatty degeneration of these cells) is observed. This inflammation occurs both when the skin is coated with balsamic varnish, as by a solution of asphalt in turpentine, and when the solution is of an indifferent substance, as gelatine or gum arabic.

ABSORPTION—CIRCULATION.

1. Dr. G. NEUMANN. *Zur Kenntniss der Lymphgefäße der Haut des Menschen und der Säugethiere.* ('Wiener Med. Zeitung,' 1873, p. 22.)
2. Dr. V. FELTZ. *Étude expérimentale sur la Puissance d'Absorption du Tissu médullaire des Os.* (Robin's 'Journal de l'Anatomie,' 1872, pp. 417—427.)
3. M. DUVAL. *Note pour servir à l'Étude de quelques Papilles vasculaires.* (Robin's 'Journal de l'Anatomie,' No. 1, 1873, pp. 30—42.)

Neumann has carefully investigated the mode of termination of the nerves in the skin, and, in opposition to Recklinghausen, contends that these are fine capillary ramifications, the membranous walls of which are composed of simple connective tissue. In regard to the question whether the lymphatics commence by open mouths, as Brücke still continues to maintain is the case with the lacteals, or by a closed system of canals, Neumann answers unhesitatingly in favour of the latter view. These canals have no stomata, and do not commence in the connective-tissue-corpuscles. He adduces as arguments demonstrating the presence of a membrane forming the walls of the capillary lymphatics of the skin, first, the fact that they can be injected, and that

when the injection has been dissolved out the lumen of the vessel becomes apparent; secondly, that the fine adjustment will show that the vascular wall is of a definite thickness; and thirdly, that injection of solution of nitrate of silver brings the contours of the cells of a lining epithelium into view. As regards the arrangements of the lymphatics in the skin, he found that they are very abundant in the skin, especially in that of the glans, labia, palm of hand, and sole of foot. They form a superficial close, and a deeper more wide-meshed plexus. These plexuses surround the fat-lobules, the hair, sebaceous and sweat glands.

M. Feltz shows that the osseous lacunæ of the cancellous tissue of the articular extremities of the long bones and of the intertabular substance of the flat bones are in direct connection with the venous system, and that the cancellous tissue itself may be regarded as a kind of cavernous tissue with solid walls. It is easy, therefore, to see how in purulent infection the products of the local disease may gain entrance into the system generally.

NERVOUS SYSTEM—MUSCLE.

1. BEAUNIS. *Note sur l'application des Injections interstitielles à l'étude de Fonctions des Centres nerveaux.* ('Gazette Médicale de Paris,' Nos. 30, 31, 1872.)
2. AUGUST SOLBRIG. *Ueber die feinere Struktur der Nerven-elemente bei den Gasteropoden, mit 7 Tafeln.* (Leipzig, Engelmann, pp. 50.)
3. LIONEL S. BEALE, M.D. *The Nerves of Capillary Vessels, and their probable Action in Health and Disease.* ('Monthly Microscop. Journ.,' No. xlv, August 1, 1872, p. 55.)
4. LIONEL S. BEALE, M.D. *On the Active Part of the Nerve-fibre and on the probable Nature of the Nerve Current.* (Idem, p. 173.)
5. HERMANN JOSEPH. *The Influence of the Nerves on Nutrition.* ('Reichert und Dubois-Reymond's Archiv für Anatomie,' 1872, p. 206.)
6. MM. LEGROS et ONIMUS. *Recherches expérimentales sur la Physiologie des Nerfs Pneumogastriques.* (Robin's 'Journal de l'Anatomie,' 1872, pp. 561—592.)
7. MM. ARLOING et TRIPIER. *Contributions à la Physiologie des Nerfs Vagues.* (Brown-Séguard's 'Journal de l'Anatomie,' 1872, pp. 411—426, 588—601, 732—742.)
8. JULIUS BUDGE. *Ueber das Centrum der Gefässnerven.* ('Pflüger's Archiv der Physiologie,' Band vi, 1872, p. 303.)
9. ALBERT EULENBURG and PAUL GUTTMANN. *Die Pathologie des Sympathicus.* (Berlin, 1873, pp. 202.)
10. S. FUCHS. *Ueber die Regeln der Muskelzuckungen in der offenen Galvanischen Kette.* ('Zeitschrift für Biologie,' Band viii, 1872, p. 100. On the laws of muscular contraction in the open galvanic current.)
11. H. N. MOSELEY, M.A. *On Methods of Preparing the Organ of*

- Corti for Microscopical Investigation.* ('Quart. Journ. of Mic. Sci.,' No. lxxviii, 1872, pp. 374-379.)
12. URBAN PRICHARD, M.D. *Methods of Preparing the Cochlea for Microscopical Investigation.* (Idem, pp. 380-384.)
13. SIGMUND EXNER. *Weitere Studien über die Struktur der Riechschleimhaut bei Wirbelthieren.* ('Sitzungsber. der K. Acad. d. Wiss.,' 1872, Band lxxv, p. 7.)

M. Beaunis, whilst insisting on the difficulties of determining the functions of the various parts of the brain by the method of ablation, since this inflicts such severe injury, suggests the employment of injections of various kinds of fluid, and points out that the influence of these can be localised with much exactness, and that they can be injected into deep-lying parts without doing material damage to the more superficial structures. He removes a portion of the skull with a trephine, and then forces into the part to be investigated either corrosive or diffusible fluids, or fluids which coagulate. The results do not as yet, however, appear to have been very satisfactory, for after injections into the region of the corpus striatum and the cornu ammonis, irregular movements occurred, followed by the death of the animal in convulsions.

Dr. Solbrig gives the following as the conclusions at which he has arrived after much careful research upon the structure of the finer elements of the nervous system in the Gasteropoda :

1. The ganglion-cells are very rarely provided with a membrane. The membrane of the nucleus, on the other hand, is easily demonstrable.

2. The cell substance consists of an albuminous mass with various sized granules, sometimes regularly, sometimes irregularly distributed through it, and which after treatment with reagents, but not before, exhibit a concentric striation.

3. There are no apolar ganglion-cells in the Gasteropoda.

4. Cells with one process predominate in number ; bipolar and multipolar cells are much less frequent. They stand to the unipolar cells in the proportion of 1 to 8. Amongst the unipolar cells the smaller sized cells, with a diameter not exceeding 10 μ , are most numerous.

5. The cell processes either run without division into a nerve-fibre or they divide first. If the latter they either form several branches, which do not divide again, or they continue to divide till they become immeasurably fine. Branches are occasionally met with which after a short course break up into a brush of fibres. From each of the above kinds of fibres delicate fibrils may be given off.

6. Direct anastomoses between two adjoining cells do not apparently occur in any instance.

7. The processes usually form a cone where they proceed from the cell substance or protoplasm, but there appear to be fine processes in bipolar cells which arise from the nucleoli.

8. The nerve-fibres of the Gasteropoda have no sheath of Schwann.

9. No nerve-medulla or axis-cylinder is distinguishable in them.

10. The nerve-fibres are as a whole comparable to the axis-cylinder of the nerve-fibres of Vertebrata, appearing in the form of a homogeneous band in which no fibrillation is in the *fresh state* visible.

11. The passage of the processes of the cells into the nerve-fibres takes place either directly, in which case they arise both from the cell substance and from the nucleus of the cell, or—

12. Indirectly, in which case true primitive fibres spring from an intermediate granulo-fibrous mass, in which the processes of the cells undergo extremely minute subdivision.

A very good pendant to the preceding paper, though too long for these pages, is the account given by M. Lacaze Duthiers of the anatomical characters of the nervous system of the Gasteropoda, contained in his own 'Archives de Zoologie expérimentale,' No. 4, 1872. (Baillière.)

Dr. Beale, in his paper on the nerves of the capillary vessels, observes that, although it has been confidently asserted that the capillary walls consists of protoplasm, any one who will be at the pains of examining actual capillaries, as, for example, those of the pia mater or of the ciliary processes of the ear, will soon be convinced that this view is a mistake. They will be found to be composed of *membrane*, and the bioplasts connected with it can be demonstrated in considerable number and without difficulty. They are destitute of any structure that can be regarded as contractile. The nerve-fibres supplying them cannot, therefore, be regarded as motor, or as indirectly affecting any reduction in their calibre. And although many high authorities still hold to the opinion that nerves do act directly upon the numberless processes, many considerations render it at least doubtful whether the action of the cells is directly influenced by nerve-fibres in any case. Nutrition and growth are carried on at a rapid rate in living structures which are destitute of nerves, and at every period of life; in diseased structures destitute of nerves, as pus and tubercle; in gland that contain but few nerves, &c. Hence Dr. Beale is disposed to consider that these nerve-fibres, whether supplying the capillaries of sensory surfaces or of muscles, are really sensory in their function. In support of this view he states that he observed when a bright ray of light was made to fall on the vessels of the exposed branchiæ of a *Proteus* the little arteries of the gill contracted by reducing the latter to one third of its original size, which he attributes to reflex action. Commencing with stimulation of these fibres, continued by reflection from the vaso-motor centres, and completed by excitation of the motor nerves supplying the branchial arteries, the whole circle he regards as a self-acting mechanism by which the supply of blood to tissues is effected.

Dr. Beale, in his second paper above quoted, remarks that so simple is the structure of the cylinder-axis that anatomical observation almost justifies the idea that if it were possible to replace an axis-cylinder by a long filament of ordinary fibrous tissue we should find that this would conduct the nerve current as effectually as the former. He thinks it to be doubtful whether the axis-cylinder is capable of undergoing any remarkable change in ultimate arrangement during nerve action. After reviewing the various theories of nerve action, he considers that no one has yet succeeded in showing that nerve action is *not* electricity.

Hermann Joseph calls attention to the fact that the late wars in America and France have led to many observations on the influence of the nerves on nutrition. He refers also to the experiments of Snellen,

which were not always alike in their results, as well as those of Bidder and Valentin. In his own experiments he employed frogs, and he gives a sketch of the little table to which they were attached. The skin of the posterior third of the right dorsal half was always raised into a transverse fold into which a nick was made with scissors. The fascia which then came into view was divided, the muscles raised successively in their layers and divided obliquely. Through the last thin layer two nerves could usually be seen glimmering, and this layer was torn through with the forceps. The nerves supplying the right leg could then be raised and a portion excised. The legs were thus intact, and the only difference between them was that one was supplied with nerves and the other was not. It was now necessary to discover a means by which the two legs could be examined for some weeks under precisely the same conditions, and this he found in plaster of Paris, with which he covered both legs, leaving the rest of the body free. The moulds were taken in two longitudinal halves, so that no pressure was exerted. The membrane of the feet was often left free in order that the circulation might be watched. The first question he proposed to himself was, what are the immediate consequences of destroyed nerve supply? At the moment of section the leg was violently convulsed, and some quiverings were observed in the muscles afterwards; voluntary movement and sensibility were lost. The relations of the circulation are important; if a similar cut was made through the skin of the two sides much more blood flowed from the paralysed side. After two or three days have elapsed, however, the quantity of blood is equal. Microscopical examination showed the arteries to be at first a little dilated, but there was no appreciable change in the capillaries or in the veins. At a later stage no stoppage, retardation or other change, was observed. The primary congestion he is disposed to attribute to the relaxation of all the parts, especially of the muscular, that occurs after section of the nerves. After some time has elapsed the limb, innervation of which has been destroyed, becomes atrophied. In Joseph's mode of operation both legs were kept equally still. Nevertheless, after nine days (earliest period) or after fourteen days (ordinary period) some diminution in the relative size of the wounded limb was observed. The epithelium was more or less desquamated in all the animals, and there was some variation in the colour of the muscles, some small blood extravasation, &c., but he appears to think that these pathological changes are quite independent of nervous influence.

MM. Legros and Onimus give the details of a series of experiments they have performed to determine the effects of electrically irritating the pneumogastric nerves by means of an apparatus permitting accurate measurement of the *number* of the interruptions in the current. The animals experimented on were various, including dogs, rabbits, frogs, snakes, and turtle, and state the following as the conclusions at which they have arrived:—1. Electrical excitation of the pneumogastric causes a diminution of tension, and at the same time the pulsations fewer and fuller. The diminution of the tension and in the number of pulsations is greater in proportion to the number of the intermittencies of the current. 2. In

some cases, when the intensity of the current is very feeble and there are not more than four interruptions in a second, there is an instantaneous diminution of tension, which is immediately followed by a slight elevation, which is due to a greater amplitude of the pulsation. 3. When the interruptions of the current succeed one another very rapidly the tension primarily descends several centimètres; then, after some seconds (10 to 15), it rises by great pulsations though remaining always some centimètres below the original level. 4. When the current is no longer applied the tension rises above the original level. 5. It requires from 15 to 20 interruptions per second to stop the heart of a dog in ordinary condition, the feebler the animal the fewer are the interruptions required. 6. In a warm-blooded animal, whatever may be the intensity of the current and the number of interruptions, the heart never stops for more than from 15 to 20 seconds. After this time, notwithstanding the continuance of the excitation, slowly repeated but strong contractions occur, which become continuously more and more frequent. 7. After the excitation of the pneumogastric has been stopped the contractions of the heart recover their natural state. 8. The number of interruptions of the current per second required to stop the heart varies in different instances. In a warm-blooded animal 15 to 20 interruptions per second are necessary, whilst in a cold-blooded animal 2 to 3 are sufficient, especially when in a state of hibernation. 9. A more or less long interval always elapses between the irritation of the pneumogastric and the occurrence of any alteration in the beats of the heart. This interval does not exceed one or two seconds in a warm-blooded animal, and may last half a minute in a cold-blooded animal, especially when in a state of hibernation.

Budge observes that in 1864 he called attention to the fact that by electrical irritation of that part of the brain in which the pedunculus cerebri is situated all the smaller arteries of the body contract. He has now repeated this experiment with a view of determining the effect upon the blood pressure. He finds that the blood pressure shortly after the commencement of the irritation increased considerably, continued to rise for a short time after the irritation had ceased to be applied, and then gradually fell. The experiments were made upon the dog, and the carotid was the artery selected for experiment. The animal was placed under the influence of woorara, and artificial respiration maintained; the irritation lasted from six to twenty-four seconds. In many cases a minute or more elapsed before the blood pressure returned to its original account. As a rule the beats of the heart increased in frequency. His experiments tend to show that the sympathetic nerves arise, not only from the spinal cord, as he formerly showed, but that their origin extends much higher up, and that it is to be sought either in the pedunculus cerebri or in its immediate vicinity.

MM. Eulenburg and Paul Guttman give the results of their experiments upon the galvanization of the cervical sympathetic in healthy persons. However striking the effects of stimulating the sympathetic may be when exposed in animals, they are very slight when practised percutaneously in man. This holds alike for the oculo-

pupillary, vasculo-thermic and cardiac phenomena. The oculo-pupillary effect consists in a slight dilatation of the pupil, but the enlargement is so slight that it would scarcely be possible to observe it except with the Giraud-Teulon's pupilloscope. It was produced by Gerhardt when he placed the negative electrode between the angle of the lower jaw and the sterno-mastoid, and the positive upon the alveolar arch of the same side. This dilatation, however, is certainly inconsiderable, and sometimes absent. Thus, when the superior cervical ganglion was galvanized by a current produced by from 20 to 40 elements, the anode being placed on the manubrium sterni and the cathode on the angle of the lower jaw, an extremely slight dilatation of the pupil was observed, and during the passage of the current the pupil again contracted to its ordinary size. The dilatation is to be regarded as the result of stimulation of the sympathetic, the subsequent contraction to its paralysis. On breaking contact the effect was very inconstant, dilatation of the pupil in some cases, in others contraction, taking place. When the electrodes were placed symmetrically behind and below the two opposite angles of the lower jaw the dilatation was most marked on the side of the cathode. As regards the effect of galvanization of the sympathetic upon the action of the heart, they found that with strong currents both the frequency of the pulse and the blood pressure in the carotid fell. E. Meyer observed that augmentation of the secretion of sweat followed the same operation. Rockwell and Beard found that this also produced an alteration in the size of the retinal vessels, as seen by the ophthalmoscope; one observer (Roosa) states that hyperæmia was produced in the first instance followed by anæmia of the retinal veins, whilst a second (Loring) only observed congestion of the veins, and a third (Hackley) noticed slight contraction of the arteries. The current was that obtained from 10 to 25 elements applied for 2 to 5 minutes, the anode being placed in the auriculo-mastoid fossa, the cathode on the manubrium sterni or on the side of the sixth cervical vertebra.

Fuchs investigated the action of the unipolar current upon the nerves when he connected one pole with the earth and the other with a condenser formed of a Leyden jar, and placed the nerve either in the tract of conduction to the earth or in that to the jar. As soon as the poles of the current were brought into connection with the two conductors a contraction of the muscle occurred, due to the passage of electricity, dependent on the tension of the current and the surface of the recipient. M. Fuchs finds that the positive electrical current applied in a centrifugal direction has the same effect as that of the negative electrical current has in a centripetal direction. The feeblest unipolar currents capable of causing any contraction at all, as a rule, only excite the fresh nerve when they are components of the ascending, and not when of the descending current. Strong unipolar currents excite both the fresh and the dying nerves, either when they are components of the ascending or of the descending current.

MEMORANDUM.

January, 1873.

A FEW small errors by the copier having found their way into the extract from a letter by Earl Fortescue, published in the last number of this Review, at page 13; his Lordship requests the insertion of the following correct version of those paragraphs :

“I am more and more convinced that the county affords for most purposes the best basis of supervising and controlling ‘provincial’ administration, with an action intermediate between that of the Central Government or Parliament on the one hand, and merely executive local administration on the spot on the other hand. It would be difficult to exaggerate the mischief and confusion, the waste of time and labour by the Imperial Parliament, of money and trouble to local bodies and individuals, arising from the utter absence in England of any such intermediate superintendence and control as that which a partially elective county board would afford. Such a board would represent the interests both of the owners and of the occupiers of real property, neither centralised and bureaucratic in spirit as the Whitehall offices, nor subject to all the petty personal jealousies and narrow views too often prevailing in a small provincial municipality or in a purely rural administrative area, such as an ordinary poor-law union or highway district. The county seems, unquestionably, best suited to afford the basis of such an intermediate administration as I have indicated in sanitary matters, and as it has been recognised by the Legislature in the case of roads; following the precedent, I suppose, of bridges, which, except when specially otherwise allotted by statute to turnpike trustees or other local bodies, have for centuries been built and repaired by the counties.”

* * * * *

“The union, with its boundaries adjusted to those of the county, which would generally not be very difficult (those of the county being in a few cases adjusted to those of the parish or union), ought to be, in my view, the new unit of English primary administration for almost all purposes, while the county should be that of secondary or intermediate controlling administration; the comparatively light duty of enforcing general unity, though by no means uniformity, of administration being alone left to the Central Government and the Legislature.”

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NOTICE TO READERS.

THE Editor is particularly desirous of having all Reports of Hospitals, Asylums, Sanitary Boards, Scientific Societies, &c., forwarded to him, as also Inaugural Lectures, Dissertations, or Theses, Medical and Scientific Addresses, &c.

INDEX TO VOL. LI

OF THE

BRITISH AND FOREIGN MEDICO-CHIRURGICAL REVIEW.

PAGE	PAGE
<p>Abscess of liver 367</p> <p>—— retro-pharyngeal, in children 239</p> <p>Absorption of osseous tissue 519</p> <p>Abuse of medical relief 102</p> <p>Aconite, therapeutical effects of 499</p> <p>Acoustics, experiments on 485</p> <p>Aitken's 'Science and Practice of Medicine' 162</p> <p>Albuminuria, puerperal, causation of 235</p> <p>Aldridge on effects of tonic agents on fundus of eye 342</p> <p>—— on ophthalmoscope in general paralysis 341</p> <p>Anæsthetic value of ether and nitrous oxide mixed 340</p> <p>Anatomy of ear 477</p> <p>—— lessons in 421</p> <p>Aneurisms, minute, of cerebral vessels 457</p> <p>Apomorphin as an emetic 496</p> <p>Arm, amputation of, in shoulder presentation 234</p> <p>Army surgery 315</p> <p>Arnott on cancer 142</p> <p>'Arsenal de la Chirurgie,' par G. Gaujot et E. Spillman 123</p> <p>Asylum, West Riding, reports 337</p> <p>Atlee, diagnosis of ovarian tumours 269</p> <p>Atropa mandragora, action of 241</p> <p>Atropine an antidote to opium 248</p> <p>Auditory vibrations, conduction of 485</p> <p>Aveling on English midwives 435</p> <p>Axis-cylinder of nerves 521</p> <p>Basham's 'Aids to Diagnosis of Kidney Disease' 432</p> <p>Belcher on miracles of healing 436</p> <p>Bennett (J. R.) on intra-thoracic cancer 344</p> <p>Bigg on orthopraxy 123</p> <p>Biliary calculi, composition of 515</p> <p>Bile, physiology of the 514</p>	<p>Blood, gases of the 506</p> <p>—— hæmatozoa of 424</p> <p>—— iron of the 507</p> <p>—— quantity of, in pregnancy 231</p> <p>—— vessels of nerve-centres, lesions of 387</p> <p>Boil-plague in Kurdistan 173</p> <p>Bones, absorption of 519</p> <p>Books, &c., received 266, 526</p> <p>Boston Hospital report 175</p> <p>Botany for beginners 159</p> <p>Braidwood, morphology of vaccine lymph 214</p> <p>Brain, granulations of surfaces 459</p> <p>—— in disease, histology of 370</p> <p>—— pathology of 370</p> <p>—— wasting, histology of 339</p> <p>Browne's (Crichton) 'Asylum Reports' 337</p> <p>Browne and Sabben's 'Handbook of Law and Lunacy' 41</p> <p>Bryant's 'Practice of Surgery' 409</p> <p>Buckmaster's 'Elements of Chemistry' 157</p> <p>Burman on properties, &c., of conia 338, 444</p> <p>Burresi on percussion in cardiac disease 108</p> <p>Butcher on excision 257</p> <p>Cæsarean section, statistics of 235</p> <p>Calculus, salivary 260</p> <p>Canal, central, of cord, changes in 460</p> <p>Camphor, monobromide of, in nervous diseases 494</p> <p>Cancer, Arnott on 142</p> <p>—— differential diagnosis of 358</p> <p>—— of uterus removed by curette 231</p> <p>—— varieties of, in thorax 345</p> <p>—— within the chest 344</p> <p>Capillaries, nerves of 521</p> <p>Cappie on causation of sleep 428</p> <p>Carbolic acid in scabies 239</p> <p>Carbon, oxide of, in respiration 516</p>

	PAGE		PAGE
Cartilage, minute structure of	513	Diagnosis of cancer in chest	358
Cases (200) of extraction of cataract	196	— — ovarian tumours	272
Cataract, linear section for extraction of	196	'Dictionnaire de Médecine'	164
Cattlin on dental surgery	29	'Diet and Regimen,' by Dobell	160
Causes of heart disease	118	Digestion, physiology of	514
Cerebellum, histology of	76	— — products of fibrin	504
Cerebral lymphatics	390	Digitalin, crystallized, uses of	500
— — vessels, diseased states of	387	Diseases of heart, new works on	108
Cerebritis, pathology of	375	Disinfection, methods of	403
Change of life and uterine inflammation	230	Dislocation, double, of clavicle	261
Charcot on gout	46	Diphtheria, Semple on	165
Chemical analogies, by Fresenius	157	Dobell on diet and regimen	160
— — technology	431	Domville's 'Manual for Nurses'	171
Chemistry, Buckmaster's	157	Dyspepsia from starchy food in infancy	238
— — junior course of, by Jones	432	Ear, anatomy and physiology of	477
— — of urine	509	— — external, its physiology	ib.
— — report on	504	— — ossicles of	480
Children's diseases, report on	225	Electricity, effects of, on brain	523
Chloral in tetanus	492	— — in insanity	341
— — used by intra-venous injection	493	— — uses of	502
Chronic acid as a caustic in throat affections	495	Electro-therapeutics	503
Church's report on chemistry	504	Embolism, pulmonary	237
Chyluria, its connection with hæmatozoa	424	Emetic properties of apomorphin	496
Cirrhosis, pathology of	365	Empyema in infants treated by tapping	239
Clark's, Le Gros, 'Surgery'	166	English midwives	435
Clavicle, double dislocation of	261	Enucleation of ovarian tumours	228
Coagulation of fibrin	506	— — uterine fibroid growths	229
Coleman, cystic tumour of jaws	29	Ergotin, subcutaneous injection of	222
Collodion in erysipelas	256	Erichsen's 'Science and Art of Surgery'	138
Conia, Burman on	444	Erysipelas, collodion in	256
— — its uses in insanity	338	Excision of knee-joint	257
Cooley's 'Cyclopædia of Receipts'	158	Faraday, memoir of	431
Copaiva in scabies	239	Fenestra rotunda of ear	484
Cord, spinal, syphilitic changes in	386	Ferrand's 'Pharmacy'	445
Courtenay on value of opium in melancholia	342	Fibrin, digestion-products of	504
Coxeter's surgical instruments	123	— — coagulation of	506
Creuznach waters in women's diseases	433	Fibroids, uterine, enucleation of	229
Crookes's 'Chemical Technology'	431	Fibrous tumours of uterus	ib.
Croup and diphtheria	165	Field's hints for obstetric clerks	435
Curette, removal of cancer of uterus by	231	Fleming on rabies	246
'Cyclopædia of Receipts,' by Cooley	157	Fœtation, extra-uterine, use of gastrotoomy in	325
Dalton's 'Physiology'	174	Food Adulteration Act	190
Davison on cure of varicocele	259	Forensic medicine, report on	241
Dead, incineration of the	255	Fortescue (Earl), letter by, in 'Pall Mall Gazette,' memorandum respecting	525
Death, causes of, in New York	406	Fothergill on heart diseases	108
Degeneration, brain tissue	383	Fractures of jaws	29
Deposits on cerebral vessels in insanity	455	Fresenius's 'Qualitative Chemical Analysis'	157
		Gallard's clinical lectures	448

	PAGE		PAGE
Galvanization of sympathetic	523	Infants, new-born, with urates in kidneys	238
Gases of the blood	506	Injections in spina bifida	237
Gasteropoda, nerves of	520	————— of brain to determine function	520
Gastrotony in extra-uterine foetation	235	Injection of chloral into veins	493
————— after rupture of uterus	235	————— of tumours	260
Gaujot on surgical appliances	123	Insane, morbid histology of brain and cord in the, by Dr. Batty Tuke	450
Gerlach on spinal cord	59	Insanity, changes of cerebral vessels in	452
Gigantic family, a	172	————— and menstrual irregularities	339
Gladstone's 'Faraday'	431	————— and uterine disease	230
Glioma of brain	383	'Institutes of Medicine,' by Paine	448
Gout, Meldon on	441	Intra-thoracic cancer	344
————— pathology of	46	Investigation of uterine maladies	83
Graefe's operation for cataract	196	Iodoform in venereal affections	494
Granulations on surfaces of brain	459	Iritis, syphilitic	263
Gross's 'System of Surgery'	138	Iron of the blood	507
Gunshot wounds	320	Irregular uterine contractions	234
Gynæcology, report on	225	Jaws, surgery of	29
Habershon on diseases of the liver	361	Jones's 'Course of Analytical Chemistry'	432
Hæmatocele, ante-uterine	227	Keller on extra-uterine pregnancy	169
Hæmatozoa in blood	424	Kidney diseases, diagnosis of	432
Hæmophilia, Legg on	146	Knee-joint, excision of	257, 332
Hæmorrhage from wounds in battle	325	Kurdistan boil-plague	173
Hæmorrhagic diathesis	146	Labour impeded by diseased foetus	233
Hæmorrhoids in pregnant women	232	————— induction of	233
'Handbook of Law and Lunacy'	41	Lamination of brain	64
Harley on the urine	447	Language, impairment of, dependent on brain disease	343
Hayden, reclamation by	265	Lateau, Louise, case of	149
Healing, miracles of	436	'Law and Lunacy, Handbook of'	41
Health Act of 1872	1	Leclanché's battery	503
Hearing in relation to vocal sounds	491	Lectures, clinical, by Gallard	446
Heart disease, works on	108	Legg on hæmophilia	146
————— sounds, Paton on	430	Legouest on army surgery	315
Heath on injuries, &c., of the jaws	29	Lewis on hæmatozoa in blood	424
Hebrew and Celtic affinities	171	Little, cases of extraction of cataract by Graefe's method	196
Henle's 'Nerve Pathology'	59	Liver, chemistry of	508
Hepatic abscess	367	————— diseases, Harbershon and Ward on	361
Hepatitis, pneumonic	472	Lobular pneumonia	474
Hernia, treatment of	415	Lunatic asylum reports reviewed	299
Hewitt's (G.) 'Diseases of Women'	167	'Lunacy and Law, Handbook of'	41
Hibernation, physiology of	516	Lung, pneumonic, pathology of	461
Hinton, report on otology	477	Lung-substance altered by cancer	347
Histology of nervous centres	59	Lymphatic system of brain	390
————— report on	512	Lymphatics of skin	518
Hofmann on uroscopy	155	————— of uterus	236
Hood on gout and rheumatism	46	Major on histology of the morbid brain	339
Hospital report, Boston	175	Malleus of ear, its minute anatomy	480
Hyaline membrane of cerebral vessels	454		
Hygiene, report on	252		
Hypertrophy of coats of cerebral vessels	456		
Hypodermic use of strychnia	497		
Hysterical vomiting	226		
Induction of labour	233		
Infancy diseases, by Smith	166		
Infantile paralysis, brain changes in	378		

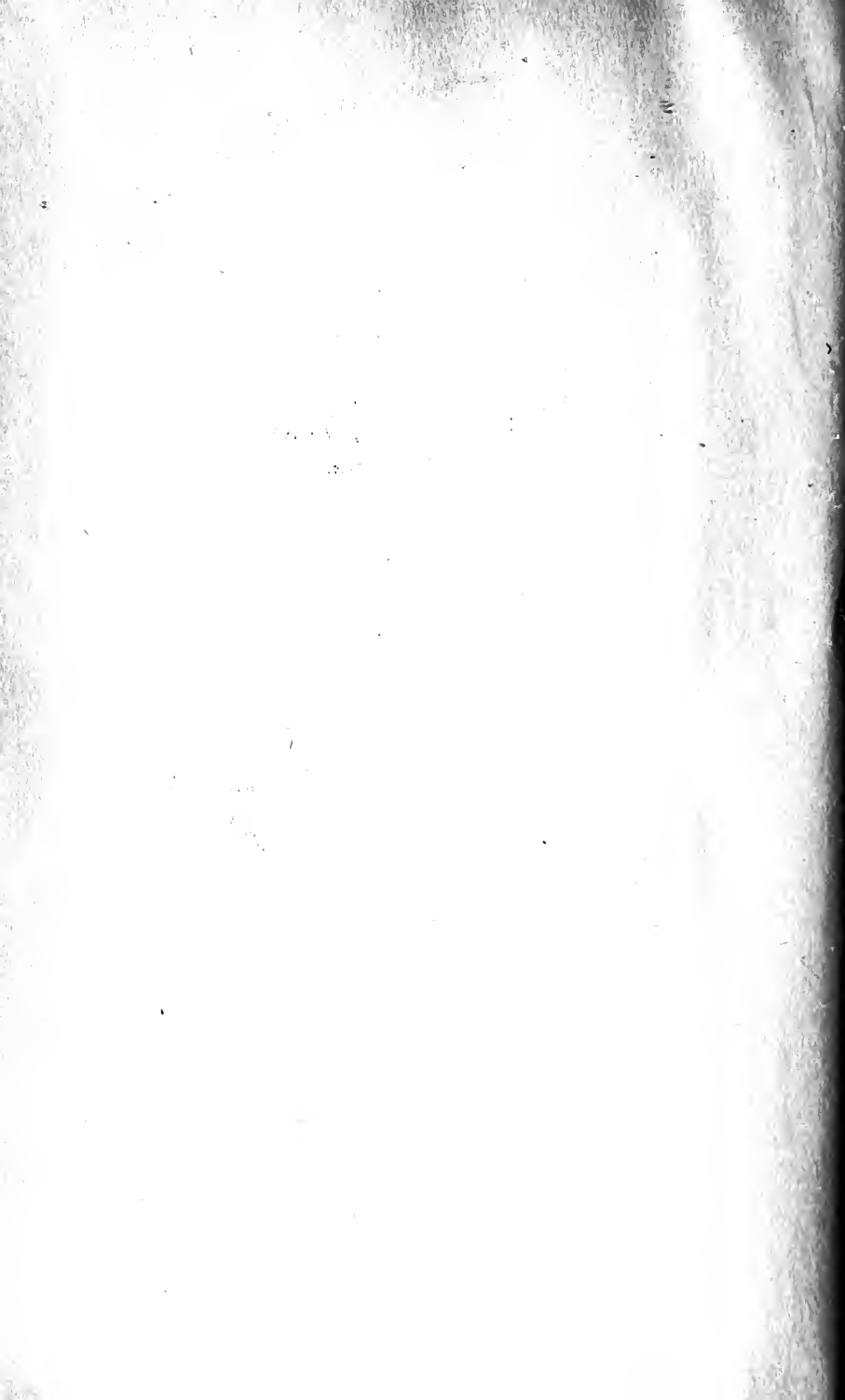
	PAGE		PAGE
Mandragora, action of	241	Nitrous oxide mixed with ether as an anæsthetic	340
Mammary glands, morphology of	264	Non-restraint, promulgation of doc- trine of	300
'Manual for Nurses'	171	'Nurses, Manual for'	171
Martin on microscopic mounting	425	Nutrition, nerves concerned in	521
Massachusetts Board of Health	395	Obstetric clerks, hints for	435
Masters's 'Botany for Beginners'	159	Obstetrics, report on	225
Materia medica, elements of	159	'Obstetrical Transactions'	434
Maw's illustrations of instru- ments	123	Ogston (Dr.) on smallpox	177
Mayer on sympathetic nerves	59	O'Neal family	172
Medical relief	100	Opium in melancholia	342
'Medicine (Aitken's), Science and Practice of'	162	----- poisoning, use of atropine in	248
'----- and Surgery, Diction- ary of'	164	Oppolzer on pathology	161
Meldon on gout and rheumatism	441	Orthopraxy, Bigg on	123
Membranes of brain, changes in, in insanity	458	Ossicula of ear	480
Memorandum respecting Earl Fortescue's letter in 'Pall Mall Gazette'	525	Otology, report on	477
Meningitis, recognition of	240	Ovarian disease, statistics of	287
Menstrual irregularities amongst the insane	339	----- fluid, characteristics of	275
Metritis, chronic, use of mineral waters in	496	----- tumours	96, 269
Mercury in para-metritis	236	----- adhesions of	282
Meynert on brain of mammals	59	----- removed by enu- cleation	228
Michels on Creuznach waters	433	Ovaries, diseases of	269
Microscopic mounting, by Martin	425	Ovariotomy	269, 286
'Midwives, Handbook for'	435	Paine's 'Institutes of Medicine'	448
'----- History of	435	Paraffin, local action of	243
Mineral waters in chronic metritis	496	Paralysis, general, use of ophthal- moscope in	341
Mines Regulation Acts	190	----- infantile, pathology of	378
Miracles, Belcher on	436	Para-metritis treated by perchloride of mercury	236
Mitchell on mixture of ether and nitrous oxide	340	Parotid, physiology of	514
Mivart's 'Elementary Anatomy'	421	Pathological histology of brain and spinal cord	370
Modern surgical armamentarium	123	Pathology, lectures on, by Op- polzer	161
Moinet on causes of heart disease	108	----- of gout	46
Moustrousity, double, case of	234	----- of intra-thoracic cancer	344
Morphology of mammary glands	264	Paton on sounds of the heart	430
----- of vaccine lymph	214	Peaslee on ovarian tumours	269
Movements of the tympanum in conducting sound	485	Pedicle of ovarian tumours	291
Neoplasia of neuroglia	383	Pelvic cellulitis	230
Nerve-cells, structure of	69	----- peritonitis	ib.
----- plexuses	73	Pereira's 'Materia Medica'	159
Nerves, action of galvanization on	524	Peri-arthritis of shoulder	262
----- influence of, on nutrition	521	Peri-vascular spaces of brain	390, 453
----- of capillaries	ib.	Perspiration, consequences of entire arrest of	518
Nervous centres, histology of	59	Pessaries, intra-uterine	227
----- diseases treated by mono- bromide of camphor	494	Pharmacy vade-mecum	445
Neuroglia of brain	68	Phenol, chemistry of	510
New York, sanitary organization in	394	Physiology of ear	477
Nicol on mental symptoms of ordi- nary disease	340	----- report on	512
		----- treatise on	174
		Pigmentation of brain	458
		Playfair (Dr.), report on gynæco- logy, &c.	225

	PAGE		PAGE
Pneumogastric, effects of electricity on	522	Sanitary work in United States	393
Pneumonia a specific disease	467	Scabies in children treated by copaiva and carbolic acid	239
————— pathology of	461	Scapula, resection of	262
Poland, A., notice of	255	Schultze on nervous tissue	59
Pollock on tumours of the jaw	29	Sclerosis of spinal cord and brain	380
Poor-law medical relief	100	Semple on croup and diphtheria	165
Power's report on physiology	512	———— report on materia medica and therapeutics	492
'Practice of Surgery' (review)	409	Sex, prediction of, in utero	231
Pregnancy, extra-uterine	169	Shoulder, periarthrits of	262
———— hæmorrhoids in	232	———— presentation	234
———— quantity of blood in	231	Skin lymphatics	518
Preventive measures against epidemics in New York	402	Sleep, causation of	428
Progress and present state of army surgery	315	Smallpox complications	185
Prolapse of cervix uteri	226	———— epidemic in Milan	252
Propylamine in rheumatism	497	———— eruptive stage	180
Public Health Act	1	———— Ogston (Dr.) on	177
Puerperal albuminuria, causation of	235	Smith's 'Diseases of Infancy'	166
———— poison, modes of elimination	236	———— (Fly) 'Handbook for Midwives'	435
———— septic disease, turpentine in	235	Sound in the ear, experiments on conduction of	485
Pulmonary thrombosis	237	Spillman on surgical appliances	123
Rabies, virus of	246	Spinal nerves	74
Reeves' report on surgery	255	Spina bifida cured by injection	237
Relation of nerve-fibres to cells	71	Spinal cord, morbid states of 370—392	
Reports of health officers of United States reviewed	393	Spine, conformation of, at birth	513
———— of Poor Law Commissioners 100		Starchy food indigestible to infants 238	
Report on forensic medicine	241	Stigmatics, notice of	149
———— on hygiene	252	Stratton on Hebrew and Celtic	171
———— on materia medica	492	Strychnia, hypodermic use of	497
———— on otology	477	Sturges on pathology of pneumonia 461	
———— on surgery	255	Sunstroke, Wood on	440
———— on toxicology	241	Surgery, army	315
Resection of scapula	262	———— by Le Gros Clark	166
Restraint and non-restraint	299	———— of the jaws	29
Results of ovariectomy	295	'———— Surgery, Practice of,' by Bryant	409
Retro-pharyngeal abscess in children 239		———— report on	255
Review of pathology of intra-thoracic cancer	344	Surgical apparatus	123
Rheumatism, Meldon on	441	Sutherland on menstrual irregularities in insanity	339
———— treated by propylamine	496	Sympathetic, galvanization of	523
Richardson, report on toxicology, &c.	241	Symptoms of cancer in chest	351
Roscoe's 'Junior Chemistry'	432	Syphilitic iritis	263
Rumsey (Dr.) on Food Adulteration and Mines Regulation Acts 190		Teeth, surgical diseases of	29
Sabben and Browne's 'Handbook of Law and Lunacy'	41	Temperature in variola	186
Salivary calculus, case of	260	———— of body, variations of 517	
Salter on surgical diseases of teeth 29		Tensor tympani, action of	492
Salt's surgical instruments	123	Tetanus, changes in nerve-tissue in	383
Sanitary government of New York	394	———— use of chloral in	492
———— state of New York City	397	Therapeutical effects of aconite	499
		———— uses of electricity	502
		Therapeutics of digitalin	500
		———— report on	492
		'———— Year-Book of'	434
		Thermic fever	440
		Thomas on diseases of women	78

	PAGE		PAGE
Thoracentesis in the empyema of infants	239	Uterus, lymphatics of	236
Throat affections, chronic acid in	495	Uteri, cervix, elongation of	226
Thrombosis in lungs	237	Uterine disease in United States	81
Toxicological action of mandragora	241	— — and insanity	230
Toxicology, report on	241	— — fibrous tumours	229
'Transactions of Obstetrical Society of London'	434	— — hæmatocele	227
' — — of Edinburgh Obstetrical Society'	434	— — inflammation with change of life	230
Trimethylamine in rheumatism	497	— — inversion, reduction of	228
Trousseau on gout	46	— — supports	225
Tuke (Batty) on morbid histology of brain and cord in the insane	450	Vaccine germs	221
Tumours, injection of	260	— — lymph, morphology of	214
Tunica adventitia of cerebral vessels	455	Vaccination, value of	253
Turpentine in puerperal disease	235	Vaccinia and variola, affinity between	216
Twins united by heads	235	Varicocele, radical cure of	259
Tympanum of ear	478	Variola epidemic in Milan	252
Ulceration of uterus	89	— — distinct species of	216
Ultzmann on uroscopy	155	Veneral affections, use of iodoform in	494
United States, cases of Cæsarean section in	235	Vessels of brain altered in direction	457
— — sanitary work in	393	Virus of rabies	246
Uræmic nerve disorders in new-born infants	238	Vital statistics of New York	404
Urates in kidneys of new-born infants	238	Wagner's 'Chemical Technology,' by Crookes	431
Urethral hæmorrhoids	226	Ward on diseases of the liver	361
Uric acid in gout	50	Weiss's 'Catalogue of Surgical Instruments'	123
Urine, chemistry of	509	Wells (Spencer) on diseases of ovaries	269
— Harley on	447	'West Riding Asylum Reports,' by Crichton Browne	337
Uroscopy, by Ultzmann and Hofmann	155	Women, diseases of	78
Uterus, absence of, after four pregnancies	232	— — by Graily Hewitt	167
— — cancer of, removed by curette	231	Wood on sunstroke	440
— — irregular contractions of	234	Wounds received in battle	318
		'Year-Book of Therapeutics'	444

END OF VOL. II.





2775

British and Foreign Medico-Chirurgical Review
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