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VOLUME XVI SLICE I

L to Lamellibranchia

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LACORDAIRE, JEAN BAPTISTE HENRI
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INITIALS USED IN VOLUME XVI. TO IDENTIFY INDIVIDUAL CONTRIBUTORS,[1] WITH THE HEADINGS OF THE ARTICLES IN THIS VOLUME SO SIGNED.

A. B. Ch.	A. B. Chatwood, B.Sc., A.M.Inst.C.E., M.Inst.Elec.E.	**Lock.**
A. B. R.	Alfred Barton Rendle, M.A., D.Sc, F.R.S., F.L.S. Keeper, Department of Botany, British Museum. Author of *Text Book on Classification of Flowering Plants, &c.*	**Leaf.**
A. C. F.	Alexander Campbell Fraser, LL.D. See the biographical article: Fraser, A. C.	**Locke, John.**
A. C. S.	Algernon Charles Swinburne.	**Landor.**

	See the biographical article: Swinburne, A. C.	
A. D.	Henry Austin Dobson, LL.D. See the biographical article: Dobson, Henry Austin.	**Locker-Lampson.**
A. Fi.	Pierre Marie Auguste Filon. See the biographical article: Filon, P. M. A.	**Labiche.**
A. F. P.	Albert Frederick Pollard, M.A., F.R.Hist.Soc. Professor of English History in the University of London. Fellow of All Souls' College, Oxford. Assistant editor of the Dictionary of National Biography, 1893-1901. Lothian Prizeman, Oxford, 1892; Arnold Prizeman, 1898. Author of *England under the Protector Somerset*; *Henry VIII.*; *Life of Thomas Cranmer*; &c.	**Lambert, Francis;** **Lambert, Nicholson.**
A. Gl.	Arnold Glover, M.A., LL.B. (d. 1905) Trinity College, Cambridge; Joint-editor of *Beaumont and Fletcher* for the Cambridge University Press.	**Layard.**
A. Go.*	Rev. Alexander Gordon, M.A. Lecturer in Church History in the University of Manchester.	**Laurentius, Paul;** **Libertines.**
A. G. D.	Arthur George Doughty, C.M.G., M.A., Litt.D., F.R.Hist.S., F.R.S.(Canada). Dominion Archivist of Canada. Member of the Geographical Board of Canada. Author of *The Cradle of New France*; &c. Joint editor of *Documents relating to the Constitutional History of Canada*.	**Lafontaine.**
A. H. S.	Rev. Archibald Henry Sayce, Litt.D., LL.D. See the biographical article: Sayce, A. H.	**Laodicea.**
A. J. G.	Rev. Alexander James Grieve, M.A., B.D. Professor of New Testament and Church History, Yorkshire United Independent College, Bradford. Sometime Registrar of Madras University, and Member of Mysore Educational Service.	**Logos** (*in part*).
A. J. L.	Andrew Jackson Lamoureux. Librarian, College of Agriculture, Cornell University. Editor of the *Rio News* (Rio de Janeiro), 1879-1901.	**Lima** (*Peru*).
A. L.	Andrew Lang. See the biographical article: Lang, Andrew.	**La Cloche.**
A. M. An.	Adelaide Mary Anderson, M.A. H.M. Principal Lady Inspector of Factories, Home Office. Clerk to the Royal Commission on Labour, 1892-1894. Gamble Gold Medallist, Girton College, Cambridge, 1893. Author of various articles on Industrial Life and Legislation, &c.	**Labour Legislation.**
A. M. C.	Agnes Mary Clerke. See the biographical article: Clerke, A. M.	**Lagrange;** **Laplace;** **Leverrier.**
A. N.	Alfred Newton, F.R.S. See the biographical article: Newton, Alfred.	**Lämmergeyer;** **Lapwing;** **Lark;** **Linnet;** **Loom.**
A. P. C.	Arthur Philemon Coleman, M.A., Ph.D., F.R.S. Professor of Geology in the University of Toronto. Geologist, Bureau of Mines, Toronto, 1893-1910. Author of *Reports of the Bureau of Mines of Ontario*.	**Labrador** (*in part*).
A. P. Lo.	Albert Peter Low. Deputy Minister of Department of Mines, Canada. Member of Geological Survey of Canada. Author of *Report on the Exploration in the Labrador Peninsula*; &c.	**Labrador** (*in part*).
A. Se.*	Adam Sedgwick, M.A., F.R.S. Professor of Zoology at the Imperial College of Science and Technology, London. Fellow, and formerly Tutor, of Trinity College, Cambridge. Professor of Zoology in the University of Cambridge, 1907-1909.	**Larval Forms.**
A. Sl.	Arthur Shadwell, M.A., M.D., LL.D., F.R.C.P. Member of Council of Epidemiological Society. Author of *The London Water-Supply*; *Industrial Efficiency*; *Drink, Temperance and Legislation*.	**Liquor Laws.**

A. So.	Albrecht Socin, Ph.D. (1844-1899). Formerly Professor of Semitic Philology in the Universities of Leipzig and Tübingen. Author of *Arabische Grammatik*; &c.	**Lebanon** (*in part*).
A. S. C.	Alan Summerly Cole, C.B. Assistant Secretary for Art, Board of Education, 1900-1908. Author of *Ancient Needle Point and Pillow Lace*; *Embroidery and Lace*; *Ornament in European Silks*; &c.	**Lace.**
A. St H. G.	Alfred St Hill Gibbons. Major, East Yorkshire Regiment. Explorer in South Central Africa. Author of *Africa from South to North through Marotseland.*	**Lewanika.**
A. S. M.	Alexander Stuart Murray, LL.D. See the biographical article: Murray, Alexander Stuart.	**Lamp.**
A. S. W.	Augustus Samuel Wilkins, M.A., LL.D., Litt.D. (1843-1905). Professor of Latin, Owens College, Manchester, 1869-1905. Author of *Roman Literature*; &c.	**Latin Language** (*in part*).
A. T. T.	A. T. Thorson. Official in Life Saving Service, U.S.A.	**Life-boat:** *United States*.
A. W. H.*	Arthur William Holland. Formerly Scholar of St John's College, Oxford. Bacon Scholar of Gray's Inn, 1900.	**Leopold I.** (*Roman Emperor*); **Levellers.**
A. W. Hu.	Rev. Arthur Wollaston Hutton, M.A. Rector of Bow Church, Cheapside. Librarian National Liberal Club, 1889-1899. Author of *Life of Cardinal Newman*; *Life of Cardinal Manning*; &c.	**Leo XIII.**
A. W. R.	Alexander Wood Renton, M.A., LL.B. Puisne Judge of the Supreme Court of Ceylon. Editor of *Encyclopaedia of the Laws of England*.	**Landlord and Tenant;** **Letters Patent;** **Lodger and Lodgings.**
A. W. W.	Adolphus William Ward, Litt.D., LL.D. See the biographical article: Ward, Adolphus William.	**Lodge, Thomas.**
B. D. J.	Benjamin Daydon Jackson, Ph.D. General Secretary of the Linnean Society. Secretary to Departmental Committee of H.M. Treasury on Botanical Work, 1900-1901. Author of *Glossary of Botanic Terms*; &c.	**Linnaeus.**
C.	The Rt. Hon. the Earl of Crewe. See the biographical article: Crewe, 1st Earl of.	**Laprade.**
C. C. W.	Charles Crawford Whinery, A.M. Cornell University. Assistant editor 11th Edition of the *Encyclopaedia Britannica*.	**La Salle;** **Lincoln, Abraham** (*in part*).
C. Di.	Charles Dibdin. F.R.G.S. Secretary of the Royal National Life-boat Institution. Hon. Secretary of the Civil Service Life-boat Fund, 1870-1906.	**Life-boat:** *British*.
C. D. W.	Hon. Carroll Davidson Wright. See the biographical article: Wright, Hon. Carroll Davidson.	**Labour Legislation:** *United States*.
C. E.*	Charles Everitt. M.A., F.C.S., F.G.S., F.R.A.S. Formerly Scholar of Magdalen College, Oxford.	**Light:** *Introduction and History*.
C. F. A.	Charles Francis Atkinson. Formerly Scholar of Queen's College, Oxford. Captain, 1st City of London (Royal Fusiliers). Author of *The Wilderness and Cold Harbour*.	**Long Island** (*Battle*).
C. F.-Br.	Charles Fortescue-Brickdale. Barrister-at-Law, Lincoln's Inn. Registrar of the Office of the Land Registry, Lincoln's Inn Fields. Author of *Registration of Title to Land*; *The Practice of the Land Registry*; *Land Transfer in Various Countries*; &c.	**Land Registration.**
C. H.*	Sir Charles Holroyd. See the biographical article: Holroyd, Sir Charles.	**Legros.**
C. H. Ha.	Carlton Huntley Hayes, A.M., Ph.D. Assistant Professor of History in Columbia University, New York City. Member of the American Historical Association.	**Leo I.-X.** (*Popes*).

C. J. B.*	Rev. Charles James Ball, M.A. University Lecturer in Assyriology, Oxford. Author of *Light from the East*.	**Lamentations.**
C. L. K.	Charles Lethbridge Kingsford, MA., F.R.Hist.S., F.S.A. Assistant Secretary, Board of Education. Author of *Life of Henry V.* Editor of *Chronicles of London* and Stow's *Survey of London*.	**Lancaster, John of Gaunt, duke of.**
C. M.	Carl Theodor Mirbt, D.Th. Professor of Church History in the University of Marburg. Author of *Publizistik im Zeitalter Gregor VII.*; *Quellen zur Geschichte des Papstthums*; &c.	**Lateran Councils.**
C. Mo.	William Cosmo Monkhouse. See the biographical article: Monkhouse, W. C.	**Leighton, Lord.**
C. R. B.	Charles Raymond Beazley, M.A., D.Litt., F.R.G.S., F.R.Hist.S. Professor of Modem History in the University of Birmingham. Formerly Fellow of Merton College, Oxford, and University Lecturer in the History of Geography. Lothian Prizeman, Oxford, 1889. Lowell Lecturer, Boston, 1908. Author of *Henry the Navigator*; *The Dawn of Modern Geography*; &c.	**Leif Ericsson;** **Leo, Johannes.**
De B.	Henri G. S. A. de Blowitz. See the biographical article: Blowitz, H. de.	**Lesseps, Ferdinand de.**
D. F. T.	Donald Francis Tovey. Author of *Essays in Musical Analysis*: comprising *The Classical Concerto*, *The Goldberg Variations*, and analysis of many other classical works.	**Lasso, Orlando.**
D. G. H.	David George Hogarth, M.A. Keeper of the Ashmolean Museum, Oxford. Fellow of Magdalen College, Oxford. Fellow of the British Academy. Excavated at Paphos, 1888; Naucratis, 1899 and 1903; Ephesus, 1904-1905; Assiut, 1906-1907; Director, British School at Athens, 1897-1900; Director, Cretan Exploration Fund, 1899.	**Latakia;** **Lebanon** (*in part*).
D. H.	David Hannay. Formerly British Vice-Consul at Barcelona. Author of *Short History of the Royal Navy*; *Life of Emilio Castelar*; &c.	**La Hogue, Battle of;** **Lauria, Roger de;** **Lepanto, Battle of;** **Lissa.**
D. Ll. T.	Daniel Lleufer Thomas. Barrister-at-Law, Lincoln's Inn. Stipendiary Magistrate at Pontypridd and Rhondda.	**Llantwit Major.**
D. Mn.	Rev. Dugald Macfadyen, M.A. Minister of South Grove Congregational Church, Highgate. Author of *Constructive Congregational Ideals*; &c.	**Leighton, Robert** (*in part*).
D. M. W.	Sir Donald Mackenzie Wallace, K.C.I.E., K.C.V.O. Extra Groom of the Bedchamber to H.M. King George V. Director of the Foreign Department of *The Times*, 1891-1899. Member of the Institut de Droit International and Officier de l'Instruction Publique (France). Joint-editor of New Volumes (10th ed.) of the *Encyclopaedia Britannica*. Author of *Russia*; *Egypt and the Egyptian Question*; *The Web of Empire*; &c.	**Lobánov-Rostovski.**
E. B.*	Ernest Charles François Babelon. Professor at the Collège de France. Keeper of the department of Medals and Antiquities at the Bibliothèque Nationale. Member of the Académie des Inscriptions et de Belles Lettres, Paris. Chevalier of the Legion of Honour. Author of *Descriptions Historiques des Monnaies de la République Romaine*; *Traités des Monnaies Grecques et Romaines*; *Catalogue des Camées de la Bibliothèque Nationale*.	**Leptis.**
E. C. B.	Edward Cuthbert Butler, O.S.B., M.A., D.Litt. (Dublin). Abbot of Downside Abbey, Bath. Author of "The Lausiac History of Palladius," in *Cambridge Texts and Studies*, vol. vi.	**Leo, Brother.**
E. Da.	Edward George Dannreuther (1844-1905). Member of Board of Professors, Royal College of Music, 1895-1905. Conducted the first Wagner Concerts in London, 1873-1874. Author of *The Music of the Future*; &c. Editor of a critical edition of Liszt's *Etudes*.	**Liszt.**

E. D. J. W.	Edward D. J. Wilson. Formerly Leader-writer on *The Times*.	**Londonderry, 2nd Marquess of.**
E. G.	Edmund Gosse, LL.D., D.C.L. See the biographical article: Gosse, Edmund.	**Lampoon; Lie, Jonas L. E.**
E. Ga.	Emile Garcke, M.Inst.E.E. Managing Director of British Electric Traction Co., Ltd. Author of *Manual of Electrical Undertakings*; &c.	**Lighting:** *Electric* (*Commercial Aspects*).
E. He.	Edward Heawood, M.A. Gonville and Caius College, Cambridge. Librarian of the Royal Geographical Society, London.	**Livingstone Mountains.**
E. J. D.	Edward Joseph Dent, M.A., Mus.Bac. Formerly Fellow of King's College, Cambridge. Author of *A. Scarlatti: his Life and Works*.	**Leo, Leonardo.**
E. O.*	Edmund Owen, M.B., F.R.C.S., LL.D., D.Sc. Consulting Surgeon to St Mary's Hospital, London, and to the Children's Hospital, Great Ormond Street, London. Chevalier of the Legion of Honour. Late Examiner in Surgery at the Universities of Cambridge, London and Durham. Author of *A Manual of Anatomy for Senior Students*.	**Liver:** *Surgery of Liver and Gall Bladder*.
E. Pr.	Edgar Prestage. Special Lecturer in Portuguese Literature in the University of Manchester. Examiner in Portuguese in the Universities of London, Manchester, &c. Commendador, Portuguese Order of S. Thiago. Corresponding Member of Lisbon Royal Academy of Sciences, Lisbon Geographical Society, &c. Author of *Letters of a Portuguese Nun*; *Azurara's Chronicle of Guinea*; &c.	**Lobo, F. R.;** **Lopes, Fernão.**
E. R. L.	Sir Edwin Ray Lankester, K.C.B., F.R.S., D.Sc. Hon. Fellow of Exeter College, Oxford. Director of the Natural History Departments of the British Museum, 1898-1907. President of the British Association, 1906. Professor of Zoology and Comparative Anatomy in University College, London, 1874-1890. Linacre Professor of Comparative Anatomy at Oxford, 1891-1898. Vice-President of the Royal Society, 1896. Romanes Lecturer at Oxford, 1905. Author of *Degeneration*; *The Advancement of Science*; *The Kingdom of Man*; &c.	**Lamellibranchia** (*in part*).
E. V. L.	Edward Verrall Lucas. Editor of *Works of Charles Lamb*. Author of *Life of Charles Lamb*.	**Lamb, Charles.**
F. E. B.	Frank Evers Beddard, M.A., F.R.S. Prosector of Zoological Society, London. Formerly Lecturer in Biology at Guy's Hospital, London. Naturalist to "Challenger" Expedition Commission, 1882-1884. Author of *Monograph of the Oligochaeta*; *Animal Colouration*; &c.	**Leech.**
F. E. W.	Rev. Frederick Edward Warren, M.A., B.D., F.S.A. Rector of Bardwell, Bury St Edmunds. Fellow of St John's College, Oxford, 1865-1882. Author of *The Old Catholic Ritual done into English and compared with the Corresponding Offices in the Roman and Old German Manuals*; *The Liturgy and Ritual of the Celtic Church*; &c.	**Lection, Lectionary;** **Lector;** **Litany;** **Liturgy.**
F. G. M. B.	Frederick George Meeson Beck, M.A. Fellow and Lecturer in Classics, Clare College, Cambridge.	**Lombards** (*in part*).
F. G. P.	Frederick Gymer Parsons, F.R.C.S., F.Z.S., F.R.Anthrop.Inst. Vice-President, Anatomical Society of Great Britain and Ireland. Lecturer on Anatomy at St Thomas's Hospital and the London School of Medicine for Women. Formerly Hunterian Professor at the Royal College of Surgeons.	**Liver**: *Anatomy*.
F. J. H.	Francis John Haverfield, M.A., LL.D., F.S.A. Camden Professor of Ancient History in the University of Oxford. Fellow of Brasenose College. Ford's Lecturer, 1906-1907. Fellow of the British Academy. Author of Monographs on Roman History, especially Roman Britain; &c.	**Legion** (*in part*); **Limes Germanicus.**
F. L.*	Sir Franklin Lushington, M.A. Formerly Chief Police Magistrate for London. Author of Wagers of Battle.	**Lear, Edward.**

F. V. B.	F. Vincent Brooks.	**Lithography.**
F. v. H.	Baron Friedrich von Hügel. Member of Cambridge Philological Society; Member of Hellenic Society. Author of *The Mystical Element of Religion*.	**Loisy.**
F. Wa.	Francis Watt, M.A. Barrister-at-Law, Middle Temple. Author of *Law's Lumber Room*; *Scotland of to-day*; &c.	**Law, John.**
F. W. R.*	Frederick William Rudler, I.S.O., F.G.S. Curator and Librarian of the Museum of Practical Geology, London, 1879-1902. President of the Geologists' Association, 1887-1889.	**Labradorite;** **Lapis Lazuli.**
F. W. Ra.	Francis William Raikes, K.C., LL.D. (1842-1906). Judge of County Courts, Hull, 1898-1906. Joint-author of *The New Practice*; &c.	**Lien.**
G. A. Gr.	George Abraham Grierson, C.I.E., Ph.D., D.Litt. (Dubl.). Member of the Indian Civil Service, 1873-1903. In charge of Linguistic Survey of India, 1898-1902. Gold Medallist, Royal Asiatic Society, 1909. Vice-President of the Royal Asiatic Society. Formerly Fellow of Calcutta University. Author of *The Languages of India*; &c.	**Lahnda.**
G. E.	Rev. George Edmundson. M.A., F.R.Hist.S. Formerly Fellow and Tutor of Brasenose College, Oxford. Ford's Lecturer, 1909-1910. Employed by British Government in preparation of the British Case in the British Guiana-Venezuelan and British Guiana-Brazilian boundary arbitrations.	**Limburg.**
G. F. B.	George Frederick Barwick. Assistant-Keeper of Printed Books and Superintendent of Reading-room, British Museum.	**Lavigerie.**
G. F. K.	George Frederick Kunz, A.M., Ph.D., D.Sc. Gem Expert to Messrs Tiffany & Co., New York. Hon. Curator of Precious Stones, American Museum of Natural History, New York. Fellow of Geological Society of America. Author of *Precious Stones of North America*; &c. Senior Editor of *Book of the Pearl*.	**Lapidary and Gem-cutting.**
G. H. C.	George Herbert Carpenter, B.Sc. Professor of Zoology in the Royal College of Science, Dublin. Author of *Insects: Their Structure and Life*.	**Lepidoptera.**
G. Sa.	George Saintsbury, D.C.L., LL.D. See the biographical article: Saintsbury, George E. B.	**La Bruyère;** **La Fontaine;** **Lamartine;** **La Rochefoucauld;** **Le Sage.**
G. S. L.	George Somes Layard. Trinity College, Cambridge. Barrister-at-Law, Inner Temple. Author of *Charles Keene*; *Shirley Brooks*; &c.	**Linton, William James.**
G. W. T.	Rev. Griffithes Wheeler Thatcher, M.A., B.D. Warden of Camden College, Sydney, N.S.W. Formerly Tutor in Hebrew and Old Testament History at Mansfield College, Oxford.	**Labid.**
H. A. L.	Hendrik Antoon Lorentz. Professor of Physics in the University of Leiden. Author of *La théorie electromagnétique de Maxwell et son application aux corps mouvants*.	**Light:** *Nature of.*
H. B. W.*	Henry Benjamin Wheatley, F.S.A. Assistant Secretary, Royal Society of Arts, 1879-1909. President of the Samuel Pepys Club, 1903-1910. Vice-President of the Bibliographical Society, 1908-1910. Author of *The Story of London*; *London Past and Present*; &c.	**London:** *History.*
H. B. Wo.	Horace Bolingbroke Woodward, F.R.S., F.G.S. Formerly Assistant Director of the Geological Survey of England and Wales. President Geologists' Association, 1893-1894. Wollaston Medallist, 1908.	**Logan, Sir William E.;** **Lonsdale, William.**
H. Ch.	Hugh Chisholm, M.A. Formerly Scholar of Corpus Christi College, Oxford. Editor of the 11th edition of the *Encyclopaedia Britannica*; Co-editor of the 10th edition.	**Lloyd George, D.**

H. De.	Rev. Hippolyte Delehaye, S.J. Bollandist. Joint-author of the *Acta Sanctorum*.	**Lawrence, St**; **Linus**.
H. F. G.	Hans Friedrich Gadow, M.A., F.R.S., Ph.D. Strickland Curator and Lecturer on Zoology in the University of Cambridge. Author of *Amphibia and Reptiles* (Cambridge Natural History).	**Lizard.**
H. F. P.	Henry Francis Pelham, LL.D. See the biographical article: Pelham, H. F.	**Livy** (*in part*).
H. H. J.	Sir Henry Hamilton Johnston, K.C.B., G.C.M.G. See the biographical article: Johnston, Sir Henry Hamilton.	**Liberia.**
H. M. S.	Henry Morse Stephens, M.A., Litt.D. Professor of History and Director of University Extension, University of California. Author of *History of the French Revolution*; *Revolutionary Europe*; &c.	**Littré.**
H. R. T.	Henry Richard Tedder, F.S.A. Secretary and Librarian of the Athenaeum Club, London.	**Libraries** (*in part*).
H. St.	Henry Sturt, M.A. Author of *Idola Theatri*; *The Idea of a Free Church*; and *Personal Idealism*.	**Lange, Friedrich Albert.**
H. T. A.	Rev. Herbert Thomas Andrews. Professor of New Testament Exegesis, New College, London. Author of the "Commentary on Acts," in the *Westminster New Testament*; *Handbook on the Apocryphal Books* in the "Century Bible."	**Logia.**
H. W. B.*	Herbert William Blunt, M.A. Student, Tutor, and Librarian, Christ Church, Oxford. Formerly Fellow of All Souls' College.	**Logic**: *History*.
H. W. C. D.	Henry William Carless Davis, M.A. Fellow and Tutor of Balliol College, Oxford. Fellow of All Souls' College, Oxford, 1895-1902. Author of *Charlemagne*; *England under the Normans and Angevins*; &c.	**Lanfranc;** **Langton, Stephen.**
H. Y.	Sir Henry Yule, K.C.S.I. See the biographical article: Yule, Sir Henry.	**Lhasa** (*in part*).
I. A.	Israel Abrahams. Reader in Talmudic and Rabbinic Literature in the University of Cambridge. Formerly President, Jewish Historical Society of England. Author of *A Short History of Jewish Literature*; *Jewish Life in the Middle Ages*; *Judaism*; &c.	**Lazarus, Emma;** **Leon, Moses;** **Leon of Modena.**
J. An.	Joseph Anderson, LL.D. Keeper of the National Museum of Antiquities, Edinburgh. Assistant Secretary to the Society of Antiquaries of Scotland, and Rhind Lecturer, 1879-1882 and 1892. Editor of Drummond's *Ancient Scottish Weapons*; &c.	**Lake Dwellings.**
J. A. F.	John Ambrose Fleming, M.A., D.Sc., F.R.S. Pender Professor of Electrical Engineering in the University of London. Fellow of University College, London. Formerly Fellow of St John's College, Cambridge. Vice-President of the Institution of Electrical Engineers. Author of *The Principles of Electric Wave Telegraphy*; *Magnets and Electric Currents*; &c.	**Leyden Jar;** **Lighting:** *Electric*.
J. A. F. M.	John Alexander Fuller Maitland, M.A., F.S.A. Musical critic of *The Times*. Author of *Life of Schumann*; *The Musician's Pilgrimage*; *Masters of German Music*; *English Music in the Nineteenth Century*; *The Age of Bach and Handel*. Editor of *Grove's Dictionary of Music and Musicians*; &c.	**Lind, Jenny.**
J. A. H.	John Allen Howe, B.Sc. Curator and Librarian of the Museum of Practical Geology, London. Author of *The Geology of Building Stones*; &c.	**Lias;** **Llandovery Group.**
J. Dr.	Sir James Dewar, F.R.S., LL.D. See the biographical article: Dewar, Sir J.	**Liquid Gases.**
J. D. B.	James David Bourchier, M.A., F.R.G.S. King's College, Cambridge. Correspondent of *The Times* in South-Eastern Europe. Commander of the Orders of	

	Prince Danilo of Montenegro and of the Saviour of Greece, and Officer of the Order of St Alexander of Bulgaria.	**Larissa.**
J. D. Br.	James Duff Brown. Borough Librarian, Islington Public Libraries. Vice-President of the Library Association. Author of *Guide to Librarianship*; &c.	**Libraries** (*in part*).
J. F.-K.	James Fitzmaurice-Kelly, Litt.D., F.R.Hist.S. Gilmour Professor of Spanish Language and Literature, Liverpool University. Norman McColl Lecturer, Cambridge University. Fellow of the British Academy. Member of the Royal Spanish Academy. Knight Commander of the Order of Alphonso XII. Author of *A History of Spanish Literature*; &c.	**La Cueva;** **Larra;** **Literature.**
J. F. St.	John Frederick Stenning, M.A. Dean and Fellow of Wadham College, Oxford. University Lecturer in Aramaic, Lecturer in Divinity and Hebrew at Wadham College.	**Leviticus.**
J. Ga.	James Gairdner, C.B., LL.D. See the biographical article: Gairdner, James.	**Lancaster, House of;** **Leicester, Robert Dudley, earl of.**
J. G. F.	Sir Joshua Girling Fitch, LL.D. See the biographical article: Fitch, Sir J. G.	**Lancaster, Joseph.**
J. G. N.	John George Nicolay (1832-1901). Marshal of the U.S. Supreme Court, 1872-1887. Joint-author of *Abraham Lincoln*: &c.	**Lincoln, Abraham** (*in part*).
J. G. P.*	James Gordon Parker, D.Sc., F.C.S. Principal of Leathersellers Technical College, London. Gold Medallist, Society of Arts. Author of *Leather for Libraries*; *Principles of Tanning*; &c.	**Leather.**
J. G. R.	John George Robertson, M.A., Ph.D. Professor of German Language and Literature, University of London. Editor of the *Modern Language Journal*. Author of *History of German Literature*; *Schiller after a Century*; &c.	**Lessing** (*in part*).
J. Hn.	Jūstuūs Hashagen, Ph.D. Privat-dozent in Medieval and Modern History, University of Bonn. Author of *Das Rheinland unter der französische Herrschaft*.	**Lang, Karl Heinrich;** **Ledochowski;** **Leo, Heinrich.**
J. H. F.	John Henry Freese, M.A. Formerly Fellow of St John's College, Cambridge.	**Leo VI.** (*Emperor of the East*).
J. Hl. R.	John Holland Rose, M.A., Litt.D. Lecturer on Modern History to the Cambridge University Local Lectures Syndicate. Author of *Life of Napoleon I.*; *Napoleonic Studies*; *The Development of the European Nations*; *The Life of Pitt*; &c.	**Las Casas.**
J. J. L.*	Rev. John James Lias, M.A. Chancellor of Llandaff Cathedral. Formerly Hulsean Lecturer in Divinity and Lady Margaret Preacher, University of Cambridge.	**Langen.**
J. K. I.	John Kells Ingram, LL.D. See the biographical article: Ingram, J. K.	**Leslie, Thomas E. C.**
J. Le.	Rev. James Legge, M.A. See the biographical article: Legge, James.	**Lâo-Tsze.**
J. L. M.	John Linton Myres, M.A., F.S.A., F.R.G.S. Wykeham Professor of Ancient History in the University of Oxford. Formerly Gladstone Professor of Greek and Lecturer in Ancient Geography, University of Liverpool. Lecturer in Classical Archaeology in University of Oxford.	**Leleges;** **Locri** (*Greece*).
J. L. W.	Jessie Laidlay Weston. Author of *Arthurian Romances unrepresented in Malory*.	**Lancelot.**
J. Mu.	Sir John Murray, K.C.B., F.R.S. See the biographical article: Murray, Sir John.	**Lake.**
J. M. C.	Rev. James M. Crombie. Author of *Braemar: its Topography and Natural History*; *Lichenes Britannici*.	**Lichens** (*in part*).

J. M. G.	John Miller Gray (1850-1894). Art Critic and Curator of the Scottish National Portrait Gallery, 1884-1894. Author of *David Scott, R.S.A.*; *James and William Tassie*.	**Leech, John.**
J. P. E.	Jean Paul Hippolyte Emmanuel Adhémar Esmein. Professor of Law in the University of Paris. Officer of the Legion of Honour. Member of the Institute of France. Author of *Cours élémentaire d'histoire du droit français*; &c.	**Lettres de Cachet.**
J. P. P.	John Percival Postgate, M.A., Litt.D. Professor of Latin in the University of Liverpool. Fellow of Trinity College, Cambridge. Fellow of the British Academy. Editor of the *Classical Quarterly*. Editor-in-chief of the *Corpus Poetarum Latinorum*; &c.	**Latin Literature** (*in part*).
J. P. Pe.	Rev. John Punnett Peters, Ph.D., D.D. Canon Residentiary, P. E. Cathedral of New York. Formerly Professor of Hebrew in the University of Pennsylvania. Director of the University Expedition to Babylonia, 1888-1895. Author of *Nippur, or Explorations and Adventures on the Euphrates*; *Scriptures, Hebrew and Christian*.	**Lagash;** **Larsa.**
J. S.	James Sully, LL.D. See the biographical article: Sully, James.	**Lewes, George Henry** (*in part*).
J. Si.	James Sime, M.A. (1843-1895). Author of *A History of Germany*; &c.	**Lessing** (*in part*).
J. S. F.	John Smith Flett, D.Sc., F.G.S. Petrographer to the Geological Survey. Formerly Lecturer on Petrology in Edinburgh University. Neill Medallist of the Royal Society of Edinburgh. Bigsby Medallist of the Geological Society of London.	**Laccolite;** **Lamprophyres;** **Laterite;** **Leucite:** *Leucite Rocks*; **Limestone.**
J. S. K.	John Scott Keltie, LL.D., F.S.S., F.S.A. (Scot.). Secretary, Royal Geographical Society. Hon. Member, Geographical Societies of Paris, Berlin, Rome, &c. Editor of the *Statesman's Year Book*. Editor of the *Geographical Journal*.	**Livingstone.**
J. S. W.	John Stephen Willison, LL.D., F.R.S. (Canada). Editor of *The News* (Toronto). Canadian Correspondent of *The Times*. Author of *Sir Wilfrid Laurier and the Liberal Party*; &c.	**Laurier.**
J. T. Be.	John Thomas Bealby. Joint-author of Stanford's *Europe*. Formerly Editor of the *Scottish Geographical Magazine*. Translator of Sven Hedin's *Through Asia, Central Asia and Tibet*; &c.	**Ladoga** (*in part*); **Livonia** (*in part*); **Lop-nor.**
J. T. Br.	J. Taylor Brown.	**Leighton, Robert** (*in part*).
J. T. C.	Joseph Thomas Cunningham, M.A., F.Z.S. Lecturer on Zoology at the South-Western Polytechnic, London. Formerly Fellow of University College, Oxford. Assistant Professor of Natural History in the University of Edinburgh. Naturalist to the Marine Biological Association.	**Lamellibranchia** (*in part*).
J. T. S.*	James Thomson Shotwell, Ph.D. Professor of History in Columbia University, New York City.	**Languedoc.**
J. V.*	Jules Viard. Archivist at the National Archives, Paris. Officer of Public Instruction. Author of *La France sous Philippe VI. de Valois*; &c.	**Le Maçon.**
J. W. D.	Captain J. Whitly Dixon, R.N. Nautical Assessor to the Court of Appeal.	**Log.**
J. W. He.	James Wycliffe Headlam, M.A. Staff Inspector of Secondary Schools under the Board of Education. Formerly Fellow of King's College, Cambridge. Professor of Greek and Ancient History at Queen's College, London. Author of *Bismarck and the Foundation of the German Empire*; &c.	**Lasker.**
J. W. L. G.	James Whitbread Lee Glaisher, M.A., D.Sc., F.R.S. Fellow of Trinity College, Cambridge. Formerly President of the Cambridge Philosophical Society, and	**Legendre, A. M.;**

	the Royal Astronomical Society. Editor of *Messenger of Mathematics* and the *Quarterly Journal of Pure and Applied Mathematics*.	**Logarithm.**
K. H.	Killingworth Hedges, M.Inst.C.E., M.Inst.Elect.E. Hon. Secretary of the Lightning Research Committee. Author of *Modern Lightning Conductors*; &c.	**Lightning Conductor.**
K. S.	Kathleen Schlesinger. Editor of *The Portfolio of Musical Archaeology*. Author of *The Instruments of the Orchestra*.	**Lituus.**
L. A. W.	Laurence Austine Waddell, C.B., C.I.E., LL.D., M.B. Lieut.-Colonel I.M.S. (retired). Author of *Lhasa and its Mysteries*; &c.	**Lhasa** (*in part*).
L. B.	Laurence Binyon. See the biographical article: Binyon, L.	**Lawson, Cecil Gordon.**
L. D.*	Louis Marie Olivier Duchesne. See the biographical article: Duchesne, L. M. O.	**Liberius.**
L. J. S.	Leonard James Spencer, M.A. Assistant in the Department of Mineralogy, British Museum. Formerly Scholar of Sidney Sussex College, Cambridge, and Harkness Scholar. Editor of the *Mineralogical Magazine*.	**Leadhillite;** **Lepidolite;** **Leucite** (*in part*); **Liroconite.**
L. T. D.	Sir Lewis Tonna Dibdin, M.A., D.C.L., F.S.A. Dean of the Arches; Master of the Faculties; and First Church Estates Commissioner. Bencher of Lincoln's Inn. Author of *Monasticism in England*; &c.	**Lincoln Judgment, The.**
L. V.*	Luigi Villari. Italian Foreign Office (Emigration Dept.). Formerly Newspaper Correspondent in east of Europe. Italian Vice-Consul in New Orleans, 1906, Philadelphia, 1907, and Boston, U.S.A., 1907-1910. Author of *Italian Life in Town and Country*; &c.	**Leopold II.** (*Grand Duke of Tuscany*).
M. Br.	Margaret Bryant.	**Landor:** *Bibliography*; **La Sale.**
M. Ca.	Moritz Cantor, Ph.D. Honorary Professor of Mathematics in the University of Heidelberg. Author of *Vorlesungen über die Geschichte der Mathematik*; &c.	**Leonardo of Pisa.**
M. H. S.	Marion H. Spielmann, F.S.A. Formerly Editor of the *Magazine of Art*. Member of Fine Art Committee of International Exhibitions of Brussels, Paris, Buenos Aires, Rome, and the Franco-British Exhibition, London. Author of *History of "Punch"*; *British Portrait Painting to the Opening of the Nineteenth Century*; *Works of G. F. Watts, R.A.*; *British Sculpture and Sculptors of To-day*; *Henriette Ronner*; &c.	**Line Engraving** (*in part*).
M. N. T.	Marcus Niebuhr Tod, M.A. Fellow and Tutor of Oriel College, Oxford. University Lecturer in Epigraphy. Joint-author of *Catalogue of the Sparta Museum*.	**Laconia;** **Leonidas;** **Leotychides.**
M. O. B. C.	Maximilian Otto Bismarck Caspari, M.A. Reader in Ancient History at London University. Lecturer in Greek at Birmingham University, 1905-1908.	**Leo I.-V.** (*Emperors of the East*); **Lesbos;** **Leuctra.**
M. P.*	Leon Jacques Maxime Prinet. Formerly Archivist to the French National Archives. Auxiliary of the Institute of France (Academy of Moral and Political Sciences).	**L'Aubespine.**
N. G. G.	Nicholas G. Gedye. Chief Engineer to the Tyne Improvement Commission.	**Lighthouse** (*in part*).
O. Hr.	Otto Henker, Ph.D. On the Staff of the Carl Zeiss Factory, Jena, Germany.	**Lens.**
P. A. K.	Prince Peter Alexeivitch Kropotkin. See the biographical article: Kropotkin, Prince P. A.	**Ladoga** (*in part*); **Lithuanians and Letts:** *History*; **Livonia** (*in part*).
P. C. M.	Peter Chalmers Mitchell, M.A., F.R.S., D.Sc., LL.D. Secretary to the Zoological Society of London. University	

	Demonstrator in Comparative Anatomy and Assistant to Linacre Professor at Oxford, 1888-1891. Lecturer on Biology at Charing Cross Hospital, 1892-1894; at London Hospital, 1894. Examiner in Biology to the Royal College of Physicians, 1892-1896, 1901-1903. Examiner in Zoology to the University of London, 1903.	**Life;** **Longevity.**
P. C. Y.	Philip Chesney Yorke, M.A. Magdalen College, Oxford.	**Laud, Archbishop;** **Lauderdale, Duke of;** **Leeds, 1st Duke of.**
P. G.	Percy Gardner. Litt.D., LL.D., F.S.A. See the biographical article: Gardner, Percy.	**Leochares.**
P. Gi.	Peter Giles, M.A., LL.D., Litt.D. Fellow and Classical Lecturer of Emmanuel College, Cambridge, and University Reader in Comparative Philology. Late Secretary of the Cambridge Philological Society. Author of *Manual of Comparative Philology*; &c.	**L.**
P. G. H.	Philip Gilbert Hamerton. See the biographical article: Hamerton, Philip Gilbert.	**Line Engraving** (*in part*).
R. A. S. M.	Robert Alexander Stewart Macalister, M.A., F.S.A. St John's College, Cambridge. Director of Excavations for the Palestine Exploration Fund.	**Lachish.**
R. G.	Richard Garnett, LL.D. See the biographical article: Garnett, Richard.	**Leopardi.**
R. I. P.	Reginald Innes Pocock, F.Z.S. Superintendent of the Zoological Gardens, London.	**Leaf-insect;** **Locust** (*in part*).
R. J. M.	Ronald John McNeill, M.A. Christ Church, Oxford. Barrister-at-Law. Formerly Editor of the *St James's Gazette*, London.	**Lawn Tennis;** **Leicester, R. Sidney, earl of;** **Lockhart, George.**
R. K. D.	Sir Robert Kennaway Douglas. Formerly Professor of Chinese, King's College, London. Keeper of Oriental Printed Books and MSS. at British Museum, 1892-1907. Member of the Chinese Consular Service, 1858-1865. Author of *The Language and Literature of China*; *Europe and the Far East*; &c.	**Li Hung Chang.**
R. L.*	Richard Lydekker, F.R.S., F.G.S., F.Z.S. Member of the Staff of the Geological Survey of India, 1874-1882. Author of *Catalogue of Fossil Mammals, Reptiles and Birds in the British Museum*; *The Deer of all Lands*; *The Game Animals of Africa*; &c.	**Langur;** **Lemming** (*in part*); **Lemur;** **Leopard** (*in part*); **Lion** (*in part*); **Litopterna.**
R. M'L.	Robert M'Lachlan. Editor of the *Entomologists' Monthly Magazine*.	**Locust** (*in part*).
R. M. B.	Robert Michael Ballantyne. See the biographical article: Ballantyne, R. M.	**Life-boat:** *British* (*in part*).
R. N. B.	Robert Nisbet Bain (d. 1909). Assistant Librarian, British Museum, 1883-1909. Author of *Scandinavia: the Political History of Denmark, Norway and Sweden, 1513-1900*; *The First Romanovs, 1613-1725*; *Slavonic Europe: the Political History of Poland and Russia from 1469 to 1796*; &c.	**Ladislaus I. and IV. of Hungary;** **Laski.**
R. S. C.	Robert Seymour Conway, M.A., D.Litt. (Cantab.). Professor of Latin and Indo-European Philology in the University of Manchester. Formerly Professor of Latin in University College, Cardiff; and Fellow of Gonville and Caius College, Cambridge. Author of *The Italic Dialects*.	**Latin Language** (*in part*); **Liguria:** *Archaeology and Philology*.
R. We.	Richard Webster, A.M. Formerly Fellow in Classics, Princeton University. Editor of *The Elegies of Maximianus*; &c.	**Long Island.**
R. W. C.	The Very Rev. R. W. Church, D.D. See the biographical article: Church, R. W.	**Lombards:** *The Kingdom in Italy*.
S. A. C.	Stanley Arthur Cook, M.A. Lecturer in Hebrew and Syriac, and formerly Fellow, Gonville and Caius College, Cambridge. Editor for Palestine Exploration Fund. Examiner in Hebrew and Aramaic, London University, 1904-1908. Author of *Glossary of Aramaic Inscriptions*; *The Laws of Moses and*	**Levites.**

	the Code of Hammurabi; *Critical Notes on Old Testament History*; *Religion of Ancient Palestine*; &c.	
S. C.	Sidney Colvin, LL.D. See the biographical article: Colvin, Sidney.	**Leonardo da Vinci.**
St C.	Viscount St Cyres. See the biographical article: Iddesleigh, 1st Earl of.	**Liguori.**
S. D. F. S.	Rev. Stewart Dingwall Fordyce Salmon, M.A., D.D. (1838-1905). Professor of Systematic Theology and Exegesis of the Epistles, U.F.C. College Aberdeen, 1876-1905. Author of *The Parables of our Lord*; &c. Editor of *The International Library of Theology*; &c.	**Logos** (*in part*).
S. N.	Simon Newcomb, LL.D., D.Sc. See the biographical article: Newcomb, Simon.	**Latitude;** **Light**: *Velocity*.
T. As.	Thomas Ashby, M.A., D.Litt., F.S.A. Director of the British School of Archaeology at Rome. Corresponding Member of the Imperial German Archaeological Institute. Formerly Scholar of Christ Church, Oxford. Craven Fellow, Oxford, 1897. Author of *The Classical Topography of the Roman Campagna*; &c.	**Labicana, Via;** **Labici;** **Lampedusa;** **Lanciano;** **Lanuvium;** **Larino;** **Latina, Via;** **Latium;** **Laurentina, Via;** **Lavinium;** **Lecce;** **Leghorn;** **Leontini;** **Licodia Eubea;** **Ligures Baebiani;** **Liguria:** *History*; **Locri:** *Italy*.
T. A. I.	Thomas Allan Ingram, M.A., LL.D. Trinity College, Dublin.	**Livery Companies;** **London:** *Finance*.
T. Ca.	Thomas Case, M.A. President of Corpus Christi College, Oxford. Formerly Waynflete Professor of Moral and Metaphysical Philosophy at Oxford and Fellow of Magdalen College. Author of *Physical Realism*; &c.	**Logic.**
T. C. A.	Sir Thomas Clifford Allbutt, K.C.B., M.A., M.D., D.Sc., LL.D., F.R.S. Regius Professor of Physic in the University of Cambridge. Physician to Addenbrooke's Hospital, Cambridge. Fellow of Gonville and Caius College, Cambridge. Editor of *Systems of Medicine*.	**Lister, 1st Baron.**
T. Da.	Thomas Davidson, LL.D.	**Longfellow.**
T. F. C.	Theodore Freylinghuysen Collier, Ph.D. Assistant Professor of History, Williams College, Williamstown, Mass., U.S.A.	**Laodicea, Synod of.**
T. F. H.	Thomas F. Henderson. Author of *Mary Queen of Scots and the Casket Letters*; &c.	**Latimer.**
T. H. H.*	Sir Thomas Hungerford Holdich, K.C.M.G., K.C.I.E., D.Sc., F.R.G.S. Colonel in the Royal Engineers. Superintendent, Frontier Surveys, India, 1892-1898. Gold Medallist, R.G.S. (London), 1887. H.M. Commissioner for the Perso-Beluch Boundary, 1896. Author of *The Indian Borderland*; *The Gates of India*; &c.	**Ladakh and Baltistan**
T. K.	Thomas Kirkup, M.A., LL.D. Author of *An Inquiry into Socialism*; *Primer of Socialism*; &c.	**Lassalle.**
T. Mo.	Thomas Moore, F.L.S. (1821-1887). Curator of the Garden of the Apothecaries Company at Chelsea, 1848-1887. Editor of the *Gardeners' Magazine of Botany*; Author of *Handbook of British Ferns*; *Index Filicum*; *Illustrations of Orchidaceous Plants*.	**Labyrinth.**

T. M. L.	Rev. Thomas Martin Lindsay, LL.D., D.D. Principal of the United Free Church College, Glasgow. Formerly Assistant to the Professor of Logic and Metaphysics in the University of Edinburgh. Author of *History of the Reformation*; *Life of Luther*; &c.	**Lollards.**
T. Se.	Thomas Seccombe, M.A. Lecturer in History, East London and Birkbeck Colleges, University of London. Stanhope Prizeman, Oxford, 1887. Assistant Editor of *Dictionary of National Biography*, 1891-1900. Author of *The Age of Johnson*; &c.	**Lever, Charles.**
T. W. R. D.	Thomas William Rhys Davids, LL.D., Ph.D. Professor of Comparative Religion, Manchester University. Professor of Pali and Buddhist Literature, University College, London, 1882-1904. President of the Pali Text Society. Fellow of the British Academy. Secretary and Librarian of Royal Asiatic Society, 1885-1902. Author of *Buddhism*; *Sacred Books of the Buddhists*; *Early Buddhism*; *Buddhist India*; *Dialogues of the Buddha*; &c.	**Lāmāism.**
T. Wo.	Thomas Woodhouse. Head of the Weaving and Textile Designing Department, Technical College, Dundee.	**Linen and Linen Manufactures.**
V. B. L.	Vivian Byam Lewes, F.I.C., F.C.S. Professor of Chemistry, Royal Naval College. Chief Superintendent Gas Examiner to the Corporation of the City of London.	**Lighting:** *Oil and Gas*.
V. H. B.	Vernon Herbert Blackman, M.A., D.Sc. Professor of Botany in the University of Leeds. Formerly Fellow of St John's College, Cambridge.	**Lichens** (*in part*).
W. A. B. C.	Rev. William Augustus Brevoort Coolidge, M.A., F.R.G.S. Fellow of Magdalen College, Oxford. Professor of English History, St David's College, Lampeter, 1880-1881. Author of *Guide to Switzerland*; *The Alps in Nature and in History*; &c. Editor of *The Alpine Journal*, 1880-1889.	**Lausanne;** **Leuk;** **Liechtenstein;** **Linth;** **Locarno;** *Locle, Le.*
W. A. P.	Walter Alison Phillips, M.A. Formerly Exhibitioner of Merton College and Senior Scholar of St John's College, Oxford. Author of *Modern Europe*; &c.	**Laibach, Congress of;** **Lights, Ceremonial use of.**
W. E. Co.	The Rt. Rev. William Edward Collins, M.A., D.D. Bishop of Gibraltar. Formerly Professor of Ecclesiastical History, King's College, London. Lecturer of Selwyn and St John's Colleges, Cambridge. Author of *The Study of Ecclesiastical History*; *Beginnings of English Christianity*; &c.	**Libellatici.**
W. F. I.	William Fergusson Irvine, Hon. M.A. (Liverpool). Hon. Secretary and General Editor of Historical Society of Lancashire and Cheshire. Hon. Local Secretary for Cheshire of the Society of Antiquaries. Author of *Liverpool in the reign of Charles II.*; *Old Halls of Wirral*; &c.	**Liverpool.**
W. H. Be.	William Henry Bennett, M.A., D.D., D.Litt. (Cantab.). Professor of Old Testament Exegesis in New and Hackney Colleges, London. Formerly Fellow of St John's College, Cambridge. Lecturer in Hebrew at Firth College, Sheffield. Author of *Religion of the Post-Exilic Prophets*; &c.	**Lamech.**
W. H. F.	Sir William Henry Flower, F.R.S. See the biographical article: Flower, Sir W. H.	**Lemming** (*in part*); **Leopard** (*in part*); **Lion** (*in part*).
W. M. R.	William Michael Rossetti. See the biographical article: Rossetti, Dante Gabriel.	**Lely, Sir Peter;** **Lippi.**
W. P. T.	William Peterfield Trent, LL.D., D.C.L. Professor of English Literature. Columbia University. Author of *English Culture in Virginia*; *A Brief History of American Literature*; &c.	**Lanier.**
W. R. So.	William Ritchie Sorley, M.A., Litt.D., LL.D. Professor of Moral Philosophy in the University of Cambridge. Fellow of King's College, Cambridge. Fellow of the British Academy. Formerly Fellow of Trinity College. Author of *The Ethics of Naturalism*; *The*	**Leibnitz.**

	Interpretation of Evolution; &c.	
W. R. S.-R.	William Ralston Shedden-Ralston, M.A. Formerly Assistant in the Department of Printed Books, British Museum. Author of *Russian Folk Tales*; &c.	**Lermontov.**
W. T. Ca.	William Thomas Calman. D.Sc., F.Z.S. Assistant in charge of Crustacea, Natural History Museum, South Kensington. Author of "Crustacea" in *A Treatise on Zoology*, edited by Sir E. Ray Lankester.	**Lobster.**
W. T. D.	William Tregarthen Douglass, M.Inst.C.E., M.I.M.E. Consulting Engineer to Governments of Western Australia, New South Wales, Victoria, Cape of Good Hope, &c. Erected the Eddystone and Bishop Rock Lighthouses. Author of *The New Eddystone Lighthouse*; &c.	**Lighthouse** (*in part*).
W. W. R.*	William Walker Rockwell, Lic.Theol. Assistant Professor of Church History, Union Theological Seminary, New York.	**Leo XI. and XII.** (*popes*).
W. W. S.	Walter William Skeat, Litt.D., LL.D., D.C.L. See the biographical article: Skeat, W. W.	**Layamon.**
W. Y. S.	William Young Sellar, LL.D. See the biographical article: Sellar, William Young.	**Latin Literature** (*in part*).

1 A complete list, showing all individual contributors, appears in the final volume.

PRINCIPAL UNSIGNED ARTICLES

Labiatae.
Lacrosse.
Lagos.
Lahore.
Lake District.
Lambeth Conferences.
Lanarkshire.
Lancashire.
Lantern.
Lapland.
Larceny.
Larch.
Lead Poisoning.
Leeds.
Legitimacy.
Leguminosae.
Leicestershire.
Leipzig.
Leith.
Lemnos.
Lemon.
Lent.
Leprosy.
Libel.
Liberal Party.
Liliaceae.
Lille.
Lily.
Limitation, Statutes of.
Lincoln.
Lincolnshire.
Lippe.
Lisbon.

L a letter which was the twelfth letter of the Phoenician alphabet. It has in its history passed through many changes of form, ending curiously enough in its usual manuscript form with a shape almost identical with that which it had about 900 B.C. ( ). As was the case with B and some other letters the Greeks did not everywhere keep the symbol in the position in which they had borrowed it  . This, which was its oldest form in Attica and in the Chalcidian colonies of Italy, was the form adopted by the Romans, who in time converted it into the rectangle  , which passed from them to the nations of western Europe. In the Ionic alphabet, however, from which the ordinary Greek alphabet is derived it appeared as  . A still more common form in other parts of Greece was  , with the legs of unequal length. The editors of Herodotus have not always recognized that the name of Labda, the mother of Cypselus, in the story (v. 92) of the founding of the great family of Corinthian despots, was derived from the fact that she was lame and so suggested the form of the Corinthian . Another form or was practically confined to the west of Argolis. The name of the Greek letter is ordinarily given as *Lambda*, but in Herodotus (above) and in Athenaeus x. p. 453 *e*, where the names of the letters are given, the best authenticated form is *Labda*. The Hebrew name, which was probably identical with the Phoenician, is *Lamed*, which, with a final vowel added as usual, would easily become *Lambda*, *b* being inserted between *m* and another consonant. The pronunciation of *l* varies a great deal according to the point at which the tongue makes contact with the roof of the mouth. The contact, generally speaking, is at the same point as for *d*, and this accounts for an interchange between these sounds which occurs in various languages, *e.g.* in Latin *lacrima* from the same root as the Greek δάκρυ and the English *tear*. The change in Latin occurs in a very limited number of cases and one explanation of their occurrence is that they are borrowed (Sabine) words. In pronunciation the breath may be allowed to escape at one or both sides of the tongue. In most languages *l* is a fairly stable sound. Orientals, however, have much difficulty in distinguishing between *l* and *r*. In Old Persian *l* is

found in only two foreign words, and in Sanskrit different dialects employ *r* and *l* differently in the same words. Otherwise, however, the interchanges between *r* and *l* were somewhat exaggerated by the older philologists. Before other consonants *l* becomes silent in not a few languages, notably in French, where it is replaced by *u*, and in English where it has occasionally been restored in recent times, *e.g.* in *fault* which earlier was spelt without *l* (as in French whence it was borrowed), and which Goldsmith could still rhyme with *aught*. In the 15th century the Scottish dialect of English dropped *l* largely both before consonants and finally after *a* and *ū*, *a'* = all, *fa'* = fall, *pu'* = pull, '*oo*' = wool, *bulk* pronounced like *book*, &c., while after *o* it appears as *w*, *row* (pronounced *rau*) = roll, *know* = knoll, &c. It is to be observed that ⌊ = 50 does not come from this symbol, but was an adaptation of ↓, the western Greek form of χ, which had no corresponding sound in Latin and was therefore not included in the ordinary alphabet. This symbol was first rounded into ⌓ and then changed first to ⊥, and ultimately to ⌊.

(P. Gi.)

LAACHER SEE, a lake of Germany, in the Prussian Rhine Province, 5 m. W. of Brohl on the Rhine, and N. of the village of Niedermendig. It occupies what is supposed to be a crater of the Eifel volcanic formation, and the pumice stone and basalt found in great quantities around it lend credence to this theory. It lies 850 ft. above the sea, is 5 m. in circumference and 160 ft. deep, and is surrounded by an amphitheatre of high hills. The water is sky blue in colour, very cold and bitter to the taste. The lake has no natural outlet and consequently is subjected to a considerable rise and fall. On the western side lies the Benedictine abbey of St Maria Laach (*Abballa Lacensis*) founded in 1093 by Henry II., count palatine of the Rhine. The abbey church, dating from the 12th century, was restored in 1838. The history of the monastery down to modern times appears to have been uneventful. In 1802 it was abolished and at the close of the Napoleonic wars it became a Prussian state demesne. In 1863 it passed into the hands of the Jesuits, who, down to their expulsion in 1873, published here a periodical, which still appears, entitled *Stimmen aus Maria Laach*. In 1892 the monastery was again occupied by the Benedictines.

LAAGER, a South African Dutch word (Dutch *leger*, Ger. *lager*, connected with Eng. "lair") for a temporary defensive encampment, formed by a circle of wagons. The English word is "leaguer," an armed camp, especially that of a besieging or "beleaguering" army. The Ger. *lager*, in the sense of "store," is familiar as the name of a light beer (see Brewing).

LAAS, ERNST (1837-1885), German philosopher, was born on the 16th of June 1837 at Fürstenwalde. He studied theology and philosophy under Trendelenburg at Berlin, and eventually became professor of philosophy in the new university of Strassburg. In *Kant's Analogien der Erfahrung* (1876) he keenly criticized Kant's transcendentalism, and in his chief work *Idealismus und Positivismus* (3 vols., 1879-1884), he drew a clear contrast between Platonism, from which he derived transcendentalism, and positivism, of which he considered Protagoras the founder. Laas in reality was a disciple of Hume. Throughout his philosophy he endeavours to connect metaphysics with ethics and the theory of education.

His chief educational works were *Der deutsche Aufsatz in den obern Gymnasialklassen* (1868; 3rd ed., part i., 1898, part ii, 1894), and *Der deutsche Unterricht auf höhern Lehranstalten* (1872; 2nd ed. 1886). He contributed largely to the *Vierteljahrsschr. f. wiss. Philos.* (1880-1882); the *Litterarischer Nachlass*, a posthumous collection, was published at Vienna (1887). See Hanisch, *Der Positivismus von Ernst Laas* (1902); Gjurits, *Die Erkenntnistheorie des Ernst Laas* (1903); Falckenberg, *Hist. of Mod. Philos.* (Eng. trans., 1895).

LA BADIE, JEAN DE (1610-1674), French divine, founder of the school known as the Labadists, was born at Bourg, not far from Bordeaux, on the 13th of February 1610, being the son of Jean Charles de

la Badie, governor of Guienne. He was sent to the Jesuit school at Bordeaux, and when fifteen entered the Jesuit college there. In 1626 he began to study philosophy and theology. He was led to hold somewhat extreme views about the efficacy of prayer and the direct influence of the Holy Spirit upon believers, and adopted Augustinian views about grace, free will and predestination, which brought him into collision with his order. He therefore separated from the Jesuits, and then became a preacher to the people, carrying on this work in Bordeaux, Paris and Amiens. At Amiens in 1640 he was appointed a canon and teacher of theology. The hostility of Cardinal Mazarin, however, forced him to retire to the Carmelite hermitage at Graville. A study of Calvin's *Institutes* showed him that he had more in common with the Reformed than with the Roman Catholic Church, and after various adventures he joined the Reformed Church of France and became professor of theology at Montauban in 1650. His reasons for doing so he published in the same year in his *Déclaration de Jean de la Badie*. His accession to the ranks of the Protestants was deemed a great triumph; no such man since Calvin himself, it was said, had left the Roman Catholic Church. He was called to the pastorate of the church at Orange on the Rhone in 1657, and at once became noted for his severity of discipline. He set his face zealously against dancing, card-playing and worldly entertainments. The unsettled state of the country, recently annexed to France, compelled him to leave Orange, and in 1659 he became a pastor in Geneva. He then accepted a call to the French church in London, but after various wanderings settled at Middelburg, where he was pastor to the French-speaking congregation at a Walloon church. His peculiar opinions were by this time (1666) well known, and he and his congregation found themselves in conflict with the ecclesiastical authorities. The result was that la Badie and his followers established a separate church in a neighbouring town. In 1669 he moved to Amsterdam. He had enthusiastic disciples, Pierre Yvon (1646-1707) at Montauban, Pierre Dulignon (d. 1679), François Menuret (d. 1670), Theodor Untereyk (d. 1693), F. Spanheim (1632-1701), and, more important than any, Anna Maria v. Schürman (1607-1678), whose book *Eucleria* is perhaps the best exposition of the tenets of her master. At the head of his separatist congregation, la Badie developed his views for a reformation of the Reformed Churches: the church is a communion of holy people who have been born again from sin; baptism is the sign and seal of this regeneration, and is to be administered only to believers; the Holy Spirit guides the regenerate into all truth, and the church possesses throughout all time those gifts of prophecy which it had in the ancient days; the community at Jerusalem is the continual type of every Christian congregation, therefore there should be a community of goods, the disciples should live together, eat together, dance together; marriage is a holy ordinance between two believers, and the children of the regenerate are born without original sin, marriage with an unregenerate person is not binding. They did not observe the Sabbath, because—so they said—their life was a continual Sabbath. The life and separatism of the community brought them into frequent collision with their neighbours and with the magistrates, and in 1670 they accepted Society is in Miss Edith Sichel's *Women and Men of the French Renaissance* (1901). See also J. Favre, *Olivier de Magny* (1885).

LABEL (a French word, now represented by *lambeau*, possibly a variant; it is of obscure origin and may be connected with a Teutonic word appearing in the English "lap," a flap or fold), a slip, ticket, or card of paper, metal or other material, attached to an object, such as a parcel, bottle, &c., and containing a name, address, description or other information, for the purpose of identification. Originally the word meant a band or ribbon of linen or other material, and was thus applied to the fillets (*infulae*) attached to a bishop's mitre. In heraldry the "label" is a mark of "cadency."

In architecture the term "label" is applied to the outer projecting moulding over doors, windows, arches, &c., sometimes called "Dripstone" or "Weather Moulding," or "Hood Mould." The former terms seem scarcely applicable, as this moulding is often inside a building where no rain could come, and consequently there is no drip. In Norman times the label frequently did not project, and when it did it was very little, and formed part of the series of arch mouldings. In the Early English styles they were not very large, sometimes slightly undercut, sometimes deeply, sometimes a quarter round with chamfer, and very frequently a "roll" or "scroll-moulding," so called because it resembles the part of a scroll where the edge laps over the body of the roll. Labels generally resemble the string-courses of the period, and, in fact, often return horizontally and form strings. They are less common in Continental architecture than in English.

LABEO, MARCUS ANTISTIUS (*c.* 50 B.C.-A.D. 18), Roman jurist, was the son of Pacuvius Antistius Labeo, a jurist who caused himself to be slain after the defeat of his party at Philippi. A member of the plebeian nobility, and in easy circumstances, the younger Labeo early entered public life, and soon rose to the praetorship; but his undisguised antipathy to the new régime, and the somewhat brusque manner in which in the senate he occasionally gave expression to his republican sympathies—what Tacitus (*Ann.* iii. 75) calls his *incorrupta libertas*—proved an obstacle to his advancement, and his rival, Ateius Capito, who had unreservedly given in his adhesion to the ruling powers, was promoted by Augustus to the

consulate, when the appointment should have fallen to Labeo; smarting under the wrong done him, Labeo declined the office when it was offered to him in a subsequent year (Tac. *Ann.* iii. 75; Pompon, in fr. 47, *Dig.* i. 2). From this time he seems to have devoted his whole time to jurisprudence. His training in the science had been derived principally from Trebatius Testa. To his knowledge of the law he added a wide general culture, devoting his attention specially to dialectics, philology (*grammatica*), and antiquities, as valuable aids in the exposition, expansion, and application of legal doctrine (Gell. xiii. 10). Down to the time of Hadrian his was probably the name of greatest authority; and several of his works were abridged and annotated by later hands. While Capito is hardly ever referred to, the dicta of Labeo are of constant recurrence in the writings of the classical jurists, such as Gaius, Ulpian and Paul; and no inconsiderable number of them were thought worthy of preservation in Justinian's *Digest*. Labeo gets the credit of being the founder of the Proculian sect or school, while Capito is spoken of as the founder of the rival Sabinian one (Pomponius in fr. 47, *Dig.* i. 2); but it is probable that the real founders of the two *scholae* were Proculus and Sabinus, followers respectively of the methods of Labeo and Capito.

Labeo's most important literary work was the *Libri Posteriorum*, so called because published only after his death. It contained a systematic exposition of the common law. His *Libri ad Edictum* embraced a commentary, not only on the edicts of the urban and peregrine praetors, but also on that of the curule aediles. His *Probabilium* (πιθανῶν) *lib. VIII.*, a collection of definitions and axiomatic legal propositions, seems to have been one of his most characteristic productions.

See van Eck, "De vita, moribus, et studiis M. Ant. Labeonis" (Franeker, 1692), in Oelrichs's *Thes. nov.*, vol. i.; Mascovius, *De sectis Sabinianor. et Proculianor.* (1728); Pernice, *M. Antistius Labeo. Das röm. Privatrecht im ersten Jahrhunderte der Kaizerzeit* (Halle, 1873-1892).

LABERIUS, DECIMUS (*c.* 105-43 B.C.), Roman knight and writer of mimes. He seems to have been a man of caustic wit, who wrote for his own pleasure. In 45 Julius Caesar ordered him to appear in one of his own mimes in a public contest with the actor Publilius Syrus. Laberius pronounced a dignified prologue on the degradation thus thrust on his sixty years, and directed several sharp allusions against the dictator. Caesar awarded the victory to Publilius, but restored Laberius to his equestrian rank, which he had forfeited by appearing as a mimus (Macrobius, *Sat.* ii. 7). Laberius was the chief of those who introduced the mimus into Latin literature towards the close of the republican period. He seems to have been a man of learning and culture, but his pieces did not escape the coarseness inherent to the class of literature to which they belonged; and Aulus Gellius (xvi. 7, 1) accuses him of extravagance in the coining of new words. Horace (*Sat.* i. 10) speaks of him in terms of qualified praise.

In addition to the prologue (in Macrobius), the titles of forty-four of his mimi have been preserved; the fragments have been collected by O. Ribbeck in his *Comicorum Latinorum reliquiae* (1873).

LABIATAE (*i.e.* "lipped," Lat. *labium*, lip), in botany, a natural order of seed-plants belonging to the series Tubiflorae of the dicotyledons, and containing about 150 genera with 2800 species. The majority are annual or perennial herbs inhabiting the temperate zone, becoming shrubby in warmer climates. The stem is generally square in section and the simple exstipulate leaves are arranged in decussating pairs (*i.e.* each pair is in a plane at right angles to that of the pairs immediately above and below it); the blade is entire, or toothed, lobed or more or less deeply cut. The plant is often hairy, and the hairs are frequently glandular, the secretion containing a scent characteristic of the genus or species. The flowers are borne in the axils of the leaves or bracts; they are rarely solitary as in *Scutellaria* (skull-cap), and generally form an apparent whorl (*verticillaster*) at the node, consisting of a pair of cymose inflorescences each of which is a simple three-flowered dichasium as in *Brunella*, *Salvia*, &c., or more generally a dichasium passing over into a pair of monochasial cymes as in *Lamium* (fig. 1), *Ballota*, *Nepeta*, &c. A number of whorls may be crowded at the apex of the stem and the subtending leaves reduced to small bracts, the whole forming a raceme- or spike-like inflorescence as in *Mentha* (fig. 2, *5*) *Brunella*, &c.; the bracts are sometimes large and coloured as in *Monarda*, species of *Salvia*, &c., in the latter the apex of the stem is sometimes occupied with a cluster of sterile coloured bracts. The plan of the flower is remarkably uniform (fig. 1, *3*); it is bisexual, and zygomorphic in the median plane, with 5 sepals united to form a persistent cup-like calyx, 5 petals united to form a two-lipped gaping corolla, 4 stamens inserted on the corolla-tube, two of which, generally the anterior pair, are longer than the other two (didynamous arrangement)—sometimes as in *Salvia*, the posterior pair is aborted—and two superior median carpels, each very early divided by a constriction in a vertical plane, the pistil consisting of four cells each containing one erect anatropous ovule attached to the base of an axile placenta; the style springs from the centre of the pistil between the four segments (*gynobasic*), and is simple with a bifid apex. The fruit comprises four one-seeded nutlets included in the persistent calyx; the seed has a thin testa and the embryo almost or completely fills it. Although the general form and plan of arrangement of the flower is very uniform, there are wide

variations in detail. Thus the calyx may be tubular, bell-shaped, or almost spherical, or straight or bent, and the length and form of the teeth or lobes varies also; it may be equally toothed as in mint (*Mentha*) (fig. 2, *3*), and marjoram (*Origanum*), or two-lipped as in thyme (*Thymus*), *Lamium* (fig. 1) and *Salvia* (fig. 2, *1*); the number of nerves affords useful characters for distinction of genera, there are normally five main nerves between which simple or forked secondary nerves are more or less developed. The shape of the corolla varies widely, the differences being doubtless intimately associated with the pollination of the flowers by insect-agency. The tube is straight or variously bent and often widens towards the mouth. Occasionally the limb is equally five-toothed, or forms, as in *Mentha* (fig. 2, *3*, *4*) an almost regular four-toothed corolla by union of the two posterior teeth. Usually it is two-lipped, the upper lip being formed by the two posterior, the lower lip by the three anterior petals (see fig. 1, and fig. 2, *1*, *6*); the median lobe of the lower lip is generally most developed and forms a resting-place for the bee or other insect when probing the flower for honey, the upper lip shows great variety in form, often, as in *Lamium* (fig. 1), *Stachys*, &c., it is arched forming a protection from rain for the stamens, or it may be flat as in thyme. In the tribe *Ocimoideae* the four upper petals form the upper lip, and the single anterior one the lower lip, and in *Teucrium* the upper lip is absent, all five lobes being pushed forward to form the lower. The posterior stamen is sometimes present as a staminode, but generally suppressed; the upper pair are often reduced to staminodes or more or less completely suppressed as in *Salvia* (fig. 2, *2*, *6*); rarely are these developed and the anterior pair reduced. In *Coleus* the stamens are monadelphous. In *Nepeta* and allied genera the posterior pair are the longer, but this is rare, the didynamous character being generally the result of the anterior pair being the longer. The anthers are two-celled, each cell splitting lengthwise; the connective may be more or less developed between the cells; an extreme case is seen in *Salvia* (fig. 2, *2*), where the connective is filiform and jointed to the filament, while the anterior anther-cell is reduced to a sterile appendage. Honey is secreted by a hypogynous disk. In the more general type of flower the anthers and stigmas are protected by the arching upper lip as in dead-nettle (fig. 1) and many other British genera; the lower lip affords a resting-place for the insect which in probing the flower for the honey, secreted on the lower side of the disk, collects pollen on its back. Numerous variations in detail are found in the different genera; in *Salvia* (fig. 2), for instance, there is a lever mechanism, the barren half of each anther forming a knob at the end of a short arm which when touched by the head of an insect causes the anther at the end of the longer arm to descend on the insect's back. In the less common type, where the anterior part of the flower is more developed, as in the *Ocimoideae*, the stamens and style lie on the under lip and honey is secreted on the upper side of the hypogynous disk; the insect in probing the flower gets smeared with pollen on its belly and legs. Both types include brightly-coloured flowers with longer tubes adapted to the visits of butterflies and moths, as species of *Salvia*, *Stachys*, *Monarda*, &c.; some South American species of *Salvia* are pollinated by humming-birds. In *Mentha* (fig. 2, *3*), thyme, marjoram (*Origanum*), and allied genera, the flowers are nearly regular and the stamens spread beyond the corolla.

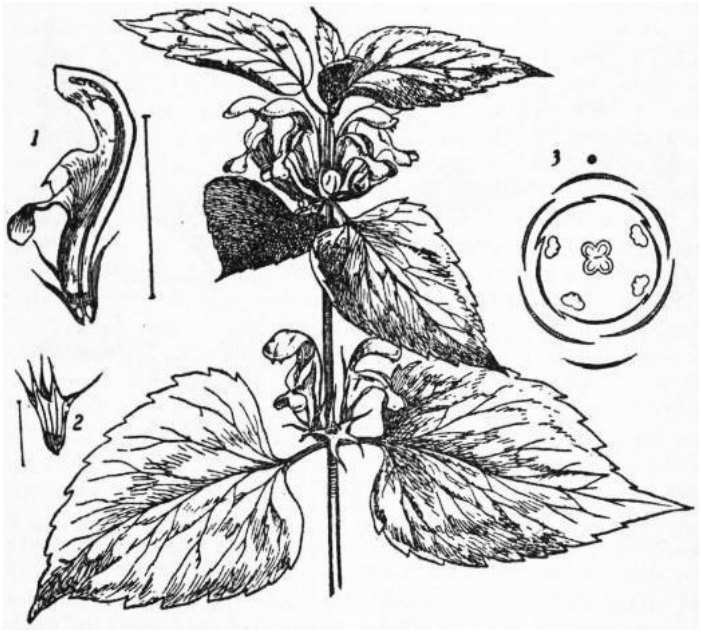

FIG. 1.—Flowering Shoot of Dead-nettle (*Lamium album*). *1*, Flower cut lengthwise, enlarged; *2* calyx, enlarged; *3*, floral diagram.

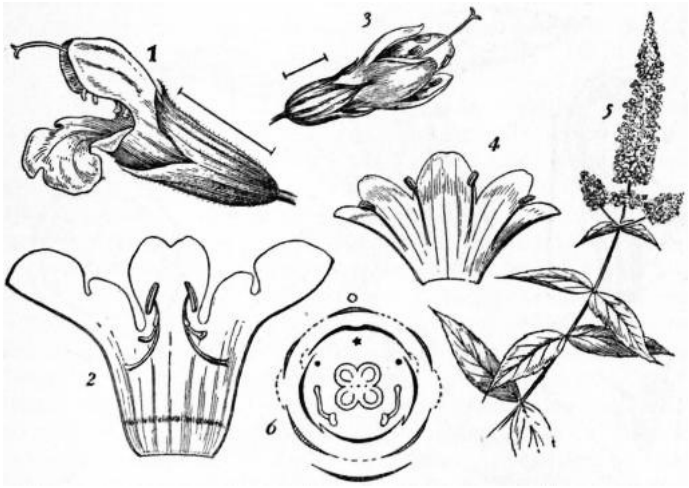

FIG. 2.—*1*, Flower of Sage (*Salvia officinalis*); *2*, Corolla of same cut open showing the two stamens; *3*, flower of spearmint (*Mentha viridis*); *4*, corolla of same cut open showing stamens; *5*, flowering shoot of same, reduced; *6*, floral diagram of *Salvia*.

The persistent calyx encloses the ripe nutlets, and aids in their distribution in various ways, by means of winged spiny or hairy lobes or teeth; sometimes it forms a swollen bladder. A scanty endosperm is sometimes present in the seed; the embryo is generally parallel to the fruit axis with a short inferior radicle and generally flat cotyledons.

The order occurs in all warm and temperate regions; its chief centre is the Mediterranean region, where some genera such as *Lavandula*, *Thymus*, *Rosmarinus* and others form an important feature in the vegetation. The tribe *Ocimoideae* is exclusively tropical and subtropical and occurs in both hemispheres. The order is well represented in Britain by seventeen native genera; *Mentha* (mint) including also *M. piperita* (peppermint) and *M. Pulegium* (pennyroyal); *Origanum vulgare* (marjoram); *Thymus Serpyllum* (thyme); *Calamintha* (calamint), including also *C. Clinopodium* (wild basil) and *C. Acinos* (basil thyme); *Salvia* (sage), including *S. Verbenaca* (clary); *Nepeta Cataria* (catmint), *N. Glechoma* (ground-ivy); *Brunella* (self-heal); *Scutellaria* (skull-cap); *Stachys* (woundwort); *S. Betonica* is wood betony; *Galeopsis* (hemp-nettle); *Lamium* (dead-nettle); *Ballota* (black horehound); *Teucrium* (germander); and *Ajuga* (bugle).

Labiatae are readily distinguished from all other orders of the series excepting Verbenaceae, in which, however, the style is terminal; but several genera, *e.g. Ajuga*, *Teucrium* and *Rosmarinus*, approach Verbenaceae in this respect, and in some genera of that order the style is more or less sunk between the ovary lobes. The fruit-character indicates an affinity with Boraginaceae from which, however, they differ in habit and by characters of ovule and embryo.

The presence of volatile oil renders many genera of economic use, such are thyme, marjoram (*Origanum*), sage (*Salvia*), lavender (*Lavandula*), rosemary (*Rosmarinus*), patchouli (*Pogostemon*). The tubers of *Stachys Sieboldi* are eaten in France.

LABICANA, VIA,

an ancient highroad of Italy, leading E.S.E. from Rome. It seems possible that the road at first led to Tusculum, that it was then prolonged to Labici, and later still became a road for through traffic; it may even have superseded the Via Latina as a route to the S.E., for, while the distance from Rome to their main junction at Ad Bivium (or to another junction at Compitum Anagninum) is practically identical, the summit level of the former is 725 ft. lower than that of the latter, a little to the west of the pass of Algidus. After their junction it is probable that the road bore the name Via Latina rather than Via Labicana. The course of the road after the first six miles from Rome is not identical with that of any modern road, but can be clearly traced by remains of pavement and buildings along its course.

See T. Ashby in *Papers of the British School at Rome*, i. 215 sqq.

(T. As.)

LABICHE, EUGÈNE MARIN

(1815-1888), French dramatist, was born on the 5th of May 1815, of *bourgeois* parentage. He read for the bar, but literature had more powerful attractions, and he was hardly twenty when he gave to the *Chérubin*—an impertinent little magazine, long vanished and forgotten—a short story, entitled, in the cavalier style of the period, *Les plus belles sont les plus fausses*. A few others followed much in the same strain, but failed to catch the attention of the public. He tried his hand at dramatic criticism in the *Revue des théâtres*, and in 1838 made a double venture on the stage. The small Théâtre du Panthéon produced, amid some signs of popular favour, a drama of his, *L'Avocat Loubet*,

while a vaudeville, *Monsieur de Coislin ou l'homme infiniment poli*, written in collaboration with Marc Michel, and given at the Palais Royal, introduced for the first time to the Parisians a provincial actor who was to become and to remain a great favourite with them, Grassot, the famous low comedian. In the same year Labiche, still doubtful about his true vocation, published a romance called *La Clé des champs*. M. Léon Halévy, his successor at the Academy and his panegyrist, informs us that the publisher became a bankrupt soon after the novel was out. "A lucky misadventure, for," the biographer concludes, "this timely warning of Destiny sent him back to the stage, where a career of success was awaiting him." There was yet another obstacle in the way. When he married, he solemnly promised his wife's parents that he would renounce a profession then considered incompatible with moral regularity and domestic happiness. But a year afterwards his wife spontaneously released him from his vow, and Labiche recalled the incident when he dedicated the first edition of his complete works: "To my wife." Labiche, in conjunction with Varin,[1] Marc Michel,[2] Clairville,[3] Dumanoir,[4] and others contributed comic plays interspersed with couplets to various Paris theatres. The series culminated in the memorable farce in five acts, *Un Chapeau de paille d'Italie* (August 1851). It remains an accomplished specimen of the French *imbroglio*, in which some one is in search of something, but does not find it till five minutes before the curtain falls. Prior to that date Labiche had been only a successful *vaudevilliste* among a crowd of others; but a twelvemonth later he made a new departure in *Le Misanthrope et l'Auvergnat*. All the plays given for the next twenty-five years, although constructed on the old plan, contained a more or less appreciable dose of that comic observation and good sense which gradually raised the French farce almost to the level of the comedy of character and manners. "Of all the subjects," he said, "which offered themselves to me, I have selected the *bourgeois*. Essentially mediocre in his vices and in his virtues, he stands half-way between the hero and the scoundrel, between the saint and the profligate." During the second period of his career Labiche had the collaboration of Delacour,[5] Choler,[6] and others. When it is asked what share in the authorship and success of the plays may be claimed for those men, we shall answer in Émile Augier's words: "The distinctive qualities which secured a lasting vogue for the plays of Labiche are to be found in all the comedies written by him with different collaborators, and are conspicuously absent from those which they wrote without him." A more useful and more important collaborator he found in Jean Marie Michel Geoffroy (1813-1883) whom he had known as a *débutant* in his younger days, and who remained his faithful interpreter to the last. Geoffroy impersonated the *bourgeois* not only to the public, but to the author himself; and it may be assumed that Labiche, when writing, could see and hear Geoffroy acting the character and uttering, in his pompous, fussy way, the words that he had just committed to paper. *Célimare le bien-aimé* (1863), *Le Voyage de M. Perrichon* (1860), *La Grammaire*, *Un Pied dans le crime*, *La Cagnotte* (1864), may be quoted as the happiest productions of Labiche.

In 1877 he brought his connexion with the stage to a close, and retired to his rural property in Sologne. There he could be seen, dressed as a farmer, with low-brimmed hat, thick gaiters and an enormous stick, superintending the agricultural work and busily engaged in reclaiming land and marshes. His lifelong friend, Augier, visited him in his principality, and, being left alone in the library, took to reading his host's dramatic productions, scattered here and there in the shape of theatrical *brochures*. He strongly advised Labiche to publish a collected and revised edition of his works. The suggestion, first declined as a joke and long resisted, was finally accepted and carried into effect. Labiche's comic plays, in ten volumes, were issued during 1878 and 1879. The success was even greater than had been expected by the author's most sanguine friends. It had been commonly believed that these plays owed their popularity in great measure to the favourite actors who had appeared in them; but it was now discovered that all, with the exception of Geoffroy, had introduced into them a grotesque and caricatural element, thus hiding from the spectator, in many cases, the true comic vein and delightful delineation of human character. The amazement turned into admiration, and the *engouement* became so general that very few dared grumble or appear scandalized when, in 1880, Labiche was elected to the French Academy. It was fortunate that, in former years, he had never dreamt of attaining this high distinction; for, as M. Pailleron justly observed, while trying to get rid of the little faults which were in him, he would have been in danger of losing some of his sterling qualities. But when the honour was bestowed upon him, he enjoyed it with his usual good sense and quiet modesty. He died in Paris on the 23rd of January 1888.

Some foolish admirers have placed him on a level with Molière, but it will be enough to say that he was something better than a public *amuseur*. Many of his plays have been transferred to the English stage. They are, on the whole, as sound as they are entertaining. Love is practically absent from his theatre. In none of his plays did he ever venture into the depths of feminine psychology, and womankind is only represented in them by pretentious old maids and silly, insipid, almost dumb, young ladies. He ridiculed marriage according to the invariable custom of French playwrights, but in a friendly and good-natured manner which always left a door open to repentance and timely amendment. He is never coarse, never suggestive. After he died the French farce, which he had raised to something akin to literature, relapsed into its former grossness and unmeaning complexity.

(A. Fi.)

His *Théâtre complet* (10 vols., 1878-1879) contains a preface by Émile Augier.

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1 Victor Varin, pseudonym of Charles Voirin (1798-1869).

2 Marc Antoine Amédée Michel (1812-1868), vaudevillist.

3 Louis François Nicolaise, called Clairville (1811-1879), part-author of the famous *Fille de Mme Angot* (1872).

4 Philippe François Pinel, called Dumanoir (1806-1865).

5 Alfred Charlemagne Lartigue, called Delacour (1815-1885). For a list of this author's pieces see O. Lorenz, *Catalogue Général* (vol. ii., 1868).

6 Adolphe Joseph Choler (1822-1889).

LABICI, an ancient city of Latium, the modern Monte Compatri, about 17 m. S.E. from Rome, on the northern slopes of the Alban Hills, 1739 ft. above sea-level. It occurs among the thirty cities of the Latin League, and it is said to have joined the Aequi in 419 B.C. and to have been captured by the Romans in 418. After this it does not appear in history, and in the time of Cicero and Strabo was almost entirely deserted if not destroyed. Traces of its ancient walls have been noticed. Its place was taken by the *respublica Lavicanorum Quintanensium*, the post-station established in the lower ground on the Via Labicana (see LABICANA, VIA), a little S.W. of the modern village of Colonna, the site of which is attested by various inscriptions and by the course of the road itself.

See T. Ashby in *Papers of the British School at Rome*, i. 256 sqq.

(T. As.)

LABĪD (Abū ʻAqīl Labīd ibn Rabīʼa) (*c.* 560-*c.* 661), Arabian poet, belonged to the Banī ʼĀmir, a division of the tribe of the Hawāzin. In his younger years he was an active warrior and his verse is largely concerned with inter-tribal disputes. Later, he was sent by a sick uncle to get a remedy from Mahomet at Medina and on this occasion was much influenced by a part of the Koran. He accepted Islam soon after, but seems then to have ceased writing. In Omar's caliphate he is said to have settled in Kufa. Tradition ascribes to him a long life, but dates given are uncertain and contradictory. One of his poems is contained in the *Moʻallakat* (*q.v.*).

Twenty of his poems were edited by Chalidī (Vienna, 1880); another thirty-five, with fragments and a German translation of the whole, were edited (partly from the remains of A. Huber) by C. Brockelmann (Leiden, 1892); cf. A. von Kremer, *Über die Gedichte des Lebyd* (Vienna, 1881). Stories of Labīd are contained in the *Kitābul-Aghāni*, xiv. 93 ff. and xv. 137 ff.

(G. W. T.)

LABIENUS, the name of a Roman family, said (without authority) to belong to the gens Atia. The most important member was TITUS LABIENUS. In 63 B.C., at Caesar's instigation, he prosecuted Gaius Rabirius (*q.v.*) for treason; in the same year, as tribune of the plebs, he carried a plebiscite which indirectly secured for Caesar the dignity of pontifex maximus (Dio Cassius xxxvii. 37). He served as a legatus throughout Caesar's Gallic campaigns and took Caesar's place whenever he went to Rome. His chief exploits in Gaul were the defeat of the Treviri under Indutiomarus in 54, his expedition against Lutetia (Paris) in 52, and his victory over Camulogenus and the Aedui in the same year. On the outbreak of the civil war, however, he was one of the first to desert Caesar, probably owing to an overweening sense of his own importance, not adequately recognized by Caesar. He was rapturously welcomed on the Pompeian side; but he brought no great strength with him, and his ill fortune under Pompey was as marked as his success had been under Caesar. From the defeat at Pharsalus, to which he had contributed by affecting to despise his late comrades, he fled to Corcyra, and thence to Africa. There he was able by mere force of numbers to inflict a slight check upon Caesar at Ruspina in 46. After the defeat at Thapsus he joined the younger Pompey in Spain, and was killed at Munda (March 17th, 45).

LABLACHE, LUIGI (1794-1858), Franco-Italian singer, was born at Naples on the 6th of December 1794, the son of a merchant of Marseilles who had married an Irish lady. In 1806 he entered the Conservatorio della Pieta de Turchini, where he studied music under Gentili and singing under Valesi, besides learning to play the violin and violoncello. As a boy he had a beautiful alto voice, and by the age of twenty he had developed a magnificent bass with a compass of two octaves from E♭ below to E♭ above the bass stave. After making his first appearance at Naples he went to Milan in 1817, and subsequently travelled to Turin, Venice and Vienna. His first appearances in London and Paris in 1830 led to annual engagements in both the English and French capitals. His reception at St Petersburg a few years later was no less enthusiastic. In England he took part in many provincial musical festivals, and was engaged by

Queen Victoria to teach her singing. On the operatic stage he was equally successful in comic or tragic parts, and with his wonderfully powerful voice he could express either humour or pathos. Among his friends were Rossini, Bellini, Donizetti and Mercadante. He was one of the thirty-two torch-bearers chosen to surround the coffin at Beethoven's funeral in 1827. He died at Naples on the 23rd of January 1858 and was buried at Maison Lafitte, Paris. Lablache's Leporello in *Don Giovanni* was perhaps his most famous impersonation; among his principal other rôles were Dandini in *Cenerentola* (Rossini), Assur in *Semiramide* (Rossini), Geronimo in *La Gazza Ladra* (Rossini), Henry VIII. in *Anna Bolena* (Donizetti), the Doge in *Marino Faliero* (Donizetti), the title-rôle in *Don Pasquale* (Donizetti), Geronimo in *Il Matrimonio Segreto* (Cimarosa), Gritzenko in *L'Étoile du Nord* (Meyerbeer), Caliban in *The Tempest* (Halévy).

LABOR DAY, in the United States, a legal holiday in nearly all of the states and Territories, where the first Monday in September is observed by parades and meetings of labour organizations. In 1882 the Knights of Labor paraded in New York City on this day; in 1884 another parade was held, and it was decided that this day should be set apart for this purpose. In 1887 Colorado made the first Monday in September a legal holiday; and in 1909 Labor Day was observed as a holiday throughout the United States, except in Arizona and North Dakota; in Louisiana it is a holiday only in New Orleans (Orleans parish), and in Maryland, Wyoming and New Mexico it is not established as a holiday by statute, but in each may be proclaimed as such in any year by the governor.

LA BOURBOULE, a watering-place of central France, in the department of Puy-de-Dôme, 4½ m. W. by N. of Mont-Dore by road. Pop. (1906) 1401. La Bourboule is situated on the right bank of the Dordogne at a height of 2790 ft. Its waters, of which arsenic is the characteristic constituent, are used in cases of diseases of the skin and respiratory organs, rheumatism, neuralgia, &c. Though known to the Romans they were not in much repute till towards the end of the 19th century. The town has three thermal establishments and a casino.

LABOUR CHURCH, THE, an organization intended to give expression to the religion of the labour movement. This religion is not theological—it leaves theological questions to private individual conviction—but "seeks the realization of universal well-being by the establishment of Socialism—a commonwealth founded upon justice and love." It asserts that "improvement of social conditions and the development of personal character are both essential to emancipation from social and moral bondage, and to that end insists upon the duty of studying the economic and moral forces of society." The first Labour Church was founded at Manchester (England) in October 1891 by a Unitarian minister, John Trevor. This has disappeared, but vigorous successors have been established not only in the neighbourhood, but in Bradford, Birmingham, Nottingham, London, Wolverhampton and other centres of industry, about 30 in all, with a membership of 3000. Many branches of the Independent Labour Party and the Social Democratic Federation also hold Sunday gatherings for adults and children, using the Labour Church hymn-book and a similar form of service, the reading being chosen from Dr Stanton Coit's *Message of Man*. There are special forms for child-naming, marriages and burials. The separate churches are federated in a Labour Church Union, which holds an annual conference and business meeting in March. At the conference of 1909, held in Ashton-under-Lyne, the name "Labour Church" was changed to "Socialist Church."

LA BOURDONNAIS, BERTRAND FRANÇOIS, Count Mahé de (1699-1753), French naval commander, was born at Saint Malo on the 11th of February 1699. He went to sea when a boy, and in 1718 entered the service of the French India Company as a lieutenant. In 1724 he was promoted captain,

and displayed such bravery in the capture of Mahé of the Malabar coast that the name of the town was added to his own. For two years he was in the service of the Portuguese viceroy of Goa, but in 1735 he returned to French service as governor of the Île de France and the Île de Bourbon. His five years' administration of the islands was vigorous and successful. A visit to France in 1740 was interrupted by the outbreak of hostilities with Great Britain, and La Bourdonnais was put at the head of a fleet in Indian waters. He saved Mahé, relieved General Dupleix at Pondicherry, defeated Lord Peyton, and in 1746 participated in the siege of Madras. He quarrelled with Dupleix over the conduct of affairs in India, and his anger was increased on his return to the Île de France at finding a successor to himself installed there by his rival. He set sail on a Dutch vessel to present his case at court, and was captured by the British, but allowed to return to France on parole. Instead of securing a settlement of his quarrel with Dupleix, he was arrested (1748) on a charge of gubernatorial peculation and maladministration, and secretly imprisoned for over two years in the Bastille. He was tried in 1751 and acquitted, but his health was broken by the imprisonment and by chagrin at the loss of his property. To the last he made unjust accusations against Dupleix. He died at Paris on the 10th of November 1753. The French government gave his widow a pension of 2400 livres.

La Bourdonnais wrote *Traité de la mâture des vaisseaux* (Paris 1723), and left valuable memoirs which were published by his grandson, a celebrated chess player, Count L. C. Mahé de la Bourdonnais (1795-1840) (latest edition, Paris, 1890). His quarrel with Dupleix has given rise to much debate; for a long while the fault was generally laid to the arrogance and jealousy of Dupleix, but W. Cartwright and Colonel Malleson have pointed out that La Bourdonnais was proud, suspicious and over-ambitious.

See P. de Gennes, *Mémoire pour le sieur de la Bourdonnais, avec les pièces justificatives* (Paris, 1750); *The Case of Mde la Bourdonnais, in a Letter to a Friend* (London, 1748); Fantin des Odoards, *Révolutions de l'Inde* (Paris, 1796); Collin de Bar, *Histoire de l'Inde ancienne et moderne* (Paris, 1814); Barchou de Penhoën, *Histoire de la conquête et de la fondation de l'empire anglais dans l'Inde* (Paris, 1840); Margry, "Les Isles de France et de Bourbon sous le gouvernement de La Bourdonnais," in *La Revue maritime et coloniale* (1862); W. Cartwright, "Dupleix et l'Inde française," in *La Revue britannique* (1882); G. B. Malleson, *Dupleix* (Oxford, 1895); Anandaranga Pillai, *Les Français dans l'Inde, Dupleix et Labourdonnais, extraits du journal d'Anandaran-gappoullé 1736-1748*, trans. in French by Vinsor in *École spéciale des langues orientales vivantes*, séries 3, vol. xv. (Paris, 1894).

LABOUR EXCHANGE, a term very frequently applied to registries having for their principal object the better distribution of labour (see Unemployment). Historically the term is applied to the system of equitable labour exchanges established in England between 1832 and 1834 by Robert Owen and his followers. The idea is said to have originated with Josiah Warren, who communicated it to Owen. Warren tried an experiment in 1828 at Cincinnati, opening an exchange under the title of a "time store." He joined in starting another at Tuscarawas, Ohio, and a third at Mount Vernon, Indiana, but none were quite on the same line as the English exchanges. The fundamental idea of the English exchanges was to establish a currency based upon labour; Owen in *The Crisis* for June 1832 laid down that all wealth proceeded from labour and knowledge; that labour and knowledge were generally remunerated according to the time employed, and that in the new exchanges it was proposed to make *time* the standard or measure of wealth. This new currency was represented by "labour notes," the notes being measured in hours, and the hour reckoned as being worth sixpence, this figure being taken as the mean between the wage of the best and the worst paid labour. Goods were then to be exchanged for the new currency. The exchange was opened in extensive premises in the Gray's Inn Road, near King's Cross, London, on the 3rd of September 1832. For some months the establishment met with considerable success, and a considerable number of tradesmen agreed to take labour notes in payment for their goods. At first, an enormous number of deposits was made, amounting in seventeen weeks to 445,501 hours. But difficulties soon arose from the lack of sound practical valuators, and from the inability of the promoters to distinguish between the labour of the highly skilled and that of the unskilled. Tradesmen, too, were quick to see that the exchange might be worked to their advantage; they brought unsaleable stock from their shops, exchanged it for labour notes, and then picked out the best of the saleable articles. Consequently the labour notes began to depreciate; trouble also arose with the proprietors of the premises, and the experiment came to an untimely end early in 1834.

See F. Podmore's *Robert Owen*, ii. c. xvii. (1906); B. Jones, *Co-operative Production*, c. viii. (1894); G. J. Holyoake, *History of Co-operation*, c. viii. (1906).

LABOUR LEGISLATION. Regulation of labour,[1] in some form or another, whether by custom, royal authority, ecclesiastical rules or by formal legislation in the interests of a community, is no doubt as old as the most ancient forms of civilization. And older than all civilization is the necessity for the greater

part of mankind to labour for maintenance, whether freely or in bonds, whether for themselves and their families or for the requirements or superfluities of others. Even while it is clear, however, that manual labour, or the application of the bodily forces—with or without mechanical aid—to personal maintenance and the production of goods, remains the common lot of the majority of citizens of the most developed modern communities, still there is much risk of confusion if modern technical terms such as "labour," "employer," "labour legislation" are freely applied to conditions in bygone civilizations with wholly different industrial organization and social relationships. In recent times in England there has been a notable disappearance from current use of correlative terms implying a social relationship which is greatly changed, for example, in the rapid passage from the Master and Servant Act 1867 to the Employer and Workman Act 1875. In the 18th century the term "manufacturer" passed from its application to a working craftsman to its modern connotation of at least some command of capital, the employer being no longer a small working master. An even more significant later change is seen in the steady development of a labour legislation, which arose in a clamant social need for the care of specially helpless "protected" persons in factories and mines, into a wider legislation for the promotion of general industrial health, safety and freedom for the worker from fraud in making or carrying out wage contracts.

If, then, we can discern these signs of important changes within so short a period, great caution is needed in rapidly reviewing long periods of time prior to that industrial revolution which is traced mainly to the application of mechanical power to machinery in aid of manual labour, practically begun and completed within the second half of the 18th century. "In 1740 save for the fly-shuttle the loom was as it had been since weaving had begun ... and the law of the land was" (under the Act of Apprentices of 1503) "that wages in each district should be assessed by Justices of the Peace."[2] Turning back to still earlier times, legislation—whatever its source or authority—must clearly be devoted to aims very different from modern aims in regulating labour, when it arose before the labourer, as a man dependent on an "employer" for the means of doing work, had appeared, and when migratory labour was almost unknown through the serfdom of part of the population and the special status secured in towns to the artisan.

In the great civilizations of antiquity there were great aggregations of labour which was not solely, though frequently it was predominantly, slave labour; and some of the features of manufacture and mining on a great scale arose, producing the same sort of evils and industrial maladies known and regulated in our own times. Some of the maladies were described by Pliny and classed as "diseases of slaves." And he gave descriptions of processes, for example in the metal trades, as belonging entirely to his own day, which modern archaeological discoveries trace back through the earliest known Aryan civilizations to a prehistoric origin in the East, and which have never died out in western Europe, but can be traced in a concentrated manufacture with almost unchanged methods, now in France, now in Germany, now in England.

Little would be gained in such a sketch as this by an endeavour to piece together the scattered and scanty materials for a comparative history of the varying conditions and methods of labour regulation over so enormous a range. While our knowledge continually increases of the remains of ancient craft, skill and massed labour, much has yet to be discovered that may throw light on methods of organization of the labourers. While much, and in some civilizations most, of the labour was compulsory or forced, it is clear that too much has been sometimes assumed, and it is by no means certain that even the pyramids of Egypt, much less the beautiful earliest Egyptian products in metal work, weaving and other skilled craft work, were typical products of slave labour. Even in Rome it was only at times that the proportion of slaves valued as property was greater than that of hired workers, or, apart from capture in war or self-surrender in discharge of a debt, that purchase of slaves by the trader, manufacturer or agriculturist was generally considered the cheapest means of securing labour. As in early England the various stages of village industrial life, medieval town manufacture, and organization in craft gilds, and the beginnings of the mercantile system, were parallel with a greater or less prevalence of serfdom and even with the presence in part of slavery, so in other ages and civilizations the various methods of organization of labour are found to some extent together. The Germans in their primitive settlements were accustomed to the notion of slavery, and in the decline of the Roman Empire Roman captives from among the most useful craftsmen were carried away by their northern conquerors.

The history and present details of the labour laws of various countries are dealt with below in successive sections: (1) history of legislation in the United Kingdom; (2) the results as shown by the law in force in 1909, with the corresponding facts for (3) Continental Europe and (4) the United States. Under other headings (Trade-Unions, Strikes and Lock-Outs, Arbitration and Conciliation, &c., &c.) are many details on cognate subjects.

I. History in the United Kingdom

1. *Until the Close of the 15th Century.*—Of the main conditions of industrial labour in early Anglo-Saxon England details are scanty. Monastic industrial communities were added in Christian times to village industrial communities. While generally husbandry was the first object of toil, and developed under elaborate regulation in the manorial system, still a considerable variety of industries grew up, the aim being expressly to make each social group self-sufficing, and to protect and regulate village artisans in the interest of village resources. This protective system, resting on a communal or co-operative view of labour and social life, has been compared as analogous to the much later and wider system under which the main purpose was to keep England as a whole self-sufficing.[3] It has also been shown how greatly a fresh spirit of enterprise in industry and trade was stimulated first by the Danish and next by the Norman invasion; the former brought in a vigour shown in growth of villages, increase in number of freemen, and formation of trading towns; the latter especially opened up new communications with the most civilized continental people, and was followed by a considerable immigration of artisans, particularly of Flemings. In Saxon

England slavery in the strictest sense existed, as is shown in the earliest English laws, but it seems that the true slave class as distinct from the serf class was comparatively small, and it may well be that the labour of an ordinary serf was not practically more severe, and the remuneration in maintenance and kind not much less than that of agricultural labourers in recent times. In spite of the steady protest of the Church, slavery (as the exception, not the general rule) did not die out for many centuries, and was apt to be revived as a punishment for criminals, *e.g.* in the fierce provisions of the statute of Edward VI. against beggars, not repealed until 1597. At no time, however, was it general, and as the larger village and city populations grew the ratio of serfs and slaves to the freemen in the whole population rapidly diminished, for the city populations "had not the habit and use of slavery," and while serfs might sometimes find a refuge in the cities from exceptionally severe taskmasters, "there is no doubt that freemen gradually united with them under the lord's protection, that strangers engaged in trade sojourned among them, and that a race of artisans gradually grew up in which original class feelings were greatly modified." From these conditions grew two parallel tendencies in regulation of labour. On the one hand there was, under royal charters, the burgh or municipal organization and control of artisan and craft labour, passing later into the more specialized organization in craft gilds; on the other hand, there was a necessity, sometimes acute, to prevent undue diminution in the numbers available for husbandry or agricultural labour. To the latter cause must be traced a provision appearing in a succession of statutes (see especially an act of Richard II., 1388), that a child under twelve years once employed in agriculture might never be transferred to apprenticeship in a craft. The steady development of England, first as a wool-growing, later as a cloth-producing country, would accentuate this difficulty. During the 13th century, side by side with development of trading companies for the export of wool from England, may be noted many agreements on the part of monasteries to sell their wool to Florentines, and during the same century absorption of alien artisans into the municipal system was practically completed. Charters of Henry I. provided for naturalization of these aliens. From the time of Edward I. to Edward III. a gradual transference of burgh customs, so far as recognized for the common good, to statute law was in progress, together with an assertion of the rights of the crown against ecclesiastical orders. "The statutes of Edward I.," says Dr. Cunningham, "mark the first attempt to deal with Industry and Trade as a public matter which concerns the whole state, not as the particular affair of leading men in each separate locality." The first direct legislation for labour by statute, however, is not earlier than the twenty-third year of the reign of Edward III., and it arose in an attempt to control the decay and ruin, both in rural and urban districts, which followed the Hundred Years' War, and the pestilence known as the Black Death. This first "Statute of Labourers" was designed for the benefit of the community, not for the protection of labour or prevention of oppression, and the policy of enforcing customary wages and compelling the able-bodied labourer, whether free or bond, not living in merchandise or exercising any craft, to work for hire at recognized rates of pay, must be reviewed in the circumstances and ideals of the time. Regulation generally in the middle ages aimed at preventing any individual or section of the community from making what was considered an exceptional profit through the necessity of others.[4] The scarcity of labour by the reduction of the population through pestilence was not admitted as a justification for the demands for increased pay, and while the unemployed labourer was liable to be committed to gaol if he refused service at current rates, the lords of the towns or manors who promised or paid more to their servants were liable to be sued treble the sum in question. Similar restrictions were made applicable to artificers and workmen. By another statute, two years later, labourers or artificers who left their work and went into another county were liable to be arrested by the sheriff and brought back. These and similar provisions with similar aims were confirmed by statutes of 1360, 1368 and 1388, but the act of 1360, while prohibiting "all alliances and covins of masons, carpenters, congregations, chapters, ordinances and oaths betwixt them made," allowed "every lord to bargain or covenant for their works in gross with such labourers and artificers when it pleaseth them, so that they perform such works well and lawfully according to the bargain and covenant with them thereof made." Powers were given by the acts of 1368 and 1388 to justices to determine matters under these statutes and to fix wages. Records show that workmen of various descriptions were pressed by writs addressed to sheriffs to work for their king at wages regardless of their will as to terms and place of work. These proceedings were founded on notions of royal prerogative, of which impressment of seamen survived as an example to a far later date. By an act of 1388 no servant or labourer, man or woman, however, could depart out of the hundred to serve elsewhere unless bearing a letter patent under the king's seal stating the cause of going and time of return. Such provisions would appear to have widely failed in their purpose, for an act of 1414 declares that the servants and labourers fled from county to county, and justices were empowered to send writs to the sheriffs for fugitive labourers as for felons, and to examine labourers, servants and their masters, as well as artificers, and to punish them on confession. An act of 1405, while putting a property qualification on apprenticeship and requiring parents under heavy penalties to put their children to such labour as their estates required, made a reservation giving freedom to any person "to send their children to school to learn literature." Up to the end of the 15th century a monotonous succession of statutes strengthening, modifying, amending the various attempts (since the first Statute of Labourers) to limit free movement of labour, or demands by labourers for increased wages, may be seen in the acts of 1411, 1427, 1444, 1495. It was clearly found extremely difficult, if not impracticable, to carry out the minute control of wages considered desirable, and exceptions in favour of certain occupations were in some of the statutes themselves. In 1512 the penalties for giving wages contrary to law were repealed so far as related to masters, but it also appears that London workmen would not endure the prevalent restrictions as to wages, and that they secured in practice a greater freedom to arrange rates when working within the city. Several of these statutes, and especially one of 1514, fixed the hours of labour when limiting wages. During March to September the limits were 5 A.M. to 7 or 8 P.M., with half an hour off for breakfast and an hour and a half off for mid-day dinner. In winter the outside limits were fixed by the length of daylight.

Throughout the 15th century the rapidly increasing manufacture of cloth was subject to a regulation which aimed at maintaining the standard of production and prevention of bad workmanship, and the noteworthy statute 4 Edward IV. c. 1, while giving power to royal officers to supervise size of cloths,

modes of sealing, &c., also repressed payment to workers in “pins, girdles and unprofitable wares,” and ordained payment in true and lawful money. This statute (the first against “Truck”) gives an interesting picture of the way in which clothiers—or, as we should call them, wholesale merchants and manufacturers—delivered wool to spinners, carders, &c., by weight, and paid for the work when brought back finished. It appears that the work was carried on in rural as well as town districts. While this industry was growing and thriving other trades remained backward, and agriculture was in a depressed condition. Craft gilds had primarily the same purpose as the Edwardian statutes, that is, of securing that the public should be well served with good wares, and that the trade and manufacture itself should be on a sound basis as to quality of products and should flourish. Incidentally there was considerable regulation by the gilds of the conditions of labour, but not primarily in the interests of the labourer. Thus night work was prohibited because it tended to secrecy and so to bad execution of work; working on holidays was prohibited to secure fair play between craftsmen and so on. The position of apprentices was made clear through indentures, but the position of journeymen was less certain. Signs are not wanting of a struggle between journeymen and masters, and towards the end of the 15th century masters themselves, in at least the great wool trade, tended to develop from craftsmen into something more like the modern capitalist employer; from an act of 1555 touching weavers it is quite clear that this development had greatly advanced and that cloth-making was carried on largely by employers with large capitals. Before this, however, while a struggle went on between the town authorities and the craft gilds, journeymen began to form companies of their own, and the result of the various conflicts may be seen in an act of Henry VI., providing that in future new ordinances of gilds shall be submitted to justices of the peace—a measure which was strengthened in 1503.

2. *From Tudor Days until the Close of the 18th Century.*—A detailed history of labour regulation in the 16th century would include some account of the Tudor laws against vagrancy and methods of dealing with the increase of pauperism, attributable, at least in part, to the dissolution of the monasteries under Henry VIII., and to the confiscation of craft gild funds, which proceeded under Somerset and Edward VI. It is sufficient here to point to the general recognition of the public right to compel labourers to work and thus secure control of unemployed as well as employed. The statutes of Henry VIII. and Edward VI. against vagrancy differed rather in degree of severity than in principle from legislation for similar purposes in previous and subsequent reigns. The Statute of Labourers, passed in the fifth year of Elizabeth’s reign (1562), as well as the poor law of the same year, was to a considerable extent both a consolidating and an amending code of law, and was so securely based on public opinion and deeply rooted custom that it was maintained in force for two centuries. It avowedly approves of principles and aims in earlier acts, regulating wages, punishing refusal to work, and preventing free migration of labour. It makes, however, a great advance in its express aim of protecting the poor labourer against insufficient wages, and of devising a machinery, by frequent meeting of justices, which might yield “unto the hired person both in time of scarcity and in time of plenty a convenient proportion of wages.” Minute regulations were made governing the contract between master and servant, and their mutual rights and obligations on parallel lines for (*a*) artificers, (*b*) labourers in husbandry. Hiring was to be by the year, and any unemployed person qualified in either calling was bound to accept service on pain of imprisonment, if required, unless possessed of property of a specified amount or engaged in art, science or letters, or being a “gentleman.” Persons leaving a service were bound to obtain a testimonial, and might not be taken into fresh employment without producing such testimonial, or, if in a new district, until after showing it to the authorities of the place. A master might be fined £5, and a labourer imprisoned, and if contumacious, whipped, for breach of this rule. The carefully devised scheme for technical training of apprentices embodied to a considerable extent the methods and experiences of the craft gilds. Hours of labour were as follows: “All artificers and labourers being hired for wages by the day or week shall, betwixt the midst of the months of March and September, be and continue at their work at or before 5 o’clock in the morning and continue at work and not depart until betwixt 7 and 8 o’clock at night, except it be in the time of breakfast, dinner or drinking, the which time at the most shall not exceed two hours and a half in a day, that is to say, at every drinking half an hour, for his dinner one hour and for his sleep when he is allowed to sleep, the which is from the midst of May to the midst of August, half an hour; and all the said artificers and labourers betwixt the midst of September and the midst of March shall be and continue at their work from the spring of the day in the morning until the night of the same day, except it be in time afore appointed for breakfast and dinner, upon pain to lose and forfeit one penny for every hour’s absence, to be deducted and defaulked out of his wages that shall so offend.” Although the standpoint of the Factory Act and Truck Act in force at the beginning of the 20th century as regards hours of labour or regulation of fines deducted from wages is completely reversed, yet the difference is not great between the average length of hours of labour permissible under the present law for women and those hours imposed upon the adult labourer in Elizabeth’s statute. Apart from the standpoint of compulsory imposition of fines, one advantage in the definiteness of amount deductable from wages would appear to lie on the side of the earlier statute.

Three points remain to be touched on in connexion with the Elizabethan poor law. In addition to (*a*) consolidation of measures for setting vagrants to work, we find the first compulsory contributions from the well-to-do towards poor relief there provided for, (*b*) at least a theoretical recognition of a right as well as an obligation on the part of the labourer to be hired, (*c*) careful provision for the apprenticing of destitute children and orphans to a trade.

One provision of considerable interest arose in Scotland, which was nearly a century later in organizing provisions for fixing conditions of hire and wages of workmen, labourers and servants, similar to those consolidated in the Elizabethan Statute of Labourers. In 1617 it was provided (and reaffirmed in 1661) that power should be given to the sheriffs to compel payment of wages, “that servants may be the more willing to obey the ordinance.” The difficulties in regulation of compulsory labour in Scotland must, however, have been great, for in 1672 houses of correction were erected for disobedient servants, and masters of these houses were empowered to force them to work and to correct them according to their

demerits. While servants in manufacture were compelled to work at reasonable rates they might not enter on a new hire without their previous master's consent.

Such legislation continued, at least theoretically, in force until the awakening effected by the beginning of the industrial revolution—that is, until the combined effects of steady concentration of capital in the hands of employers and expansion of trade, followed closely by an unexampled development of invention in machinery and application of power to its use. completely altered the face of industrial England. From time to time, in respect of particular trades, provisions against truck and for payment of wages in current coin, similar to the act of Edward IV. in the woollen industry, were found necessary, and this branch of labour legislation developed through the reigns of Anne and the four Georges until consolidation and amendment were effected, after the completion of the industrial revolution, in the Truck Act of 1831. From the close of the 17th century and during the 18th century the legislature is no longer mainly engaged in devising means for compelling labourers and artisans to enter into involuntary service, but rather in regulating the summary powers of justices of the peace in the matter of dispute between masters and servants in relation to contracts and agreements, express or implied, presumed to have been entered into voluntarily on both sides. While the movement to refer labour questions to the jurisdiction of the justices thus gradually developed, the main subject matter for their exercise of jurisdiction in regard to labour also changed, even when theoretically for a time the two sets of powers—such as (*a*) moderation of craft gild ordinances and punishment of workers refusing hire, or (*b*) fixing scales of wages and enforcement of labour contracts—might be concurrently exercised. Even in an act of George II. (1746) for settlement of disputes and differences as to wages or other conditions under a contract of labour, power was retained for the justices, on complaint of the masters of misdemeanour or ill-behaviour on the part of the servant, to discharge the latter from service or to send him to a house of correction "there to be corrected," that is, to be held to hard labour for a term not exceeding a month or to be corrected by whipping. In an act with similar aims of George IV. (1823), with a rather wider scope, the power to order corporal punishment, and in 1867 to hard labour, for breach of labour contracts had disappeared, and soon after the middle of the 19th century the right to enforce contracts of labour also disappeared. Then breach of such labour contracts became simply a question of recovery of damages, unless both parties agreed that security for performance of the contract shall be given instead of damages.

While the endeavour to enforce labour apart from a contract died out in the latter end of the 18th century, sentiment for some time had strongly grown in favour of developing early industrial training of children. It appears to have been a special object of charitable and philanthropic endeavour in the 17th century, as well as the 18th, to found houses of industry, in which little children, even under five years of age, might be trained for apprenticeship with employers. Connected as this development was with poor relief, one of its chief aims was to prevent future unemployment and vagrancy by training in habits and knowledge of industry, but not unavowed was another motive: "from children thus trained up to constant labour we may venture to hope the lowering of its price."[5] The evils and excesses which lay enfolded within such a movement gave the first impulse to the new ventures in labour legislation which are specially the work of the 19th century. Evident as it is "that before the Industrial Revolution very young children were largely employed both in their own homes and as apprentices under the Poor Law," and that "long before Peel's time there were misgivings about the apprenticeship system," still it needed the concentration and prominence of suffering and injury to child life in the factory system to lead to parliamentary intervention.

3. *From 1800 to the Codes of 1872 and 1878.*—A serious outbreak of fever in 1784 in cotton mills near Manchester appears to have first drawn widespread and influential public opinion to the overwork of children, under terribly dangerous and insanitary conditions, on which the factory system was then largely being carried on. A local inquiry, chiefly by a group of medical men presided over by Dr Percival, was instituted by the justices of the peace for Lancashire, and in the forefront of the resulting report stood a recommendation for limitation and control of the working hours of the children. A resolution by the county justices followed, in which they declared their intention in future to refuse "indentures of parish Apprentices whereby they shall be bound to Owners of Cotton Mills and other works in which children are obliged to work in the night or more than ten hours in the day." In 1795 the Manchester Board of Health was formed, which, with fuller information, more definitely advised legislation for the regulation of the hours and conditions of labour in factories. In 1802 the Health and Morals of Apprentices Act was passed, which in effect formed the first step towards prevention of injury to and protection of labour in factories. It was directly aimed only at evils of the apprentice system, under which large numbers of pauper children were worked in cotton and woollen mills without education, for excessive hours, under wretched conditions. It did not apply to places employing fewer than twenty persons or three apprentices, and it applied the principle of limitation of hours (to twelve a day) and abolition of night work, as well as educational requirements, only to apprentices. Religious teaching and suitable sleeping accommodation and clothing were provided for in the act, also as regards apprentices. Lime-washing and ventilation provisions applied to all cotton and woollen factories employing more than twenty persons. "Visitors" were to be appointed by county justices for repression of contraventions, and were empowered to "direct the adoption of such sanitary regulations as they might on advice think proper." The mills were to be registered by the clerk of the peace, and justices had power to inflict fines of from £2 to £5 for contraventions. Although enforcement of the very limited provisions of the act was in many cases poor or non-existent, in some districts excellent work was done by justices, and in 1803 the West Riding of Yorkshire justices passed a resolution substituting the ten hours' limit for the twelve hours' limit of the act, as a condition of permission for indenturing of apprentices in mills.

Rapid development of the application of steam power to manufacture led to growth of employment of children in populous centres, otherwise than on the apprenticeship system, and before long the evils attendant on this change brought the general question of regulation and protection of child labour in textile factories to the front. The act of 1819, limited as it was, was a noteworthy step forward, in that it

dealt with this wider scope of employment of children in cotton factories, and it is satisfactory to record that it was the outcome of the efforts and practical experiments of a great manufacturer, Robert Owen. Its provisions fell on every point lower than the aims he put forward on his own experience as practicable, and notably in its application only to cotton mills instead of all textile factories. Prohibition of child labour under nine years of age and limitation of the working day to twelve in the twenty-four (without specifying the precise hour of beginning and closing) were the main provisions of this act. No provision was made for enforcement of the law beyond such as was attempted in the act of 1802. Slight amendments were attempted in the acts of 1825 and 1831, but the first really important factory act was in 1833 applying to textile factories generally, limiting employment of young persons under eighteen years of age, as well as children, prohibiting night work between 8.30 P.M. and 5.30 A.M., and first providing for "inspectors" to enforce the law. This is the act which was based on the devoted efforts of Michael Sadler, with whose name in this connexion that of Lord Ashley, afterwards earl of Shaftesbury, was from 1832 associated. The importance of this act lay in its provision for skilled inspection and thus for enforcement of the law by an independent body of men unconnected with the locality in which the manufactures lay, whose specialization in their work enabled them to acquire information needed for further development of legislation for protection of labour. Their powers were to a certain extent judicial, being assimilated to those possessed by justices; they could administer oaths and make such "rules, regulations and orders" as were necessary for execution of the act, and could hear complaints and impose penalties under the act. In 1844 a textile factory act modified these extensive inspectoral powers, organizing the service on lines resembling those of our own time, and added provision for certifying surgeons to examine workers under sixteen years of age as to physical fitness for employment and to grant certificates of age and ordinary strength. Hours of labour, by the act of 1833, were limited for children under eleven to 9 a day or 48 in the week, and for young persons under eighteen to 12 a day or 69 in the week. Between 1833 and 1844 the movement in favour of a ten hours' day, which had long been in progress, reached its height in a time of great commercial and industrial distress, but could not be carried into effect until 1847. By the act of 1844 the hours of adult women were first regulated, and were limited (as were already those of "young persons") to 12 a day; children were permitted either to work the same hours on alternate days or "half-time," with compulsory school attendance as a condition of their employment. The aim in thus adjusting the hours of the three classes of workers was to provide for a practical standard working-day. For the first time detailed provisions for health and safety began to make their appearance in the law. Penal compensation for preventible injuries due to unfenced machinery was also provided, and appears to have been the outcome of a discussion by witnesses before the Royal Commission on Labour of Young Persons in Mines and Manufactures in 1841.

From this date, 1841, begin the first attempts at protective legislation for labour in mining. The first Mines Act of 1842 following the terrible revelations of the Royal Commission referred to excluded women and girls from underground working, and limited the employment of boys, excluding from underground working those under ten years, but it was not until 1850 that systematic reporting of fatal accidents and until 1855 that other safeguards for health, life and limb in mines were seriously provided by law. With the exception of regulations against truck there was no protection for the miner before 1842; before 1814 it was not customary to hold inquests on miners killed by accidents in mines. From 1842 onwards considerable interaction in the development of the two sets of acts (mines and factories), as regards special protection against industrial injury to health and limb, took place, both in parliament and in the department (Home Office) administering them. Another strong influence tending towards ultimate development of scientific protection of health and life in industry began in the work and reports of the series of sanitary commissions and Board of Health reports from 1843 onwards. In 1844 the mines inspector made his first report, but two years later women were still employed to some extent underground. Organized inspection began in 1850, and in 1854 the Select Committee on Accidents adopted a suggestion of the inspectors for legislative extension of the practice of several colliery owners in framing special safety rules for working in mines. The act of 1855 provided seven general rules, relating to ventilation, fencing of disused shafts, proper means for signalling, proper gauges and valve for steam-boiler, indicator and brake for machine lowering and raising; also it provided that detailed special rules submitted by mine-owners to the secretary of state, might, on his approval, have the force of law and be enforceable by penalty. The Mines Act of 1860, besides extending the law to ironstone mines, following as it did on a series of disastrous accidents and explosions, strengthened some of the provisions for safety. At several inquests strong evidence was given of incompetent management and neglect of rules, and a demand was made for enforcing employment only of certificated managers of coal mines. This was not met until the act of 1872, but in 1860 certain sections relating to wages and education were introduced. Steady development of the coal industry, increasing association among miners, and increased scientific knowledge of means of ventilation and of other methods for securing safety, all paved the way to the Coal Mines Act of 1872, and in the same year health and safety in metalliferous mines received their first legislative treatment in a code of similar scope and character to that of the Coal Mines Act. This act was amended in 1886, and repealed and recodified in 1887; its principal provisions are still in force, with certain revised special rules and modifications as regards reporting of accidents (1906) and employment of children (1903). It was based on the recommendations of a Royal Commission, which had reported in 1864, and which had shown the grave excess of mortality and sickness among metalliferous miners, attributed to the inhalation of gritty particles, imperfect ventilation, great changes of temperature, excessive physical exertion, exposure to wet, and other causes. The prohibition of employment of women and of boys under ten years underground in this class of mines, as well as in coal mines, had been effected by the act of 1842, and inspection had been provided for in the act of 1860; these were in amended form included in the code of 1872, the age of employment of boys underground being raised to twelve. In the Coal Mines Act of 1872 we see the first important effort to provide a complete code of regulation for the special dangers to health, life and limb in coal mines apart from other mines; it applied to "mines of coal, mines of stratified ironstone, mines of shale and mines of fire-clay." Unlike the companion act—applying to all other mines—it maintained the age limit of entering underground employment for boys at ten years,

but for those between ten and twelve it provided for a system of working analogous to the half-time system in factories, including compulsory school attendance. The limits of employment for boys from twelve to sixteen were 10 hours in any one day and 54 in anyone week. The chief characteristics of the act lay in extension of the "general" safety rules, improvement of the method of formulating "special" safety rules, provision for certificated and competent management, and increased inspection. Several important matters were transferred from the special to the general rules, such as compulsory use of safety lamps where needed, regulation of use of explosives, and securing of roofs and sides. Special rules, before being submitted to the secretary of state for approval, must be posted in the mine for two weeks, with a notice that objections might be sent by any person employed to the district inspector. Wilful neglect of safety provisions became punishable in the case of employers as well as miners by imprisonment with hard labour. But the most important new step lay in the sections relating to daily control and supervision of every mine by a manager holding a certificate of competency from the secretary of state, after examination by a board of examiners appointed by the secretary of state, power being retained for him to cause later inquiry into competency of the holder of the certificate, and to cancel or suspend the certificate in case of proved unfitness.

Returning to the development of factory and workshop law from the year 1844, the main line of effort—after the act of 1847 had restricted hours of women and young persons to 10 a day and fixed the daily limits between 6 A.M. and 6 P.M. (Saturday 6 A.M. to 2 P.M.)—lay in bringing trade after trade in some degree under the scope of this branch of law, which had hitherto only regulated conditions in textile factories. Bleaching and dyeing works were included by the acts of 1860 and 1862; lace factories by that of 1861; calendering and finishing by acts of 1863 and 1864; bakehouses became partially regulated by an act of 1863, with special reference to local authorities for administration of its clauses. The report of the third Children's Employment Commission brought together in accessible form the miserable facts relating to child labour in a number of unregulated industries in the year 1862, and the act of 1864 brought some of (these earthenware-making, lucifer match-making, percussion cap and cartridge making, paper-staining, and fustian cutting) partly under the scope of the various textile factory acts in force. A larger addition of trades was made three years later, but the act of 1864 is particularly interesting in that it first embodied some of the results of inquiries of expert medical and sanitary commissioners, by requiring ventilation to be applied to the removal of injurious gases, dust, and other impurities generated in manufacture, and made a first attempt to engraft part of the special rules system from the mines acts. The provisions for framing such rules disappeared in the Consolidating Act of 1878, to be revived in a better form later. The Sanitary Act of 1866, administered by local authorities, provided for general sanitation in any factories and workshops not under existing factory acts, and the Workshops Regulation Act of 1867, similarly to be administered by local authorities, amended in 1870, practically completed the application of the main principle of the factory acts to all places in which manual labour was exercised for gain in the making or finishing of articles or parts of articles for sale. A few specially dangerous or injurious trades brought under regulation in 1864 and 1867 (*e.g.* earthenware and lucifer match making, glass-making) ranked as "factories," although not using mechanical power, and for a time employment of less than fifty persons relegated certain workplaces to the category of "workshops," but broadly the presence or absence of such motor power in aid of process was made and has remained the distinction between factories and workshops. The Factory Act of 1874, the last of the series before the great Consolidating Act of 1878, raised the minimum age of employment for children to ten years in textile factories. In most of the great inquiries into conditions of child labour the fact has come clearly to light, in regard to textile and non-textile trades alike, that parents as much as any employers have been responsible for too early employment and excessive hours of employment of children, and from early times until to-day in factory legislation it has been recognized that they must to some extent be held responsible for due observation of the limits imposed. For example, in 1831 it was found necessary to protect occupiers against parental responsibility for false certificates of age, and in 1833 parents of a child or "any Person having any benefit from the wages of such child" were made to share responsibility for employment of children without school attendance or beyond legal hours.

During the discussions on the bill which became law in 1874, it had become apparent that revision and consolidation of the multiplicity of statutes then regulating manufacturing industry had become pressingly necessary; modifications and exceptions for exceptional conditions in separate industries needed reconsideration and systematization on clear principles, and the main requirements of the law could with great advantage be applied more generally to all the industries. In particular, the daily limits as to period of employment, pauses for meals, and holidays, needed to be unified for non-textile factories and workshops, so as to bring about a standard working-day, and thus prevent the tendency in "the larger establishments to farm out work among the smaller, where it is done under less favourable conditions both sanitary and educational."[6] In these main directions, and that of simplifying definitions, summarizing special sanitary provisions that had been gradually introduced for various trades, and centralizing and improving the organization of the inspectorate, the Commission of 1876 on the Factory Acts made its recommendations, and the Factory Act of 1878 took effect. In the fixed working-day, provisions for pauses, holidays, general and special exceptions, distinctions between systems of employment for children, young persons and women, education of children and certificates of fitness for children and young persons, limited regulation of domestic workshops, general principles of administration and definitions, the law of 1878 was made practically the same as that embodied in the later principal act of 1901. More or less completely revised are: (*a*) the sections in the 1878 act relating to mode of controlling sanitary conditions in workshops (since 1891 primarily enforced by the local sanitary authority); (*b*) provision for reporting accidents and for enforcing safety (other than fencing of mill gearing and dangerous machinery); (*c*) detailed regulation of injurious and dangerous process and trades; (*d*) powers of certifying surgeons; (*e*) amount of overtime permissible (greatly reduced in amount and now confined to adults); (*f*) age for permissible employment of a child has been raised from ten years to twelve years. Entirely new since the act of 1878 are the provisions: (*a*) for control of outwork; (*b*) for supplying particulars of work and wages

to piece-workers, enabling them to compute the total amount of wages payable to them; (*e*) extension of the act to laundries; (*f*) a tentative effort to limit the too early employment of mothers after childbirth.

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Factories and Workshops.—The act of 1878 remained until 1901, although much had been meanwhile superimposed, a monument to the efforts of the great factory reformers of the first half of the 19th century, and the general groundwork of safety for workers in factories and workshops in the main divisions of sanitation, security against accidents, physical fitness of workers, general limitation of hours and times of employment for young workers and women. The act of 1901, which came into force 1st January 1902 (and became the principal act), was an amending as well as a consolidating act. Comparison of the two acts shows, however, that, in spite of the advantages of further consolidation and helpful changes in arrangement of sections and important additions which tend towards a specialized hygiene for factory life, the fundamental features of the law as fought out in the 19th century remain undisturbed. So far as the law has altered in character, it has done so chiefly by gradual development of certain sanitary features, originally subordinate, and by strengthening provision for security against accidents and not by retreat from its earlier aims. At the same time a basis for possible new developments can be seen in the protection of "outworkers" as well as factory workers against fraudulent or defective particulars of piece-work rates of wages.

Later acts directly and indirectly affecting the law are certain acts of 1903, 1906, 1907, to be touched on presently.

Additions to act of 1878.

The act of 1878, in a series of acts from 1883 to 1895, received striking additions, based (1) on the experience gained in other branches of protective legislation, *e.g.* development of the method of regulation of dangerous trades by "special rules" and administrative inquiry into accidents under Coal Mines Acts; (2) on the findings of royal commissions and parliamentary inquiries, *e.g.* increased control of "outwork" and domestic workshops, and limitation of "overtime"; (3) on the development of administrative machinery for enforcing the more modern law relating to public health, *e.g.* transference of administration of sanitary provisions in workshops to the local sanitary authorities; (4) on the trade-union demand for means for securing trustworthy records of wage-contracts between employer and workman, *e.g.* the section requiring particulars of work and wages for piece-workers. The first additions to the act of 1878 were, however, almost purely attempts to deal more adequately than had been attempted in the code of 1878 with certain striking instances of trades injurious to health. Thus the Factory and Workshop Act of 1883 provided that white-lead factories should not be carried on without a certificate of conformity with certain conditions, and also made provision for special rules, on lines later superseded by those laid down in the act of 1891, applicable to any employment in a factory or workshop certified as dangerous or injurious by the secretary of state. The act of 1883 also dealt with sanitary conditions in bakehouses. Certain definitions and explanations of previous enactments touching overtime and employment of a child in any factory or workshop were also included in the act. A class of factories in which excessive heat and humidity seriously affected the health of operatives was next dealt with in the Cotton Cloth Factories Act 1889. This provided for special notice to the chief inspector from all occupiers of cotton cloth factories (*i.e.* any room, shed, or workshop or part thereof in which weaving of cotton cloth is carried on) who intend to produce humidity by artificial means; regulated both temperature of workrooms and amount of moisture in the atmosphere, and provided for tests and records of the same; and fixed a standard minimum volume of fresh air (600 cub. ft.) to be admitted in every hour for every person employed in the factory. Power was retained for the secretary of state to modify by order the standard for the maximum limit of humidity of the atmosphere at any given temperature. A short act in 1870 extended this power to other measures for the protection of health.

The special measures from 1878 to 1889 gave valuable precedents for further developments of special hygiene in factory life, but the next advance in the Factory and Workshop Act 1891, following the House of Lords Committee on the sweating system and the Berlin International Labour Conference, extended over much wider ground. Its principal objects were: (*a*) to render administration of the law relating to workshops more efficient, particularly as regards sanitation; with this end in view it made the primary controlling authority for sanitary matters in workshops the local sanitary authority (now the district council), acting by their officers, and giving them the powers of the less numerous body of factory inspectors, while at the same time the provisions of the Public Health Acts replaced in workshops the very similar sanitary provisions of the Factory Acts; (*b*) to provide for greater security against accidents and more efficient fencing of machinery in factories; (*c*) to extend the method of regulation of unhealthy or dangerous occupations by application of special rules and requirements to any incident of employment (other than in a domestic workshop) certified by the secretary of state to be dangerous or injurious to health or dangerous to life or limb; (*d*) to raise the age of employment of children and restrict the employment of women immediately after childbirth; (*e*) to require particulars of rate of wages to be given with work to piece-workers in certain branches of the textile industries; (*f*) to amend the act of 1878 in various subsidiary ways, with the view of improving the administration of its principles, *e.g.* by increasing the means of checking the amount of overtime worked, empowering inspectors to enter workplaces used as dwellings without a justice's warrant, and the imposition of minimum penalties in certain cases. On this act followed four years of greatly accelerated administrative activity. No fewer than sixteen trades were scheduled by the secretary of state as dangerous to health. The manner of preparing and establishing suitable rules was greatly modified by the act of 1901 and will be dealt with in that connexion.

The Factory and Workshop Act 1895 followed thus on a period of exercise of new powers of administrative regulation (the period being also that during which the Royal Commission on Labour made

its wide survey of industrial conditions), and after two successive annual reports of the chief inspector of factories had embodied reports and recommendations from the women inspectors, who in 1893 were first added to the inspectorate. Again, the chief features of an even wider legislative effort than that of 1891 were the increased stringency and definiteness of the measures for securing hygienic and safe conditions of work. Some of these measures, however, involved new principles, as in the provision for the prohibition of the use of a dangerous machine or structure by the order of a magistrate's court, and the power to include in the special rules drawn up in pursuance of section 8 of the act of 1891, the prohibition of the employment of any class of persons, or the limitation of the period of employment of any class of persons in any process scheduled by order of the secretary of state. These last two powers have both been exercised, and with the exercise of the latter passed away, without opposition, the absolute freedom of the employer of the adult male labourer to carry on his manufacture without legislative limitation of the hours of labour. Second only in significance to these new developments was the addition, for the first time since 1867, of new classes of workplaces not covered by the general definitions in section 93 of the Consolidating Act of 1878, viz.: (*a*) laundries (with special conditions as to hours, &c.); (*b*) docks, wharves, quays, warehouses and premises on which machinery worked by power is temporarily used for the purpose of the construction of a building or any structural work in connexion with the building (for the purpose only of obtaining security against accidents). Other entirely new provisions in the act of 1895, later strengthened by the act of 1901, were the requirement of a reasonable temperature in workrooms, the requirement of lavatories for the use of persons employed in any department where poisonous substances are used, the obligation on occupiers and medical practitioners to report cases of industrial poisoning; and the penalties imposed on an employer wilfully allowing wearing apparel to be made, cleaned or repaired in a dwelling-house where an inmate is suffering from infectious disease. Another provision empowered the secretary of state to specify classes of outwork and areas with a view to the regulation of the sanitary condition of premises in which outworkers are employed. Owing to the conditions attached to its exercise, no case was found in which this power could come into operation, and the act of 1901 deals with the matter on new lines. The requirement of annual returns from occupiers of persons employed, and the competency of the person charged with infringing the act to give evidence in his defence, were important new provisions, as was also the adoption of the powers to direct a formal investigation of any accident on the lines laid down in section 45 of the Coal Mines Regulation Act 1887. Other sections, relating to sanitation and safety, were developments of previous regulations, *e.g.* the fixing of a standard of overcrowding, provision of sanitary accommodation separate for each sex where the standard of the Public Health Act Amendment Act of 1890 had not been adopted by the competent local sanitary authority, power to order a fan or other mechanical means to carry off injurious gas, vapour or other impurity (the previous power covering only dust). The fencing of machinery and definition of accidents were made more precise, young persons were prohibited from cleaning dangerous machinery, and additional safeguards against risk of injury by fire or panic were introduced. On the question of employment the foremost amendments lay in the almost complete prohibition of overtime for young persons, and the restriction of the power of an employer to employ protected persons outside his factory or workshop on the same day that he had employed them in the factory or workshop. Under the head of particulars of work and wages to piece-workers an important new power, highly valued by the workers, was given to apply the principle with the necessary modifications by order of the secretary of state to industries other than textile and to outworkers as well as to those employed inside factories and workshops.

The act of 1901.

In 1899 an indirect modification of the limitation to employment of children was effected by the Elementary Education Amendment Act, which, by raising from eleven to twelve the minimum age at which a child may, by the by-laws of a local authority, obtain total or partial exemption from the obligation to attend school, made it unlawful for an occupier to take into employment any child under twelve in such a manner as to prevent full-time attendance at school. The age of employment became generally thereby the same as it has been for employment at a mine above ground since 1887. The act of 1901 made the prohibition of employment of a child under twelve in a factory or workshop direct and absolute. Under the divisions of sanitation, safety, fitness for employment, special regulation of dangerous trades, special control of bakehouses, exceptional treatment of creameries, new methods of dealing with home work and outworkers, important additions were made to the general law by the act of 1901, as also in regulations for strengthened administrative control. New general sanitary provisions were those prescribing: (*a*) ventilation *per se* for every workroom, and empowering the secretary of state to fix a standard of sufficient ventilation; (*b*) drainage of wet floors; (*c*) the power of the secretary of state to define in certain cases what shall constitute sufficient and suitable sanitary accommodation. New safety provisions were those relating to—(*a*) Examination and report on steam boilers; (*b*) prohibition of employment of a child in cleaning below machinery in motion; (*c*) power of the district council to make by-laws for escape in case of fire. The most important administrative alterations were: (*a*) a justice engaged in the same trade as, or being officer of an association of persons engaged in the same trade as, a person charged with an offence may not act at the hearing and determination of the charge; (*b*) ordinary supervision of sanitary conditions under which outwork is carried on was transferred to the district council, power being reserved to the Home Office to intervene in case of neglect or default by any district council.

Acts of 1903, 1906, 1907.

The Employment of Children Act 1903, while primarily providing for industries outside the scope of the Factory Act, incidentally secured that children employed as half-timers should not also be employed in other occupations. The Notice of Accidents Act 1906 amended the whole system of notification of accidents, simultaneously in mines, quarries, factories and workshops, and will be set out in following paragraphs. The Factory and Workshop Act of 1907 amended the law in respect of laundries by generally applying the provisions of 1901 to trade laundries while granting them choice of new exceptional periods, and by extending the provisions of the act (with certain powers to the Home Office by Orders laid before parliament to allow variations) to

institution laundries carried on for charitable or reformatory purposes. The Employment of Women Act 1907 repealed an exemption in the act of 1901 (and earlier acts) relating to employment of women in flax scutch mills, thus bringing this employment under the ordinary provisions as to period of employment.

The following paragraphs aim at presenting an idea of the scope of the modified and amended law, as a whole, adding where clearly necessary reference to the effect of acts, which ceased to apply after the 31st of December 1901:—

Definitions.

The workplaces to which the act applies are, first, "factories" and "workshops"; secondly, laundries, docks, wharves, &c., enumerated above as introduced and regulated partially only by the act of 1895 and subsequent acts. Apart from this secondary list, and having regard to workplaces which remain undefined by the law, the act may broadly be said to apply to premises, rooms or places in which manual labour, with or without the aid of mechanical power, is exercised for gain in or incidental to the making, altering, repairing, ornamenting, washing, cleaning or finishing or adapting for sale of any article or part of any article. If steam, water or other mechanical power is used in aid of the manufacturing process, the workplace is a factory; if not, it is a workshop. There is, however, a list of eighteen classes of works (brought under the factory law for reasons of safety, &c., before workshops generally were regulated) which are defined as factories whether power is used in them or not. Factories are, again, subdivided into textile and non-textile: they are textile if the machinery is employed in preparing, manufacturing or finishing cotton, wool, hair, silk, flax, hemp, jute, tow, China grass, cocoanut fibre or other like material either separately or mixed together, or mixed with any other material, or any fabric made thereof; all other factories are non-textile. The distinction turns on the historical origin of factory regulation and the regulations in textile factories remain in some respects slightly more stringent than in the non-textile factories and workshops, though the general provisions are almost the same. Three special classes of workshops have for certain purposes to be distinguished from ordinary workshops, which include tenement workshops: (*a*) Domestic workshops, *i.e.* any private house, room or place, which, though used as a dwelling, is by reason of the work carried on there a workshop, and in which the only persons employed are members of the same family, dwelling there alone—in these women's hours are unrestricted; (*b*) Women's workshops, in which neither children nor young persons are employed —in these a more elastic arrangement of hours is permissible than in ordinary workshops; (*c*) Workshops in which men only are employed—these come under the same general regulations in regard to sanitation as other workshops, also under the provisions of the Factory Act as regards security, and, if certified by the secretary of state, may be brought under special regulations. They are otherwise outside the scope of the act of 1901.

The person to whom the regulations apply in the above-defined workplaces are *children*, *i.e.* persons between the ages of twelve and fourteen, *young persons*, *i.e.* boys or girls between the ages of fourteen (or if an educational certificate has been obtained, thirteen) and eighteen years of age, and *women*, *i.e.* females above the age of eighteen; these are all "protected" persons to whom the general provisions of the act, inclusive of the regulation of hours and times of employment, apply. To adult men generally those provisions broadly only apply which are aimed at securing sanitation and safety in the conduct of the manufacturing process.

The person generally responsible for observance of the provisions of the law, whether these relate to health, safety, limitation of the hours of labour or other matters, is the *occupier* (a term undefined in the act) of the factory, workshop or laundry. There are, however, limits to his responsibility: (*a*) generally, where the occupier has used due diligence to enforce the execution of the act, and can show that another person, whether agent, servant, workman or other person, is the real offender; (*b*) specially in a factory the sections relating to employment of protected persons, where the owner or hirer of a machine or implement driven by mechanical power is some person other than the occupier of the factory, the owner or hirer, so far as respects any offence against the act committed in relation to a person who is employed in connexion with the machine or implement, and is in the employment or pay of the owner or hirer, shall be deemed to be the occupier of the factory; (*c*) for the one purpose of reporting accidents, the actual employer of the person injured in any factory or workshop is bound under penalty immediately to report the same to the occupier; (*d*) so far as relates to sanitary conditions, fencing of machinery, affixing of notices in *tenement* factories, the *owner* (as defined by the Public Health Act 1875), generally speaking, takes the place of the occupier.

Employment in a factory or workshop includes work whether for wages or not: (*a*) in a manufacturing process or handicraft, (*b*) in cleaning any place used for the same, (*c*) in cleaning or oiling any part of the machinery, (*d*) any work whatsoever incidental to the process or handicraft, or connected with the article made. Persons found in any part of the factory or workshop, where machinery is used or manufacture carried on, except at meal-times, or when machinery is stopped, are deemed to be employed until the contrary is proved. The act, however, does not apply to employment for the sole purpose of repairing the premises or machinery, nor to the process of preserving and curing fish immediately upon its arrival in the fishing boats in order to prevent the fish from being destroyed or spoiled, nor to the process of cleaning and preparing fruit so far as is necessary to prevent it from spoiling during the months of June, July, August and September. Certain light handicrafts carried on by a family only in a private house or room at irregular intervals are also outside the scope of the act.

Sanitation.

The foremost provisions are those relating to the sanitary condition of the workplaces and the general security of every class of worker. Every factory must be kept in a cleanly condition, free from noxious effluvia, ventilated in such a manner as to render harmless, so far as practicable, gases, vapours, dust or other impurities generated in the manufacture; must be provided with sufficient and suitable sanitary conveniences separate for the sexes; must not be overcrowded (not less than 250 cubic ft. during the day, 400 during overtime, for each worker). In these matters the law of public health takes in workshops the place of the Factory Act, the requirements being substantially the same. Although, however, primarily the officers of the district council enforce the sanitary provisions in workshops, the government factory inspectors may give notice of any defect in them to the district council in whose district they are situate; and if proceedings are not taken within one month

by the latter, the factory inspector may act in default and recover expenses from the district council. This power does not extend to domestic workshops which are under the law relating to public health so far as general sanitation is concerned. General powers are reserved to the secretary of state, where he is satisfied that the Factory Act or law relating to public health as regards workplaces has not been carried out by any district council, to authorize a factory inspector during a period named in his order to act instead of the district council. Other general sanitary provisions administered by the government inspectors are the requirement in factories and workshops of washing conveniences where poisonous substances are used; adequate measures for securing and maintaining a reasonable temperature of such a kind as will not interfere with the purity of the air in each room in which any person is employed; maintenance of sufficient means of ventilation in every room in a factory or workshop (in conformity with such standard as may be prescribed by order of the secretary of state); provision of a fan to carry off injurious dust, gas or other impurity, and prevent their inhalation in any factory or workshop; drainage of floors where wet processes are carried on. For laundries and bakehouses there are further sanitary regulations; *e.g.* in laundries all stoves for heating irons shall be sufficiently separated from any ironing-room or ironing-table, and the floors shall be "drained in such a manner as will allow the water to flow off freely"; and in bakehouses a cistern supplying water to a bakehouse must be quite separate from that supplying water to a water-closet, and the latter may not communicate directly with the bakehouse. Use of underground bakehouses (*i.e.* a baking room with floor more than 3 ft. below the ground adjoining) is prohibited, except where already used at the passing of the act; further, in these cases, after 1st January 1904, a certificate as to suitability in light, ventilation, &c., must be obtained from the district council. In other trades certified by the secretary of state further sanitary regulations may be made to increase security for health by special rules to be presently touched on. The secretary of state may also make sanitary requirements a condition of granting such exceptions to the general law as he is empowered to grant. In factories, as distinct from workshops, a periodical lime washing (or washing with hot water and soap where paint and varnish have been used) of all inside walls and ceilings once at least in every fourteen months is generally required (in bakehouses once in six months). As regards sufficiency and suitability of sanitary accommodation, the standards determined by order of the secretary of state shall be observed in the districts to which it is made applicable. An order was made called the Sanitary Accommodation Order, on the 4th of February 1903, the definitions and standards in which have also been widely adopted by local sanitary authorities in districts where the Order itself has no legal force, the local authority having parallel power under the Public Health Act of 1890.

Security and accidents.

Security in the use of machinery is provided for by precautions as regards the cleaning of machinery in motion and working between the fixed and traversing parts of self-acting machines driven by power, by fencing of machinery, and by empowering inspectors to obtain an order from a court of summary jurisdiction to prohibit the use, temporarily or absolutely, of machinery, ways, works or plant, including use of a steam boiler, which cannot be used without danger to life and limb. Every hoist and fly-wheel directly connected with mechanical power, and every part of a water-wheel or engine worked by mechanical power, and every wheel race, must be fenced, whatever its position, and every part of mill-gearing or dangerous machinery must either be fenced or be in such position that it is as safe as if fenced. No protected persons may clean any part of mill-gearing in motion, and children may further not clean any part of or below manufacturing machinery in motion by aid of mechanical power; young persons further may not clean any machinery if the inspector notifies it to the occupier as dangerous. Security as regards the use of dangerous premises is provided for by empowering courts of summary jurisdiction, on the application of an inspector, to prohibit their use until the danger has been removed. The district council, or, in London, the county council, or in case of their default the factory inspector, can require certain provisions for escape in case of fire in factories and workshops in which more than forty persons are employed; special powers to make by-laws for means of escape from fire in any factory or workshop are, in addition to any powers for prevention of fire that they possess, given to every district council, in London to the county council. The means of escape must be kept free from obstruction. Provisions are made for doors to open outwards in each room in which more than ten persons are employed, and to prevent the locking, bolting or fastening of doors so that they cannot easily be opened from inside when any person is employed or at meals inside the workplace. Further, provisions for security may be provided in special regulations. Every boiler for generating steam in a factory or workshop or place where the act applies must have a proper safety valve, a steam gauge, and a water gauge, and every such boiler, valve and gauge must be maintained in proper condition. Examination by a competent person must take place at least once in every fourteen months. The occupier of any factory or workshop may be liable for penal compensation not exceeding £100 in case of injury or death due to neglect of any provision or special rule, the whole or any part of which may be applied for the benefit of the injured person or his family, as the secretary of state determines. When a death has occurred by accident in a factory or workshop, the coroner must advise the factory inspector for the district of the place and time of the inquest. The secretary of state may order a formal investigation of the circumstances of any accident as in the case of mines. Careful and detailed provisions are made for the reporting by occupiers to inspectors, and entry in the registers at factories and workshops of accidents which occur in a factory or workshop and (*a*) cause loss of life to a person employed there, or (*b*) are due to machinery moved by mechanical power, molten metal, hot liquid, explosion, escape of gas or steam, electricity, so disabling any person employed in the factory or workshop as to cause him to be absent throughout at least one whole day from his ordinary work, (*c*) are due to any other special cause which the secretary of state may determine, (*d*) not falling under the previous heads and yet cause disablement for more than seven days' ordinary work to any person working in the factory or workshop. In the case of (*a*) or (*b*) notice has also to be sent to the certifying surgeon by the occupier. Cases of lead, phosphorus, arsenical and mercurial poisoning, or anthrax, contracted in any factory or workshop must similarly be reported and registered by the occupier, and the duty of reporting these cases is also laid on medical practitioners under whose observation they come. The list of classes of poisoning can be extended by the secretary of state's order.

Certificates of physical fitness for employment must be obtained by the occupier from the certifying surgeon for the district for all persons under sixteen years of age employed in a factory, and in any class of workshops to which the requirement has been extended by order of the secretary of state, and an inspector may suspend any such persons for re-examination in a factory, or for

Physical fitness of workers.

examination in a workshop, when "disease or bodily infirmity" unfits the person, in his opinion, for the work of the place. The certifying surgeon may examine the process as well as the person submitted, and may qualify the certificate he grants by conditions as to the work on which the person is fit to be employed. An occupier of a factory or workshop or laundry shall not knowingly allow a woman to be employed therein within four weeks after childbirth.

The employment of children, young persons and women is regulated as regards ordinary and exceptional hours of work, ordinary and exceptional meal-times, length of spells and holidays. The outside limits of ordinary periods of employment and holidays are, broadly, the same for textile factories as for non-textile factories and workshops; the main difference lies in the requirement of not less than a total two hours' interval for meals out of the twelve, and a limit of four and a half hours for any spell of work, a longer weekly half holiday, and a prohibition of overtime, in textile factories, as compared with a total one and a half hours' interval for meals and a limit of five hours for spells and (conditional) permission of overtime in non-textile factories. The hours of work must be specified, and from Monday to Friday may be between 6 A.M. and 6 P.M., or 7 A.M. to 7 P.M.; in non-textile factories and workshops the hours also may be taken between 8 A.M. and 8 P.M. or by order of the secretary of state for special industries 9 A.M. to 9 P.M. Between these outside limits, with the proviso that meal-times must be fixed and limits as to spells observed, women and young persons may be employed the full time, children on the contrary only half time, on alternate days, or in alternate sets attending school half time regularly. On Saturdays, in textile factories in which the period commences at 6 A.M. all manufacturing work must cease at 12 if not less than one hour is given for meals, or 11.30 if less than one hour is given for meals (half an hour extra allowed for cleaning), and in non-textile factories and workshops at 2 P.M., 3 P.M. or 4 P.M., according as the hour of beginning is 6 A.M., 7 A.M. or 8 A.M. In "domestic workshops" the total number of hours for young persons and children must not exceed those allowed in ordinary workshops, but the outside limits for beginning and ending are wider; and the case is similar as regards hours of women in "women's workshops." Employment outside a factory or workshop in the business of the same is limited in a manner similar to that laid down in the Shop Hours Act, to be touched on presently. Overtime in certain classes of factories, workshops and warehouses attached to them is permitted, under conditions specified in the acts, for women, to meet seasonal or unforeseen pressure of business, or where goods of a perishable nature are dealt with, for young persons only in a very limited degree in factories liable to stoppage for drought or flood, or for an unfinished process. These and other cases of exceptional working are under minute and careful administrative regulations. Broadly these same regulations as to exceptional overtime may apply in *laundries* but the act of 1907 granted to laundries not merely ancillary to the manufacture carried on in a factory or workshop (*e.g.* shirt and collar factories), additional power to fix different periods of employment for different days of the week, and to make use of one or other of two exceptional methods of arranging the daily periods so as to permit of periods of different length on different days; these exceptional periods cannot be worked in addition to overtime permissible under the general law. Laundries carried on in connexion with charitable or reformatory institutions were brought in 1907 within the scope of the law, but special schemes for regulation as to hours, meals, holidays, &c., may be submitted by the managers to the secretary of state, who is empowered to approve them if he is satisfied that they are not less favourable than the corresponding provisions of the principal act; such schemes shall be laid as soon as possible before both Houses of Parliament.

Hours of protected persons.

Night work is allowed in certain specified industries, under conditions, for male young persons, but for no other workers under eighteen, and overtime for women may never be later than 10 P.M. or before 6 A.M. Sunday work is prohibited except, under conditions, for Jews; and in factories, workshops and laundries six holidays (generally the Bank holidays) must be allowed in the year. In creameries in which women and young persons are employed the secretary of state may by special order vary the beginning and end of the daily period of employment, and allow employment for not more than three hours on Sundays and holidays.

Dangerous and unhealthy industries.

The general provisions of the act may be supplemented where specially dangerous or unhealthy trades are carried on, by special regulations. This was provided for in the law in force until 31st December 1901, as in the existing principal act, and the power to establish rules had been exercised between 1892 and 1901 in twenty-two trades or processes where injury arose either from handling of dangerous substances, such as lead and lead compounds, phosphorus, arsenic or various chemicals, or where there is inhalation of irritant dust or noxious fumes, or where there is danger of explosion or infection of anthrax. Before the rule could be drawn up under the acts of 1891 to 1895, the secretary of state had to certify that in the particular case or class of cases in question (*e.g.* process or machinery), there was, in his opinion, danger to life or limb or risk of injury to health; thereupon the chief inspector might propose to the occupier of the factory or workshop such special rules or measures as he thought necessary to meet the circumstances. The occupier might object or propose modifications, but if he did not the rules became binding in twenty-one days; if he objected, and the secretary of state did not assent to any proposed modification, the matters in difference had to be referred to arbitration, the award in which finally settled the rules or requirement to be observed. In November 1901, in the case of the earthenware and china industry, the last arbitration of the kind was opened and was finally concluded in 1903. The parties to the arbitration were the chief inspector, on behalf of the secretary of state, and the occupier or occupiers, but the workmen interested might be and were represented on the arbitration. In the establishing of the twenty-two sets of existing special rules only thrice has arbitration been resorted to, and only on two of these occasions were workmen represented. The provisions as to the arbitration were laid down in the first schedule to the Act of 1891, and were similar to those under the Coal Mines Regulation Acts. Many of these codes have still the force of law and will continue until in due course revised under the amended procedure of the act of 1901. They might not only regulate conditions of employment, but also restrict or prohibit employment of any class of workers; where such restriction or prohibition affected adult workers the rules had to be laid for forty days before both Houses of Parliament before coming into operation. The obligation to observe the rules in detail lies on workers as well as on occupiers, and the section in the act

of 1891 providing a penalty for non-observance was drafted, as in the case of the mines, so as to provide for a simultaneous fine for each (not exceeding two pounds for the worker, not exceeding ten pounds for the employer).

The provisions as to special regulations of the act of 1901 touch primarily the method of procedure for making the regulations, but they also covered for the first time domestic workshops and added a power as to the kind of regulations that may be made; further, they strengthened the sanction for observance of any rules that may be established, by placing the occupier in the same general position as regards penalty for non-observance as in other matters under the act. On the certificate of the secretary of state that any manufacture, machinery, plant, process or manual labour used in factories or workshops is dangerous or injurious to life, health or limb, such regulations as appear to the secretary of state to meet the necessity of the case may be made by him after he has duly published notice: (1) of his intention; (2) of the place where copies of the draft regulations can be obtained; and (3) of the time during which objections to them can be made by persons affected. The secretary of state may modify the regulations to meet the objections made. If not, unless the objection is withdrawn or appears to him frivolous, he shall, before making the regulations, appoint a competent person to hold a public inquiry with regard to the draft regulations and to report to him thereon. The inquiry is to be made under such rules as the secretary of state may lay down, and when the regulations are made, they must be laid as soon as possible before parliament. Either House may annul these regulations or any of them, without prejudice to the power of the secretary of state to make new regulations. The regulations may apply to all factories or workshops in which the certified manufacture, process, &c., is used, or to a specified class. They may, among other things, (*a*) prohibit or limit employment of any person or class of persons; (*b*) prohibit, limit, or control use of any material or process; (*c*) modify or extend special regulations contained in the Act. Regulations have been established among others in the following trades and processes: felt hat-making where any inflammable solvent is used; file-cutting by hand; manufacture of electric accumulators; docks, processes of loading, unloading, &c.; tar distilling; factories in which self-acting mules are used; use of locomotives; spinning and weaving of flax, hemp and jute; manufacture of paints and colours; heading of yarn dyed by means of lead compounds.

Although the Factory and Workshop Acts have not directly regulated wages, they have made certain provision for securing to the worker that the amount agreed upon shall be received: (*a*) by extending every act in force relating to the inspection of weights, measures and weighing machines for use in the sale of goods to those used in a factory or workshop for checking or ascertaining the wages of persons employed; (*b*) by ensuring that piece-workers in the textile trades (and other trades specified by the secretary of state) shall receive, before commencing any piece of work, clear particulars of the wages applicable to the work to be done and of the work to which that rate is to be applied. Unless the particulars of work are ascertainable by an automatic indicator, they must be given to textile workers in writing, and in the case of weavers in the cotton, worsted and woollen trades the particulars of wages must be supplied separately to each worker, and also shown on a placard in a conspicuous position. In other textile processes, it is sufficient to furnish the particulars separately to each worker. The secretary of state has used his powers to extend this protection to non-textile workers, with suitable modifications, in various hardware industries, including pen-making, locks, chains, in wholesale tailoring and making of wearing apparel, in fustian cutting, umbrella-making, brush-making and a number of other piece-work trades. He further has in most of these and other trades used his power to extend this protection to outworkers.

Measures and particulars to piece-workers.

With a view to efficient administration of the act (*a*) certain notices have to be conspicuously exhibited at the factory or workshop, (*b*) registers and lists kept, and (*c*) notices sent to the inspector by the occupier. Among the first the most important are the prescribed abstract of the act, the names and addresses of the inspector and certifying surgeon, the period of employment, and specified meal-times (which may not be changed without fresh notice to the inspector), the air space and number of persons who may legally be employed in each room, and prescribed particulars of exceptional employment; among the second are the general registers of children and young persons employed, of accidents, of lime-washing, of overtime, and lists of outworkers; among the third are the notice of beginning to occupy a factory or workshop, which the occupier must send within one month, report of overtime employment, notice of accident, poisoning or anthrax, and returns of persons employed, with such other particulars as may be prescribed. These must be sent to the chief inspector at intervals of not less than one and not more than three years, as may be directed by the secretary of state.

Administration.

The secretary of state for the Home Department controls the administration of the acts, appoints the inspectors referred to in the acts, assigns to them their duties, and regulates the manner and cases in which they are to exercise the powers of inspectors. The act, however, expressly assigns certain duties and powers to a chief inspector and certain to district inspectors. Many provisions of the acts depend as to their operation on the making of orders by the secretary of state. These orders may impose special obligations on occupiers and increase the stringency of regulations, may apply exceptions as to employment, and may modify or relax regulations to meet special classes of circumstances. In certain cases, already indicated, his orders guide or determine the action of district councils, and, generally, in case of default by a council he may empower his inspectors to act as regards workplaces, instead of the council, both under the Factory Acts and Public Health Acts.

The powers of an inspector are to enter, inspect and examine, by day or by night, at any reasonable time, any factory or workshop (or laundry, dock, &c.), or part of one, when he has reason to believe that any person is employed there; to take with him a constable if he has reasonable cause to expect obstruction; to require production of registers, certificates, &c., under the acts; to examine, alone or in the presence of any other person, as he sees fit, every person in the factory or workshop, or in a school where the children employed are being educated; to prosecute, conduct or defend before a court of summary jurisdiction any proceeding under the acts; and to exercise such other powers as are necessary for carrying the act into effect. The inspector has also the duty of enforcing the Truck Acts in places, and in respect of persons, under the Factory Acts. Certifying surgeons are appointed by the chief inspector subject to the regulations

of the secretary of state, and their chief duties are (*a*) to examine workers under sixteen, and persons under special rules, as to physical fitness for the daily work during legal periods, with power to grant qualified certificates as to the work for which the young worker is fit, and (*b*) to investigate and report on accidents and cases of lead, phosphorus or other poisoning and anthrax.

In 1907 there were registered as under inspection 110,276 factories, including laundries with power, 146,917 workshops (other than men's workshops), including laundries without power; of works under special rules or regulations (included in the figures just given) there were 10,586 and 19,687 non-textile works under orders for supply of particulars to piece-workers. Of notices of accidents received there were 124,325, of which 1179 were fatal; of reported cases of poisoning there were 653, of which 40 were fatal. Prosecutions were taken by inspectors in 4474 cases and convictions obtained in 4211 cases. Of persons employed there were, according to returns of occupiers, 1904, 4,165,791 in factories and 688,756 in workshops.

Coal Mines.—The mode of progress to be recorded in the regulation of coal mines since 1872 can be contrasted in one aspect with the progress just recorded of factory legislation since 1878. Consolidation was again earlier adopted when large amendments were found necessary, with the result that by far the greater part of the law is to be found in the act of 1887, which repealed and re-enacted, with amendments, the Coal Mines Acts of 1872 and 1886, and the Stratified Ironstone Mines (Gunpowder) Act, 1881. The act of 1881 was simply concerned with rules relating to the use of explosives underground. The act of 1886 dealt with three questions: (*a*) The election and payment of checkweighers (*i.e.* the persons appointed and paid by miners in pursuance of section 13 of the act of 1887 for the purpose of taking a correct account on their behalf of the weight of the mineral gotten by them, and for the correct determination of certain deductions for which they may be liable); (*b*) provision for new powers of the secretary of state to direct a formal investigation of any explosion or accident, and its causes and circumstances, a provision which was later adopted in the law relating to factories; (*c*) provision enabling any relatives of persons whose death may have been caused by explosions or accidents in or about mines to attend in person, or by agent, coroners' inquests thereon, and to examine witnesses. The act of 1887, which amended, strengthened and consolidated these acts and the earlier Consolidating Act of 1872, may also be contrasted in another aspect with the general acts of factory legislation. In scope it formed, as its principal forerunner had done, a general code; and in some measure it went farther in the way of consolidation than the Factory Acts had done, inasmuch as certain questions, which in factories are dealt with by statutes distinct from the Factory Acts, have been included in the Mines Regulation Acts, *e.g.* the prohibition of the payment of wages in public-houses, and the machinery relating to weights and measures whereby miners control their payment; further, partly from the less changing nature of the industry, but probably mainly from the power of expression gained for miners by their organization, the code, so far as it went, at each stage answered apparently on the whole more nearly to the views and needs of the persons protected than the parallel law relating to factories. This was strikingly seen in the evidence before the Royal Commission on Labour in 1892-1894, where the repeated expression of satisfaction on the part of the miners with the provisions as distinct from the administration of the code ("with a few trifling exceptions") is in marked contrast with the long and varied series of claims and contentions put forward for amendment of the Factory Acts.

Since the act of 1887 there have followed five minor acts, based on the recommendation of the officials acting under the acts, while two of them give effect to claims made by the miners before the Royal Commission on Labour. Thus, in 1894, the Coal Mines (Checkweigher) Act rendered it illegal for an employer ("owner, agent, or manager of any mine, or any person employed by or acting under the instructions of any such owner, agent, or manager") to make the removal of a particular checkweigher a condition of employment, or to exercise improper influence in the appointment of a checkweigher. The need for this provision was demonstrated by a decision of the Court of Session in Edinburgh, which upheld an employer in his claim to the right of dismissing all the workmen and re-engaging them on condition that they would dismiss a particular checkweigher. In 1896 a short act extended the powers to propose, amend and modify special rules, provided for representation of workmen on arbitration under the principal act on any matter in difference, modified the provision for plans of mines in working and abandoned mines, amended three of the general rules (inspection before commencing work, use of safety lamp and non-inflammable substances for stemming), and empowered the secretary of state by order to prohibit or regulate the use of any explosive likely to become dangerous. In 1900 another brief act raised the age of employment of boys underground from twelve to thirteen. In 1903 another amending act allowed as an alternative qualification for a manager's certificate a diploma in scientific and mining training after at least two years' study at a university mining school or other educational institution approved by the secretary of state, coupled with practical experience of at least three years in a mine. In the same year the Employment of Children Act affected children in mines to the extent already indicated in connexion with factories. In 1905 a Coal Mines (Weighing of Minerals) Act improved some provisions relating to appointment and pay of checkweighers and facilities for them and their duly appointed deputies in carrying out their duties. In 1906 the Notice of Accidents Act provided for improved annual returns of accidents and for immediate reporting to the district inspector of accidents under newly-defined conditions as they arise in coal and metalliferous mines.

Act of 1887.

While the classes of mines regulated by the act of 1887 are the same as those regulated by the act of 1872 (*i.e.* mines of coal, of stratified ironstone, of shale and of fire-clay, including works above ground where the minerals are prepared for use by screening, washing, &c.) the interpretation of the term "mine" is wider and simpler, including "every shaft in the course of being sunk, and every level and inclined plane in the course of being driven, and all the shafts, levels, planes, works, tramways and sidings, both below ground and above ground, in and adjacent to and belonging to the mine." Of the persons responsible under penalty for the observance of the acts the term "owner" is defined precisely as in the act of 1872, but the term "agent" is modified to mean "any person appointed as the representative of the owner in respect of any mine or any part thereof, and, as such,

superior to a manager appointed in pursuance of this act." Of the persons protected, the term "young person" disappeared from the act, and "boy," *i.e.* "a male under the age of sixteen years," and "girl," *i.e.* "a female under the age of sixteen years," take their place, and the term "woman" means, as before, "a female of the age of sixteen years and upwards." The prohibition of employment underground of women and girls remains untouched, and the prohibition of employment underground of boys has been successively extended from boys of the age of ten in 1872 to boys of twelve in 1887 and to boys of thirteen in 1900. The age of employment of boys and girls above ground in connexion with any mine is raised from ten years in 1872 to twelve years since 1887. The hours of employment of a boy below ground may not exceed fifty-four in any one week, nor ten in any one day from the time of leaving the surface to the time of returning to the surface. Above ground any boy or girl under thirteen (and over twelve) may not be employed on more than six days in any one week; if employed on more than three days in one week, the daily total must not exceed six hours, or in any other case ten hours. Protected persons above thirteen are limited to the same daily and weekly total of hours as boys below ground, but there are further provisions with regard to intervals for meals and prohibiting employment for more than five hours without an interval of at least half an hour for a meal. Registers must be kept of all protected persons, whether employed above or below ground. Section 38 of the Public Health Act 1875, which requires separate and sufficient sanitary conveniences for persons of each sex, was first extended by the act of 1887 to the portions of mines above ground in which girls and women are employed; underground this matter is in metalliferous mines in Cornwall now provided for by special rules. Ventilation, the only other requirement in the acts that can be classed as sanitary, is provided for in every mine in the "general rules" which are aimed at securing safety of mines, and which, so far as ventilation is concerned, seek to dilute and render harmless noxious or inflammable gases. The provision which prohibits employment of any persons in mines not provided with at least two shafts is made much more stringent by the act of 1887 than in the previous code, by increasing the distance between the two shafts from 10 to 15 yds., and increasing the height of communications between them. Other provisions amended or strengthened are those relating to the following points: (*a*) Daily personal supervision of the mine by the certificated manager; (*b*) classes of certificates and constitution of board for granting certificates of competency; (*c*) plan of workings of any mine to be kept up to a date not more than three months previously at the office of the mine; (*d*) notice to be given to the inspector of the district by the owner, agent or manager, of accidents in or about any mine which cause loss of life or serious personal injury, or are caused by explosion of coal or coal dust or any explosive or electricity or any other special cause that the secretary of state specifies by order, and which causes any personal injury to any person employed in or about the mine; it is provided that the place where an explosion or accident occurs causing loss of life or serious personal injury shall be left for inspection for at least three days, unless this would tend to increase or continue a danger or impede working of the mine: this was new in the act of 1887; (*e*) notice to be given of opening and abandonment of any mine: this was extended to the opening or abandonment of any seam; (*f*) plan of an abandoned mine or seam to be sent within three months; (*g*) formal investigation of any explosion or accident by direction of the secretary of state: this provision, first introduced by the act of 1886, was modified in 1887 to admit the appointment by the secretary of state of "any competent person" to hold the investigation, whereas under the earlier section only an inspector could be appointed.

General rules.

The "general rules" for safety in mines have been strengthened in many ways since the act of 1872. Particular mention may be made of rule 4 of the act of 1887, relating to the inspection of conditions as to gas ventilation beyond appointed stations at the entrance to the mine or different parts of the mine; this rule generally removed the earlier distinction between mines in which inflammable gas has been found within the preceding twelve months, and mines in which it has not been so found; of rules 8, 9, 10 and 11, relating to the construction, use, &c., of safety lamps, which are more detailed and stringent than rule 7 of the act of 1872, which they replaced; of rule 12, relating to the use of explosives below ground; of rule 24, which requires the appointment of a competent male person not less than twenty-two years of age for working the machinery for lowering and raising persons at the mine; of rule 34, which first required provision of ambulances or stretchers with splints and bandages at the mine ready for immediate use; of rule 38, which strengthened the provision for periodical inspection of the mine by practical miners on behalf of the workmen at their own cost. With reference to the last-cited rule, during 1898 a Prussian mining commission visited Great Britain, France and Belgium, to study and compare the various methods of inspection by working miners established in these three countries. They found that, so far as the method had been applied, it was most satisfactory in Great Britain, where the whole cost is borne by the workers' own organizations, and they attributed part of the decrease in number of accidents per thousand employed since 1872 to the inauguration of this system.

Special rules.

The provisions as to the proposal, amendment and modification of "special rules," last extended by the act of 1896, may be contrasted with those of the Factory Act. In the latter it is not until an industry or process has been scheduled as dangerous or injurious by the secretary of state's order that occasion arises for the formation of special rules, and then the initiative rests with the Factory Department whereas in mines it is incumbent in every case on the owner, agent or manager to propose within three months of the commencement of any working, for the approval of the secretary of state, special rules best calculated to prevent dangerous accidents, and to provide for the safety, convenience and proper discipline of the persons employed in or about the mine. These rules may, if they relate to lights and lamps used in the mine, description of explosives, watering and damping of the mine, or prevention of accidents from inflammable gas or coal dust, supersede any general rule in the principal act. Apart from the initiation of the rules, the methods of establishing them, whether by agreement or by resort to arbitration of the parties (*i.e.* the mine owners and the secretary of state), are practically the same as under the Factory Act, but there is special provision in the Mines Acts for enabling the persons working in the mine to transmit objections to the proposed rules, in addition to their subsequent right to be represented on the arbitration, if any.

Of the sections touching on wages questions, the prohibition of the payment of wages in public-houses remains unaltered, being re-enacted in 1887; the sections relating to payment by weight for amount of mineral gotten by persons employed, and for checkweighing the amount by a "checkweigher" stationed by the majority of workers at each place appointed for the weighing of the material, were revised, particularly

as to the determination of deductions by the act of 1887, with a view to meeting some problems raised by decisions on cases under the act of 1872. The attempt seems not to have been wholly successful, the highest legal authorities having expressed conflicting opinions on the precise meaning of the terms "mineral contracted to be gotten." The whole history of the development of this means of securing the fulfilment of wage contract to the workers may be compared with the history of the sections affording protection to piece-workers by particulars of work and wages in the textile trades since the Factory Act of 1891.

Administration.

As regards legal proceedings, the chief amendments of the act of 1872 are: the extension of the provision that the "owner, agent, or manager" charged in respect of any contravention by another person might be sworn and examined as an ordinary witness, to any person charged with any offence under the act. The result of the proceedings against workmen by the owner, agent or manager in respect of an offence under the act is to be reported within twenty-one days to the inspector of the district. The powers of inspectors were extended to cover an inquiry as to the care and treatment of horses and other animals in the mine, and as to the control, management or direction of the mine by the manager.

An important act was passed in 1908 (Coal Mines Regulation Act 1908) limiting the hours of work for workmen below ground. It enacted that, subject to various provisions, a workman was not to be below ground in a mine for the purpose of his work, and of going to and from his work, for more than eight hours in any consecutive twenty-four hours. Exception was made in the case of those below ground for the purpose of rendering assistance in the event of an accident, or for meeting any danger, or for dealing with any emergency or work incompleted, through unforeseen circumstances, which requires to be dealt with to avoid serious interference in the work of the mine. The authorities of every mine must fix the times for the lowering and raising of the men to begin and be completed, and such times must be conspicuously posted at the pit head. These times must be approved by an inspector. The term "workman" in the act means any person employed in a mine below ground who is not an official of the mine (other than a fireman, examiner or deputy), or a mechanic or a horse keeper or a person engaged solely in surveying or measuring. In the case of a fireman, examiner, deputy, onsetter, pump minder, fanman or furnace man, the maximum period for which he may be below ground is nine hours and a half. A register must be kept by the authorities of the mine of the times of descent and ascent, while the workmen may, at their own cost, station persons (whether holding the office of checkweigher or not) at the pit head to observe the times. The authorities of the mine may extend the hours of working by one hour a day on not more than sixty days in one calendar year (s. 3). The act may be suspended by order in council in the event of war or of imminent national danger or great emergency, or in the event of any grave economic disturbance due to the demand for coal exceeding the supply available at any time. The act came into force on the 1st of July 1909 except for the counties of Northumberland and Durham where its operation was postponed until the 1st of January 1910.

In 1905 the number of coal-mines reported on was 3126, and the number of persons employed below ground was 691,112 of whom 43,443 were under 16 years of age. Above ground 167,261 were employed, of whom 6154 were women and girls. The number of separate fatal accidents was 1006, causing the loss of 1205 lives. Of prosecutions by far the greater number were against workmen, numbering in coal and metalliferous mines 953; owners and managers were prosecuted in 72 cases, and convictions obtained in 43 cases.

Quarries.—From 1878 until 1894 open quarries (as distinct from underground quarries regulated by the Metalliferous Mines Regulation Act) were regulated only by the Factory Acts so far as they then applied. It was laid down in section 93 of the act of 1878 (41 Vict. c. 16), that "any premises or place shall not be excluded from the definition of a factory or workshop by reason only that such premises, &c., are or is in the open air," thereby overruling the decision in *Kent* v. *Astley* that quarries in which the work, as a whole, was carried on in the open air were not factories; in a schedule to the same act quarries were defined as "any place not being a mine in which persons work in getting slate, stone, coprolites or other minerals." The Factory Act of 1891 made it possible to bring these places in part under "special rules" adapted to meet the special risks and dangers of the operations carried on in them, and by order of the secretary of state they were certified, December 1892, as dangerous, and thereby subject to special rules. Until then, as reported by one of the inspectors of factories, quarries had been placed under the Factory Acts without insertion of appropriate rules for their safe working, and many of them were "developed in a most dangerous manner without any regard for safety, but merely for economy," and managers of many had "scarcely seen a quarry until they became managers." In his report for 1892 it was recommended by the chief inspector of factories that quarries should be subject to the jurisdiction of the government inspectors of mines. At the same time currency was given, by the published reports of the evidence before the Royal Commission on Labour, to the wish of large numbers of quarrymen that open as well as underground quarries should come under more specialized government inspection. In 1893 a committee of experts, including inspectors of mines and of factories, was appointed by the Home Office to investigate the conditions of labour in open quarries, and in 1894 the Quarries Act brought every quarry, as defined in the Factory Act 1878, any part of which is more than 20 ft. deep, under certain of the provisions of the Metalliferous Mines Acts, and under the inspection of the inspectors appointed under those acts; further, it transferred the duty of enforcing the Factory and Workshop Acts, so far as they apply in quarries over 20 ft. deep, from the Factory to the Metalliferous Mines inspectors.

The provisions of the Metalliferous Mines Acts 1872 and 1875, applied to quarries, are those relating to payment of wages in public-houses, notice of accidents to the inspector, appointment and powers of inspectors, arbitration, coroners' inquests, special rules, penalties, certain of the definitions, and the powers of the secretary of state finally to decide disputed questions whether places come within the application of the acts. For other matters, and in particular fencing of machinery and employment of women and young persons, the Factory Acts apply, with a proviso that nothing shall prevent the

employment of young persons (boys) in three shifts for not more than eight hours each. In 1899 it was reported by the inspectors of mines that special rules for safety had been established in over 2000 quarries. In the reports for 1905 it was reported that the accounts of blasting accidents indicated that there was “still much laxity in observance of the Special rules, and that many irregular and dangerous practices are in vogue.” The absence or deficiency of external fencing to a quarry dangerous to the public has been since 1887 (50 & 51 Vict. c. 19) deemed a nuisance liable to be dealt with summarily in the manner provided by the Public Health Act 1875.

In 1905, 94,819 persons were employed, of whom 59,978 worked inside the actual pits or excavations, and 34,841 outside. Compared with 1900, there was a total increase of 924 in the number of persons employed. Fatal accidents resulted in 1900 in 127 deaths; compared with 1899 there was an increase of 10 in the number of deaths, and, as Professor Le Neve Foster pointed out, this exceeded the average death-rate of underground workers at mines under the Coal Mines Acts during the previous ten years, in spite of the quarrier “having nothing to fear from explosions of gas, underground fires or inundations.” He attributed the difference to a lax observance of precautions which might in time be remedied by stringent administration of the law. In 1905 there were 97 fatal accidents resulting in 99 deaths. In 1900 there were 92 prosecutions against owners or agents, with 67 convictions, and 13 prosecutions of workers, with 12 convictions, and in 1905 there were 45 prosecutions of owners or agents with 43 convictions and 9 prosecutions of workmen with 5 convictions.

Payment of wages in public-houses.

In 1883 a short act extended to all “workmen” who are manual labourers other than miners, with the exception of domestic or menial servants, the prohibition of payment of wages in public-houses, beer-shops and other places for the sale of spirituous or fermented liquor, laid down in the Coal Mines Regulations and Metalliferous Mines Regulation Acts. The places covered by the prohibition include any office, garden or place belonging to or occupied with the places named, but the act does not apply to such wages as are paid by the resident, owner or occupier of the public-house, beer-shop and other places included in the prohibition to any workman *bona fide* employed by him. The penalty for an offence against this act is one not exceeding £10 (compare the limit of £20 for the corresponding offence under the Coal Mines Act), and all offences may be prosecuted and penalties recovered in England and Scotland under the Summary Jurisdiction Acts. The act does not apply to Ireland, and no special inspectorate is charged with the duty of enforcing its provisions.

Shop Hours.—In four brief acts, 1892 to 1899, still in force, the first very limited steps were taken towards the positive regulation of the employment of shop assistants. In the act of 1904 certain additional optional powers were given to any local authority making a “closing order” fixing the hour (not earlier than 7 P.M. or on one day in the week 1 P.M.) at which shops shall cease to serve customers throughout the area of the authority or any specified part thereof as regards all shops or as regards any specified class of shops. Before such an order can be made (1) a prima facie case for it must appear to the local authority; (2) the local authority must inquire and agree; (3) the order must be drafted and sent for confirmation or otherwise to the central authority, that is, the secretary of state for the Home Department; (4) the order must be laid before both Houses of Parliament. The Home Office has given every encouragement to the making of such orders, but their number in England is very small, and the act is practically inoperative in London and many large towns where the need is greatest. As the secretary of state pointed out in the House of Commons on the 1st of May 1907, the local authorities have not taken enough initiative, but at the same time there is a great difficulty for them in obtaining the required two-thirds majority, among occupiers of the shops to be affected, in favour of the order, and at the same time shop assistants have no power to set the law in motion. In England 364 local authorities have taken no steps, but in Scotland rather better results have been obtained. The House resolved, on the date named, that more drastic legislation is required. As regards shops, therefore, in place of such general codes as apply to factories, laundries, mines—only three kinds of protective requirement are binding on employers of shop assistants: (1) Limitation of the weekly total of hours of work of persons under eighteen years of age to seventy-four inclusive of meal-times; (2) prohibition of the employment of such persons in a shop on the same day that they have, to the knowledge of the employer, been employed in any factory or workshop for a longer period than would, in both classes of employment together, amount to the number of hours permitted to such persons in a factory or workshop; (3) provision for the supply of seats by the employer, in all rooms of a shop or other premises where goods are retailed to the public, for the use of female assistants employed in retailing the goods—the seats to be in the proportion of not fewer than one to every three female assistants. The first two requirements are contained in the act of 1892, which also prescribed that a notice, referring to the provisions of the act, and stating the number of hours in the week during which a young person may be lawfully employed in the shop, shall be kept exhibited by the employer; the third requirement was first provided by the act of 1899. The intervening acts of 1893 and 1895 are merely supplementary to the act of 1892; the former providing for the salaries and expenses of the inspectors which the council of any county or borough (and in the City of London the Common Council) were empowered by the act of 1892 to appoint; the latter providing a penalty of 40s. for failure of an employer to keep exhibited the notice of the provisions of the acts, which in the absence of a penalty it had been impossible to enforce. The penalty for employment contrary to the acts is a fine not exceeding £1 for each person so employed, and for failure to comply with the requirements as to seats, a fine not exceeding £3 for a first offence, and for any subsequent offence a fine of not less than £1 and not exceeding £5.

Meaning of “shop.”

A wide interpretation is given by the act of 1892 to the class of workplace to which the limitation of hours applies. “Shop” means retail and wholesale shops, markets, stalls and warehouses in which assistants are employed for hire, and includes licensed public-houses and refreshment houses of any kind. The person responsible for the observance of the acts is the “employer” of the “young persons” (*i.e.* persons under the age of eighteen years), whose hours are limited, and of the “female assistants” for whom seats must be provided. Neither the term “employer” nor “shop assistant” (used in the title of the act of 1899) is defined; but other

terms have the meaning assigned to them in the Factory and Workshop Act 1878. The “employer” has, in case of any contravention alleged, the same power as the “occupier” in the Factory Acts to exempt himself from fine on proof of due diligence and of the fact that some other person is the actual offender. The provisions of the act of 1892 do not apply to members of the same family living in a house of which the shop forms part, or to members of the employer’s family, or to any one wholly employed as a domestic servant.

In London, where the County Council has appointed men and women inspectors to apply the acts of 1892 to 1899, there were, in 1900, 73,929 premises, and in 1905, 84,269, under inspection. In the latter year there were 22,035 employing persons under 18 years of age. In 1900 the number of young persons under the acts were: indoors, 10,239 boys and 4428 girls; outdoors, 35,019 boys, 206 girls. In 1905 the ratio between boys and girls had decidedly altered: indoors, 6602 boys, 4668 girls; outdoors, 22,654 boys, 308 girls. The number of irregularities reported in 1900 were 9204 and the prosecutions were 117; in 1905 the irregularities were 6966 and the prosecutions numbered 34. As regards the act of 1899, in only 1088 of the 14,844 shops affected in London was there found in 1900 to be failure to provide seats for the women employed in retailing goods. The chief officer of the Public Control Department reported that with very few exceptions the law was complied with at the end of the first year of its application.

As regards cleanliness, ventilation, drainage, water-supply and sanitary condition generally, shops have been since 1878 (by 41 Vict. c. 16, s. 101) subject to the provisions of the Public Health Act 1875, which apply to all buildings, except factories under the Factory Acts, in which any persons, whatever their number be, are employed. Thus, broadly, the same sanitary provisions apply in shops as in workshops, but in the former these are enforced solely by the officers of the local authority, without reservation of any power, as in workshops for the Home Office inspectorate, to act in default of the local authority.

Shop assistants, so far as they are engaged in manual, not merely clerical labour, come under the provisions of the Truck Acts 1831 to 1887, and in all circumstances they fall within the sections directed against unfair and unreasonable fines in the Truck Act of 1896; but, unlike employés in factories, workshops, laundries and mines, they are left to apply these provisions so far as they can themselves, since neither Home Office inspectors nor officers of the local authority have any specially assigned powers to administer the Truck Acts in shops.

Truck.—Setting aside the special Hosiery Manufacture (Wages) Act 1874, aimed at a particular abuse appearing chiefly in the hosiery industry—the practice of making excessive charges on wages for machinery and frame rents—only two acts, those of 1887 and 1896, have been added to the general law against truck since the act of 1831, which repealed all prior Truck Acts and which remains the principal act. Further amendments of the law have been widely and strenuously demanded, and are hoped for as the result of the long inquiry by a departmental committee appointed early in 1906. The Truck Act Amendment Act 1887, amended and extended the act without adding any distinctly new principle; the Truck Act of 1896 was directed towards providing remedies for matters shown by decisions under the earlier Truck Acts to be outside the scope of the principles and provisions of those acts. Under the earlier acts the main objects were: (1) to make the wages of workmen, *i.e.* the reward of labour, payable only in current coin of the realm, and to prohibit whole or part payment of wages in food or drink or clothes or any other articles; (2) to forbid agreements, express or implied, between employer and workmen as to the manner or place in which, or articles on which, a workman shall expend his wages, or for the deduction from wages of the price of articles (other than materials to be used in the labour of the workmen) supplied by the employer. The act of 1887 added a further prohibition by making it illegal for an employer to charge interest on any advance of wages, “whenever by agreement, custom, or otherwise a workman is entitled to receive in anticipation of the regular period of the payment of his wages an advance as part or on account thereof.” Further, it strengthened the section of the principal act which provided that no employer shall have any action against his workman for goods supplied at any shop belonging to the employer, or in which the employer is interested, by (*a*) securing any workman suing an employer for wages against any counter-claim in respect of goods supplied to the workman by any person under any order or direction of the employer, and (*b*) by expressly prohibiting an employer from dismissing any worker on account of any particular time, place or manner of expending his wages. Certain exemptions to the prohibition of payment otherwise than in coin were provided for in the act of 1831, if an agreement were made in writing and signed by the worker, viz. rent, victuals dressed and consumed under the employer’s roof, medicine, fuel, provender for beasts of burden used in the trade, materials and tools for use by miners, advances for friendly societies or savings banks; in the case of fuel, provender and tools there was also a proviso that the charge should not exceed the real and true value. The act of 1887 amended these provisions by requiring a correct annual audit in the case of deductions for medicine or tools, by permitting part payment of servants in husbandry in food, drink (not intoxicants) or other allowances, and by prohibiting any deductions for sharpening or repairing workmen’s tools except by agreement not forming part of the condition of hiring. Two important administrative amendments were made by the act of 1887: (1) a section similar to that in the Factory and Mines Acts was added, empowering the employer to exempt himself from penalty for contravention of the acts on proof that any other person was the actual offender and of his own due diligence in enforcing the execution of the acts; (2) the duty of enforcing the acts in factories, workshops, and mines was imposed upon the inspectors of the Factory and Mines Departments, respectively, of the Home Office, and to their task they were empowered to bring all the authorities and powers which they possessed in virtue of the acts under which they are appointed; these inspectors thus prosecute defaulting employers and recover penalties under the Summary Jurisdiction Acts, but they do not undertake civil proceedings for improper deductions or payments, proceedings for which would lie with workmen under the Employers and Workmen Act 1875. The persons to whom the benefits of the act applied were added to by the act of 1887, which repealed the complicated list of trades contained in the principal act and substituted the simpler definition of the Employers and Workmen Act, 1875. Thus the acts 1831 to 1887, and also the act of 1896, apply to all workers (men, women and

The Truck Act 1887.

Persons benefited by Truck Acts.

children) engaged in manual labour, except domestic servants; they apply not only in mines, factories and workshops, but, to quote the published Home Office Memorandum on the acts, "in all places where workpeople are engaged in manual labour under a contract with an employer, whether or no the employer be an owner or agent or a parent, or be himself a workman; and therefore a workman who employs and pays others under him must also observe the Truck Acts." The law thus in certain circumstances covers outworkers for a contractor or sub-contractor. A decision of the High Court at Dublin in 1900 (*Squire* v. *Sweeney*) strengthened the inspectors in investigation of offences committed amongst outworkers by supporting the contention that inquiry and exercise of all the powers of an inspector could legally take place in parts of an employer's premises other than those in which the work is given out. It defined for Ireland, in a narrower sense than had hitherto been understood and acted upon by the Factory Department, the classes of outworkers protected, by deciding that only such as were under a contract personally to execute the work were covered. In 1905 the law in England was similarly declared in the decided case of *Squire* v. *The Midland Lace Co.* The judges (Lord Alverstone, C.J.; and Kennedy and Ridley, J.J.) stated that they came to the conclusion with "reluctance," and said: "We venture to express the hope that some amendment of the law may be made so as to extend the protection of the Truck Act to a class of workpeople indistinguishable from those already within its provisions." The workers in question were lace-clippers taking out work to do in their homes, and in the words of the High Court decision "though they do sometimes employ assistants are evidently, as a class, wage-earning manual labourers and not contractors in the ordinary and popular sense." The principle relied on in the decision was that in the case of *Ingram* v. *Barnes*.

Meaning of "wages."

At the time of the passing of the act of 1887 it seems to have been generally believed that the obligation under the principal act to pay the "entire amount of wages earned" in coin rendered illegal any deductions from wages in respect of fines. Important decisions in 1888 and 1889 showed this belief to have been ill-founded. The essential point lies in the definition of the word "wages" as the "recompense, reward or remuneration of labour," which implies not necessarily any gross sum in question between employer and workmen where there is a contract to perform a certain piece of work, but that part of it, the real *net* wage, which the workman was to get as his *recompense* for the labour performed. As soon as it became clear that excessive deductions from wages as well as payments by workers for materials used in the work were not illegal, and that deductions or payments by way of compensation to employers or by way of discipline might legally (with the single exception of fines for lateness for women and children, regulated by the Employers and Workmen Act 1875) even exceed the degree of loss, hindrance or damage to the employer, it also came clearly into view that further legislation was desirable to extend the principles at the root of the Truck Acts. It was desirable, that is to say, to hinder more fully the unfair dealing that may be encouraged by half-defined customs in workplaces, on the part of the employer in making a contract, while at the same time leaving the principle of freedom of contract as far as possible untouched. The Truck Act of 1896 regulates the conditions under which deductions can be made by or payments made to the employer, out of the "sum contracted to be paid to the worker," *i.e.* out of any gross sum whatever agreed upon between employer and workman. It makes such deductions or payments illegal unless they are in pursuance of a contract; and it provides that deductions (or payments) for (*a*) fines, (*b*) bad work and damaged goods, (*c*) materials, machines, and any other thing provided by the employer in relation to the work shall be reasonable, and that particulars of the same in writing shall be given to the workman. In none of the cases mentioned is the employer to make any profit; neither by fines, for they may only be imposed in respect of acts or omissions which cause, or are likely to cause, loss or damage; nor by sale of materials, for the price may not exceed the cost to the employer; nor by deductions or payments for damage, for these may not exceed the actual or estimated loss to the employer. Fines and charges for damage must be "fair and reasonable having regard to all the circumstances of the case," and no contract could make legal a fine which a court held to be unfair to the workman in the sense of the act. The contract between the employer and workman must either be in writing signed by the workman, or its terms must be clearly stated in a notice constantly affixed in a place easily accessible to the workman to whom, if a party to the contract, a copy shall be given at the time of making the contract, and who shall be entitled, on request, to obtain from the employer a copy of the notice free of charge. On each occasion when a deduction or payment is made, full particulars in writing must be supplied to the workman. The employer is bound to keep a register of deductions or payments, and to enter therein particulars of any fine made under the contract, specifying the amount and nature of the act or omission in respect of which the fine was imposed. This register must be at all times open to inspectors of mines or factories, who are entitled to make a copy of the contract or any part of it. This act as a whole applies to all workmen included under the earlier Truck Acts; the sections relating to fines apply also to shop assistants. The latter, however, apparently are left to enforce the provisions of the law themselves, as no inspectorate is empowered to intervene on their behalf. In these and other cases a prosecution under the Truck Acts may be instituted by any person. Any workman or shop assistant may recover any sum deducted by or paid to his employer contrary to the act of 1896, provided that proceedings are commenced within six months, and that where he has acquiesced in the deduction or payment he shall only recover the excess over the amount which the court may find to have been fair and reasonable in all the circumstances of the case. It is expressly declared in the act that nothing in it shall affect the provisions of the Coal Mines Acts with reference to payment by weight, or legalize any deductions, from payments made, in pursuance of those provisions. The powers and duties of inspectors are extended to cover the case of a laundry, and of any place where work is given out by the occupier of a factory or workshop or by a contractor or sub-contractor. Power is reserved for the secretary of state to exempt by order specified trades or branches of them in specified areas from the provisions of the act of 1896, if he is satisfied that they are unnecessary for the protection of the workmen. This power has been exercised only in respect of one highly organized industry, the Lancashire cotton industry. The effect of the exemption is not to prevent fines and deductions from being made, but the desire for it demonstrated that there are cases where leaders among workers have felt competent to make their own terms on their own lines without the specific conditions laid down in this act. The reports of the inspectors of factories have demonstrated that in other industries much work has had to be done under this act, and knowledge

The Truck Act 1896.

of a highly technical character to be gradually acquired, before opinions could be formed as to the reasonableness and fairness, or the contrary, of many forms of deduction. Owing partly to difficulties of legal interpretation involving the necessity of taking test cases into court, partly to the margin for differences of opinion as to what constitutes "reasonableness" in a deduction, the average number of convictions obtained on prosecutions is not so high as under the Factory Acts, though the average penalty imposed is higher. In 1904, 61 cases were taken into court resulting in 34 convictions with an average penalty of £1, 10s. In 1905, 38 cases resulting in 34 convictions were taken with an average penalty of £1, 3s. In 1906, 37 cases resulting in 25 convictions were taken with an average penalty of £1, 10s.

Reference should here be made to the Shop Clubs Act of 1902 as closely allied with some of the provisions of the Truck Acts by its provision that employers shall not make it a condition of employment that any workman shall become a member of a shop club unless it is registered under the Friendly Societies Act of 1896. As in the case of payment of wages in Public Houses Act, no special inspectorate has the duty of enforcing this act.

III. Continental Europe

In comparing legislation affecting factories, mines, shops and truck in the chief industrial countries of the continent with that of Great Britain, it is essential to a just view that inquiry should be extended beyond the codes themselves to the general social order and system of law and administration in each country. Further, special comparison of the definitions and the sanctions of each industrial code must be recognized as necessary, for these vary in all. In so brief a summary as is appended here no more is possible than an outline indication of the main general requirements and prohibitions of the laws as regards: (1) hours and times of employment, (2) ordinary sanitation and special requirements for unhealthy and dangerous industries, (3) security against accidents, and (4) prevention of fraud and oppression in fulfilment of wage contracts. As regards the first of these subdivisions, in general in Europe the ordinary legal limit is rather wider than in Great Britain, being in several countries not less than 11 hours a day, and while in some, as in France, the normal limit is 10 hours daily, yet the administrative discretion in granting exceptions is rather more elastic. The weekly half-holiday is a peculiarly British institution. On the other hand, in several European countries, notably France, Austria, Switzerland and Russia, the legal maximum day applies to adult as well as youthful labour, and not only to specially protected classes of persons. As regards specialized sanitation for unhealthy factory industries, German regulations appear to be most nearly comparable with British. Mines' labour regulation in several countries, having an entirely different origin linked with ownership of mines, is only in few and most recent developments comparable with British Mines Regulation Acts. In regulation of shops, Germany, treating this matter as an integral part of her imperial industrial code, has advanced farther than has Great Britain. In truck legislation most European countries (with the exception of France) appear to have been influenced by the far earlier laws of Great Britain, although in some respects Belgium, with her rapid and recent industrial development, has made interesting original experiments. The rule of Sunday rest (see Sunday) has been extended in several countries, most recently in Belgium and Spain. In France this partially attempted rule has been so modified as to be practically a seventh day rest, not necessarily Sunday.

France.—Hours of labour were, in France, first limited in factories (*usines et manufactures*) for adults by the law of the 9th of September 1848 to 12 in the 24. Much uncertainty existed as to the class of workplaces covered. Finally, in 1885, an authoritative decision defined them as including: (1) Industrial establishments with motor power or continual furnaces, (2) workshops employing over 20 workers. In 1851, under condition of notification to the local authorities, exceptions, still in force, were made to the general limitation, in favour of certain industries or processes, among others for letterpress and lithographic printing, engineering works, work at furnaces and in heating workshops, manufacture of projectiles of war, and any work for the government in the interests of national defence or security. The limit of 12 hours was reduced, as regards works in which women or young workers are employed, in 1900 to 11, and was to be successively reduced to 10½ hours and to 10 hours at intervals of two years from April 1900. This labour law for adults was preceded in 1841 by one for children, which prevented their employment in factories before 8 years of age and prohibited night labour for any child under 13. This was strengthened in 1874, particularly as regards employment of girls under 21, but it was not until 1892 that the labour of women was specially regulated by a law, still in force, with certain amendments in 1900. Under this law factory and workshop labour is prohibited for children under 13 years, though they may begin at 12 if qualified by the prescribed educational certificate and medical certificate of fitness. The limit of daily hours of employment is the same as for adult labour, and, similarly, from the 1st of April 1902 was 10½, and two years later became 10 hours in the 24. Notice of the hours must be affixed, and meal-times or pauses with absolute cessation of work of at least one hour must be specified. By the act of 1892 one day in the week, not necessarily Sunday, had to be given for entire absence from work, in addition to eight recognized annual holidays, but this was modified by a law of 1906 which generally requires Sunday rest, but allows substitution of another day in certain industries and certain circumstances. Night labour—work between 9 p.m. and 5 a.m.—is prohibited for workers under 18, and only exceptionally permitted, under conditions, for girls and women over 18 in specified trades. In mines and underground quarries employment of women and girls is prohibited except at surface works, and at the latter is subject to the same limits as in factories. Boys of 13 may be employed in certain work underground, but under 16 may not be employed more than 8 hours in the 24 from bank to bank. A law of 1905 provided for miners a 9 hours' day and in 1907 an 8 hours' day from the foot of the entrance gallery back to the same point.

As in Great Britain, distinct services of inspection enforce the law in factories and mines respectively. In factories and workshops an inspector may order re-examination as to physical fitness for the work imposed of any worker under 16; certain occupations and processes are prohibited—*e.g.* girls under 16 at machines worked by treadles, and the weights that may be lifted, pushed or carried by girls or boys under 18 are carefully specified. The law applies generally to philanthropic and religious institutions where industrial

work is carried on, as in ordinary trading establishments; and this holds good even if the work is by way of technical instruction. Domestic workshops are not controlled unless the industry is classed as dangerous or unhealthy; introduction of motor power brings them under inspection. General sanitation in industrial establishments is provided for in a law of 1893, amended in 1903, and is supplemented by administrative regulations for special risks due to poisons, dust, explosive substances, gases, fumes, &c. Ventilation, both general and special, lighting, provision of lavatories, cloakrooms, good drinking water, drainage and cleanliness are required in all workplaces, shops, warehouses, restaurant kitchens, and where workers are lodged by their employers hygienic conditions are prescribed for dormitories. In many industries women, children and young workers are either absolutely excluded from specified unhealthy processes, or are admitted only under conditions. As regards shops and offices, the labour laws are: one which protects apprentices against overwork (law of 22nd February 1851), one (law of 29th December 1900) which requires that seats shall be provided for women and girls employed in retail sale of articles, and a decree of the 28th of July 1904 defining in detail conditions of hygiene in dormitories for workmen and shop assistants. The law relating to seats is enforced by the inspectors of factories. In France there is no special penal legislation against abuses of the truck system, or excessive fines and deductions from wages, although bills with that end in view have frequently been before parliament. Indirect protection to workers is no doubt in many cases afforded in organized industries by the action of the *Conseils de Prud'hommes*.

Belgium.—In 1848 in Belgium the Commission on Labour proposed legislation to limit, as in France, the hours of labour for adults, but this proposal was never passed. Belgian regulation of labour in industry remains essentially, in harmony with its earliest beginnings in 1863 and onwards, a series of specialized provisions to meet particular risks of individual trades, and did not, until 1889, give any adherence to a common principle of limitation of hours and times of labour for "protected" persons. This was in the law of the 13th of December 1889, which applies to mines, quarries, factories, workshops classed as unhealthy, wharves and docks, transports. As in France, industrial establishments having a charitable or philanthropic or educational character are included. The persons protected are girls and women under 21 years, and boys under 16; and women over 21 only find a place in the law through the prohibition of their employment within four weeks after childbirth. As the hours of labour of adult women remain ordinarily unlimited by law, so are the hours of boys from 16 to 21. The law of Sunday rest dated the 17th of July 1905, however, applies to labour generally in all industrial and commercial undertakings except transport and fisheries, with certain regulated exceptions for (*a*) cases of breakdown or urgency due to *force majeure*, (*b*) certain repairs and cleaning, (*c*) perishable materials, (*d*) retail food supply. Young workers are excluded from the exceptions. The absolute prohibitions of employment are: for children under 12 years in any industry, manufacturing or mining or transport, and for women and girls under 21 years below the surface in working of mines. Boys under 16 years and women and girls under 21 years may in general not be employed before 5 A.M. or after 9 P.M., and one day in the seven is to be set apart for rest from employment; to these rules exception may be made either by royal decree for classes or groups of processes, or by local authorities in exceptional cases. The exceptions may be applied, generally, only to workers over 14 years, but in mines, by royal decree, boys over 12 years may be employed from 4 A.M. The law of 1889 fixes only a maximum of 12 hours of effective work, to be interrupted by pauses for rest of not less than 1½ hours, empowering the king by decree to formulate more precise limits suited to the special circumstances of individual industries. Royal decrees have accordingly laid down the conditions for many groups, including textile trades, manufacture of paper, pottery, glass, clothing, mines, quarries, engineering and printing works. In some the daily limit is 10 hours, but in more 10½ or 11 hours. In a few exceptionally unhealthy trades, such as the manufacture of lucifer matches, vulcanization of india-rubber by means of carbon bi-sulphide, the age of exclusion from employment has been raised, and in the last-named process hours have been reduced to 5, broken into two spells of 2½ hours each. As a rule the conditions of health and safeguarding of employments in exceptionally injurious trades have been sought by a series of decrees under the law of 1863 relating to public health in such industries. Special regulations for safety of workers have been introduced in manufactures of white-lead, oxides of lead, chromate of lead, lucifer match works, rag and shoddy works; and for dangers common to many industries, provisions against dust, poisons, accidents and other risks to health or limb have been codified in a decree of 1896. A royal decree of the 31st of March 1903 prohibits employment of persons under 16 years in fur-pulling and in carotting of rabbit skins, and another of the 13th of May 1905 regulates use of lead in house-painting. In 1898 a law was passed to enable the authorities to deal with risks in quarries under the same procedure. Safety in mines (which are not private property, but state concessions to be worked under strict state control) has been provided for since 1810. In matters of hygiene, until 1899 the powers of the public health authorities to intervene were insufficient, and a law was passed authorizing the government to make regulations for every kind of risk in any undertaking, whether classed under the law of public health or not. By a special law of 1888 children and young persons under 18 years are excluded from employment as pedlars, hawkers or in circuses, except by their parents, and then only if they have attained 14 years. Abuses of the truck system have, since 1887, been regulated with care. The chief objects of the law of 1887 were to secure payment in full to all workers, other than those in agriculture or domestic service, of wages in legal tender, to prohibit payment of wages in public-houses, and to secure prompt payment of wages. Certain deductions were permitted under careful control for specific customary objects: lodging, use of land, uniforms, food, firing. A royal order of the 10th of October 1903 required use of automatic indicators for estimating wages in certain cases in textile processes. The law of the 15th of June 1896 regulates the affixing in workplaces, where at least five workers are employed, of a notice of the working rules, the nature and rate of fines, if any, and the mode of their application. Two central services the mines inspectorate and the factory and workshop inspectorate, divide the duties above indicated. There is also a system of local administration of the regulations relating to industries classed as unhealthy, but the tendency has been to give the supreme control in these matters to the factory service, with its expert staff.

Holland.—The first law for regulation of labour in manufacture was passed in 1874, and this related only to employment of children. The basis of all existing regulations was established in the law of the 5th of May 1889, which applies to all industrial undertakings, excluding agriculture and forestry, fishing, stock-rearing. Employment of children under 12 years is prohibited, and hours are limited for young persons under 16 and for women of any age. These protected persons may be excluded by royal decree from

unhealthy industries, and such industries are specified in a decree of 1897 which supersedes other earlier regulations. Hours of employment must not exceed 11 in the 24, and at least one hour for rest must be given between 11 A.M. and 3 P.M., which hour must not be spent in a workroom. Work before 5 A.M. or after 7 P.M., Sunday work, and work on recognized holidays is generally prohibited, but there are exceptions. Overtime from 7 to 10 P.M., under conditions, is allowed for women and young workers, and Sunday work for women, for example, in butter and cheese making, and night work for boys over 14 in certain industries. Employment of women within four weeks of childbirth is prohibited. Notices of working hours must be affixed in workplaces. Underground work in mines is prohibited for women and young persons under 16, but in Holland mining is a very small industry. In 1895 the first legislative provision was made for protection of workers against risk of accident or special injury to health. Sufficient cubic space, lighting, ventilation, sanitary accommodation, reasonable temperature, removal of noxious gases or dust, fencing of machinery, precautions against risk from fire and other matters are provided for. The manufacture of lucifer matches by means of white phosphorus was forbidden and the export, importation and sale was regulated by a law of the 28th of May 1901. By a regulation of the 16th of March 1904 provisions for safety and health of women and young workers were strengthened in processes where lead compounds or other poisons are used, and their employment at certain dangerous machines and in cleaning machinery or near driving belts was prohibited. No penal provision against truck exists in Holland, but possibly abuses of the system are prevented by the existence of industrial councils representing both employers and workers, with powers to mediate or arbitrate in case of disputes.

Switzerland.—In Switzerland separate cantonal legislation prepared the way for the general Federal labour law of 1877 on which subsequent legislation rests. Such legislation is also cantonal as well as Federal, but in the latter there is only amplification or interpretation of the principles contained in the law of 1877, whereas cantonal legislation covers industries not included under the Federal law, *e.g.* single workers employed in a trade (*métier*) and employment in shops, offices and hotels. The Federal law is applied to factories, workshops employing young persons under 18 or more than 10 workers, and workshops in which unhealthy or dangerous processes are carried on. Mines are not included, but are regulated in some respects as regards health and safety by cantonal laws. Further, the Law of Employers' Liability 1881-1887, which requires in all industries precautions against accidents and reports of all serious accidents to the cantonal governments, applies to mines. This led, in 1896, to the creation of a special mining department, and mines, of which there are few, have to be inspected once a year by a mining engineer. The majority of the provisions of the Federal labour law apply to adult workers of both sexes, and the general limit of the 11-hours' day, exclusive of at least one hour for meals, applies to men as well as women. The latter have, however, a legal claim, when they have a household to manage, to leave work at the dinner-hour half an hour earlier than the men. Men and unmarried women may be employed in such subsidiary work as cleaning before or after the general legal limits. On Saturdays and eves of the eight public holidays the 11-hours' day is reduced to 10. Sunday work and night work are forbidden, but exceptions are permitted conditionally. Night work is defined as 8 P.M. to 5 A.M. in summer, 8 P.M. to 6 A.M. in winter. Children are excluded from employment in workplaces under the law until 14 years of age, and until 16 must attend continuation schools. Zürich canton has fixed the working day for women at 10 hours generally, and 9 hours on Saturdays and eves of holidays. Bâle-Ville canton has the same limits and provides that the very limited Sunday employment permitted shall be compensated by double time off on another day. In the German-speaking cantons girls under 18 are not permitted to work overtime; in all cantons except Glarus the conditional overtime of 2 hours must be paid for at an enhanced wage.

Sanitary regulations and fencing of machinery are provided for with considerable minuteness in a Federal decree of 1897. The plans of every new factory must be submitted to the cantonal government. In the case of lucifer match factories, not only the building but methods of manufacture must be submitted. Since 1901 the manufacture, sale and import of matches containing white phosphorus have been forbidden. Women must be absent from employment during eight weeks before and after childbirth. In certain dangerous occupations, *e.g.* where lead or lead compounds are in use, women may not legally be employed during pregnancy. A resolution of the federal council in 1901 classed thirty-four different substances in use in industry as dangerous and laid down that in case of clearly defined illness of workers directly caused by use of any of these substances the liability provided by article 3 of the law of the 25th of June 1881, and article 1 of the law of the 26th of April 1887, should apply to the manufacture. Legislative provision against abuses of the truck system appears to be of earlier origin in Switzerland (17th century) than any other European country outside England (15th century). The Federal Labour Law 1877 generally prohibits payment of wages otherwise than in current coin, and provides that no deduction shall be made without an express contract. Some of the cantonal laws go much farther than the British act of 1896 in forbidding certain deductions; *e.g.* Zürich prohibits any charge for cleaning, warming or lighting workrooms or for hire of machinery. By the Federal law fines may not exceed half a day's wage. Administration of the Labour laws is divided between inspectors appointed by the Federal Government and local authorities, under supervision of the cantonal governments. The Federal Government forms a court of appeal against decisions of the cantonal governments.

Germany.—Regulation of the conditions of labour in industry throughout the German empire is provided for in the Imperial Industrial Code and the orders of the Federal Council based thereon. By far the most important recent amendment socially is the law regulating child-labour, dated the 30th of March 1903, which relates to establishments having industrial character in the sense of the Industrial Code. This Code is based on earlier industrial codes of the separate states, but more especially on the Code of 1869 of the North German Confederation. It applies in whole or in part to all trades and industrial occupations, except transport, fisheries and agriculture. Mines are only included so far as truck, Sunday and holiday rest, prohibition of employment underground of female labour, limitation of the hours of women and young workers are concerned; otherwise the regulations for protection of life and limb of miners vary, as do the mining laws of the different states. To estimate the force of the Industrial Code in working, it is necessary to bear in mind the complicated political history of the empire, the separate administration by the federated states, and the generally considerable powers vested in administration of initiating regulations. The Industrial Code expressly retains power for the states to initiate certain additions or exceptions to the Code which in any given state may form part of the law regulating factories there. The Code (unlike the

Austrian Industrial Code) lays down no general limit for a normal working day for adult male workers, but since 1891 full powers were given to the Imperial government to limit hours for any classes of workers in industries where excessive length of the working day endangers the health of the worker (R.G.O. § 120*e*). Previously application had been made of powers to reduce the working day in such unhealthy industries as silvering of mirrors by mercury and the manufacture of white-lead. Separate states had, under mining laws, also limited hours of miners. Sunday rest was, in 1891, secured for every class of workers, commercial, industrial and mining. Annual holidays were also secured on church festivals. These provisions, however, are subject to exceptions under conditions. An important distinction has to be shown when we turn to the regulations for hours and times of labour for protected persons (women, young persons and children). Setting aside for the moment hours of shop assistants (which are under special sections since 1900), it is to "factory workers" and not to industrial workers in general that these limits apply, although they may be, and in some instances have been, further extended—for instance, in ready-made clothing trades—by imperial decree to workshops, and by the Child Labour Law of 1903 regulation of the scope and duration of employment of children is much strengthened in workshops, commerce, transport and domestic industries. The term "factory" (*Fabrik*) is not defined in the Code, but it is clear from various decisions of the supreme court that it only in part coincides with the English term, and that some workplaces, where processes are carried on by aid of mechanical power, rank rather as English workshops. The distinction is rather between wholesale manufacturing industry, with subdivision of labour, and small industry, where the employer works himself. Certain classes of undertaking, viz. forges, timber-yards, dockyards, brickfields and open quarries, are specifically ranked as factories. Employment of protected persons at the surface of mines and underground quarries, and in salt works and ore-dressing works, and of boys underground comes under the factory regulations. These exclude children from employment under 13 years, and even later if an educational certificate has not been obtained; until 14 years hours of employment may not exceed 6 in the 24. In processes and occupations under the scope of the Child Labour Law children may not be employed by their parents or guardians before 10 years of age or by other employers before 12 years of age; nor between the hours of 8 P.M. and 8 A.M., nor otherwise than in full compliance with requirements of educational authorities for school attendance and with due regard to prescribed pauses. In school term time the daily limit of employment for children is three hours, in holiday time three hours. As regards factories Germany, unlike Great Britain, France and Switzerland, requires a shorter day for young persons than for women—10 hours for the former, 11 hours for the latter. Women over 16 years may be employed 11 hours. Night work is forbidden, *i.e.* work between 8.30 P.M. and 5.30 A.M. Overtime may be granted to meet unforeseen pressure or for work on perishable articles, under conditions, by local authorities and the higher administrative authorities. Prescribed meal-times are—an unbroken half-hour for children in their 6 hours; for young persons a mid-day pause of one hour, and half an hour respectively in the morning and afternoon spells; for women, an hour at mid-day, but women with the care of a household have the claim, on demand, to an extra half-hour, as in Switzerland. No woman may be employed within four weeks after childbirth, and unless a medical certificate can then be produced, the absence must extend to six weeks. Notice of working periods and meal-times must be affixed, and copies sent to the local authorities. Employment of protected persons in factory industries where there are special risks to health or morality may be forbidden or made dependent on special conditions. By the Child Labour Law employment of children is forbidden in brickworks, stone breaking, chimney sweeping, street cleaning and other processes and occupations. By an order of the Federal Council in 1902 female workers were excluded from main processes in forges and rolling mills. All industrial employers alike are bound to organize labour in such a manner as to secure workers against injury to health and to ensure good conduct and propriety. Sufficient light, suitable cloakrooms and sanitary accommodation, and ventilation to carry off dust, vapours and other impurities are especially required. Dining-rooms may be ordered by local authorities. Fencing and provision for safety in case of fire are required in detail. The work of the trade accident insurance associations in preventing accidents is especially recognized in provisions for special rules in dangerous or unhealthy industries. Officials of the state factory departments are bound to give opportunity to trustees of the trade associations to express an opinion on special rules. In a large number of industries the Federal Council has laid down special rules comparable with those for unhealthy occupations in Great Britain. Among the regulations most recently revised and strengthened are those for manufacture of lead colours and lead compounds, and for horse-hair and brush-making factories. The relations between the state inspectors of factories and the ordinary police authorities are regulated in each state by its constitution. Prohibitions of truck in its original sense—that is, payment of wages otherwise than in current coin—apply to any persons under a contract of service with an employer for a specified time for industrial purposes; members of a family working for a parent or husband are not included; outworkers are covered. Control of fines and deductions from wages applies only in factory industries and shops employing at least 20 workers. Shop hours are regulated by requiring shops to be closed generally between 9 P.M. and 5 A.M., by requiring a fixed mid-day rest of 1½ hours and at least 10 hours' rest in the 24 for assistants. These limits can be modified by administrative authority. Notice of hours and working rules must be affixed. During the hours of compulsory closing sale of goods on the streets or from house to house is forbidden. Under the Commercial Code, as under the Civil Code, every employer is bound to adopt every possible measure for maintaining the safety, health and good conduct of his employés. By an order of the Imperial Chancellor under the Commercial Code seats must be provided for commercial assistants and apprentices.

Austria.—The Industrial Code of Austria, which in its present outline (modified by later enactments) dates from 1883, must be carefully distinguished from the Industrial Code of the kingdom of Hungary. The latter is, owing to the predominantly agricultural character of the population, of later origin, and hardly had practical force before the law of 1893 provided for inspection and prevention of accidents in factories. No separate mining code exists in Hungary, and conditions of labour are regulated by the Austrian law of 1854. The truck system is repressed on lines similar to those in Austria and Germany. As regards limitation of hours of adult labour, Hungary may be contrasted with both those empires in that no restriction of hours applies either to men's or women's hours, whereas in Austrian factories both are limited to an 11-hours' day with exceptional overtime for which payment must always be made to the worker. The Austrian Code has its origin, however, like the British Factory Acts, in protection of child labour. Its present scope is determined by the Imperial "Patent" of 1859, and all industrial labour is included except mining,

transport, fisheries, forestry, agriculture and domestic industries. Factories are defined as including industries in which a "manufacturing process is carried on in an enclosed place by the aid of not less than twenty workers working with machines, with subdivision of labour, and under an employer who does not himself manually assist in the work." In smaller handicraft industries the compulsory gild system of organization still applies. In every industrial establishment, large or small, the sanitary and safety provisions, general requirement of Sunday rest, and annual holidays (with conditional exceptions), prohibition of truck and limitation of the ages of child labour apply. Night work for women, 8 P.M. to 5 A.M., is prohibited only in factory industries; for young workers it is prohibited in any industry. Pauses in work are required in all industries; one hour at least must be given at mid-day, and if the morning and afternoon spells exceed 5 hours each, another half-hour's rest at least must be given. Children may not be employed in industrial work before 12 years, and then only 8 hours a day at work that is not injurious and if educational requirements are observed. The age of employment is raised to 14 for "factories," and the work must be such as will not hinder physical development. Women may not be employed in regular industrial occupation within one month after childbirth. In certain scheduled unhealthy industries, where certificates of authorization from local authorities must be obtained by intending occupiers, conditions of health and safety for workers can be laid down in the certificate. The Minister of the Interior is empowered to draw up regulations prohibiting or making conditions for the employment of young workers or women in dangerous or unhealthy industries. The provisions against truck cover not only all industrial workers engaged in manual labour under a contract with an employer, but also shop-assistants; the special regulations against fines and deductions apply to factory workers and shops where at least 20 workers are employed. In mines under the law of 1884, which supplements the general mining law, employment of women and girls underground is prohibited; boys from 12 to 16 and girls from 12 to 18 may only be employed at light work above ground; 14 is the earliest age of admission for boys underground. The shifts from bank to bank must not exceed 12 hours, of which not more than 10 may be effective work. Sunday rest must begin not later than 6 A.M., and must be of 24 hours' duration. These last two provisions do not hold in case of pressing danger for safety, health or property. Sick and accident funds and mining associations are legislated for in minutest detail. The general law provides for safety in working, but special rules drawn up by the district authorities lay down in detail the conditions of health and safety. As regards manufacturing industry, the Industrial Code lays no obligation on employers to report accidents, and until the Accident Insurance Law of 1889 came into force no statistics were available. In Austria, unlike Germany, the factory inspectorate is organized throughout under a central chief inspector.

Scandinavian Countries.—In Sweden the Factory Law was amended in January 1901; in Denmark in July 1901. Until that year, however, Norway was in some respects in advance of the other two countries by its law of 1892, which applied to industrial works, including metal works of all kinds and mining. Women were thereby prohibited from employment: (*a*) underground; (*b*) in cleaning or oiling machinery in motion; (*c*) during six weeks after childbirth, unless provided with a medical certificate stating that they might return at the end of four weeks without injury to health; (*d*) in dangerous, unhealthy or exhausting trades during pregnancy. Further, work on Sundays and public holidays is prohibited to all workers, adult and youthful, with conditional exceptions under the authority of the inspectors. Children over 12 are admitted to industrial work on obtaining certificates of birth, of physical fitness and of elementary education. The hours of children are limited to 6, with pauses, and of young persons (of 14 to 18 years) to 10, with pauses. Night work between 8 P.M. and 6 A.M. is prohibited. All workers are entitled to a copy of a code of factory rules containing the terms of the contract of work drawn up by representatives of employés with the employers and sanctioned by the inspector. Health and safety in working are provided for in detail in the same law of 1892. Special rules may be made for dangerous trades, and in 1899 such rules were established for match factories, similar to some of the British rules, but notably providing for a dental examination four times yearly by a doctor. In Denmark, regulation began with unhealthy industries, and it was not until the law of 1901 came into force, on the 1st of January 1902, that children under 12 years have been excluded from factory labour. Control of child labour can be strengthened by municipal regulation, and this has been done in Copenhagen by an order of the 23rd of May 1903. In Sweden the 12 years' limit had for some time held in the larger factories; the scope has been extended so that it corresponds with the Norwegian law. The hours of children are, in Denmark, 6½ for those under 14 years; in Sweden 6 for those under 13 years. Young persons may not in either country work more than 10 hours daily, and night work, which is forbidden for persons under 18 years, is now defined as in Norway. Women may not be employed in industry within four weeks of childbirth, except on authority of a medical certificate. All factories in Sweden where young workers are employed are subject to medical inspection once a year. Fencing of machinery and hygienic conditions (ventilation, cubic space, temperature, light) are regulated in detail. In Denmark the use of white phosphorus in manufacture of lucifer matches has been prohibited since 1874, and special regulations have been drawn up by administrative orders which strengthen control of various unhealthy or dangerous industries, *e.g.* dry-cleaning works, printing works and type foundries, iron foundries and engineering works. A special act of the 6th of April 1906 regulates labour and sanitary conditions in bakehouses and confectionery works.

Italy and Spain.—The wide difference between the industrial development of these southern Latin countries and the two countries with which this summary begins, and the far greater importance of the agricultural interests, produced a situation, as regards labour legislation until as recently as 1903, which makes it convenient to touch on the comparatively limited scope of their regulations at the close of the series. It was stated by competent and impartial observers from each of the two countries, at the International Congress on Labour Laws held at Brussels in 1897, that the lack of adequate measures for protection of child labour and inefficient administration of such regulations as exist was then responsible for abuse of their forces that could be found in no other European countries. "Their labour in factories, workshops, and mines constitutes a veritable martyrdom" (Spain). "I believe that there is no country where a sacrifice of child life is made that is comparable with that in certain Italian factories and industries" (Italy). In both countries important progress has since been made in organizing inspection and preventing accidents. In Spain the first step in the direction of limitation of women's hours of labour was taken by a law of 1900, which took effect in 1902, in regulations for reduction of hours of labour for adults to 11, normally, in the 24. Hours of children under 14 must not exceed 6 in any industrial work nor 8 in any commercial undertaking. Labour before the age of 10 years and night work between 6 P.M. and 5 A.M.

was prohibited, and powers were taken to extend the prohibition of night work to young persons under 16 years. The labour of children in Italy was until 1902 regulated in the main by a law of 1886, but a royal decree of 1899 strengthened it by classing night work for children under 12 years as "injurious," such work being thereby generally prohibited for them, though exceptions are admitted; at the same time it was laid down that children from 12 to 15 years might not be employed for more than 6 hours at night. The law of 1886 prohibits employment of children under 9 years in industry and under 10 years in underground mining. Night work for women was in Italy first prohibited by the law of the 19th of June 1902, and at the same time also for boys under 15, but this regulation was not to take full effect for 5 years as regards persons already so employed; by the same law persons under 15 and women of any age were accorded the claim to one day's complete rest of 24 hours in the week; the age of employment of children in factories, workshops, laboratories, quarries, mines, was raised to 12 years generally and 14 years for underground work; the labour of female workers of any age was prohibited in underground work, and power was reserved to further restrict and regulate their employment as well as that of male workers under 15. Spain and Italy, the former by the law of the 13th of March 1900, the latter by the law of the 19th of June 1902, prohibit the employment of women within a fixed period of childbirth; in Spain the limit is three weeks, in Italy one month, which may be reduced to three weeks on a medical certificate of fitness. Sunday rest is secured in industrial works, with regulated exceptions in Spain by the law of the 3rd of March 1904. It is in the direction of fencing and other safeguards against accidents and as regards sanitary provisions, both in industrial workplaces and in mines, that Italy has made most advance since her law of 1890 for prevention of accidents. Special measures for prevention of malaria are required in cultivation of rice by a ministerial circular of the 23rd of April 1903; work may not begin until an hour after sunrise and must cease an hour before sunset; children under 13 may not be employed in this industry.

(A. M, An.)

IV. United States

Under the general head of Labour Legislation all American statute laws regulating labour, its conditions, and the relation of employer and employé must be classed. It includes what is properly known as factory legislation. Labour legislation belongs to the latter half of the 19th century, so far as the United States is concerned. Like England in the far past, the Americans in colonial days undertook to regulate wages and prices, and later the employment of apprentices. Legislation relating to wages and prices was long ago abandoned, but the laws affecting the employment of apprentices still exist in some form, although conditions of employment have changed so materially that apprenticeships are not entered as of old; but the laws regulating the employment of apprentices were the basis on which English legislation found a foothold when parliament wished to regulate the labour of factory operatives. The code of labour laws of the present time is almost entirely the result of the industrial revolution during the latter part of the 18th century, under which the domestic or hand-labour system was displaced through the introduction of power machinery. As this revolution took place in the United States at a somewhat later date than in England, the labour legislation necessitated by it belongs to a later date. The factory, so far as textiles are concerned, was firmly established in America during the period from 1820 to 1840, and it was natural that the English legislation found friends and advocates in the United States, although the more objectionable conditions accompanying the English factory were not to be found there.

History.

The first attempt to secure legislation regulating factory employment related to the hours of labour, which were very long—from twelve to thirteen hours a day. As machinery was introduced it was felt that the tension resulting from speeded machines and the close attention required in the factory ought to be accompanied by a shorter work-day. This view took firm hold of the operatives, and was the chief cause of the agitation which has resulted in a great body of laws applying in very many directions. As early as 1806 the caulkers and shipbuilders of New York City agitated for a reduction of hours to ten per day, but no legislation followed. There were several other attempts to secure some regulation relative to hours, but there was no general agitation prior to 1831. As Massachusetts was the state which first recognized the necessity of regulating employment (following in a measure, and so far as conditions demanded, the English labour or factory legislation), the history of such legislation in that state is indicative of that in the United States, and as it would be impossible in this article to give a detailed history of the origin of laws in the different states, the dates of their enactment, and their provisions, it is best to follow primarily the course of the Eastern states, and especially that of Massachusetts, where the first general agitation took place and the first laws were enacted. That state in 1836 regulated by law the question of the education of young persons employed in manufacturing establishments. The regulation of hours of labour was warmly discussed in 1832, and several legislative committees and commissions reported upon it, but no specific action on the general question of hours of labour secured the indorsement of the Massachusetts legislature until 1874, although the day's labour of children under twelve years of age was limited to ten hours in 1842. Ten hours constituted a day's labour, on a voluntary basis, in many trades in Massachusetts and other parts of the country as early as 1853, while in the shipbuilding trades this was the work-day in 1844. In April 1840 President Van Buren issued an order "that all public establishments will hereafter be regulated, as to working hours, by the ten-hours system." The real aggressive movement began in 1845, through numerous petitions to the Massachusetts legislature urging a reduction of the day's labour to eleven hours, but nothing came of these petitions at that time. Again, in 1850, a similar effort was made, and also in 1851 and 1852, but the bills failed. Then there was a period of quiet until 1865, when an unpaid commission made a report relative to the hours of labour, and recommended the establishment of a bureau of statistics for the purpose of collecting data bearing upon the labour question. This was the first step in this direction in any country. The first bureau of the kind was established in Massachusetts in 1869, but meanwhile, in accordance with reports of commissions and the address of Governor Bullock in 1866, and the general sentiment which then prevailed, the legislature passed an act regulating in a

Early attempts to regulate hours.

measure the conditions of the employment of children in manufacturing establishments; and this is one of the first laws of the kind in the United States, although the first legislation in the United States relating to the hours of labour which the writer has been able to find, and for which he can fix a date, was enacted by the state of Pennsylvania in 1849, the law providing that ten hours should be a day's work in cotton, woollen, paper, bagging, silk and flax factories.

The Massachusetts law of 1866 provided, firstly, that no child under ten should be employed in any manufacturing establishment, and that no child between ten and fourteen should be so employed unless he had attended some public or private school at least six months during the year preceding such employment, and, further, that such employment should not continue unless the child attended school at least six months in each and every year; secondly, a penalty not exceeding $50 for every owner or agent or other person knowingly employing a child in violation of the act; thirdly, that no child under the age of fourteen should be employed in any manufacturing establishment more than eight hours in any one day; fourthly, that any parent or guardian allowing or consenting to employment in violation of the act should forfeit a sum not to exceed $50 for each offence; fifthly, that the Governor instruct the state constable and his deputies to enforce the provisions of all laws for regulating the employment of children in manufacturing establishments. The same legislature also created a commission of three persons, whose duty it was to investigate the subject of hours of labour in relation to the social, educational and sanitary condition of the working classes. In 1867 a fundamental law relating to schooling and hours of labour of children employed in manufacturing and mechanical establishments was passed by the Massachusetts legislature. It differed from the act of the year previous in some respects, going deeper into the general question. It provided that no child under ten should be employed in any manufacturing or mechanical establishment of the commonwealth, and that no child between ten and fifteen should be so employed unless he had attended school, public or private, at least three months during the year next preceding his employment. There were provisions relating to residence, &c., and a further provision that no time less than 120 half-days of actual schooling should be deemed an equivalent of three months, and that no child under fifteen should be employed in any manufacturing or mechanical establishment more than sixty hours any one week. The law also provided penalties for violation. It repealed the act of 1866.

Employment of children.

In 1869 began the establishment of that chain of offices in the United States, the principle of which has been adopted by other countries, known as bureaus of statistics of labour, their especial purpose being the collection and dissemination of information relating to all features of industrial employment. As a result of the success of the first bureau, bureaus are in existence in thirty-three states, in addition to the United States Bureau of Labour.

A special piece of legislation which belongs to the commonwealth of Massachusetts, so far as experience shows, was that in 1872, providing for cheap morning and evening trains for the accommodation of working men living in the vicinity of Boston. Great Britain had long had such trains, which were called parliamentary trains. Under the Massachusetts law some of the railways running out of Boston furnished the accommodation required, and the system has since been in operation.

In different parts of the country the agitation to secure legislation regulating the hours of labour became aggressive again in 1870 and the years immediately following, there being a constant repetition of attempts to secure the enactment of a ten-hours law, but in Massachusetts all the petitions failed till 1874, when the legislature of that commonwealth established the hours of labour at sixty per week not only for children under eighteen, but for women, the law providing that no minor under eighteen and no woman over that age should be employed by any person, firm or corporation in any manufacturing establishment more than ten hours in any one day. In 1876 Massachusetts reconstructed its laws relating to the employment of children, although it did not abrogate the principles involved in earlier legislation, while in 1877 the commonwealth passed Factory Acts covering the general provisions of the British laws. It provided for the general inspection of factories and public buildings, the provisions of the law relating to dangerous machinery, such as belting, shafting, gearing, drums, &c., which the legislature insisted must be securely guarded, and that no machinery other than steam engines should be cleaned while running. The question of ventilation and cleanliness was also attended to. Dangers connected with hoistways, elevators and well-holes were minimized by their protection by sufficient trap-doors, while fire-escapes were made obligatory on all establishments of three or more storeys in height. All main doors, both inside and outside, of manufacturing establishments, as well as those of churches, school-rooms, town halls, theatres and every building used for public assemblies, should open outwardly whenever the factory inspectors of the commonwealth deemed it necessary. These provisions remain in the laws of Massachusetts, and other states have found it wise to follow them.

Factory legislation, 1877.

The labour legislation in force in 1910 in the various states of the Union might be classified in two general branches: (A) protective labour legislation, or laws for the aid of workers who, on account of their economic dependence, are not in a position fully to protect themselves; (B) legislation having for its purpose the fixing of the legal status of the worker as an employé, such as laws relating to the making and breaking of the labour contract, the right to form organizations and to assemble peaceably, the settlement of labour disputes, the licensing of occupations, &c.

(A) The first class includes factory and workshop acts, laws relating to hours of labour, work on Sundays and holidays, the payment of wages, the liability of employers for injuries to their employés, &c. Factory acts have been passed by nearly all the states of the Union. These may be considered in two groups—first, laws which relate to conditions of employment and affect only children, young persons and women; and second, laws which relate to the sanitary condition of factories and workshops and to the safety of employés generally. The states adopting such laws have usually made provision for factory inspectors, whose duties are

Factory and workshop acts.

to enforce these laws and who have power to enter and inspect factories and workshops. The most common provisions of the factory acts in the various states are those which fix an age limit below which employment is unlawful. All but five states have enacted such provisions, and these five states have practically no manufacturing industries. In some states the laws fixing an age limit are restricted in their application to factories, while in others they extend also to workshops, bakeries, mercantile establishments and other work places where children are employed. The prescribed age limit varies from ten to fourteen years. Provisions concerning the education of children in factories and workshops may be considered in two groups, those relating to apprenticeship and those requiring a certain educational qualification as a pre-requisite to employment. Apprenticeship laws are numerous, but they do not now have great force, because of the practical abrogation of the apprenticeship system through the operation of modern methods of production. Most states have provisions prohibiting illiterates under a specified age, usually sixteen, from being employed in factories and workshops. The provisions of the factory acts relating to hours of labour and night work generally affect only the employment of women and young persons. Most of the states have enacted such provisions, those limiting the hours of children occurring more frequently than those limiting the hours of women. The hour limit for work in such cases ranges from six per day to sixty-six per week. Where the working time of children is restricted, the minimum age prescribed for such children ranges from twelve to twenty-one years. In some cases the restriction of the hours of labour of women and children is general, while in others it applies only to employment in one or more classes of industries. Other provisions of law for the protection of women and children, but not usually confined in their operation to factories and workshops, are such as require seats for females and separate toilet facilities for the sexes, and prohibit employment in certain occupations as in mines, places where intoxicants are manufactured or sold, in cleaning or operating dangerous machinery, &c. Provisions of factory acts relating to the sanitary condition of factories and workshops and the safety of employés have been enacted in nearly all the manufacturing states of the Union. They prohibit overcrowding, and require proper ventilation, sufficient light and heat, the lime-washing or painting of walls and ceilings, the provision of exhaust fans and blowers in places where dust or dangerous fumes are generated, guards on machinery, mechanical belts and gearing shifters, guards on elevators and hoistways, hand-rails on stairs, fire-escapes, &c.

Hours of labour.

The statutes relating to hours of labour may be considered under five groups, namely: (1) general laws which merely fix what shall be regarded as a day's labour in the absence of a contract; (2) laws defining what shall constitute a day's work on public roads; (3) laws limiting the hours of labour per day on public works; (4) laws limiting the hours of labour in certain occupations; and (5) laws which specify the hours per day or per week during which women and children may be employed. The statutes included in the first two groups place no restrictions upon the number of hours which may be agreed upon between employers and employés, while those in the other three groups usually limit the freedom of contract and provide penalties for their violation. A considerable number of states have enacted laws which fix a day's labour in the absence of any contract, some at eight and others at ten hours, so that when an employer and an employé make a contract and they do not specify what shall constitute a day's labour, eight or ten hours respectively would be ruled as the day's labour in an action which might come before the courts. In a number of the states it is optional with the citizens to liquidate certain taxes either by cash payments or by rendering personal service. In the latter case the length of the working day is defined by law, eight hours being usually specified. The Federal government and nearly one-half of the states have laws providing that eight hours shall constitute a day's work for employés on public works. Under the Federal Act it is unlawful for any officer of the government or of any contractor or sub-contractor for public works to permit labourers and mechanics to work longer than eight hours per day. The state laws concerning hours of labour have similar provisions. Exceptions are provided for cases of extraordinary emergencies, such as danger to human life or property. In many states the hours of labour have been limited by law in occupations in which, on account of their dangerous or insanitary character, the health of the employés would be jeopardized by long hours of labour, or in which the fatigue occasioned by long hours would endanger the lives of the employés or of the public. The occupations for which such special legislation has been enacted are those of employés on steam and street railways, in mines and other underground workings, smelting and refining works, bakeries and cotton and woollen mills. Laws limiting the hours of labour of women and children have been considered under factory and workshop acts.

Sunday labour.

Nearly all states and Territories of the Union have laws prohibiting the employment of labour on Sunday. These laws usually make it a misdemeanour for persons either to labour themselves or to compel or permit their apprentices, servants or other employés, to labour on the first day of the week. Exceptions are made in the case of household duties or works of necessity or charity, and in the case of members of religious societies who observe some other than the first day of the week.

Payment of wages.

Statutes concerning the payment of wages of employés may be considered in two groups: (1) those which relate to the employment contract, such as laws fixing the maximum period of wage payments, prohibiting the payment of wages in scrip or other evidences of indebtedness in lieu of lawful money, prohibiting wage deductions on account of fines, breakage of machinery, discounts for prepayments, medical attendance, relief funds or other purposes, requiring the giving of notice of reduction of wages, &c.; (2) legislation granting certain privileges or affording special protection to working people with respect to their wages, such as laws exempting wages from attachment, preferring wage claims in assignments, and granting workmen liens upon buildings and other constructions on which they have been employed.

Employers' liability.

Employers' liability laws have been passed to enable an employé to recover damages from his employer under certain conditions when he has been injured through accident occurring in the works of the employer. The common-law maxim that the principal is responsible for the acts of his agent does not apply where two or more persons are working together under the same employer and one of the employés is injured through the carelessness of his fellow-employé, although the one causing the accident is the agent of the principal, who under

the common law would be responsible. The old Roman law and the English and American practice under it held that the co-employé was a party to the accident. The injustice of this rule is seen by a single illustration. A weaver in a cotton factory, where there are hundreds of operatives, is injured by the neglect or carelessness of the engineer in charge of the motive power. Under the common law the weaver could not recover damages from the employer, because he was the co-employé of the engineer. So, one of thousands of employés of a railway system, sustaining injuries through the carelessness of a switchman whom he never saw, could recover no damages from the railway company, both being co-employés of the same employer. The injustice of this application of the common-law rule has been recognized, but the only way to avoid the difficulty was through specific legislation providing that under such conditions as those related, and similar ones, the doctrine of co-employment should not apply, and that the workman should have the same right to recover damages as a passenger upon a railway train. This legislation has upset some of the most notable distinctions of law.

The first agitation for legislation of this character occurred in England in 1880. A number of states in the Union have now enacted statutes fixing the liability of employers under certain conditions and relieving the employé from the application of the common-law rule. Where the employé himself is contributory to the injuries resulting from an accident he cannot recover, nor can he recover in some cases where he knows of the danger from the defects of tools or implements employed by him. The legislation upon the subject involves many features of legislation which need not be described here, such as those concerning the power of employés to make a contract, and those defining the conditions, often elaborate, which lead to the liability of the employer and the duties of the employé, and the relations in which damages for injuries sustained in employment may be recovered from the employer.

(B) The statutes thus far considered may be regarded as protective labour legislation. There is, besides, a large body of statutory laws enacted in the various states for the purpose of fixing the legal status of employers and employés and defining their rights and privileges as such.

Labour contract.

A great variety of statutes have been enacted in the various states relating to the labour contract. Among these are laws defining the labour contract, requiring notice of termination of contract, making it a misdemeanour to break a contract of service and thereby endanger human life or expose valuable property to serious injury, or to make a contract of service and accept transportation or pecuniary advancements with intent to defraud, prohibiting contracts of employment whereby employés waive the right to damages in case of injury, &c. A Federal statute makes it a misdemeanour for any one to prepay the transportation or in any way assist or encourage the importation of aliens under contract to perform labour or service of any kind in the United States, exceptions being made in the case of skilled labour that cannot otherwise be obtained, domestic servants and persons belonging to any of the recognized professions.

Licensed occupations.

The Federal government and nearly all the states and territories have statutory provisions requiring the examination and licensing of persons practising certain trades other than those in the class of recognized professions. The Federal statute relates only to engineers on steam vessels, masters, mates, pilots, &c. The occupations for which examinations and licences are required by the various state laws are those of barbers, horseshoers, elevator operators, plumbers, stationary firemen, steam engineers, telegraph operators on railroads and certain classes of mine workers and steam and street railway employés.

Labour organizations.

The right of combination and peaceable assembly on the part of employés is recognized at common law throughout the United States. Organizations of working-men formed for their mutual benefit, protection and improvement, such as for endeavouring to secure higher wages, shorter hours of labour or better working conditions, are nowhere regarded as unlawful. A number of states and the Federal government have enacted statutes providing for the incorporation of trade unions, but owing to the freedom from regulation or inspection enjoyed by unincorporated trade unions, very few have availed themselves of this privilege. A number of states have enacted laws tending to give special protection to and encourage trade unions. Thus, nearly one-half of the states have passed acts declaring it unlawful for employers to discharge workmen for joining labour organizations, or to make it a condition of employment that they shall not belong to such bodies. Laws of this kind have generally been held to be unconstitutional. Nearly all the states have laws protecting trade unions in the use of the union label, insignia of membership, credentials, &c., and making it a misdemeanour to counterfeit or fraudulently use them. A number of the states exempt labour organizations from the operations of the anti-trust and insurance acts.

Labour disputes.

Until recent years all legal action concerning labour disturbances was based upon the principles of the common law. Some of the states have now fairly complete statutory enactments concerning labour disturbances, while others have little or no legislation of this class. The right of employés to strike for any cause or for no cause is sustained by the common law everywhere in the United States. Likewise an employer has a right to discharge any or all of his employés when they have no contract with him, and he may refuse to employ any person or class of persons for any reason or for no reason. Agreements among strikers to take peaceable means to induce others to remain away from the works of an employer until he yields to the demands of the strikers are not held to be conspiracies under the common law, and the carrying out of such a purpose by peaceable persuasion and without violence, intimidation or threats, is not unlawful. However, any interference with the constitutional rights of another to employ whom he chooses or to labour when, where or on what terms he pleases, is illegal. The boycott has been held to be an illegal conspiracy in restraint of trade. The statutory enactments of the various states concerning labour disturbances are in part re-enactments of the rules of common law and in part more or less departures from or additions to the established principles. The list of such statutory enactments is a large one, and includes laws relating to blacklisting, boycotting, conspiracy against working-men, interference with employment, intimidation, picketing and strikes of railway employés; laws requiring statements of causes of discharge of employés and notice of strikes in advertisements for labour; laws prohibiting deception in the employment of labour and the hiring of armed

guards by employers; and laws declaring that certain labour agreements do not constitute conspiracy. Some of these laws have been held to be unconstitutional, and some have not yet been tested in the courts.

Arbitration and conciliation.

The laws just treated relate almost entirely to acts either of employers or of employés, but there is another form of law, namely, that providing for action to be taken by others in the effort to prevent working people from losing employment, either by their own acts or by those of their employers, or to settle any differences which arise out of controversies relating to wages, hours of labour, terms and conditions of employment, rules, &c. These laws provide for the mediation and the arbitration of labour disputes (see ARBITRATION AND CONCILIATION). Twenty-three states and the Federal government have laws or constitutional provisions of this nature. In some cases they provide for the appointment of state boards, and in others of local boards only. A number of states provide for local or special boards in addition to the regular state boards. In some states it is required that a member of a labour organization must be a member of the board, and, in general, both employers and employés must be represented. Nearly all state boards are required to attempt to mediate between the parties to a dispute when information is received of an actual or threatened labour trouble. Arbitration may be undertaken in some states on application from either party, in others on the application of both parties. An agreement to maintain the *status quo* pending arbitration is usually required. The modes of enforcement of obedience to the awards of the boards are various. Some states depend on publicity alone, some give the decisions the effect of judgments of courts of law which may be enforced by execution, while in other states disobedience to such decisions is punishable as for contempt of court. The Federal statute applies only to common carriers engaged in interstate commerce, and provides for an attempt to be made at mediation by two designated government officials in controversies between common carriers and their employés, and, in case of the failure of such an attempt, for the formation of a board of arbitration consisting of the same officials together with certain other parties to be selected. Such arbitration boards are to be formed only at the request or upon the consent of both parties to the controversy.

The judicial enforcement of labour laws.

The enforcement of laws by executive or judicial action is an important matter relating to labour legislation, for without action such laws would remain dead letters. Under the constitutions of the states, the governor is the commander-in-chief of the military forces, and he has the power to order the militia or any part of it into active service in case of insurrection, invasion, tumult, riots or breaches of the peace or imminent danger thereof. Frequent action has been taken in the case of strikes with the view of preventing or suppressing violence threatened or happening to persons or property, the effect being, however, that the militia protects those working or desiring to work, or the employers. The president of the United States may use the land and naval forces whenever by reason of insurrection, domestic violence, unlawful obstructions, conspiracy, combinations or assemblages of persons it becomes impracticable to enforce the laws of the land by the ordinary course of judicial proceedings, or when the execution of the laws is so hindered by reason of such events that any portion or class of the people are deprived thereby of their rights and privileges under the constitution and laws of the country. Under this general power the United States forces have been used for the protection of both employers and employés indirectly, the purpose being to protect mails and, as in the states, to see that the laws are carried out.

The power of the courts to interfere in labour disputes is through the injunction and punishment thereunder for contempt of court. It is a principle of law that when there are interferences, actual or threatened, with property or with rights of a pecuniary nature, and the common or statute law offers no adequate and immediate remedy for the prevention of injury, a court of equity may interpose and issue its order or injunction as to what must or must not be done, a violation of which writ gives the court which issued it the power to punish for contempt. The doctrine is that something is necessary to be done to stop at once the destruction of property and the obstruction of business, and the injunction is immediate in its action. This writ has been resorted to frequently for the indirect protection of employés and of employers.

(C. D. W.)

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1 The term "labour" (Lat. *labor*) means strictly any energetic work, though in general it implies hard work, but in modern parlance it is specially confined to industrial work of the kind done by the "working-classes."

2 H. D. Traill, *Social England*, v. 602 (1896).

3 W. Cunningham, *Growth of English Commerce and Industry*.

4 W. Cunningham, *Growth of English Commerce and Industry*.

5 From an "Essay on Trade" (1770), quoted in *History of Factory Legislation*, by B. L. Hutchins and A. Harrison (1903), pp. 5, 6.

6 Minutes of Evidence, House of Commons, 1876; quoted in *History of Factory Legislation*, by Harrison and Hutchinson, p. 179.

LABOUR PARTY, in Great Britain, the name given to the party in parliament composed of working-class representatives. As the result of the Reform Act of 1884, extending the franchise to a larger new working-class electorate, the votes of "labour" became more and more a matter of importance for politicians; and the Liberal party, seeking for the support of organized labour in the trade unions, found room for a few working-class representatives, who, however, acted and voted as Liberals. It was not till 1893 that the Independent Labour party, splitting off under Mr J. Keir Hardie (b. 1856) from the socialist organization known as the Social Democratic Federation (founded 1881), was formed at Bradford, with the object of getting independent candidates returned to parliament on a socialist programme. In 1900 Mr Keir Hardie, who as secretary of the Lanarkshire Miners' Union had stood unsuccessfully as a labour candidate for Mid-Lanark in 1888, and sat as M.P. for West Ham in 1892-1895, was elected to parliament for Merthyr-Tydvil by its efforts, and in 1906 it obtained the return of 30 members, Mr Keir Hardie being chairman of the group. Meanwhile in 1899 the Trade Union Congress instructed its parliamentary committee to call a conference on the question of labour representation; and in February 1900 this was attended by trade union delegates and also by representatives of the Independent Labour party, the Social Democratic Federation and the Fabian Society. A resolution was carried "to establish a distinct labour group in parliament, who shall have their own whips, and agree upon their own policy, which must embrace a readiness to co-operate with any party which for the time being may be engaged in promoting legislation in the direct interest of labour," and the committee (the Labour Representation Committee) was elected for the purpose. Under their auspices 29 out of 51 candidates were returned at the election of 1906. These groups were distinct from the Labour members ("Lib.-Labs") who obeyed the Liberal whips and acted with the Liberals. In 1908 the attempts to unite the parliamentary representatives of the Independent Labour party with the Trades Union members were successful. In June of that year the Miners' Federation, returning 15 members, joined the Independent Labour party, now known for parliamentary purposes as the "Labour Party"; other Trades Unions, such as the Amalgamated Society of Railway Servants, took the same step. This arrangement came into force at the general election of 1910, when the bulk of the miners' representatives signed the constitution of the Labour party, which after the election numbered 40 members of parliament.

LABRADOR,[1] a great peninsula in British North America, bounded E. by the North Atlantic, N. by Hudson Strait, W. by Hudson and James Bays, and S. by an arbitrary line extending eastwards from the

south-east corner of Hudson Bay, near 51° N., to the mouth of the Moisie river, on the Gulf of St Lawrence, in 50° N., and thence eastwards by the Gulf of St Lawrence. It extends from 50° to 63° N., and from 55° to 80° W., and embraces an approximate area of 511,000 sq. m. Recent explorations and surveys have added greatly to the knowledge of this vast region, and have shown that much of the peninsula is not a land of “awful desolation,” but a well-wooded country, containing latent resources of value in its forests, fisheries and minerals.

Physical Geography.—Labrador forms the eastern limb of the V in the Archaean protaxis of North America (see CANADA), and includes most of the highest parts of that area. Along some portions of the coasts of Hudson and also of Ungava Bay there is a fringe of lowland, but most of the interior is a plateau rising toward the south and east. The highest portion extends east and west between 52° and 54° N., where an immense granite area lies between the headwaters of the larger rivers of the four principal drainage basins; the lowest area is between Hudson Bay and Ungava Bay in the north-west, where the general level is not more than 500 ft. above the sea. The only mountains are the range along the Atlantic coast, extending from the Strait of Belle Isle to Cape Chidley; in their southern half they rarely exceed 1500 ft., but increase in the northern half to a general elevation of upwards of 2000 ft., with numerous sharp peaks between 3000 and 5000 ft., some say 7000 or 8000 ft. The coasts are deeply indented by irregular bays and fringed with rocky islands, especially along the high Atlantic coast, where long narrow fiords penetrate inland. Hamilton Inlet, 250 m. north of the Strait of Belle Isle, is the longest of these bays, with a length of 150 m. and a breadth varying from 2 to 30 m. The surface of the outer portions of the plateau is deeply seamed by valleys, cut into the crystalline rocks by the natural erosion of rivers, depending for their length and depth upon the volume of water flowing through them. The valley of the Hamilton river is the greatest, forms a continuation of the valley of the Inlet and extends 300 m. farther inland, while its bottom lies from 500 to 1500 ft. below the surface of the plateau into which it is cut. The depressions between the low ridges of the interior are occupied by innumerable lakes, many of great size, including Mistassini, Mishikamau, Clearwater, Kaniapiskau and Seal, all from 50 to 100 m. long. The streams discharging these lakes, before entering their valleys, flow on a level with the country and occupy all depressions, so that they frequently spread out into lake-expansions and are often divided into numerous channels by large islands. The descent into the valleys is usually abrupt, being made by heavy rapids and falls; the Hamilton, from the level interior, in a course of 12 m. falls 760 ft. into the head of its valley, this descent including a sheer drop of 315 ft. at the Grand Falls, which, taken with the large volume of the river, makes it the greatest fall in North America. The rivers of the northern and western watersheds drain about two-thirds of the peninsula; the most important of the former are the Koksoak, the largest river of Labrador (over 500 m. long), the George, Whale and Payne rivers, all flowing into Ungava Bay. The large rivers flowing westwards into Hudson Bay are the Povungnituk, Kogaluk, Great Whale, Big, East Main and Rupert, varying in length from 300 to 500 m. The rivers flowing south are exceedingly rapid, the Moisie, Romaine, Natashkwan and St Augustine being the most important; all are about 300 m. long. The Atlantic coast range throws most of the drainage northwards into the Ungava basin, and only small streams fall into the ocean, except the Hamilton, North-west and Kenamou, which empty into the head of Hamilton Inlet.

Geology.—The peninsula is formed largely of crystalline schists and gneisses associated with granites and other igneous rocks, all of archaean age; there are also large areas of non-fossiliferous, stratified limestones, cherts, shales and iron ores, the unaltered equivalents of part of the schists and gneisses. Narrow strips of Animikie (Upper Huronian or perhaps Cambrian) rocks occur along the low-lying southern and western shores, but there are nowhere else indications of the peninsula having been below sea-level since an exceedingly remote time. During the glacial period the country was covered by a thick mantle of ice, which flowed out radially from a central collecting-ground. Owing to the extremely long exposure to denudation, to the subsequent removal of the greater part of the decomposed rock by glaciers, and to the unequal weathering of the component rocks, it is now a plateau, which ascends somewhat abruptly within a few miles of the coast-line to heights of between 500 and 2000 ft. The interior is undulating, and traversed by ridges of low, rounded hills, seldom rising more than 500 ft. above the surrounding general level.

Minerals.—The mineral wealth is undeveloped. Thick beds of excellent iron ore cover large areas in the interior and along the shores of Hudson and Ungava Bays. Large areas of mineralized Huronian rocks have also been discovered, similar to areas in other parts of Canada, where they contain valuable deposits of gold, copper, nickel and lead; good prospects of these metals have been found.

Climate.—The climate ranges from cold temperate on the southern coasts to arctic on Hudson Strait, and is generally so rigorous that it is doubtful if the country is fit for agriculture north of 51°, except on the low grounds near the coast. On James Bay good crops of potatoes and other roots are grown at Fort George, 54° N., while about the head of Hamilton Inlet, on the east coast, and in nearly the same latitude, similar crops are easily cultivated. On the outer coasts the climate is more rigorous, being affected by the floating ice borne southwards on the Arctic current. In the interior at Mistassini, 50° 30′ N, a crop of potatoes is raised annually, but they rarely mature. No attempts at agriculture have been made elsewhere inland. Owing to the absence of grass plains, there is little likelihood that it will ever be a grazing district. There are only two seasons in the interior: winter begins early in October, with the freezing of the small lakes, and lasts until the middle of June, when the ice on rivers and lakes melts and summer suddenly bursts forth. From unconnected observations the lowest temperatures of the interior range from −50° F. to −60° F., and are slightly higher along the coast. The mean summer temperature of the interior is about 55° F., with frosts during every month in the northern portion. On the Atlantic coast and in Hudson Bay the larger bays freeze solid between the 1st and 15th of December, and these coasts remain ice-bound until late in June. Hudson Strait is usually sufficiently open for navigation about the 10th of July.

Vegetation.—The southern half is included in the sub-Arctic forest belt, and nine species of trees constitute the whole arborescent flora of this region; these species are the white birch, poplar, aspen, cedar. Banksian pine, white and black spruce, balsam fir and larch. The forest is continuous over the southern portion to 53° N., the only exceptions being the summits of rocky hills and the outer islands of the Atlantic and Hudson Bay, while the low margins and river valleys contain much valuable timber. To the

northward the size and number of barren areas rapidly increase, so that in 55° N. more than half the country is treeless, and two degrees farther north the limit of trees is reached, leaving, to the northward, only barrens covered with low Arctic flowering plants, sedges and lichens.

Fisheries.—The fisheries along the shores of the Gulf of St Lawrence and of the Atlantic form practically the only industry of the white population scattered along the coasts, as well as of a large proportion of the inhabitants of Newfoundland. The census (1891) of Newfoundland gave 10,478 men, 2081 women and 828 children employed in the Labrador fishery in 861 vessels, of which the tonnage amounted to 33,689; the total catch being 488,788 quintals of cod, 1275 tierces of salmon and 3828 barrels of herring, which, compared with the customs returns for 1880, showed an increase of cod and decreases of salmon and herring. The salmon fishery along the Atlantic coast is now very small, the decrease being probably due to excessive use of cod-traps. The cod fishery is now carried on along the entire Atlantic coast and into the eastern part of Ungava Bay, where excellent catches have been made since 1893. The annual value of the fisheries on the Canadian portion of the coast is about $350,000. The fisheries of Hudson Bay and of the interior are wholly undeveloped, though both the bay and the large lakes of the interior are well stocked with several species of excellent fish, including Arctic trout, brook trout, lake trout, white fish, sturgeon and cod.

Population.—The population is approximately 14,500, or about one person to every 35 sq. m.; it is made up of 3500 Indians, 2000 Eskimo and 9000 whites. The last are confined to the coasts and to the Hudson Bay Company's trading posts of the interior. On the Atlantic coast they are largely immigrants from Newfoundland, together with descendants of English fishermen and Hudson Bay Company's servants. To the north of Hamilton Inlet they are of more or less mixed blood from marriage with Eskimo women. The Newfoundland census of 1901 gave 3634 as the number of permanent white residents along the Atlantic coast, and the Canadian census (1891) gave a white population of 5728, mostly French Canadians, scattered along the north shore of the Gulf of St Lawrence, while the whites living at the inland posts did not exceed fifty persons. It is difficult to give more than a rough approximation of the number of the native population, owing to their habits of roving from one trading post to another, and the consequent liability of counting the same family several times if the returns are computed from the books of the various posts, the only available data for an enumeration. The following estimate is arrived at in this manner: Indians—west coast, 1200; Ungava Bay, 200; east coast, 200; south coast, 1900. Eskimo—Atlantic coast, 1000; south shore of Hudson Strait, 800; east coast of Hudson Bay, 500. The Indians roam over the southern interior in small bands, their northern limit being determined by that of the trees on which they depend for fuel. They live wholly by the chase, and their numbers are dependent upon the deer and other animals; as a consequence there is a constant struggle between the Indian and the lower animals for existence, with great slaughter of the latter, followed by periodic famines among the natives, which greatly reduce their numbers and maintain an equilibrium. The native population has thus remained about stationary for the last two centuries. The Indians belong to the Algonquin family, and speak dialects of the Cree language. By contact with missionaries and fur-traders they are more or less civilized, and the great majority of them are Christians. Those living north of the St Lawrence are Roman Catholic, while the Indians of the western watershed have been converted by the missionaries of the Church Mission Society; the eastern and northern bands have not yet been reached by the missionaries, and are still pagans. The Eskimo of the Atlantic coast have long been under the guidance of the Moravian missionaries, and are well advanced in civilization; those of Hudson Bay have been taught by the Church Mission Society, and promise well; while the Eskimo of Hudson Strait alone remain without teachers, and are pagans. The Eskimo live along the coasts, only going inland for short periods to hunt the barren-ground caribou for their winter clothing; the rest of the year they remain on the shore or the ice, hunting seals and porpoises, which afford them food, clothing and fuel. The christianized Indians and Eskimo read and write in their own language; those under the teaching of the Church Mission Society use a syllabic character, the others make use of the ordinary alphabet.

Political Review.—The peninsula is divided politically between the governments of Canada, Newfoundland and the province of Quebec. The government of Newfoundland, under Letters Patent of the 28th of March 1876, exercises jurisdiction along the Atlantic coast; the boundary between its territory and that of Canada is a line running due north and south from Anse Sablon, on the north shore of the Strait of Belle Isle, to 52° N., the remainder of the boundary being as yet undetermined. The northern boundary of the province of Quebec follows the East Main river to its source in Patamisk lake, thence by a line due east to the Ashuanipi branch of the Hamilton river; it then follows that river and Hamilton Inlet to the coast area under the jurisdiction of Newfoundland. The remainder of the peninsula, north of the province of Quebec, by order in council dated the 18th of December 1897, was constituted Ungava District, an unorganized territory under the jurisdiction of the government of the Dominion of Canada.

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(A. P. LO.; A. P. C.)

1 From the Portuguese *llavrador* (a yeoman farmer). The name was originally given to Greenland (1st half of 16th century) and was transferred to the peninsula in the belief that it formed part of the same country as Greenland. The name was bestowed "because he who first gave notice of seeing it [Greenland] was a farmer (*llavrador*) from the Azores." See the historical sketch of Labrador by W. S. Wallace in Grenfell's *Labrador, &c.*, 1909.

LABRADORITE, or Labrador Spar, a lime-soda felspar of the plagioclase (*q.v.*) group, often cut and polished as an ornamental stone. It takes its name from the coast of Labrador, where it was discovered, as boulders, by the Moravian Mission about 1770, and specimens were soon afterwards sent to the secretary in London, the Rev. B. Latrobe. The felspar itself is generally of a dull grey colour, with a rather greasy lustre, but many specimens exhibit in certain directions a magnificent play of colours—blue, green, orange, purple or red; the colour in some specimens changing when the stone is viewed in different directions. This optical effect, known sometimes as "labradorescence," seems due in some cases to the presence of minute laminae of certain minerals, like göthite or haematite, arranged parallel to the surface which reflects the colour; but in other cases it may be caused not so much by inclusions as by a delicate lamellar structure in the felspar. An aventurine effect is produced by the presence of microscopic enclosures. The original labradorite was found in the neighbourhood of Nain, notably in a lagoon about 50 m. inland, and in St Paul's Island. Here it occurs with hypersthene, of a rich bronzy sheen, forming a coarse-grained norite. When wet, the stones are remarkably brilliant, and have been called by the natives "fire rocks." Russia has also yielded chatoyant labradorite, especially near Kiev and in Finland; a fine blue labradorite has been brought from Queensland; and the mineral is also known in several localities in the United States, as at Keeseville, in Essex county, New York. The ornamental stone from south Norway, now largely used as a decorative material in architecture, owes its beauty to a felspar with a blue opalescence, often called labradorite, but really a kind of orthoclase which Professor W. C. Brögger has termed cryptoperthite, whilst the rock in which it occurs is an augite-syenite called by him laurvigite, from its chief locality, Laurvik in Norway. Common labradorite, without play of colour, is an important constituent of such rocks as gabbro, diorite, andesite, dolerite and basalt. (See Plagioclase.) Ejected crystals of labradorite are found on Monti Rossi, a double parasitic cone on Etna.

The term labradorite is unfortunately used also as a rock-name, having been applied by Fouqué and Lévy to a group of basic rocks rich in augite and poor in olivine.

(F. W. R.*)

LABRADOR TEA, the popular name for a species of *Ledum*, a small evergreen shrub growing in bogs and swamps in Greenland and the more northern parts of North America. The leaves are tough, densely covered with brown wool on the under face, fragrant when crushed and have been used as a substitute for tea. The plant is a member of the heath family (Ericaceae).

LABRUM (Lat. for "lip"), the large vessel of the warm bath in the Roman thermae. These were cut out of great blocks of marble and granite, and have generally an overhanging lip. There is one in the Vatican of porphyry over 12 ft. in diameter. The term *labrum* is used in zoology, of a lip or lip-like part; in entomology it is applied specifically to the upper lip of an insect, the lower lip being termed *labium*.

LA BRUYÈRE, JEAN DE (1643-1696), French essayist and moralist, was born in Paris on the 16th of August 1645, and not as was once the common statement, at Dourdan (Seine-et-Oise) in 1639. His family was of the middle class, and his reference to a certain Geoffroy de la Bruyère, a crusader, is only a satirical illustration of a method of self-ennoblement common in France as in some other countries. Indeed he himself always signed the name Delabruyère in one word, thus avowing his *roture*. His progenitors, however, were of respectable position, and he could trace them back at least as far as his great-grandfather, who had been a strong Leaguer. La Bruyère's own father was controller-general of finance to the Hôtel de Ville. The son was educated by the Oratorians and at the university of Orleans; he was called to the bar, and in 1673 bought a post in the revenue department at Caen, which gave the status of noblesse and a certain income. In 1687 he sold this office. His predecessor in it was a relation of Bossuet,

and it is thought that the transaction was the cause of La Bruyère's introduction to the great orator. Bossuet, who from the date of his own preceptorship of the dauphin, was a kind of agent-general for tutorships in the royal family, introduced him in 1684 to the household of the great Condé, to whose grandson Henri Jules de Bourbon as well as to that prince's girl-bride Mlle de Nantes, one of Louis XIV.'s natural children, La Bruyère became tutor. The rest of his life was passed in the household of the prince or else at court, and he seems to have profited by the inclination which all the Condé family had for the society of men of letters. Very little is known of the events of this part—or, indeed, of any part—of his life. The impression derived from the few notices of him is of a silent, observant, but somewhat awkward man, resembling in manners Joseph Addison, whose master in literature La Bruyère undoubtedly was. Yet despite the numerous enemies which his book raised up for him, most of these notices are favourable—notably that of Saint-Simon, an acute judge and one bitterly prejudiced against *roturiers* generally. There is, however, a curious passage in a letter from Boileau to Racine in which he regrets that "nature has not made La Bruyère as agreeable as he would like to be." His *Caractères* appeared in 1688, and at once, as Nicolas de Malezieu had predicted, brought him "bien des lecteurs et bien des ennemis." At the head of these were Thomas Corneille, Fontenelle and Benserade, who were pretty clearly aimed at in the book, as well as innumerable other persons, men and women of letters as well as of society, on whom the cap of La Bruyère's fancy-portraits was fitted by manuscript "keys" compiled by the scribblers of the day. The friendship of Bossuet and still more the protection of the Condés sufficiently defended the author, and he continued to insert fresh portraits of his contemporaries in each new edition of his book, especially in the 4th (1689). Those, however, whom he had attacked were powerful in the Academy, and numerous defeats awaited La Bruyère before he could make his way into that guarded hold. He was defeated thrice in 1691, and on one memorable occasion he had but seven votes, five of which were those of Bossuet, Boileau, Racine, Pellisson and Bussy-Rabutin. It was not till 1693 that he was elected, and even then an epigram, which, considering his admitted insignificance in conversation, was not of the worst, *haesit lateri*:—

"Quand la Bruyère se présente
Pourquoi faut il crier haro?
Pour faire un nombre de quarante
Ne falloit il pas un zéro?"

His unpopularity was, however, chiefly confined to the subjects of his sarcastic portraiture, and to the hack writers of the time, of whom he was wont to speak with a disdain only surpassed by that of Pope. His description of the *Mercure galant* as "*immédiatement au dessous de rien*" is the best-remembered specimen of these unwise attacks; and would of itself account for the enmity of the editors, Fontenelle and the younger Corneille. La Bruyère's discourse of admission at the Academy, one of the best of its kind, was, like his admission itself, severely criticized, especially by the partisans of the "Moderns" in the "Ancient and Modern" quarrel. With the *Caractères*, the translation of Theophrastus, and a few letters, most of them addressed to the prince de Condé, it completes the list of his literary work, with the exception of a curious and much-disputed posthumous treatise. La Bruyère died very suddenly, and not long after his admission to the Academy. He is said to have been struck with dumbness in an assembly of his friends, and, being carried home to the Hôtel de Condé, to have expired of apoplexy a day or two afterwards, on the 10th of May 1696. It is not surprising that, considering the recent panic about poisoning, the bitter personal enmities which he had excited and the peculiar circumstances of his death, suspicions of foul play should have been entertained, but there was apparently no foundation for them. Two years after his death appeared certain *Dialogues sur le Quiétisme*, alleged to have been found among his papers incomplete, and to have been completed by the editor. As these dialogues are far inferior in literary merit to La Bruyère's other works, their genuineness has been denied. But the straightforward and circumstantial account of their appearance given by this editor, the Abbé du Pin, a man of acknowledged probity, the intimacy of La Bruyère with Bossuet, whose views in his contest with Fénelon these dialogues are designed to further, and the entire absence, at so short a time after the alleged author's death, of the least protest on the part of his friends and representatives, seem to be decisive in their favour.

Although it is permissible to doubt whether the value of the *Caractères* has not been somewhat exaggerated by traditional French criticism, they deserve beyond all question a high place. The plan of the book is thoroughly original, if that term may be accorded to a novel and skilful combination of existing elements. The treatise of Theophrastus may have furnished the first idea, but it gave little more. With the ethical generalizations and social Dutch painting of his original La Bruyère combined the peculiarities of the Montaigne essay, of the *Pensées* and *Maximes* of which Pascal and La Rochefoucauld are the masters respectively, and lastly of that peculiar 17th-century product, the "portrait" or elaborate literary picture of the personal and mental characteristics of an individual. The result was quite unlike anything that had been before seen, and it has not been exactly reproduced since, though the essay of Addison and Steele resembles it very closely, especially in the introduction of fancy portraits. In the titles of his work, and in its extreme desultoriness, La Bruyère reminds the reader of Montaigne, but he aimed too much at sententiousness to attempt even the apparent continuity of the great essayist. The short paragraphs of which his chapters consist are made up of maxims proper, of criticisms literary and ethical, and above all of the celebrated sketches of individuals baptized with names taken from the plays and romances of the time. These last are the great feature of the work, and that which gave it its immediate if not its enduring popularity. They are wonderfully piquant, extraordinarily life-like in a certain sense, and must have given great pleasure or more frequently exquisite pain to the originals, who were in many cases unmistakable and in most recognizable.

But there is something wanting in them. The criticism of Charpentier, who received La Bruyère at the Academy, and who was of the opposite faction, is in fact fully justified as far as it goes. La Bruyère literally "est [trop] descendu dans le particulier." He has neither, like Molière, embodied abstract peculiarities in a

single life-like type, nor has he, like Shakespeare, made the individual pass *sub speciem aeternitatis*, and serve as a type while retaining his individuality. He is a photographer rather than an artist in his portraiture. So, too, his maxims, admirably as they are expressed, and exact as their truth often is, are on a lower level than those of La Rochefoucauld. Beside the sculpturesque precision, the Roman brevity, the profoundness of ethical intuition "piercing to the accepted hells beneath," of the great Frondeur, La Bruyère has the air of a literary *petit-maître* dressing up superficial observation in the finery of *esprit*. It is indeed only by comparison that he loses, but then it is by comparison that he is usually praised. His abundant wit and his personal "malice" have done much to give him his rank in French literature, but much must also be allowed to his purely literary merits. With Racine and Massillon he is probably the very best writer of what is somewhat arbitrarily styled classical French. He is hardly ever incorrect—the highest merit in the eyes of a French academic critic. He is always well-bred, never obscure, rarely though sometimes "precious" in the turns and niceties of language in which he delights to indulge, in his avowed design of attracting readers by form, now that, in point of matter, "tout est dit." It ought to be added to his credit that he was sensible of the folly of impoverishing French by ejecting old words. His chapter on "Les ouvrages de l'esprit" contains much good criticism, though it shows that, like most of his contemporaries except Fénelon, he was lamentably ignorant of the literature of his own tongue.

The editions of La Bruyère, both partial and complete, have been extremely numerous. *Les Caractères de Théophraste traduits du Grec, avec les caractères et les mœurs de ce siècle*, appeared for the first time in 1688, being published by Michallet, to whose little daughter, according to tradition, La Bruyère gave the profits of the book as a dowry. Two other editions, little altered, were published in the same year. In the following year, and in each year until 1694, with the exception of 1693, a fresh edition appeared, and, in all these five, additions, omissions and alterations were largely made. A ninth edition, not much altered, was put forth in the year of the author's death. The Academy speech appeared in the eighth edition. The Quietist dialogues were published in 1699; most of the letters, including those addressed to Condé, not till 1867. In recent times numerous editions of the complete works have appeared, notably those of Walckenaer (1845), Servois (1867, in the series of *Grands écrivains de la France*), Asselineau (a scholarly reprint of the last original edition, 1872) and finally Chassang (1876); the last is one of the most generally useful, as the editor has collected almost everything of value in his predecessors. The literature of "keys" to La Bruyère is extensive and apocryphal. Almost everything that can be done in this direction and in that of general illustration was done by Edouard Fournier in his learned and amusing *Comédie de La Bruyère* (1866); M. Paul Morillot contributed a monograph on La Bruyère to the series of *Grands écrivains français* in 1904.

(G. Sa.)

LABUAN (a corruption of the Malay word *labuh-an*, signifying an "anchorage"), an island of the Malay Archipelago, off the north-west coast of Borneo in 5° 16′ N., 115° 15′ E. Its area is 30.23 sq. m.; it is distant about 6 m. from the mainland of Borneo at the nearest point, and lies opposite to the northern end of the great Brunei Bay. The island is covered with low hills rising from flats near the shore to an irregular plateau near the centre. About 1500 acres are under rice cultivation, and there are scattered patches of coco-nut and sago palms and a few vegetable gardens, the latter owned for the most part by Chinese. For the rest Labuan is covered over most of its extent by vigorous secondary growth, amidst which the charred trunks of trees rise at frequent intervals, the greater part of the forest of the island having been destroyed by great accidental conflagrations. Labuan was ceded to Great Britain in 1846, chiefly through the instrumentality of Sir James Brooke, the first raja of Sarawak, and was occupied two years later.

At the time of its cession the island was uninhabited, but in 1881 the population numbered 5731, though it had declined to 5361 in 1891. The census returns for 1901 give the population at 8411. The native population consists of Malay fishermen, Chinese, Tamils and small shifting communities of Kadayans, Tutongs and other natives of the neighbouring Bornean coast. There are about fifty European residents. At the time of its occupation by Great Britain a brilliant future was predicted for Labuan, which it was thought would become a second Singapore. These hopes have not been realized. The coal deposits, which are of somewhat indifferent quality, have been worked with varying degrees of failure by a succession of companies, one of which, the Labuan & Borneo Ltd., liquidated in 1902 after the collapse of a shaft upon which large sums had been expended. It was succeeded by the Labuan Coalfields Ltd. The harbour is a fine one, and the above-named company possesses three wharves capable of berthing the largest Eastern-going ocean steamers. To-day Labuan chiefly exists as a trading depôt for the natives of the neighbouring coast of Borneo, who sell their produce—beeswax, edible birds-nests, camphor, gutta, trepang, &c.,—to Chinese shopkeepers, who resell it in Singapore. There is also a considerable trade in sago, much of which is produced on the mainland, and there are three small sago-factories on the island where the raw product is converted into flour. The Eastern Extension Telegraph Company has a central station at Labuan with cables to Singapore, Hong-Kong and British North Borneo. Monthly steam communication is maintained by a German firm between Labuan, Singapore and the Philippines. The colony joined the Imperial Penny Postage Union in 1889. There are a few miles of road on the island and a metre-gauge railway from the harbour to the coal mines, the property of the company. There is a Roman Catholic church with a resident priest, an Anglican church, visited periodically by a clergyman from the mainland, two native and Chinese schools, and a sailors' club, built by the Roman Catholic mission. The bishop of Singapore and Sarawak is also bishop of Labuan. The European graveyard has repeatedly been the scene of outrages perpetrated, it is believed, by natives from the mainland of Borneo, the graves being rifled and the hair of the head and other parts of the corpses being carried off to furnish ornaments to weapons and ingredients in the magic

philtres of the natives. Pulau Dat, a small island in the near neighbourhood of Labuan, is the site of a fine coco-nut plantation whence nuts and copra are exported in bulk. The climate is hot and very humid.

Until 1869 the expenditure of the colony was partly defrayed by imperial grants-in-aid, but after that date it was left to its own resources. A garrison of imperial troops was maintained until 1871, when the troops were withdrawn after many deaths from fever and dysentery had occurred among them. Since then law and order have been maintained without difficulty by a small mixed police force of Punjabis and Malays. From the 1st of January 1890 to the 1st of January 1906 Labuan was transferred for administrative purposes to the British North Borneo Company, the governor for the time being of the company's territories holding also the royal commission as governor of Labuan. This arrangement did not work satisfactorily and called forth frequent petitions and protests from the colonists. Labuan was then placed under the government of the Straits Settlements, and is administered by a deputy governor who is a member of the Straits Civil Service.

LABURNUM, known botanically as *Laburnum vulgare* (or *Cytisus Laburnum*), a familiar tree of the pea family (Leguminosae); it is also known as "golden chain" and "golden rain." It is a native of the mountains of France, Switzerland, southern Germany, northern Italy, &c., has long been cultivated as an ornamental tree throughout Europe, and was introduced into north-east America by the European colonists. Gerard records it as growing in his garden in 1597 under the names of anagyris, laburnum or beane trefoyle (*Herball*, p. 1239), but the date of its introduction into England appears to be unknown. In France it is called *l'aubour*—a corruption from laburnum according to Du Hamel—as also *arbois*, *i.e. arc-bois*, "the wood having been used by the ancient Gauls for bows. It is still so employed in some parts of the Mâconnois, where the bows are found to preserve their strength and elasticity for half a century" (Loudon, *Arboretum*, ii. 590).

Several varieties of this tree are cultivated, differing in the size of the flowers, in the form of the foliage, &c., such as the "oak-leafed" (*quercifolium*), *pendulum*, *crispum*, &c.; var. *aureum* has golden yellow leaves. One of the most remarkable forms is *Cytisus Adami* (*C. purpurascens*), which bears three kinds of blossoms, viz. racemes of pure yellow flowers, others of a purple colour and others of an intermediate brick-red tint. The last are hybrid blossoms, and are sterile, with malformed ovules, though the pollen appears to be good. The yellow and purple "reversions" are fertile. It originated in Paris in 1828 by M. Adam, who inserted a "shield" of the bark of Cytisus purpureus into a stock of Laburnum. A vigorous shoot from this bud was subsequently propagated. Hence it would appear that the two distinct species became united by their cambium layers, and the trees propagated therefrom subsequently reverted to their respective parentages in bearing both yellow and purple flowers, but produce as well blossoms of an intermediate or hybrid character. Such a result may be called a "graft-hybrid." For full details see Darwin's *Animals and Plants under Domestication*.

The laburnum has highly poisonous properties. The roots taste like liquorice, which is a member of the same family as the laburnum. It has proved fatal to cattle, though hares and rabbits eat the bark of it with avidity (*Gardener's Chronicle*, 1881, vol. xvi. p. 666). The seeds also are highly poisonous, possessing emetic as well as acrid narcotic principles, especially in a green state. Gerard (*loc. cit.*) alludes to the powerful effect produced on the system by taking the bruised leaves medicinally. Pliny states that bees will not visit the flowers (*N.H.* xvi. 31), but this is an error, as bees and butterflies play an important part in the fertilization of the flowers, which they visit for the nectar.

The heart wood of the laburnum is of a dark reddish-brown colour, hard and durable, and takes a good polish. Hence it is much prized by turners, and used with other coloured woods for inlaying purposes. The laburnum has been called false ebony from this character of its wood.

LABYRINTH (Gr. λαβύρινθος, Lat. *labyrinthus*), the name given by the Greeks and Romans to buildings, entirely or partly subterranean, containing a number of chambers and intricate passages, which rendered egress puzzling and difficult. The word is considered by some to be of Egyptian origin, while others connect it with the Gr. λαῦρα, the passage of a mine. Another derivation suggested is from λάβρυς, a Lydian or Carian word meaning a "double-edged axe" (*Journal of Hellenic Studies*, xxi. 109, 268), according to which the Cretan labyrinth or palace of Minos was the house of the double axe, the symbol of Zeus.

Pliny (*Nat. Hist.* xxxvi. 19, 91) mentions the following as the four famous labyrinths of antiquity.

1. The Egyptian: of which a description is given by Herodotus (ii. 148) and Strabo (xvii. 811). It was situated to the east of Lake Moeris, opposite the ancient site of Arsinoë or Crocodilopolis. According to Egyptologists, the word means "the temple at the entrance of the lake." According to Herodotus, the

entire building, surrounded by a single wall, contained twelve courts and 3000 chambers, 1500 above and 1500 below ground. The roofs were wholly of stone, and the walls covered with sculpture. On one side stood a pyramid 40 orgyiae, or about 243 ft. high. Herodotus himself went through the upper chambers, but was not permitted to visit those underground, which he was told contained the tombs of the kings who had built the labyrinth, and of the sacred crocodiles. Other ancient authorities considered that it was built as a place of meeting for the Egyptian nomes or political divisions; but it is more likely that it was intended for sepulchral purposes. It was the work of Amenemhē III., of the 12th dynasty, who lived about 2300 B.C. It was first located by the Egyptologist Lepsius to the north of Hawara in the Fayum, and (in 1888) Flinders Petrie discovered its foundation, the extent of which is about 1000 ft. long by 800 ft. wide. Immediately to the north of it is the pyramid of Hawara, in which the mummies of the king and his daughter have been found (see W. M. Flinders Petrie, *Hawara, Biahmu, and Arsinoë*, 1889).

2. The Cretan: said to have been built by Daedalus on the plan of the Egyptian, and famous for its connexion with the legend of the Minotaur. It is doubtful whether it ever had any real existence and Diodorus Siculus says that in his time it had already disappeared. By the older writers it was placed near Cnossus, and is represented on coins of that city, but nothing corresponding to it has been found during the course of the recent excavations, unless the royal palace was meant. The rocks of Crete are full of winding caves, which gave the first idea of the legendary labyrinth. Later writers (for instance, Claudian, *De sexto Cons. Honorii*, 634) place it near Gortyna, and a set of winding passages and chambers close to that place is still pointed out as the labyrinth; these are, however, in reality ancient quarries.

3. The Lemnian: similar in construction to the Egyptian. Remains of it existed in the time of Pliny. Its chief feature was its 150 columns.

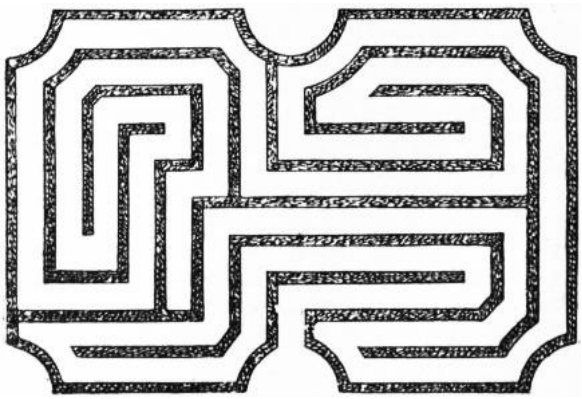


FIG. 1.—Labyrinth of London and Wise.

4. The Italian: a series of chambers in the lower part of the tomb of Porsena at Clusium. This tomb was 300 ft. square and 50 ft. high, and underneath it was a labyrinth, from which it was exceedingly difficult to find an exit without the assistance of a clew of thread. It has been maintained that this tomb is to be recognized in the mound named Poggio Gajella near Chiusi.

Lastly, Pliny (xxxvi. 19) applies the word to a rude drawing on the ground or pavement, to some extent anticipating the modern or garden maze.

On the Egyptian labyrinth see A. Wiedemann, *Ägyptische Geschichte* (1884), p. 258, and his edition of the second book of Herodotus (1890); on the Cretan, C. Höck, *Kreta* (1823-1829), and A. J. Evans in *Journal of Hellenic Studies*; on the subject generally, articles in Roscher's *Lexikon der Mythologie* and Daremberg and Saglio's *Dictionnaire des antiquités*.

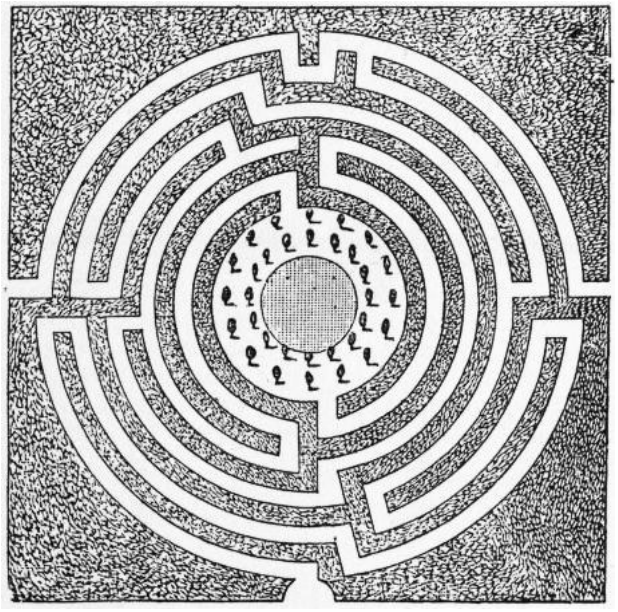


FIG. 2.—Labyrinth of Batty Langley.

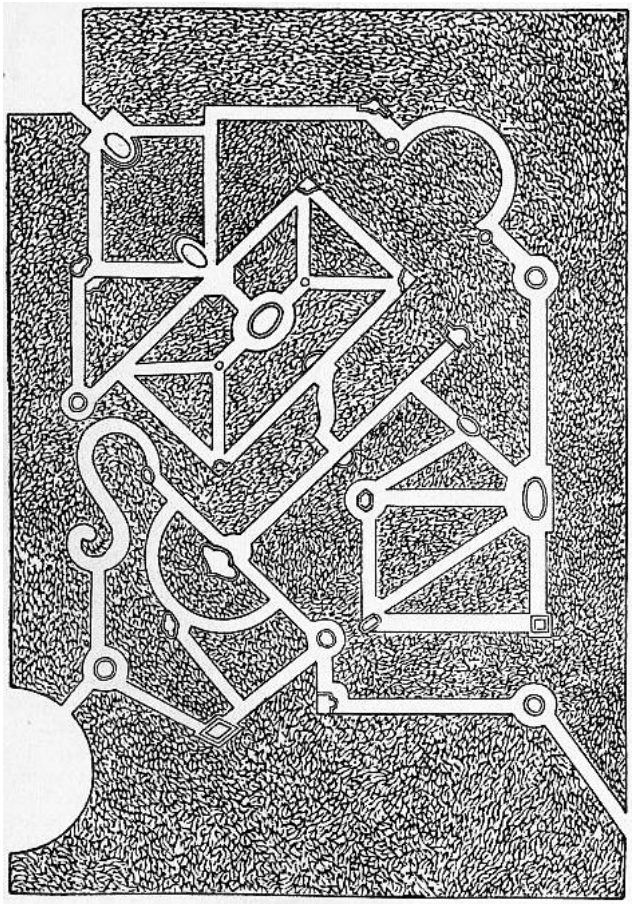


FIG. 3.—Labyrinth at Versailles.

In gardening, a labyrinth or *maze* means an intricate network of pathways enclosed by hedges or plantations, so that those who enter become bewildered in their efforts to find the centre or make their exit. It is a remnant of the old geometrical style of gardening. There are two methods of forming it. That which is perhaps the more common consists of walks, or alleys as they were formerly called, laid out and kept to an equal width or nearly so by parallel hedges, which should be so close and thick that the eye cannot readily penetrate them. The task is to get to the centre, which is often raised, and generally contains a covered seat, a fountain, a statue or even a small group of trees. After reaching this point the next thing is to return to the entrance, when it is found that egress is as difficult as ingress. To every design of this sort there should be a key, but even those who know the key are apt to be perplexed. Sometimes the design consists of alleys only, as in fig. 1, published in 1706 by London and Wise. In such a case, when the farther end is reached, there only remains to travel back again. Of a more pretentious character was a design published by Switzer in 1742. This is of octagonal form, with very numerous parallel hedges and paths, and “six different entrances, whereof there is but one that leads to the centre, and that is attended with some difficulties and a great many stops.” Some of the older designs for labyrinths, however, avoid this close parallelism of the alleys, which, though equally involved and intricate in their windings, are carried through blocks of thick planting, as shown in fig. 2, from a design published in 1728 by Batty Langley. These blocks of shrubbery have been called wildernesses. To this latter class belongs the celebrated labyrinth at Versailles (fig. 3), of which Switzer observes, that it “is allowed by all to be the noblest of its kind in the world.”

FIG. 4.—Maze at Hampton Court.

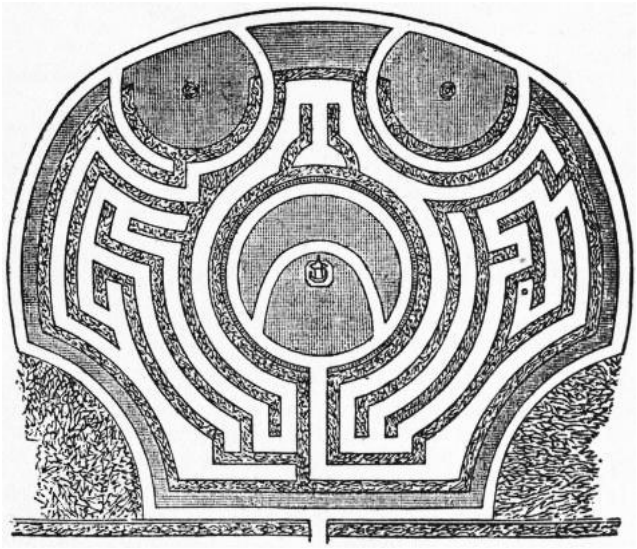


Fig. 5.—Maze at Somerleyton Hall.

Whatever style be adopted, it is essential that there should be a thick healthy growth of the hedges or shrubberies that confine the wanderer. The trees used should be impenetrable to the eye, and so tall that no one can look over them; and the paths should be of gravel and well kept. The trees chiefly used for the hedges, and the best for the purpose, are the hornbeam among deciduous trees, or the yew among evergreens. The beech might be used instead of the hornbeam on suitable soil. The green holly might be planted as an evergreen with very good results, and so might the American arbor vitae if the natural soil presented no obstacle. The ground must be well prepared, so as to give the trees a good start, and a mulching of manure during the early years of their growth would be of much advantage. They must be kept trimmed in or clipped, especially in their earlier stages; trimming with the knife is much to be preferred to clipping with shears. Any plants getting much in advance of the rest should be topped, and the whole kept to some 4 ft. or 5 ft. in height until the lower parts are well thickened, when it may be allowed to acquire the allotted height by moderate annual increments. In cutting, the hedge (as indeed all hedges) should be kept broadest at the base and narrowed upwards, which prevents it from getting thin and bare below by the stronger growth being drawn to the tops.

The maze in the gardens at Hampton Court Palace (fig. 4) is considered one of the finest examples in England. It was planted in the early part of the reign of William III., though it has been supposed that a maze had existed there since the time of Henry VIII. It is constructed on the hedge and alley system, and was, it is believed, originally planted with hornbeam, but many of the plants have been replaced by hollies, yews, &c., so that the vegetation is mixed. The walks are about half a mile in length, and the ground occupied is a little over a quarter of an acre. The centre contains two large trees, with a seat beneath each. The key to reach this resting place is to keep the right hand continuously in contact with the hedge from first to last, going round all the stops.

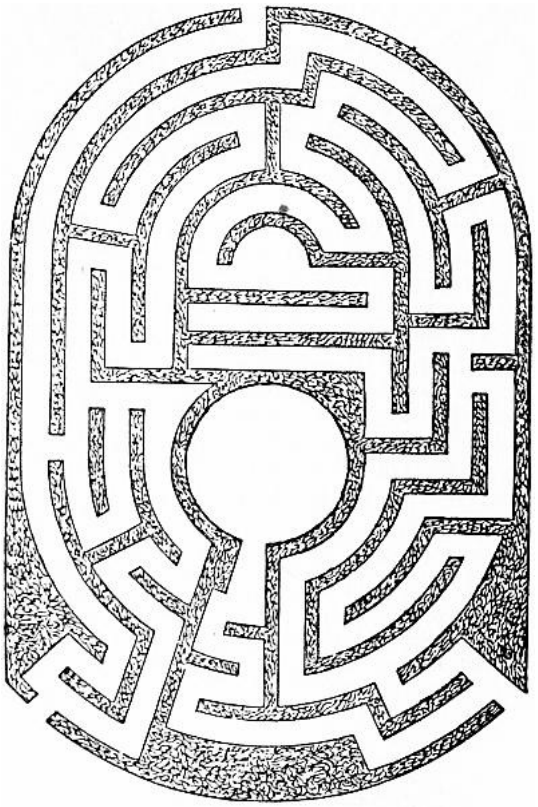


Fig. 6.—Labyrinth in Horticultural Society’s Garden.

The maze in the gardens at Somerleyton Hall, near Lowestoft (fig. 5), was designed by Mr John Thomas.

The hedges are of English yew, are about 6½ ft. high, and have been planted about sixty years. In the centre is a grass mound, raised to the height of the hedges, and on this mound is a pagoda, approached by a curved grass path. At the two corners on the western side are banks of laurels 15 or 16 ft. high. On each side of the hedges throughout the labyrinth is a small strip of grass.

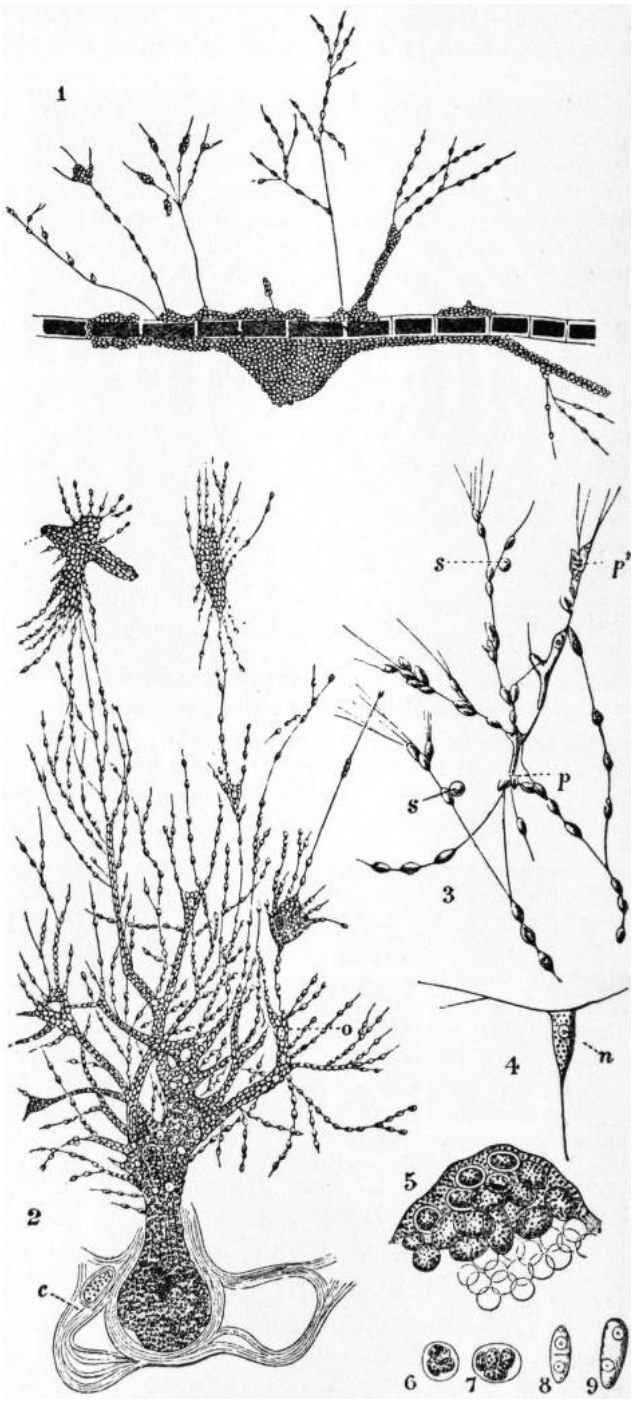
There was also a labyrinth at Theobald's Park, near Cheshunt, when this place passed from the earl of Salisbury into the possession of James I. Another is said to have existed at Wimbledon House, the seat of Earl Spencer, which was probably laid out by Brown in the 18th century. There is an interesting labyrinth, somewhat after the plan of fig. 2, at Mistley Place, Manningtree.

When the gardens of the Royal Horticultural Society at South Kensington were being planned, Albert, Prince Consort, the president of the society, especially desired that there should be a maze formed in the ante-garden, which was made in the form shown in fig. 6. This labyrinth, designed by Lieut. W. A. Nesfield, was for many years the chief point of attraction to the younger visitors to the gardens; but it was allowed to go to ruin, and had to be destroyed. The gardens themselves are now built over.

(T. Mo.)

LABYRINTHULIDEA, the name given by Sir Ray Lankester (1885) to Sarcodina (*q.v.*) forming a reticulate plasmodium, the denser masses united by fine pseudopodical threads, hardly distinct from some Proteomyxa, such as *Archerina*.

This is a small and heterogeneous group. *Labyrinthula*, discovered by L. Cienkowsky, forms a network of relatively stiff threads on which are scattered large spindle-shaped enlargements, each representing an amoeba, with a single nucleus. The threads are pseudopods, very slowly emitted and withdrawn. The amoebae multiply by fission in the active state. The nearest approach to a "reproductive" state is the approximation of the amoebae, and their separate encystment in an irregular heap, recalling the Acrasieae. From each cyst ultimately emerges a single amoeba, or more rarely four (figs. 6, 7). The saprophyte *Diplophrys* (*?*) *stercorea* (Cienk.) appears closely allied to this.



Labyrinthulidea.

1. A colony or “cell-heap” of *Labyrinthula vitellina*, Cienk., crawling upon an Alga.
2. A colony or “cell-heap” of *Chlamydomyxa labyrinthuloides*, Archer, with fully expanded network of threads on which the oat-shaped corpuscles (cells) are moving. *o*, Is an ingested food particle; at *c* a portion of the general protoplasm has detached itself and become encysted.

3 A portion of the network of *Labyrinthula vitellina*, Cienk., more highly magnified. *p*, Protoplasmic mass apparently produced by fusion of several filaments. *p'*, Fusion of several cells which have lost their definite spindle-shaped contour. *s*, Corpuscles which have

4. A single spindle cell and threads of *Labyrinthula macrocystis*, Cienk. *n*, Nucleus.
5. A group of encysted cells of *L. Macrocystis*, embedded in a tough secretion.

6, 7. Encysted cells of *L. macrocystis*, with enclosed protoplasm divided into four spores.

8, 9. Transverse division of a non-encysted spindle-cell of *L. macrocystis*.

become spherical and are no longer moving (perhaps about to be encysted).

Chlamydomyxa (W. Archer) resembles *Labyrinthula* in its freely branched plasmodium, but contains yellowish chromatophores, and minute oval vesicles ("physodes") filled with a substance allied to tannin—possibly phloroglucin—which glide along the plasmodial tracks. The cell-body contains numerous nuclei; but in its active state is not resolvable into distinct oval amoeboids. It is amphitrophic, ingesting and digesting other Protista, as well as "assimilating" by its chromatophores, the product being oil, not starch. The whole body may form a laminated cellulose resting cyst, from which it may only temporarily emerge (fig. 2), or it may undergo resolution into nucleate cells which then encyst, and become multinucleate before rupturing the cyst afresh.

Leydenia (F. Schaudinn) is a parasite in malignant diseases of the pleura. The pseudopodia of adjoining cells unite to form a network; but its affinities seem to such social naked Foraminifera as *Mikrogromia*.

See Cienkowsky, *Archiv f. Microscopische Anatomie*, iii. 274 (1867), xii. 44 (1876); W. Archer, *Quart. Jour. Microscopic Science*, xv. 107 (1875); E. R. Lankester, *Ibid.*, xxxix., 233 (1896); Hieronymus and Jenkinson, *Ibid.*, xiii. 89 (1899); W. Zopf, *Beiträge zur Physiologie und Morphologie niederer Organismen*, ii. 36 (1892), iv. 60 (1894); Pènard, *Archiv für Protistenkunde*, iv. 296 (1904); F. Schaudinn and Leyden, *Sitzungsberichte der Königlich preussischen Akademie der Wissenschaft*, vi. (1896).

LAC, a resinous incrustation formed on the twigs and young branches of various trees by an insect, *Coccus lacca*, which infests them. The term lac (*laksha*, Sanskrit; *lakh*, Hindi) is the same as the numeral lakh—a hundred thousand—and is indicative of the countless hosts of insects which make their appearance with every successive generation. Lac is a product of the East Indies, coming especially from Bengal, Pegu, Siam and Assam, and is produced by a number of trees of the species *Ficus*, particularly *F. religiosa*. The insect which yields it is closely allied to the cochineal insect, *Coccus cacti*; kermes, *C. ilicis* and Polish grains, *C. polonicus*, all of which, like the lac insect, yield a red colouring matter. The minute larval insects fasten in myriads on the young shoots, and, inserting their long proboscides into the bark, draw their nutriment from the sap of the plant. The insects begin at once to exude the resinous secretion over their entire bodies; this forms in effect a cocoon, and, the separate exudations coalescing, a continuous hard resinous layer regularly honeycombed with small cavities is deposited over and around the twig. From this living tomb the female insects, which form the great bulk of the whole, never escape. After their impregnation, which takes place on the liberation of the males, about three months from their first appearance, the females develop into a singular amorphous organism consisting in its main features of a large smooth shining crimson-coloured sac—the ovary—with a beak stuck into the bark, and a few papillary processes projected above the resinous surface. The red fluid in the ovary is the substance which forms the lac dye of commerce. To obtain the largest amount of both resin and dye-stuff it is necessary to gather the twigs with their living inhabitants in or near June and November. Lac encrusting the twigs as gathered is known in commerce as "stick lac"; the resin crushed to small fragments and washed in hot water to free it from colouring matter constitutes "seed lac"; and this, when melted, strained through thick canvas, and spread out into thin layers, is known as "shellac," and is the form in which the resin is usually brought to European markets. Shellac varies in colour from a dark amber to an almost pure black; the palest, known as "orange-lac," is the most valuable; the darker varieties—"liver-coloured," "ruby," "garnet," &c.—diminish in value as the colour deepens. Shellac may be bleached by dissolving it in a boiling lye of caustic potash and passing chlorine through the solution till all the resin is precipitated, the product being known as white shellac. Bleached lac takes light delicate shades of colour, and dyed a golden yellow it is much used in the East Indies for working into chain ornaments for the head and for other personal adornments. Lac is a principal ingredient in sealing-wax, and forms the basis of some of the most valuable varnishes, besides being useful in various cements, &c. Average stick lac contains about 68% of resin, 10 of lac dye and 6 of a waxy substance. Lac dye is obtained by evaporating the water in which stick lac is washed, and comes into commerce in the form of small square cakes. It is in many respects similar to, although not identical with, cochineal.

LACAILLE, NICOLAS LOUIS DE (1713-1762), French astronomer, was born at Rumigny, in the Ardennes, on the 15th of March 1713. Left destitute by the death of his father, who held a post in the household of the duchess of Vendôme, his theological studies at the Collège de Lisieux in Paris were prosecuted at the expense of the duke of Bourbon. After he had taken deacon's orders, however, he devoted himself exclusively to science, and, through the patronage of J. Cassini, obtained employment, first in surveying the coast from Nantes to Bayonne, then, in 1739, in remeasuring the French arc of the

meridian. The success of this difficult operation, which occupied two years, and achieved the correction of the anomalous result published by J. Cassini in 1718, was mainly due to Lacaille's industry and skill. He was rewarded by admission to the Academy and the appointment of mathematical professor in Mazarin college, where he worked in a small observatory fitted for his use. His desire to observe the southern heavens led him to propose, in 1750, an astronomical expedition to the Cape of Good Hope, which was officially sanctioned, and fortunately executed. Among its results were determinations of the lunar and of the solar parallax (Mars serving as an intermediary), the first measurement of a South African arc of the meridian, and the observation of 10,000 southern stars. On his return to Paris in 1754 Lacaille was distressed to find himself an object of public attention; he withdrew to Mazarin college, and there died, on the 21st of March 1762, of an attack of gout aggravated by unremitting toil. Lalande said of him that, during a comparatively short life, he had made more observations and calculations than all the astronomers of his time put together. The quality of his work rivalled its quantity, while the disinterestedness and rectitude of his moral character earned him universal respect.

His principal works are: *Astronomiae Fundamenta* (1757), containing a standard catalogue of 398 stars, re-edited by F. Baily (*Memoirs Roy. Astr. Society*, v. 93); Tabulae Solares (1758); *Coelum australe stelliferum* (1763) (edited by J. D. Maraldi), giving zone-observations of 10,000 stars, and describing fourteen new constellations; "Observations sur 515 étoiles du Zodiaque" (published in t. vi. of his *Éphémérides*, 1763); *Leçons élémentaires de Mathématiques* (1741), frequently reprinted; ditto *de Mécanique* (1743), &c.; ditto *d'Astronomie* (1746), 4th edition augmented by Lalande (1779); ditto *d'Optique* (1750), &c. Calculations by him of eclipses for eighteen hundred years were inserted in *L'Art de vérifier les dates* (1750); he communicated to the Academy in 1755 a classed catalogue of forty-two southern nebulae, and gave in t. ii. of his *Éphémérides* (1755) practical rules for the employment of the lunar method of longitudes, proposing in his additions to Pierre Bouguer's *Traité de Navigation* (1760) the model of a nautical almanac.

See G. de Fouchy, "Éloge de Lacaille," *Hist. de l'Acad. des Sciences*, p. 197 (1762); G. Brotier, Preface to Lacaille's *Coelum australe*; Claude Carlier, *Discours historique*, prefixed to Lacaille's *Journal historique du voyage fait au Cap* (1763); J. J. Lalande, *Connoissance des temps*, p. 185 (1767); *Bibl. astr.* pp. 422, 456, 461, 482; J. Delambre, *Hist. de l'astr. au XVIII^e siècle*, pp. 457-542; J. S. Bailly, *Hist. de l'astr. moderne*, tomes ii., iii., *passim*; J. C. Poggendorff, *Biog. Lit. Handwörterbuch*; R. Grant, *Hist. of Physical Astronomy*, pp. 486, &c.; R. Wolf, *Geschichte der Astronomie*. A catalogue of 9766 stars, reduced from Lacaille's observations by T. Henderson, under the supervision of F. Baily, was published in London in 1847.

LACAITA, SIR JAMES [Giacomo] (1813-1895), Anglo-Italian politician and writer. Born at Manduria in southern Italy, he practised law in Naples, and having come in contact with a number of prominent Englishmen and Americans in that city, he acquired a desire to study the English language. Although a moderate Liberal in politics, he never joined any secret society, but in 1851 after the restoration of Bourbon autocracy he was arrested for having supplied Gladstone with information on Bourbon misrule. Through the intervention of the British and Russian ministers he was liberated, but on the publication of Gladstone's famous letters to Lord Aberdeen he was obliged to leave Naples. He first settled in Edinburgh, where he married Maria Carmichael, and then in London where he made numerous friends in literary and political circles, and was professor of Italian at Queen's College from 1853 to 1856. In the latter year he accompanied Lord Minto to Italy, on which occasion he first met Cavour. From 1857 to 1863 he was private secretary (non-political) to Lord Lansdowne, and in 1858 he accompanied Gladstone to the Ionian Islands as secretary, for which services he was made a K.C.M.G. the following year. In 1860 Francis II. of Naples had implored Napoleon III. to send a squadron to prevent Garibaldi from crossing over from Sicily to Calabria; the emperor expressed himself willing to do so provided Great Britain co-operated, and Lord John Russell was at first inclined to agree. At this juncture Cavour, having heard of the scheme, entrusted Lacaita, at the suggestion of Sir James Hudson, the British minister at Turin, with the task of inducing Russell to refuse co-operation. Lacaita, who was an intimate friend both of Russell and his wife, succeeded, with the help of the latter, in winning over the British statesman just as he was about to accept the Franco-Neapolitan proposal, which was in consequence abandoned. He returned to Naples late in 1860 and the following year was elected member of parliament for Bitonto, although he had been naturalized a British subject in 1855. He took little part in parliamentary politics, but in 1876 was created senator. He was actively interested in a number of English companies operating in Italy, and was made one of the directors of the Italian Southern Railway Co. He had a wide circle of friends in many European countries and in America, including a number of the most famous men in politics and literature. He died in 1895 at Posilipo near Naples.

An authority on Dante, he gave many lectures on Italian literature and history while in England; and among his writings may be mentioned a large number of articles on Italian subjects in the *Encyclopaedia Britannica* (1857-1860), and an edition of Benvenuto da Imola's Latin lectures on Dante delivered in 1375; he co-operated with Lord Vernon in the latter's great edition of Dante's *Inferno* (London, 1858-1865), and he compiled a catalogue in four volumes of the duke of Devonshire's library at Chatsworth (London, 1879).

LA CALLE, a seaport of Algeria, in the arrondissement of Bona, department of Constantine, 56 m. by rail E. of Bona and 10 m. W. of the Tunisian frontier. It is the centre of the Algerian and Tunisian coral fisheries and has an extensive industry in the curing of sardines; but the harbour is small and exposed to the N.E. and W. winds. The old fortified town, now almost abandoned, is built on a rocky peninsula about 400 yds. long, connected with the mainland by a bank of sand. Since the occupation of La Calle by the French in 1836 a new town has grown up along the coast. Pop. (1906) of the town, 2774; of the commune, 4612.

La Calle from the times of its earliest records in the 10th century has been the residence of coral merchants. In the 16th century exclusive privileges of fishing for coral were granted by the dey of Algiers to the French, who first established themselves on a bay to the westward of La Calle, naming their settlement Bastion de France; many ruins still exist of this town. In 1677 they moved their headquarters to La Calle. The company—*Compagnie d'Afrique*—who owned the concession for the fishery was suppressed in 1798 on the outbreak of war between France and Algeria. In 1806 the British consul-general at Algiers obtained the right to occupy Bona and La Calle for an annual rent of £11,000; but though the money was paid for several years no practical effect was given to the agreement. The French regained possession in 1817, were expelled during the wars of 1827, when La Calle was burnt, but returned and rebuilt the place in 1836. The boats engaged in the fishery were mainly Italian, but the imposition, during the last quarter of the 19th century, of heavy taxes on all save French boats drove the foreign vessels away. For some years the industry was abandoned, but was restarted on a small scale in 1903.

See Abbé Poiret, *Voyage en Barbarie* ... (Paris, 1789); E. Broughton, *Six Years' Residence in Algiers* (London, 1839) and Sir R. L. Playfair, *Travels in the Footsteps of Bruce* (London, 1877).

LA CALPRENÈDE, GAUTHIER DE COSTES, Seigneur de (*c.* 1610-1663), French novelist and dramatist, was born at the Château of Tolgou, near Sarlat (Dordogne), in 1609 or 1610. After studying at Toulouse, he came to Paris and entered the regiment of the guards, becoming in 1650 gentleman-in-ordinary of the royal household. He died in 1663 in consequence of a kick from his horse. He was the author of several long heroic romances ridiculed by Boileau. They are: *Cassandre* (10 vols., 1642-1650); *Cléopatre* (1648); *Faramond* (1661); and *Les Nouvelles, ou les Divertissements de la princesse Alcidiane* (1661) published under his wife's name, but generally attributed to him. His plays lack the spirit and force that occasionally redeem the novels. The best is *Le Comte d'Essex*, represented in 1638, which supplied some ideas to Thomas Corneille for his tragedy of the same name.

LA CARLOTA, a town of the province of Negros Occidental, Philippine Islands, on the W. coast of the island and the left bank of San Enrique river, about 18 m. S. of Bacolod, the capital of the province. Pop. (1903), after the annexation of San Enrique, 19,192. There are fifty-four villages or barrios in the town; the largest had a population in 1903 of 3254 and two others had each more than 1000 inhabitants. The Panayano dialect of the Visayan language is spoken by most of the inhabitants. At La Carlota the Spanish government established a station for the study of the culture of sugar-cane; by the American government this has been converted into a general agricultural experiment station, known as "Government Farm."

LACCADIVE ISLANDS, a group of coral reefs and islands in the Indian Ocean, lying between 10° and 12° 20′ N. and 71° 40′ and 74° E. The name Laccadives (*laksha dwipa*, the "hundred thousand isles") is that given by the people of the Malabar coast, and was probably meant to include the Maldives; they are called by the natives simply *Divi*, "islands," or *Amendivi*, from the chief island. There are seventeen separate reefs, "round each of which the 100-fathom line is continuous" (J. S. Gardiner). There are, however, only thirteen islands, and of these only eight are inhabited. They fall into two groups—the northern, belonging to the collectorate of South Kanara, and including the inhabited islands of Amini, Kardamat, Kiltan and Chetlat; and the southern, belonging to the administrative district of Malabar, and including the inhabited islands of Agatti, Kavaratti, Androth and Kalpeni. Between the Laccadives and the

Maldives to the south lies the isolated Minikoi, which physically belongs to neither group, though somewhat nearer to the Maldives (*q.v.*). The principal submerged banks lie north of the northern group of islands; they are Munyal, Coradive and Sesostris, and are of greater extent than those on which the islands lie. The general depth over these is from 23 to 28 fathoms, but Sesostris has shallower soundings "indicating patches growing up, and some traces of a rim" (J. S. Gardiner). The islands have in nearly all cases emerged from the eastern and protected side of the reef, the western being completely exposed to the S.W. monsoon. The islands are small, none exceeding a mile in breadth, while the total area is only about 80 sq. m. They lie so low that they would be hardly discernible but for the coco-nut groves with which they are thickly covered. The soil is light coral sand, beneath which, a few feet down, lies a stratum of coral stretching over the whole of the islands. This coral, generally a foot to a foot and a half in thickness, has been in the principal islands wholly excavated, whereby the underlying damp sand is rendered available for cereals. These excavations—a work of vast labour—were made at a remote period, and according to the native tradition by giants. In these spaces (*totam*, "garden") coarse grain, pulse, bananas and vegetables are cultivated; coco-nuts grow abundantly everywhere. For rice the natives depend upon the mainland.

Population and Trade.—The population in 1901 was 10,274. The people are Moplas, *i.e.* of mixed Hindu and Arab descent, and are Mahommedans. Their manners and customs are similar to those of the coast Moplas; but they maintain their own ancient caste distinctions. The language spoken is Malayalim, but it is written in the Arabic character. Reading and writing are common accomplishments among the men. The chief industry is the manufacture of coir. The various processes are entrusted to the women. The men employ themselves with boatbuilding and in conveying the island produce to the coast. The exports from the Laccadives are of the annual value of about £17,000.

History.—No data exist for determining at what period the Laccadives were first colonized. The earliest mention of them as distinguished from the Maldives seems to be by Albírúní (*c.* 1030), who divides the whole archipelago (Díbajját) into the *Dívah Kúzah* or Cowrie Islands (the Maldives), and the *Divah Kanbar* or Coir Islands (the Laccadives). (See *Journ. Asiat. Soc.*, September 1844, p. 265). The islanders were converted to Islam by an Arab apostle named Mumba Mulyaka, whose grave at Androth still imparts a peculiar sanctity to that island. The kazee of Androth was in 1847 still a member of his family, and was said to be the twenty-second who had held the office in direct line from the saint. This gives colour to the tradition that the conversion took place about 1250. It is also further corroborated by the story given by the Ibn Batuta of the conversion of the Maldives, which occurred, as he heard, four generations (say one hundred and twenty years) before his visit to these islands in 1342. The Portuguese discovered the Laccadives in May 1498, and built forts upon them, but about 1545 the natives rose upon their oppressors. The islands subsequently became a suzerainty of the raja of Cannanore, and after the peace of Seringapatam, 1792 the southern group was permitted to remain under the management of the native chief at a yearly tribute. This was often in arrear, and on this account these islands were sequestrated by the British government in 1877.

See *The Fauna and Geography of the Maldive and Laccadive Archipelagoes*, ed. J. Stanley Gardiner (Cambridge 1901-1905); *Malabar District Gazetteer* (Madras, 1908); G. Pereira, "As Ilhas de Dyve" (*Boletim da Soc. Geog.*, Lisbon, 1898-1899) gives details relating to the Laccadives from the 16th-century MS. volume *De insulis et peregrinatione lusitanorum* in the National Library, Lisbon.

LACCOLITE (Gr. λάκκος, cistern, λίθος, stone), in geology, the name given by Grove K. Gilbert to intrusive masses of igneous rock possessing a cake-like form, which he first described from the Henry Mountains of southern Utah. Their characteristic is that they have spread out along the bedding planes of the strata, but are not so broad and thin as the sheets or intrusive sills which, consisting usually of basic rocks, have spread over immense distances without attaining any great thickness. Laccolites cover a comparatively small area and have greater thickness. Typically they have a domed upper surface while their base is flat. In the Henry Mountains they are from 1 to 5 m. in diameter and range in thickness up to about 5000 ft. The cause of their peculiar shape appears to be the viscosity of the rock injected, which is usually of intermediate character and comparatively rich in alkalis, belonging to the trachytes and similar lithological types. These are much less fluid than the basalts, and the latter in consequence spread out much more readily along the bedding planes, forming thin flat-topped sills. At each side the laccolites thin out rapidly so that their upper surface slopes steeply to the margins. The strata above them which have been uplifted and bent are often cracked by extension, and as the igneous materials well into the fissures a large number of dikes is produced. At the base of the laccolite, on the other hand, the strata are flat and dikes are rare, though there may be a conduit up which the magma has flowed into the laccolite. The rocks around are often much affected by contact alteration, and great masses of them have sometimes sunk into the laccolite, where they may be partly melted and absorbed.

Gilbert obtained evidence that these laccolites were filled at depths of 7000 to 10,000 ft. and did not reach the surface, giving rise to volcanoes. From the effects on the drainage of the country it seemed probable that above the laccolites the strata swelled up in flattish eminences. Often they occur side by side in groups belonging to a single period, though all the members of each group are not strictly of the same age. One laccolite may be formed on the side of an earlier one, and compound laccolites also occur. When exposed by erosion they give rise to hills, and their appearance varies somewhat with the stage of development.

In the western part of South America laccolites agreeing in all essential points with those described by Gilbert occur in considerable numbers and present some diversity of types. Occasionally they are asymmetrical, or have one steep or vertical side while the other is gently inclined. In other cases they split into a number of sheets spreading outwards through the rocks around. But the term laccolite has also been adopted by geologists in Britain and elsewhere to describe a variety of intrusive masses not strictly identical in character with those of the Henry Mountains. Some of these rest on a curved floor, like the gabbro masses of the Cuillin Hills in Skye; others are injected along a flattish plane of unconformability where one system of rocks rests on the upturned and eroded edges of an older series. An example of the latter class is furnished by the felsite mass of the Black Hill in the Pentlands, near Edinburgh, which has followed the line between the Silurian and the Old Red Sandstone, forcing the rocks upwards without spreading out laterally to any great extent.

The term laccolite has also been applied to many granite intrusions, such as those of Cornwall. We know from the evidence of mining shafts which have been sunk in the country near the edge of these granites that they slope downwards underground with an angle of twenty to thirty degrees. They have been proved also to have been injected along certain wall-marked horizons; so that although the rocks of the country have been folded in a very complicated manner the granite can often be shown to adhere closely to certain members of the stratigraphical sequence for a considerable distance. Hence it is clear that their upper surfaces are convex and gently arched, and it is conjectured that the strata must extend below them, though at a great depth, forming a floor. The definite proof of this has not been attained for no borings have penetrated the granites and reached sedimentary rocks beneath them. But often in mountainous countries where there are deep valleys the bases of great granite laccolites are exposed to view in the hill sides. These granite sills have a considerable thickness in proportion to their length, raise the rocks above them and fill them with dikes, and behave generally like typical laccolites. In contradistinction to intrusions of this type with a well-defined floor we may place the batholiths, bysmaliths, plutonic plugs and stocks, which have vertical margins and apparently descend to unknown depths. It has been conjectured that masses of this type eat their way upwards by dissolving the rock above them and absorbing it, or excavate a passage by breaking up the roof of the space they occupy while the fragments detached sink downwards and are lost in the ascending magma.

(J. S. F.)

LACE (corresponding to Ital. *merletto*, *trina*; Genoese *pizzo*; Ger. *spitzen*; Fr. *dentelle*; Dutch *kanten*; Span. *encaje*; the English word owes something to the Fr. *lassis* or *lacis*, but both are connected with the earlier Lat. *laqueus*; early French laces were also called *passements* or insertions and *dents* or edgings), the name applied to ornamental open work formed of threads of flax, cotton, silk, gold or silver, and occasionally of mohair or aloe fibre, looped or plaited or twisted together by hand, (1) with a needle, when the work is distinctively known as “needlepoint lace”; (2) with bobbins, pins and a pillow or cushion, when the work is known as “pillow lace”; and (3) by steam-driven machinery, when imitations of both needlepoint and pillow laces are produced. Lace-making implies the production of ornament and fabric concurrently. Without a pattern or design the fabric of lace cannot be made.

The publication of patterns for needlepoint and pillow laces dates from about the middle of the 16th century. Before that period lace described such articles as cords and narrow braids of plaited and twisted threads, used not only to fasten shoes, sleeves and corsets together, but also in a decorative manner to braid the hair, to wind round hats, and to be sewn as trimmings upon costumes. In a Harleian MS. of the time of Henry VI. and Edward IV., about 1471, directions are given for the making of “lace Bascon, lace indented, lace bordered, lace covert, a brode lace, a round lace, a thynne lace, an open lace, lace for hattys,” &c. The MS. opens with an illuminated capital letter, in which is the figure of a woman making these articles. The MS. supplies a clear description how threads in combinations of twos, threes, fours, fives, to tens and fifteens, were to be twisted and plaited together. Instead of the pillow, bobbins and pins with which pillow lace soon afterwards was made, the hands were used, each finger of a hand serving as a peg upon which was placed a “bowys” or “bow,” or little ball of thread. Each ball might be of different colour from the other. The writer of the MS. says that the first finger next the thumb shall be called A, the next B, and so on. According to the sort of cord or braid to be made, so each of the four fingers, A, B, C, D might be called into service. A “thynne lace” might be made with three threads, and then only fingers A, B, C would be required. A “round” lace, stouter than the “thynne” lace, might require the service of four or more fingers. By occasionally dropping the use of threads from certain fingers a sort of indented lace or braid might be made. But when laces of more importance were wanted, such as a broad lace for “hattys,” the fingers on the hands of assistants were required. The smaller cords or “thynne laces,” when fastened in simple or fantastic loops along the edges of collars and cuffs, were called “purls” (see the small edge to the collar worn by Catherine de’ Medici, Pl. II. fig. 4). In another direction from which some suggestion may be derived as to the evolution of lace-making, notice should be taken of the fact that at an early period the darning of varied ornamental devices, stiff and geometric in treatment into hand-made network of small square meshes (see squares of “lacis,” Pl. I. fig. 1) became specialized in many European countries. This is held by some writers to be “opus filatorium,” or “opus araneum” (spider work). Examples of this “opus filatorium,” said to date from the 13th century exist in public collections. The productions of this darning in the early part of the 16th century came to be known as “punto a maglia quadra” in Italy and as “lacis” in France, and through a growing demand for household and wearing linen, very much of the “lacis” was made in white threads not only in Italy and France but also in Spain. In appearance it is a filmy fabric. With white threads also were the “purlings” above mentioned made, by

means of leaden bobbins or “fuxii,” and were called “merletti a piombini” (see lower border, Pl. II. fig. 3). Cut and drawn thread linen work (the latter known as “tela tirata” in Italy and as “deshilado” in Spain) were other forms of embroidery as much in vogue as the darning on net and the “purling.” The ornament of much of this cut and drawn linen work (see collar of Catherine de’ Medici, Pl. II. fig. 4), more restricted in scope than that of the darning on net, was governed by the recurrence of open squares formed by the withdrawal of the threads. Within these squares and rectangles radiating devices usually were worked by means of whipped and buttonhole stitches (Pl. fig. 5). The general effect in the linen was a succession of insertions or borders of plain or enriched reticulations, whence the name “punto a reticella” given to this class of embroidery in Italy. Work of similar style and especially that with whipped stitches was done rather earlier in the Grecian islands, which derived it from Asia Minor and Persia. The close connexion of the Venetian republic with Greece and the eastern islands, as well as its commercial relations with the East, sufficiently explains an early transplanting of this kind of embroidery into Venice, as well as in southern Spain. At Venice besides being called “reticella,” cut work was also called “punto tagliato.” Once fairly established as home industries such arts were quickly exploited with a beauty and variety of pattern, complexity of stitch and delicacy of execution, until insertions and edgings made independently of any linen as a starting base (see first two borders, Pl. II. fig. 3) came into being under the name of “Punto in aria” (Pl. II. fig. 7). This was the first variety of Venetian and Italian needlepoint lace in the middle of the 16th century,[1] and its appearance then almost coincides in date with that of the “merletti a piombini,” which was the earliest Italian cushion or pillow lace (see lower edging, Pl. II. fig. 3).

The many varieties of needlepoint and pillow laces will be touched on under the heading allotted to each of these methods of making lace. Here, however, the general circumstances of their genesis may be briefly alluded to. The activity in cord and braid-making and in the particular sorts of ornamental needlework already mentioned clearly postulated such special labour as was capable of being converted into lace-making. And from the 16th century onwards the stimulus to the industry in Europe was afforded by regular trade demand, coupled with the exertions of those who encouraged their dependents or protegés to give their spare time to remunerative home occupations. Thus the origin and perpetuation of the industry have come to be associated with the women folk of peasants and fishermen in circumstances which present little dissimilarity whether in regard to needle lace workers now making lace in whitewashed cottages and cabins at Youghal and Kenmare in the south of Ireland, or those who produced their “punti in aria” during the 16th century about the lagoons of Venice, or Frenchwomen who made the sumptuous “Points de France” at Alençon and elsewhere in the 17th and 18th centuries; or pillow lace workers to be seen at the present day at little seaside villages tucked away in Devonshire dells, or those who were engaged more than four hundred years ago in “merletti a piombini” in Italian villages or on “Dentelles au fuseau” in Flemish lowlands. The ornamental character, however, of these several laces would be found to differ much; but methods, materials, appliances and opportunities of work would in the main be alike. As fashion in wearing laces extended, so workers came to be drawn together into groups by employers who acted as channels for general trade.[2] Nuns in the past as in the present have also devoted attention to the industry, often providing in the convent precincts workrooms not only for peasant women to carry out commissions in the service of the church or for the trade, but also for the purpose of training children in the art. Elsewhere lace schools have been founded by benefactors or organized by some leading local lace-maker[3] as much for trading as for education. In all this variety of circumstance, development of finer work has depended upon the abilities of the workers being exercised under sound direction, whether derived through their own intuitions, or supplied by intelligent and tasteful employers. Where any such direction has been absent the industry viewed commercially has suffered, its productions being devoid of artistic effect or adaptability to the changing tastes of demand.

It is noteworthy that the two widely distant regions of Europe where pictorial art first flourished and attained high perfection, north Italy and Flanders, were precisely the localities where lace-making first became an industry of importance both from an artistic and from a commercial point of view. Notwithstanding more convincing evidence as to the earlier development of pillow lace making in Italy the invention of pillow lace is often credited to the Flemings; but there is no distinct trace of the time or the locality. In a picture said to exist in the church of St Gomar at Lierre, and sometimes attributed to Quentin Matsys (1495), is introduced a girl apparently working at some sort of lace with pillow, bobbins, &c., which are somewhat similar to the implements in use in more recent times.[4] From the very infancy of Flemish art an active intercourse was maintained between the Low Countries and the great centres of Italian art; and it is therefore only what might be expected that the wonderful examples of the art and handiwork of Venice in lace-making should soon have come to be known to and rivalled among the equally industrious, thriving and artistic Flemings. At the end of the 16th century pattern-books were issued in Flanders having the same general character as those published for the guidance of the Venetian and other Italian lace-makers.

PLATE I.

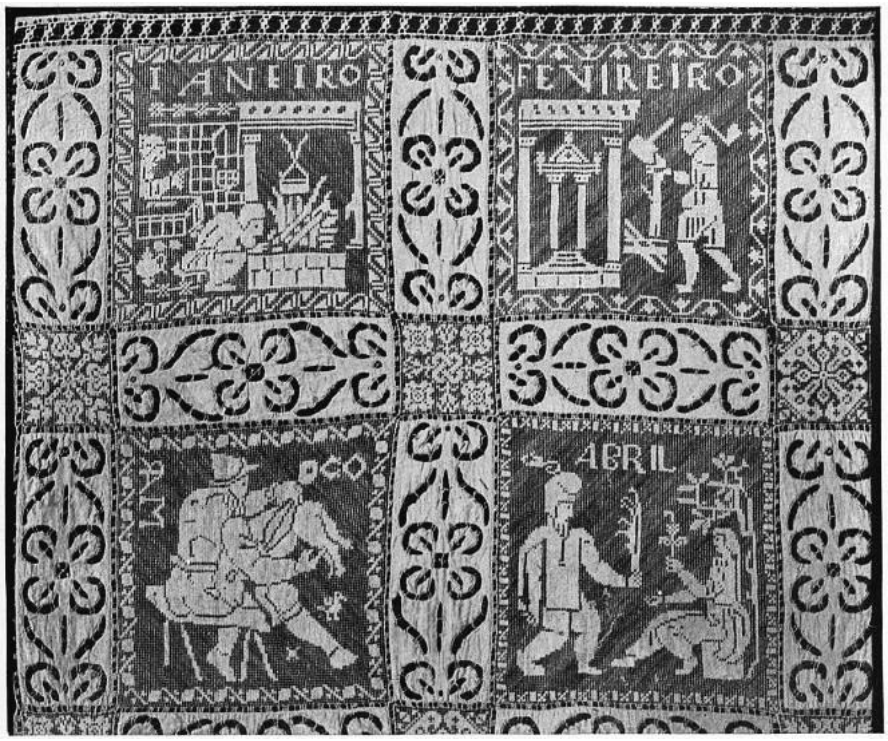


FIG. 1.—PORTION OF A COVERLET COMPOSED OF SQUARES OF "LACIS" OR DARNED NETTING, DIVIDED BY LINEN CUT-WORK BANDS.

The squares are worked with groups representing the twelve months, and with scenes from the old Spanish dramatic story "Celestina." Spanish or Portuguese. 16th century. (Victoria and Albert Museum.)

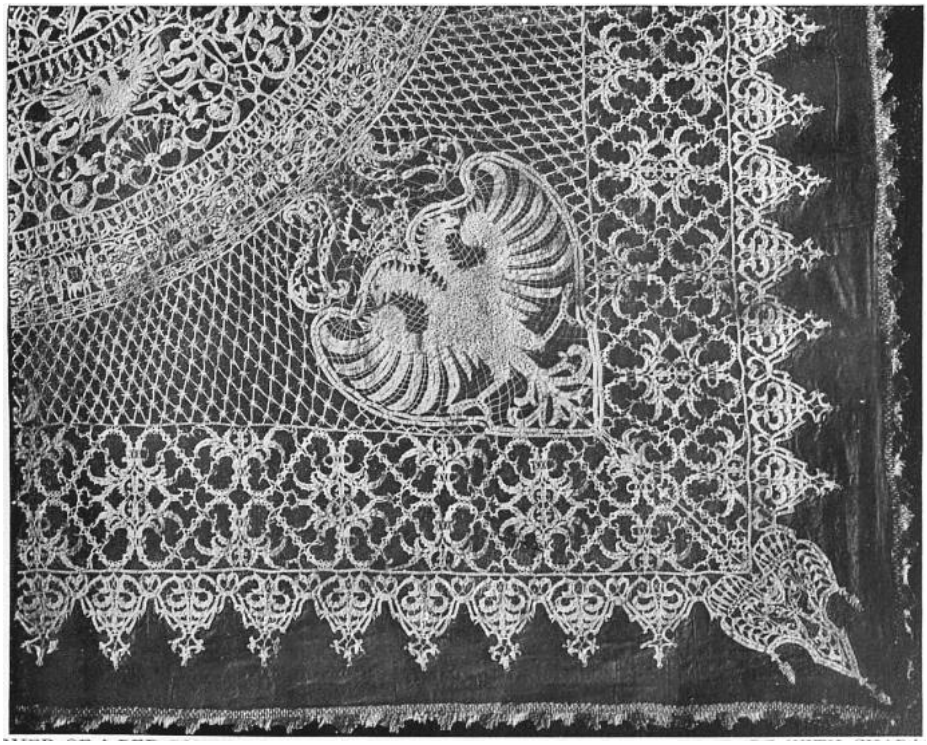


FIG. 2.—CORNER OF A BED-COVER OF PILLOW-MADE LACE OF A TAPE-LIKE TEXTURE WITH CHARACTERISTICS IN THE TWISTED AND PLAITED THREADS RELATING THE WORK TO ITALIAN "MERLETTI A PIOMBINI" OR EARLY ENGLISH "BONE LACE."

Possibly made in Flanders or Italy during the early part of the 17th or at the end of the 16th century. The design includes the Imperial double-headed eagle of Austria with the ancient crown of the German Empire. (Victoria and Albert Museum.)

PLATE II.

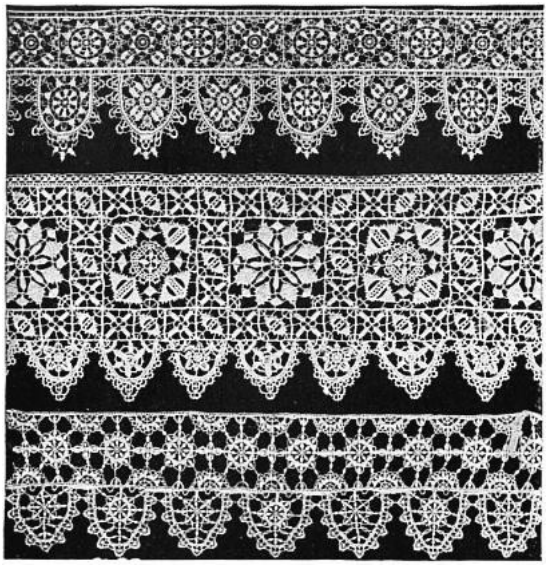


FIG. 3.—THREE VANDYKE OR DENTATED BORDERS OF ITALIAN LACE OF THE LATE 16TH CENTURY.

Style usually called “Reticella” on account of the patterns being based on repeated squares or reticulations. The two first borders are of needlepoint work; the lower border is of such pillow lace as was known in Italy as “merletti a piombini.”

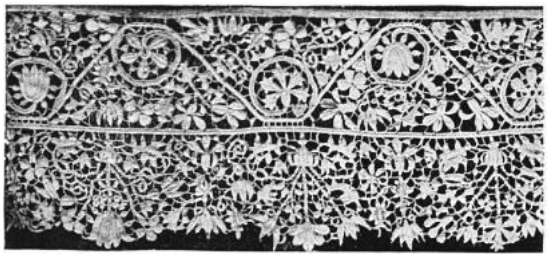


FIG. 7.—BORDER OF FLAT NEEDLEPOINT LACE OF FULLER TEXTURE THAN THAT OF FIG. 3, AND FROM A FREER STYLE OF DESIGN IN WHICH CONVENTIONALIZED FLORAL FORMS HELD TOGETHER BY SMALL BARS OR TYES ARE USED.

Style called “Punto in Aria,” chiefly on account of its independence of squares or reticulations. Italian. Early 17th century.

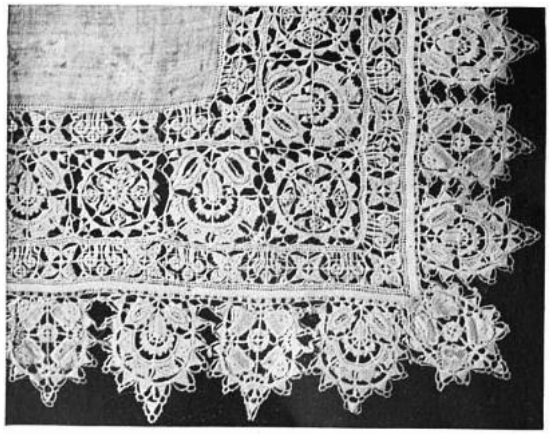


FIG. 5.—CORNER OF A NAPKIN OR HANDKERCHIEF BORDERED WITH “RETICELLA” NEEDLEPOINT LACE IN THE DESIGN OF WHICH ACORNS AND CARNATIONS ARE MINGLED WITH GEOMETRIC RADIATIONS. Probably of English early 17th century.

FIG. 4.—CATHERINE DE MEDICI, WEARING A LINEN UPTURNED COLLAR OF CUT WORK AND NEEDLEPOINT LACE. Louvre. About 1540.

FIG. 6.—AMELIE ELISABETH, COMTESSE DE HAINAULT, WEARING A RUFF OF NEEDLEPOINT RETICELLA LACE. By Morcelse. The Hague. About 1600.

(*Figs.* 4 *and* 6 *by permission of Messrs Braun, Clement & Co., Dornach (Alsace), and Paris.*)

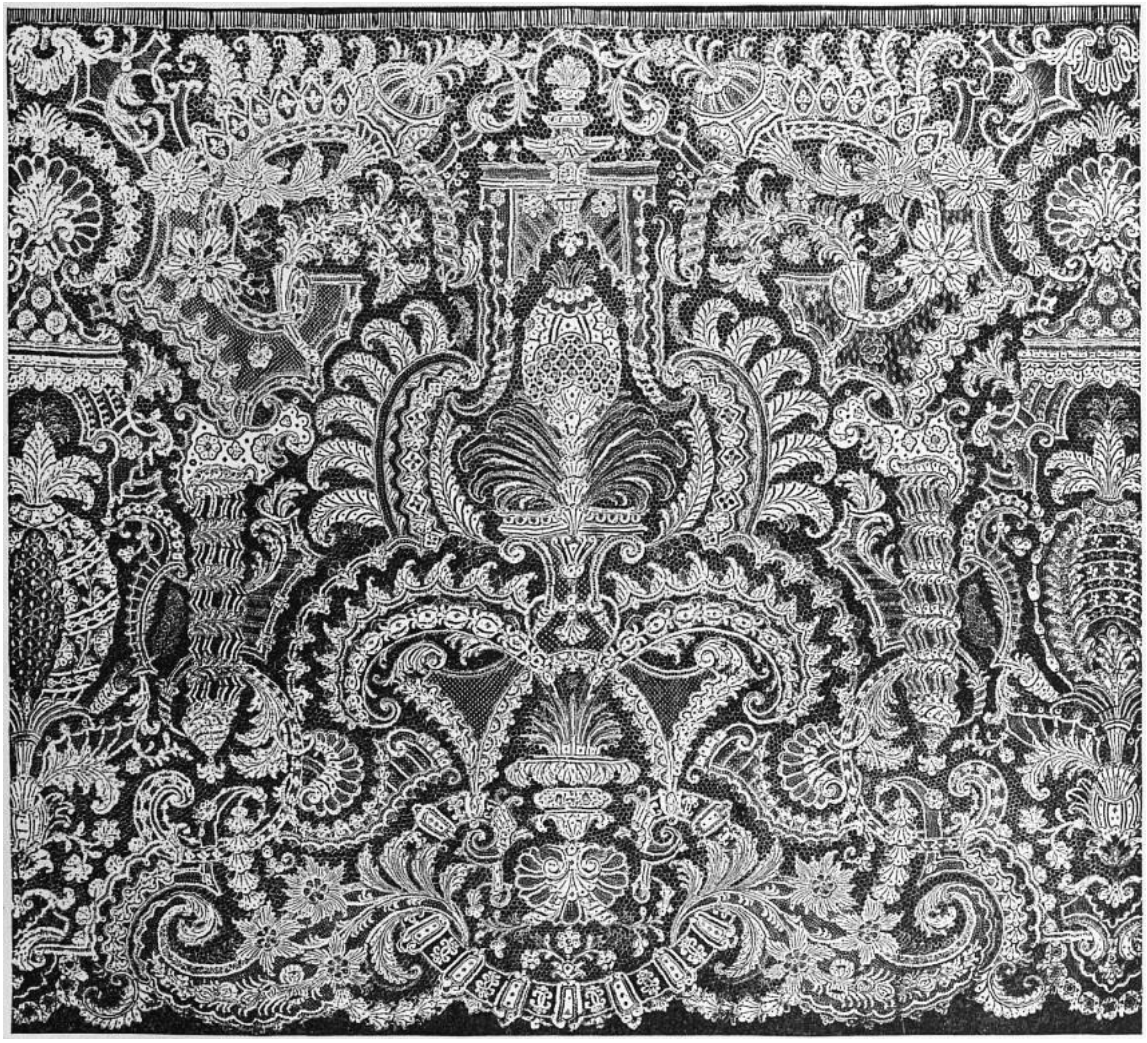


FIG. 24.—Portion of a Flounce of Needlepoint Lace, French, early 18th century, “Point de France.” The honeycomb ground is considered to be a peculiarity of “Point d’Argentan”: some of the fillings are made in the manner of the “Point d’Alençon” *réseau*.

France and England were not far behind Venice and Flanders in making needle and pillow lace. Henry III. of France (1574-1589) appointed a Venetian, Frederic Vinciolo, pattern maker for varieties of linen needle works and laces to his court. Through the influence of this fertile designer the seeds of a taste for lace in France were principally sown. But the event which *par excellence* would seem to have fostered the higher development of the French art of lace-making was the aid officially given it in the following century by Louis XIV., acting on the advice of his minister Colbert. Intrigue and diplomacy were put into action to secure the services of Venetian lace-workers; and by an edict dated 1665 the lace-making centres at Alençon, Quesnoy, Arras, Reims, Sedan, Château Thierry, Loudun and elsewhere were selected for the operations of a company in aid of which the state made a contribution of 36,000 francs; at the same time the importation of Venetian, Flemish and other laces was strictly forbidden.[5] The edict contained instructions that the lace-makers should produce all sorts of thread work, such as those done on a pillow or cushion and with the needle, in the style of the laces made at Venice, Genoa, Ragusa and other places; these French imitations were to be called “points de France.” By 1671 the Italian ambassador at Paris writes, “Gallantly is the minister Colbert on his way to bring the ‘lavori d’aria’ to perfection.” Six years later an Italian, Domenigo Contarini, alludes to the “punto in aria,” “which the French can now do to admiration.” The styles of design which emanated from the chief of the French lace centre, Alençon, were more fanciful and less severe than the Venetian, and it is evident that the Flemish lace-makers later on adopted many of these French patterns for their own use. The provision of French designs (fig. 24) which owes so much to the state patronage, contrasts with the absence of corresponding provision in England and was noticed early in the 18th century by Bishop Berkeley. “How,” he asks, “could France and Flanders have drawn so much money from other countries for figured silk, lace and tapestry, if they had not had their academies of design?”

The humble endeavours of peasantry in England (which could boast of no schools of design), Germany, Sweden, Russia and Spain could not result in work of so high artistic pretension as that of France and Flanders. In the 18th century good lace was made in Devonshire, but it is only in recent years that to some extent the hand lace-makers of England and Ireland have become impressed with the necessity of well-considered designs for their work. Pillow lace making under the name of “bone lace making” was pursued in the 17th century in Buckinghamshire, Hertfordshire and Bedfordshire, and in 1724 Defoe refers to the manufacture of bone lace in which villagers were “wonderfully exercised and improved within these few years past.” “Bone” lace dates from the 17th century in England and was practically the counterpart of Flemish “dentelles au fuseau,” and related also to the Italian “merletti a piombini” (see Pl. fig. 10). In Germany, Barbara Uttmann, a native of Nuremberg, instructed peasants of the Harz mountains to twist and plait threads in 1561. She was assisted by certain refugees from Flanders. A sort of “purling” or imitation of the Italian “merletti a piombini” was the style of work produced then.

Lace of comparatively simple design has been made for centuries in villages of Andalusia as well as in Spanish conventual establishments. The “point d’Espagne,” however, appears to have been a commercial name given by French manufacturers of a class of lace made in France with gold or silver threads on the pillow and greatly esteemed by Spaniards in the 17th century. No lace pattern-books have been found to have been published in Spain. The needle-made laces which came out of Spanish monasteries in 1830, when these institutions were dissolved, were mostly Venetian needle-made laces. The lace vestments preserved at the cathedral at Granada hitherto presumed to be of Spanish work are verified as being Flemish of the 17th century (similar in style to Pl. fig. 14). The industry is not alluded to in Spanish ordinances of the 15th, 16th or 17th centuries, but traditions which throw its origin back to the Moors or Saracens are still current in Seville and its neighbourhood, where a twisted and knotted arrangement of fine cords is often worked[6] under the name of “Morisco” fringe, elsewhere called macramé lace. Black and white silk pillow laces, or “blondes,” date from the 18th century. They were made in considerable quantity in the neighbourhood of Chantilly, and imported for mantillas by Spain, where corresponding silk lace making was started. Although after the 18th century the making of silk laces more or less ceased at Chantilly and the neighbourhood, the craft is now carried on in Normandy—at Bayeux and Caen—as well as in Auvergne, which is also noted for its simple “torchon” laces. Silk pillow lace making is carried on in Spain, especially at Barcelona. The patterns are almost entirely imitations from 18th-century French ones of a large and free floral character. Lace-making is said to have been promoted in Russia through the patronage of the court, after the visit of Peter the Great to Paris in the early days of the 18th century. Peasants in the districts of Vologda, Balakhua (Nijni-Novgorod), Bieleff (Tula) and Mzensk (Orel) make pillow laces of simple patterns. Malta is noted for producing a silk pillow lace of black or white, or red threads, chiefly of patterns in which repetitions of circles, wheels and radiations of shapes resembling grains of wheat are the main features. This characteristic of design, appearing in white linen thread laces of similar make which have been identified as Genoese pillow laces of the early 17th century, reappears in Spanish and Paraguayan work. Pillow lace in imitation of Maltese, Buckinghamshire and Devonshire laces is made to a small extent in Ceylon, in different parts of India and in Japan. A successful effort has also been made to re-establish the industry in the island of Burano near Venice, and pillow and needlepoint lace of good design is made there.

At present the chief sources of hand-made lace are France, Belgium, Ireland and England.

France is faithful to her traditions in maintaining a lively and graceful taste in lace-making. Fashion of late years has called for ampler and more boldly effective laces, readily produced with both braids and cords and far less intricate needle or pillow work than was required for the dainty and smaller laces of earlier date.

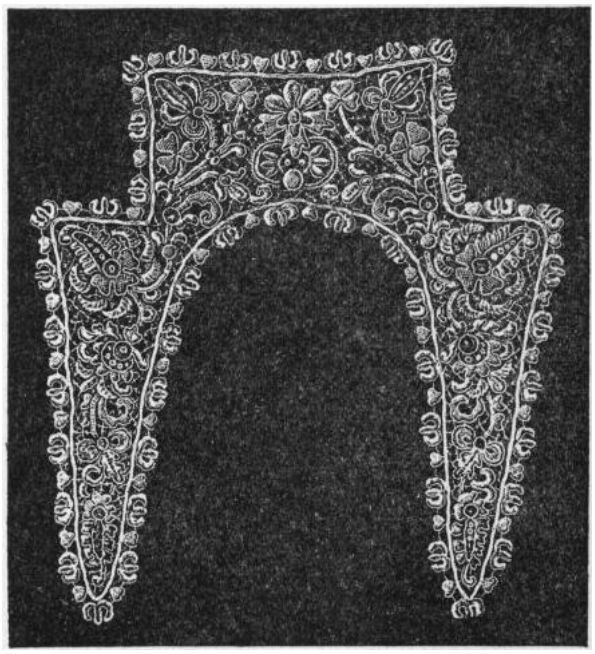


Fig. 25.—Collar and Berthe of Irish Crochet Lace.

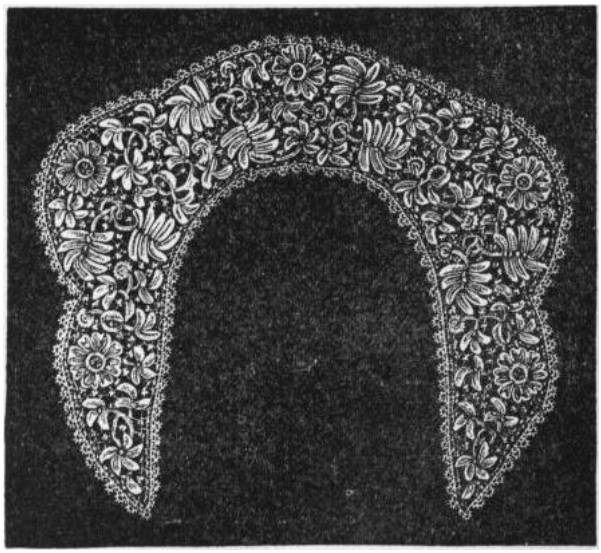


FIG. 26.—Collar of Irish Crochet Lace.

In Belgium the social and economic conditions are, as they have been in the past, more conducive and more favourable than elsewhere to lace-making at a sufficiently remunerative rate of wages. The production of hand-made laces in Belgium was in 1900 greater than that of France. The principal modern needle-made lace of Belgium is the “Point de Gaze”; “Duchesse” and Bruges laces are the chief pillow-made laces; whilst “Point Appliqué” and “Plat Appliqué” are frequently the results not only of combining needle-made and pillow work, but also of using them in conjunction with machine-made net. Ireland is the best producer of that substantial looped-thread work known as crochet (see figs. 25, 26, 27), which must be regarded as a hand-made lace fabric although not classifiable as a needlepoint or pillow lace. It is also quite distinct in character from pseudo-laces, which are really embroideries with a lace-like appearance, *e.g.* embroideries on net, cut and embroidered cambrics and fine linen. For such as these Ireland maintains a reputation in its admirable Limerick and Carrickmacross laces, made not only in Limerick and Carrickmacross, but also in Kinsale, Newry, Crossmaglen and elsewhere. The demand from France for Irish crochet is now far beyond the supply, a condition which leads not only to the rapid repetition by Irish workers of old patterns, but tends also to a gradual debasement of both texture and ornament. Attempts have been made to counteract this tendency, with some success, as the specimens of Irish crochet in figs. 25, 26 and 27 indicate.

PLATE III.

FIG. 9.—HENRI II., DUC DE MONTMORENCY, WEARING A FALLING LACE COLLAR. By LE NAIN. Louvre. About 1628.

(*By permission of Messrs Braun, Clement & Co., Dornach (Alsace), and Paris.*)

FIG. 8.—MARY, COUNTESS OF PEMBROKE, WEARING A COIF AND CUFFS OF RETICELLA LACE.

National Portrait Gallery. Dated 1614.

FIG. 11.—JAMES II. WEARING A JABOT AND CUFFS OF RAISED NEEDLEPOINT LACE

By RILEY. National Portrait Gallery. About 1685.

(*Figs.* 8 *and* 11, *photo by Emery Walker*.)

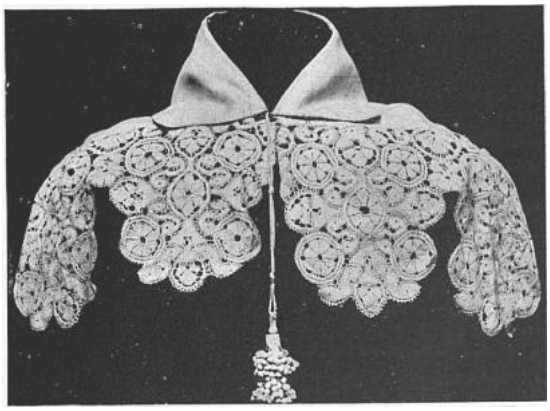


FIG. 10.—SCALLOPPED COLLAR OF TAPE-LIKE PILLOW-MADE LACE.

Possibly of English early 17th-century work. Its texture is typical of a development in pillow-lace-making later than that of the lower edge of “merletti a piombini” in Pl. II. fig. 3.

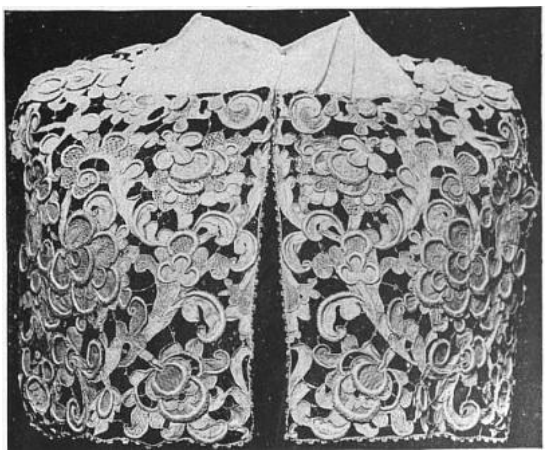


FIG. 12.—JABOT OF NEEDLEPOINT LACE WORKED PARTLY IN RELIEF, AND USUALLY KNOWN AS “GROS POINT DE VENISE.”

Middle of 17th century. Conventional scrolling stems with off-shooting pseudo-blossoms and leafs are specially characteristic.

PLATE IV.

FIG. 15.—PRINCESS MARIA TERESA STUART, WEARING A FLOUNCE OR TABLIER OF LACE SIMILAR TO THAT IN FIG. 17. Dated 1695.

FIG. 13.—MME VERBIEST, WEARING PILLOW-MADE LACE *À RÉSEAU*.

From the family group by GONZALES COQUER. Buckingham Palace. About 1664.

(*By permission of Messrs Braun, Clement & Co., Dornach (Alsace), and Paris.*)

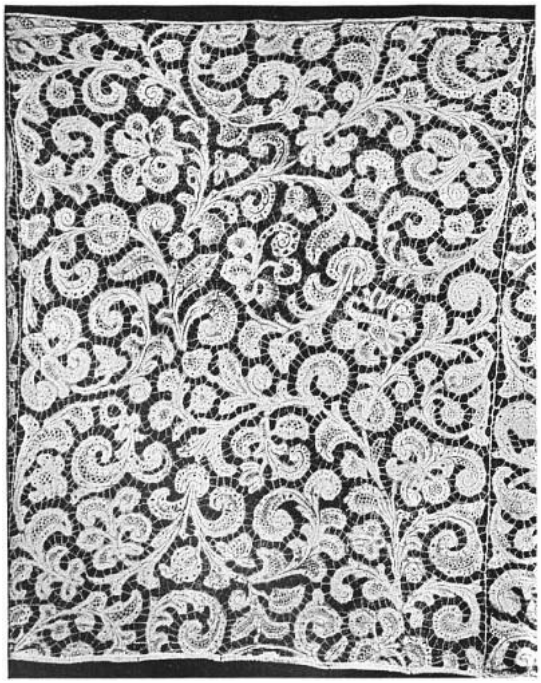


FIG. 14.—PIECE OF PILLOW-MADE LACE USUALLY KNOWN AS "POINT DE FLANDRES À BRIDES."

Of the middle of the 17th century, the designs for which were often adaptations from those made for such needlepoint lace as that of the Jabot in fig. 12.

From a group by LARGILLIERE. National Portrait Gallery. (*Photo by Emery Walker.*)

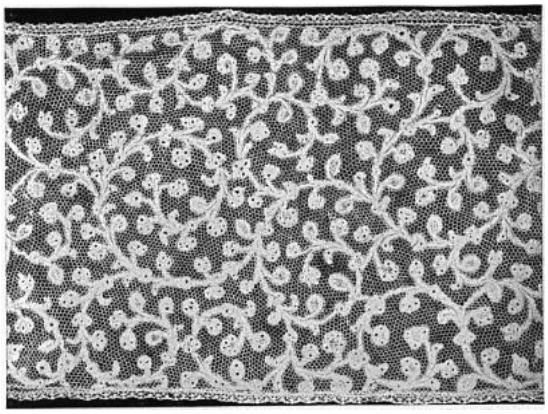


FIG. 16.—FLOUNCE OF PILLOW-MADE LACE *À RÉSEAU*.

Flemish, of the middle of the 17th century. This lace is usually thought to be the earliest type of "Point d'Angleterre" in contradistinction to the "Point de Flandres" (fig. 14).

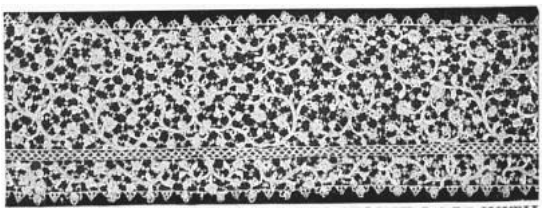


FIG. 17—VERY DELICATE NEEDLEPOINT LACE WITH CLUSTERS OF SMALL RELIEF WORK.

Venetian, middle of the 17th century, and often called "rose-point lace," and sometimes "Point de Neige."

An appreciable amount of pillow-made lace is annually

supplied from Devonshire, Buckinghamshire, Bedfordshire and Northampton, but it is bought almost wholly for home use. The English laces are made almost entirely in accordance with the precedents of the 19th century—that is to say, in definite lengths and widths, as for borders, insertions and flounces, although large shaped articles, such as panels for dresses, long sleeves complete skirts, jackets, blouses, and fancifully shaped collars of considerable dimensions have of late been freely made elsewhere. To make such things entirely of lace necessitates many modifications in the ordinary methods; the English lace-workers are slow to adapt their work in the manner requisite, and hence are far behind in the race to respond to the fashionable demand. No countries succeed so well in promptly answering the variable call of fashion as France and Belgium.

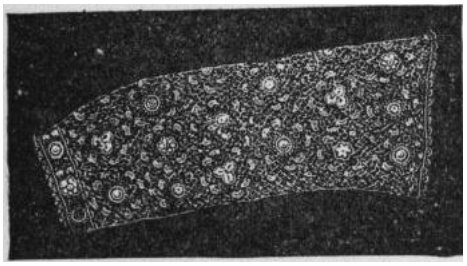


Fig. 27.—Lady's Sleeve of Irish Crochet Lace.

As regards trade in lace, America probably buys more from Belgium than from France; France and England come next as purchasers of nearly equal quantities, after which come Russia and Italy.

The greatest amount of lace now made is that which issues from machines in England, France and Germany. The total number of persons employed in the lace industry in England in 1871 was 49,370, and in 1901 about 34,929, of whom not more than 5000 made lace by hand.

The early history[7] of the lace-making machine coincides with that of the stocking frame, that machine having been adapted about the year 1768 for producing open-looped fabrics which had a net-like appearance. About 1786 frames for making point nets by machinery first appear at Mansfield and later at Ashbourne and Nottingham and soon afterwards modifications were introduced into such frames in order to make varieties of meshes in the point nets which were classed as figured nets. In 1808 and 1809 John Heathcoat of Nottingham obtained patents for machines for making bobbin net with a simpler and more readily produced mesh than that of the point net just mentioned. For at least thirty years thousands of women had been employed in and about Nottingham in the embroidery of simple ornament on net. In 1813 John Leavers began to improve the figured net weaving machines above mentioned, and from these the lace-making machines in use at the present time were developed. But it was the application of the celebrated Jacquard apparatus to such machines that enabled manufacturers to produce all sorts of patterns in thread-work in imitation of the patterns for hand-made lace. A French machine called the "dentellière" was devised (see La Nature for the 3rd of March 1881), and the patterns produced by it were of plaited threads. The expense, however, attending the production of plaited lace by the "dentellière" is as great as that of pillow lace made by the hand, and so the machine has not succeeded for ordinary trade purposes. More successful results have been secured by the new patent circular lace machine of Messrs. Birkin & Co. of Nottingham, the productions of which, all of simple design, cannot be distinguished from hand-made pillow lace of the same style (see figs. 57, 58, 59).

Before dealing with technical details in processes of making lace whether by hand or by the machine, the component parts of different makes of lace may be considered. These are governed by the ornaments or patterns, which may be so designed, as they were in the earlier laces, that the different component parts may touch one another without any intervening groundwork. But as a wish arose to vary the effect of the details in a pattern ground-works were gradually developed and at first consisted of links or ties between the substantial parts of the pattern. The bars or ties were succeeded by grounds of meshes, like nets. Sometimes the substantial parts of a pattern were outlined with a single thread or by a strongly marked raised edge of buttonhole-stitched or of plaited work. Minute fanciful devices were then introduced to enrich various portions of the pattern. Some of the heavier needle-made laces resemble low relief carving in ivory, and the edges of the relief portions are often decorated with clusters of small loops. For the most part all this elaboration was brought to a high pitch of variety and finish by French designers and workers; and French terms are more usual in speaking of details in laces. Thus the solid part of the pattern is called the *toilé* or clothing, the links or ties are called *brides*, the meshed grounds are called *réseaux*, the outline to the edges of a pattern is called *cordonnet* or *brodé*, the insertions of fanciful devices *modes*, the little loops *picots*. These terms are applicable to the various portions of laces made with the needle, on the pillow or by the machine.

The sequence of patterns in lace (which may be verified upon referring to figs. 1 to 23) is roughly as follows. From about 1540 to 1590 they were composed of geometric forms set within squares, or of crossed and radiating line devices, resulting in a very open fabric, stiff and almost wiry in effect, without *brides* or *réseaux*. From 1590 may be dated the introduction into patterns of very conventional floral and even human and animal forms and slender scrolls, rendered in a tape-like texture, held together by *brides*. To the period from 1620 to 1670 belongs the development of long continuous scroll patterns with *réseaux* and *brides*, accompanied in the case of needle-made laces with an elaboration of details, *e.g. cordonnet* with massings of *picots*. Much of these laces enriched with fillings or *modes* was made at this time. From 1650 to 1700 the scroll patterns gave way to arrangements of detached ornamental details (as in Pl. VI. fig. 22): and about 1700 to 1760 more important schemes or designs were made (as in Pl. fig. 19, and in fig. 24 in text), into which were introduced naturalistic renderings of garlands, flowers, birds, trophies, architectural ornament and human figures. Grounds composed entirely of varieties of *modes* as in the case of the *réseau rosacé* (Pl. V. fig. 21) were sometimes made then. From 1760 to 1800 small details consisting of bouquets, sprays of flowers, single flowers, leaves, buds, spots and such like were adopted, and sprinkled over meshed grounds, and the character of the texture was gauzy and filmy (as in figs. 40 and 42). Since that time variants of the foregoing styles of pattern and textures have been used according to the bent of fashion in favour of simple or complex ornamentation, or of stiff, compact or filmy textures.

Needlepoint Lace.—The way in which the early Venetian

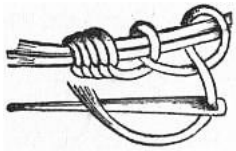


FIG. 28.

FIG. 29.

"punto in aria" was made corresponds with that in which needlepoint lace is now worked. The pattern is first drawn upon a piece of parchment. The parchment is then stitched to two pieces of linen. Upon the leading lines drawn on the parchment a thread is laid, and fastened through to the parchment and linen by means of stitches, thus constructing a skeleton thread pattern (see left-hand part of fig. 30). Those portions which are to be represented as the "clothing" or *toilé* are usually worked as indicated in the enlarged diagram (fig. 29), and then edged as a rule with buttonhole stitching (fig. 28). Between these *toilé* portions of the pattern are worked ties (*brides*) or meshes (*réseaux*), and thus the various parts united into one fabric are wrought on to the face of the parchment pattern and reproducing it (see right-hand part of fig. 30). A knife is passed between the two pieces of linen at the back of the parchment, cutting the stitches which have passed through the parchment and linen, and so releasing the lace itself from its pattern parchment. In the earlier stages, the lace was made in lengths to serve as insertions (*passements*) and also in vandykes (*dentelles*) to serve as edgings. Later on insertions and vandykes were made in one piece. All of such were at first of a geometric style of pattern (Pl. figs. 3-5 and 6).

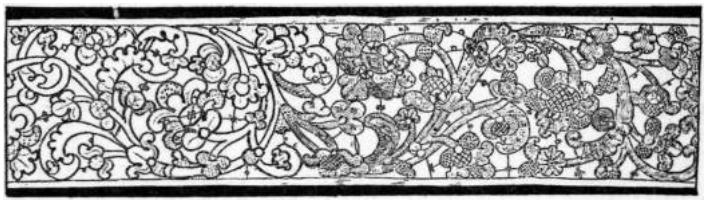


FIG. 30.—Parchment Pattern showing work in progress: the more complete lace is on the right half of the pattern.

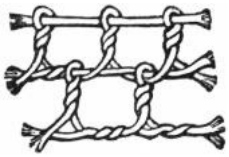


FIG. 31.

Following closely upon them came the freer style of design already mentioned, without and then with links or ties—*brides*—interspersed between the various details of the patterns (Pl. II. fig. 7), which were of flat tape-like texture. In elaborate specimens of this flat point lace some lace workers occasionally used gold thread with the white thread. These flat laces ("Punto in Aria") are also called "flat Venetian point." About 1640 "rose (raised) point" laces began to be made (Pl. III. fig. 12). They were done in relief and those of bold design with stronger reliefs are called "gros point de Venise." Lace of this latter class was used for altar cloths, flounces, *jabots* or neckcloths which hung beneath the chin over the breast (Pl. III. fig. 11), as well as for trimming the turned-over tops of jack boots. *Tabliers* and ladies' aprons were also made of such lace. In these no regular ground was introduced. All sorts of minute embellishments, like little knots, stars and loops or *picots*, were worked on to the irregularly arranged *brides* or ties holding the main patterns together, and the more dainty of these raised laces (Pl. fig. 17) exemplify the most subtle uses to which the buttonhole stitch appears capable of being put in making ornaments. But about 1660 came laces with *brides* or ties arranged in a honeycomb reticulation or regular ground. To them succeeded lace in which the compact relief gave place to daintier and lighter material combined with a ground of meshes or *réseau*. The needle-made meshes were sometimes of single and sometimes of double threads. A diagram is given of an ordinary method of making such meshes (fig. 31). At the end of the 17th century the lightest of the Venetian needlepoint laces were made; and this class which was of the filmiest texture is usually known as "point de Venise à réseau" (Pl. V. fig. 20*a*). It was contemporary with the needle-made French laces of Alençon and Argentan[8] that became famous towards the latter part of the 17th century (Pl. V. fig. 20*b*). "Point d'Argentan" has been thought to be especially distinguished on account of its delicate honeycomb ground of hexagonally arranged *brides* (fig. 32), a peculiarity already referred to in certain antecedent Venetian point laces. Often intermixed with this hexagonal *brides* ground is the fine-meshed ground or *réseau* (fig. 20*b*), which has been held to be distinctive of "point d'Alençon." But the styles of patterns and the methods of working them, with rich variety of insertions or *modes*, with the *brodé* or *cordonnet* of raised buttonhole stitched edging, are alike in Argentan and Alençon needle-made laces (Pl. V. fig. 20*b* and fig. 32). Besides the hexagonal *brides* ground and the ground of meshes another variety of grounding (*réseau rosacé*) was used in certain Alençon designs. This ground consisted of buttonhole-stitched skeleton hexagons within each of which was worked a small hexagon of *toilé* connected with the outer surrounding hexagon by means of six little ties or *brides* (Pl. V. fig. 21). Lace with this particular ground has been called "Argentella," and some writers have thought that it was a specialty of Genoese or Venetian work. But the character of the work and the style of the floral patterns are those of Alençon laces. The industry at Argentan was virtually an offshoot of that nurtured at Alençon, where "lacis," "cut work" and "vélin" (work on parchment) had been made for years before the well-developed needle-made "point d'Alençon" came into vogue under the favouring patronage of the state-aided lace company mentioned as having been formed in 1665. Madame Despierre in her *Histoire du point d'Alençon* gives an interesting and trustworthy account of the industry.

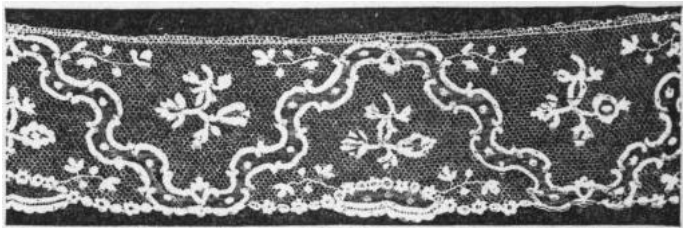


FIG. 32.—Border of Needlepoint Lace made in France about 1740-1750, the clear hexagonal mesh ground, which is compactly stitched, being usually regarded as characteristic of the point de France made at Argentan.

In Belgium, Brussels has acquired some celebrity for needle-made laces. These, however, are chiefly in imitation of those made at Alençon, but the *toilé* is of less compact texture and sharpness in definition of pattern. Brussels needlepoint lace is often worked with meshed grounds made on a pillow, and a plain thread is used as a *cordonnet* for their patterns instead of a thread overcast with buttonhole stitches as in the French needlepoint laces. Note the bright sharp outline to the various ornamental details in Pl. V. fig. 20*b*.

FIG. 33.—Shirt decorated with Insertions of Flat Needlepoint Lace. (English, 17th century. Victoria and Albert Museum.)

PLATE IV.

FIG. 18.—CHARLES GASPARD GUILLAUME DE VINTIMILLE, WEARING LACE SIMILAR IN STYLE OF DESIGN SHOWN IN FIG. 19. About 1730.

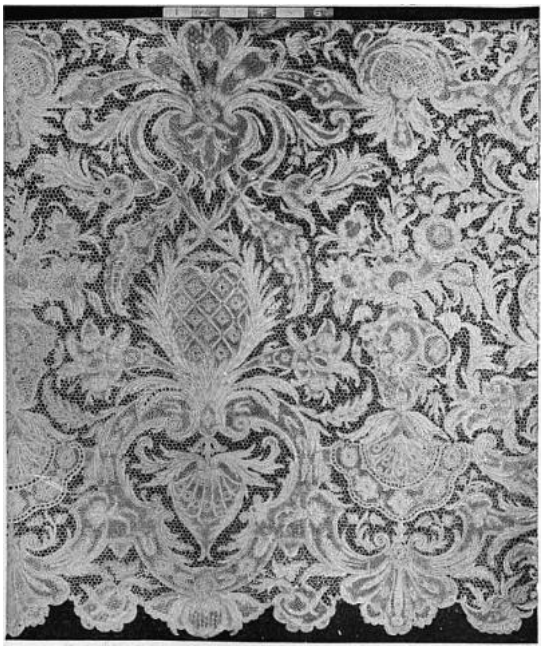
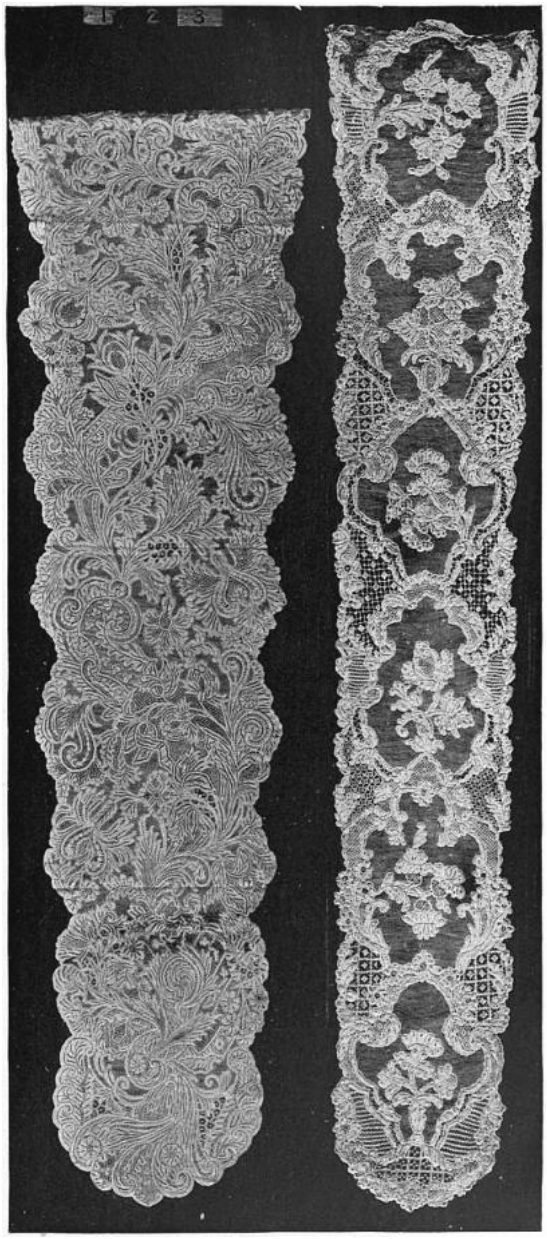


FIG. 19.—PORTION OF FLOUNCE, NEEDLEPOINT LACE COPIED AT THE BURANO LACE SCHOOL FROM THE ORIGINAL OF THE SO-CALLED "POINT DE VENISE À BRIDES PICOTÉES."

17th century. Formerly belonging to Pope Clement XIII., but now the property of the queen of Italy. The design and work, however, are indistinguishable from those of important flounces of "Point de France." The pattern consists of repetitions of two vertically-arranged groups of fantastic pine-apples and vases with flowers, intermixed with bold rococo bands and large leaf devices. The hexagonal meshes of the ground, although similar to the Venetian "brides picotées," are much akin to the buttonhole stitched ground of "Point d'Argentan." (Victoria and Albert Museum.)



A FIG. 20. B

A.—A LAPPET OF "POINT DE VENISE À RÉSEAU."

The conventional character of the pseudo-leaf and floral forms contrasts with that of the realistic designs of contemporary French laces. Italian. Early 18th century.

B.—A LAPPET OF FINE "POINT D'ALENÇON."

Louis XV. period. The variety of the fillings of geometric design is particularly remarkable in this specimen, as is the buttonhole stitched cordonnat or outline to the various ornamental forms.

FIG. 21.—BORDER OF FRENCH NEEDLEPOINT LACE, WITH GROUND OF "RÉSEAU ROSACÉ." 18th century.

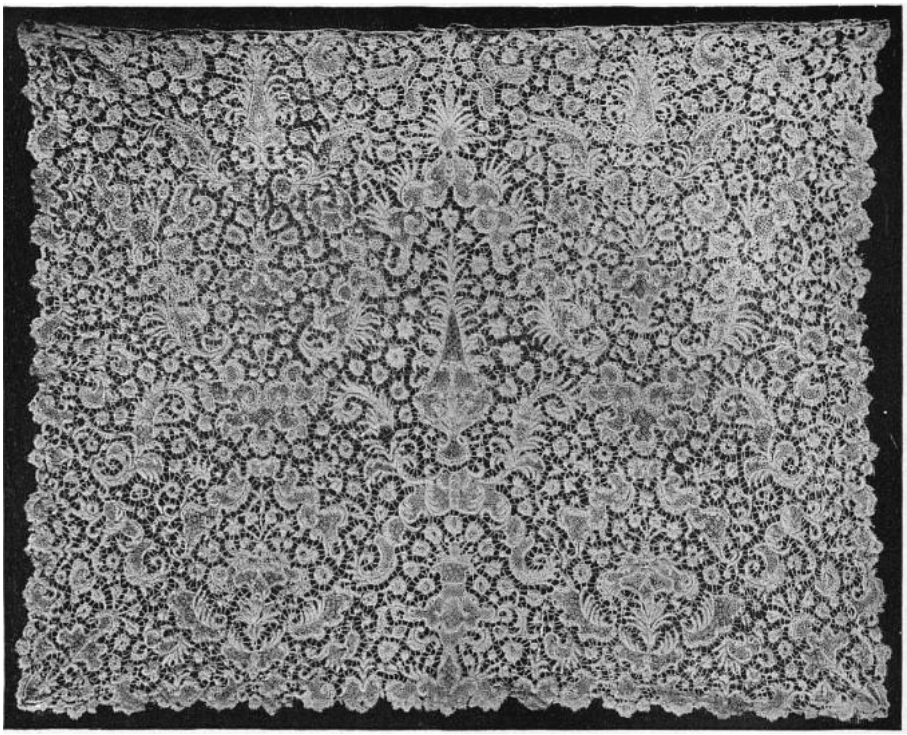


Fig. 22.—JABOT OR CRAVAT OF PILLOW-MADE LACE. Brussels. Late 17th century. (Victoria and Albert Museum.)

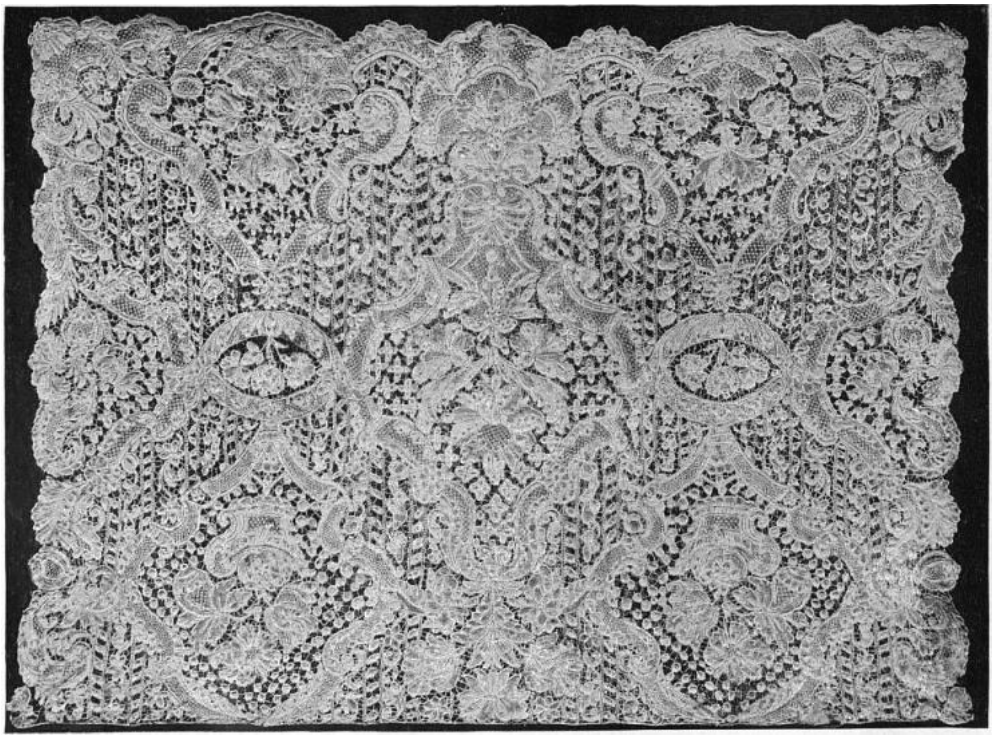


Fig. 23.—JABOT OR CRAVAT OF PILLOW-MADE LACE OF FANTASTIC FLORAL DESIGN, THE GROUND OF WHICH IS COMPOSED OF LITTLE FLOWERS AND LEAVES ARRANGED WITHIN SMALL OPENWORK VERTICAL STRIPS.

Brussels. 18th century. (Victoria and Albert Museum.)

Needlepoint lace has also been occasionally produced in England. Whilst the character of its design in the early 17th century was rather more primitive, as a rule, than that of the contemporary Italian, the method of its workmanship is virtually the same and an interesting specimen of English needle-made lace inset into an early 17th-century shirt is illustrated in fig. 33. Specimens of needle-made work done by English school children may be met with in samplers of the 17th and 18th centuries. Needlepoint lace is successfully made at Youghal, Kenmare and New Ross in Ireland, where of late years attention has been given to the study of designs for it. The lace-making school at Burano near Venice produces hand-made laces which are, to a great extent, careful reproductions of the more celebrated classes of point laces, such as “punto in aria,” “rose point de Venise,” “point de Venise à réseau,” “point d’Alençon,” “point d’Argentan” and others. Some good needlepoint lace is made in Bohemia and elsewhere in the Austrian empire.

Pillow-made Lace.—Pillow-made lace is built upon no substructure corresponding with a skeleton thread pattern such as is used for needlepoint lace, but is the representation of a pattern obtained by twisting and plaiting threads.

These patterns were never so strictly geometric in style as those adopted for the earliest point lace making from the antecedent cut linen and drawn thread embroideries. Curved forms, almost at the outset of pillow lace, seem to have been found easy of execution (see lower border, Pl. II. fig. 3); its texture was more lissom and less crisp and wiry in appearance than that of contemporary needle-made lace. The early twisted and plaited thread laces, which had the appearance of small cords merging into one another, were soon succeeded by laces of similar make but with flattened and broader lines more like fine braids or tapes (Pl. I. fig. 2, and Pl. fig. 10). But pillow laces of this tapey character must not be confused with laces in which actual tape or braid is used. That peculiar class of lace-work does not arise until after the beginning of the 17th century when the weaving of tape is said to have commenced in Flanders. In England this sort of tape-lace dates no farther back than 1747, when two Dutchmen named Lanfort were invited by an English firm to set up tape looms in Manchester.

The process by which lace is made on the pillow is roughly and briefly as follows. A pattern is first drawn upon a piece of paper or parchment. It is then pricked with holes by a skilled “pattern pricker,” who determines where the principal pins shall be stuck for guiding the threads. This pricked pattern is then fastened to the pillow. The pillow or cushion varies in shape in different countries. Some lace-makers use a circular pad, backed with a flat board, in order that it may be placed upon a table and easily moved. Other lace-workers use a well-stuffed round pillow or short bolster, flattened at the two ends, so that they may hold it conveniently on their laps. From the upper part of pillow with the pattern fastened on it hang the threads from the bobbins. The bobbin threads thus hang across the pattern. Fig. 34 shows the commencement, for instance, of a double set of three-thread plaitings. The compact portion in a pillow lace has a woven appearance (fig. 35).

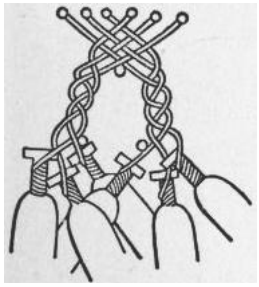


Fig. 34.—Diagram showing six Bobbins in use.

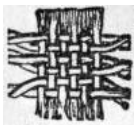


Fig. 35.

About the middle of the 17th century pillow lace of formal scroll patterns somewhat in imitation of those for point lace was made, chiefly in Flanders. The earlier of these had grounds of ties or *brides* and was often called “point de Flandres” (Pl. fig. 14) in contradistinction to scroll patterns with a mesh ground, which were called “point d’Angleterre” (Pl. fig. 16). Into Spain and France much lace from Venice and Flanders was imported as well as into England, where from the 16th century the manufacture of the simple pattern “bone lace” by peasants in the midland and southern counties was still being carried on. In Charles II.’s time its manufacture was threatened with extinction by the preference given to the more artistic and finer Flemish laces. The importation of the latter was accordingly prohibited. Dealers in Flemish lace sought to evade the prohibitions by calling certain of their laces “point d’Angleterre,” and smuggling them into England. But smuggling was made so difficult that English dealers were glad to obtain the services of Flemish lace-makers and to induce them to settle in England. It is from some such cause that the better 17th- and 18th-century English pillow laces bear resemblance to pillow laces of Brussels, of Mechlin and of Valenciennes.

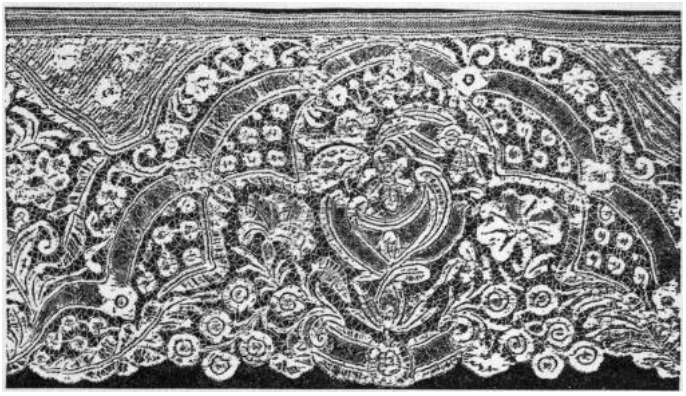


Fig. 36.—Border of English Pillow-made (Devonshire) Lace in the style of a Brussels design of the middle of the 18th century.

Fig. 37—Border of English (Bucks. or Beds.) Pillow-made Lace in the Style of a Mechlin design of the latter part of the 18th century.

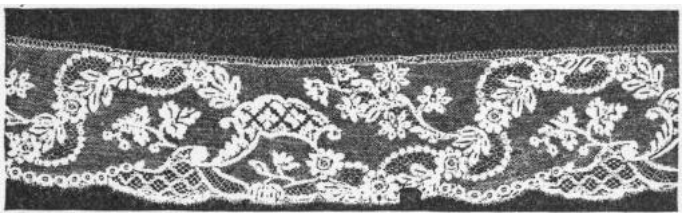


FIG. 38—Border of Pillow-made Lace, Mechlin, from a design similar to such as was used for point d'Alençon of the Louis XV. period.

As skill in the European lace-making developed soon after the middle of the 17th century, patterns and particular plaitings came to be identified with certain localities. Mechlin, for instance, enjoyed a high reputation for her productions. The chief technical features of this pillow lace lie in the plaiting of the meshes, and the outlining of the clothing or *toilé* with a thread *cordonnet*. The ordinary Mechlin mesh is hexagonal in shape. Four of the sides are of double twisted threads, two are of four threads plaited three times (fig. 39).

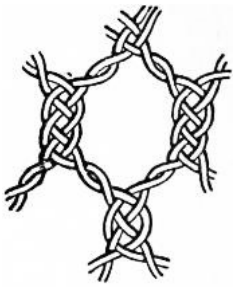


FIG. 39.—Mechlin Mesh.

In Brussels pillow lace, which has greater variety of design, the mesh is also hexagonal; but in contrast with the Mechlin mesh whilst four of its sides are of double-twisted threads the other two are of four threads plaited four times (fig. 41). The finer specimens of Brussels lace are remarkable for the fidelity and grace with which the botanical forms in many of its patterns are rendered (Pl. VI. fig. 23). These are mainly reproductions or adaptations of designs for point d'Alençon, and the soft quality imparted to them in the texture of pillow-made lace contrasts with the harder and more crisp appearance in needlepoint lace. An example of dainty Brussels pillow lace is given in fig. 42. In the Brussels pillow lace a delicate modelling effect is often imparted to the close textures of the flowers by means of pressing them with a bone instrument which gives concave shapes to petals and leaves, the edges of which consist in part of slightly raised *cordonnet* of compact plaited work.

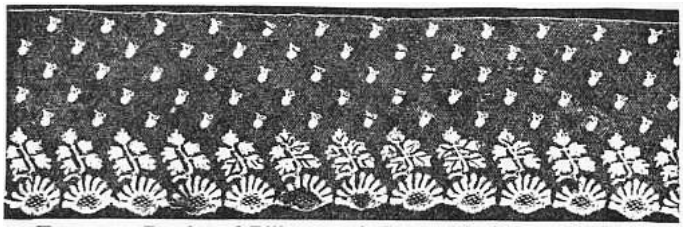


FIG. 40.—Border of Pillow-made Lace, Mechlin, end of the 18th century.

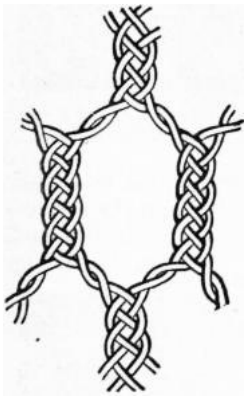


FIG. 41.—Enlargement of Brussels Mesh.

FIG. 42.—Portion of a Wedding Veil, 7 ft. 6 in. × 6 ft. 6 in., of Pillow-made Lace, Brussels, late 18th century. The design consists of light leafy garlands of orange blossoms and other flowers daintily festooned. Little feathery spirals and stars are powdered over the ground, which is of Brussels *vrai réseau*. In the centre upon a more open ground of pillow-made hexagonal *brides* is a group of two birds, one flying towards the other which appears ready to take wing from its nest; an oval frame containing two hearts pierced by an arrow, and a hymeneal torch. Throughout this veil is a profusion of pillow renderings of various *modes*, the *réseau rosacé*, star devices, &c. The ornamental devices are partly applied and partly worked into the ground (Victoria and Albert Museum).

Honiton pillow lace resembles Brussels lace, but in most of the English pillow laces (Devonshire, Buckinghamshire, Bedfordshire) the *réseau* is of a simple character (fig. 43). As a rule, English lace is made with a rather coarser thread than that used in the older Flemish laces. In real Flemish Valenciennes lace there are no twisted sides to the mesh; all are closely plaited (fig. 44) and as a rule the shape of the mesh is diamond but without the openings as shown in fig. 44. No outline or *cordonnet* to define the pattern is used in Valenciennes lace (see fig. 45). Much lace of the Valenciennes type (fig. 54) is made at Ypres. Besides these distinctive classes of pillow-like laces, there are others in which equal care in plaiting and twisting threads is displayed, though the character of the design is comparatively simple, as for instance in ordinary pillow laces from Italy, from the Auvergne, from Buckinghamshire, or rude and primitive as in laces from Crete, southern Spain and Russia. Pillow lace-making in Crete is now said to be extinct. The laces were made chiefly of silk. The patterns in many specimens are outlined with one, two or three bright-coloured silken threads. Uniformity in simple character of design may also be observed in many Italian, Spanish, Bohemian, Swedish and Russian pillow laces (see the lower edge of fig. 46).

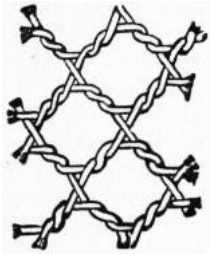


FIG. 43.

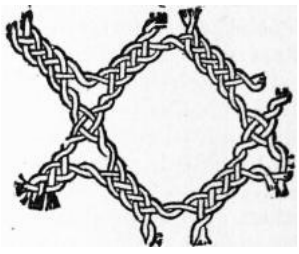


FIG. 44.

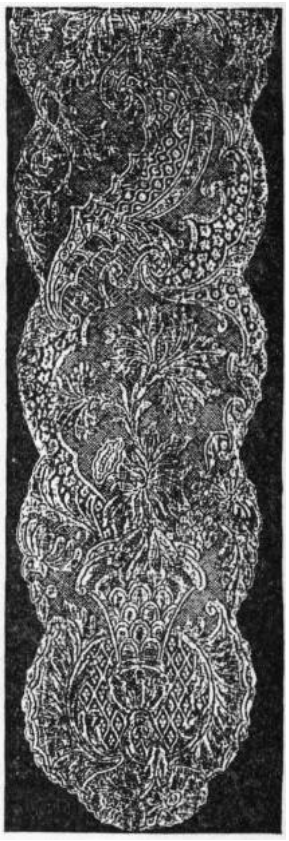


FIG. 45.—Lappet of delicate Pillow-made Lace, Valenciennes, about 1750. The peculiarity of Valenciennes lace is the filmy cambric-like texture and the absence of any cordonnet to define the separate parts of the ornament such as is used in needlepoint lace of Alençon, and in pillow Mechlin and Brussels lace.

Guipure.—This name is often applied to needlepoint and pillow laces in which the ground consists of ties or *brides*, but it more properly designates a kind of lace or "passementerie," made with gimp of fine wires whipped round with silk, and with cotton thread. An earlier kind of gimp was formed with "Cartisane," a little strip of thin parchment or vellum covered with silk, gold or silver thread. These stiff gimp threads, formed into a pattern, were held together by stitches worked with the needle. Gold and silver thread laces have been usually made on the pillow, though gold thread has been used with fine effect in 17th-century Italian needlepoint laces.

FIG. 46.—Border to a Cloth. The wide part bearing the double-headed eagle of Russia is of drawn thread embroidery: the scalloped edging is of Russian pillow-made lace, though the style of its pattern is often seen in pillow laces made by peasants in Danubian provinces as well as in the south of Spain.

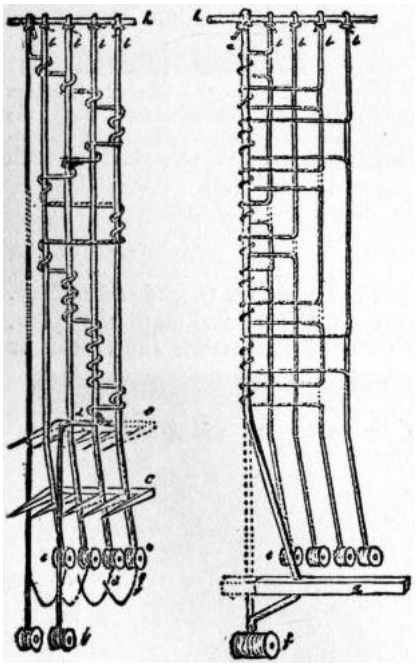


FIG. 47. FIG. 48.

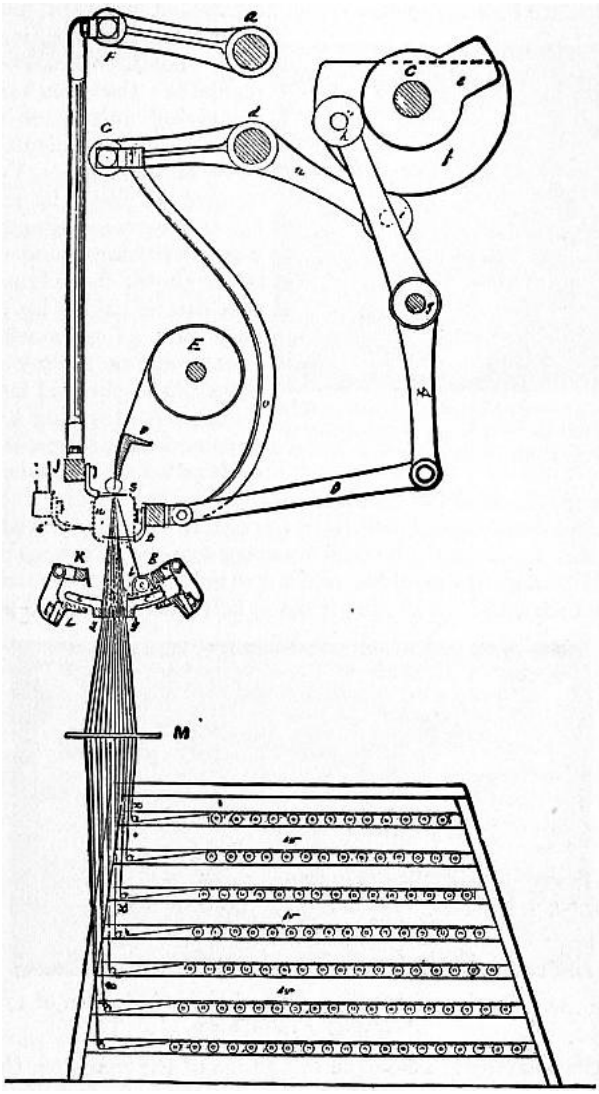


FIG. 49.—Section of Lace Machine.

FIG. 50.—Machine-made Lace in imitation of 16th-century Needlepoint "Reticella" Lace.

FIG. 51.—Border of Machine-made Lace in the style of 17th-century Pillow Guipure Lace.

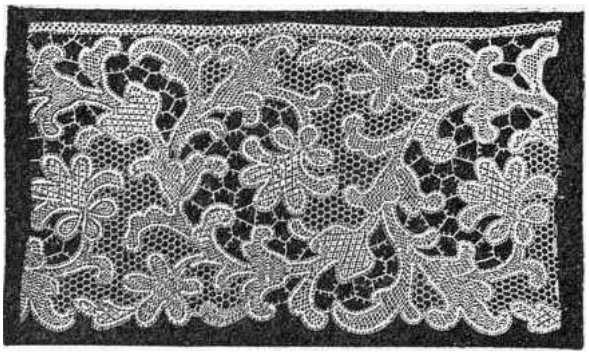


FIG. 52.—Border of Machine-made Lace in imitation of 17th-century Pillow Lace.

FIG. 53.—Machine-made Trimming Border in imitation of Irish Crochet Lace.

FIG. 54.—A Piece of Hand-made Pillow Lace, Belgian (Ypres), 20th century. (The machine imitation is given in fig. 55.)

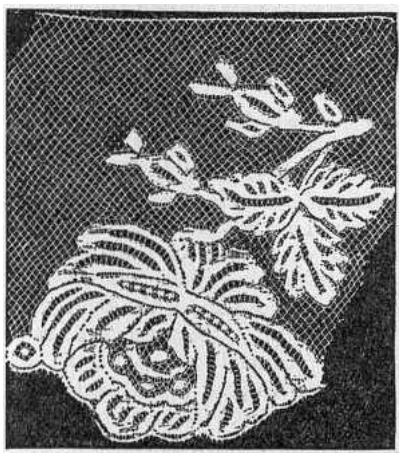


FIG. 55.—Machine-made Lace in imitation of the Hand-made Specimen of fig. 54. (Nottingham, 20th century.)

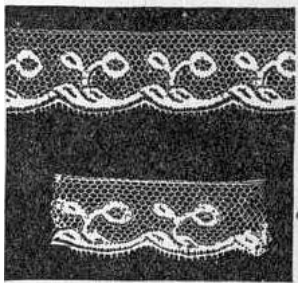


FIG. 56.—Small Borders (*a*) Hand-made and (*b*) Machine-made Lace Valenciennes. (Nottingham, 20th century.)

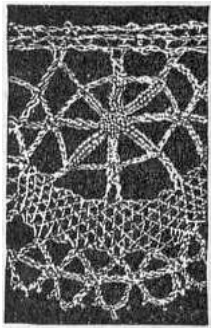


FIG. 57.—Specimen of Hand-made Pillow Lace.

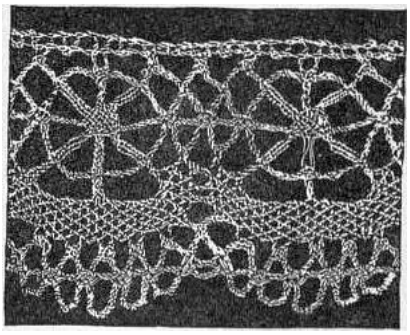


FIG. 58.—Specimen of Machine-made Lace in which the twisting and plaiting of the threads are identical with those of the hand-made specimen of fig. 57. (Nottingham, 20th century.)

Machine-made Lace.—We have already seen that a technical peculiarity in making needlepoint lace is that a single thread and needle are alone used to form the pattern, and that the buttonhole stitch and other loopings which can be worked by means of a needle and thread mark a distinction between lace made in this manner and lace made on the pillow. For the process of pillow lace making a series of threads are in constant employment, plaited and twisted the one with another. A buttonhole stitch is not producible by it. The Leavers lace machine does not make either a buttonhole stitch or a plait. An essential principle of this machine-made work is that the threads are twisted together as in stocking net. The Leavers lace machine is that generally in use at Nottingham and Calais. French ingenuity has developed improvements in this machine whereby laces of delicate thread are made; but as fast as France makes an improvement England follows with another, and both countries virtually maintain an equal position in this branch of industry. The number of threads brought into operation in a Leavers machine is regulated by the pattern to be produced, the threads being of two sorts, beam or warp threads and bobbin or weft threads. 45
Upwards of 8880 are sometimes used, sixty pieces of lace being made simultaneously, each piece requiring 148 threads—100 beam threads and 48 bobbin threads. The ends of both sets of threads are fixed to a cylinder upon which as the manufacture proceeds the lace becomes wound. The supply of the beam or warp threads is held upon reels, and that of the bobbins or weft threads is held in bobbins. The beam or warp thread reels are arranged in frames or trays beneath the stage, above which and between it and the cylinder the twisting of the bobbin or weft with beam or warp threads takes place. The bobbins containing the bobbin or weft threads are flattened in shape so as to pass conveniently between the stretched beam or warp threads. Each bobbin can contain about 120 yds. of thread. By most ingenious mechanism varying degrees of tension can be imparted to warp and weft threads as required. As the bobbins or weft threads pass like pendulums between the warp threads the latter are made to oscillate, thus causing them to become twisted with the bobbin threads. As the twistings take place, combs passing through both warp and weft threads compress the twistings. Thus the texture of the clothing or *toilé* in machine-made lace may generally be detected by its ribbed appearance, due to the compressed twisted threads. Figs. 47 and 48 are intended to show effects obtained by varying the tensions of weft and warp threads. For instance, if the weft, as threads *b, b, b, b* in fig. 47, be tight and the warp thread slack, the warp thread *a* will be twisted upon the weft threads. But if the warp thread *a* be tight and the weft threads *b, b, b, b*, be slack, as in fig. 48, then the weft threads will be twisted on the warp thread. At the same time the twisting in both these cases arises from the conjunction of movements given to the two sets of threads, namely, an oscillation or movement from side to side of the beam or warp threads, and the swinging or pendulum-like movement of the bobbin or weft threads between the warp threads. Fig. 49 is a diagram of a sectional elevation of a lace machine representing its more essential parts. E is the cylinder or beam upon which the lace is rolled as made, and upon which the ends of both warp and weft threads are fastened at starting. Beneath are *w, w, w*, a series of trays or beams, one above the other, containing the reels of the supplies of warp threads; *c, c* represent the slide bars for the passage of the bobbin *b* with its thread from *k* to *k*, the landing bars, one on each side of the rank of warp threads; *s, t* are the combs which take it in turns to press together the twistings as they are made. The combs come away clear from the threads as soon as they have pressed them together and fall into positions ready to perform their 46
pressing operations again. The contrivances for giving each thread a particular tension and movement at a certain time are connected with an adaptation of the Jacquard system of pierced cards. The machine lace pattern drafter has to calculate how many holes shall be punched in a card, and to determine the position of such holes. Each hole regulates the mechanism for giving movement to a thread. Fig. 54 displays a piece of hand-made Valenciennes (Ypres) lace and fig. 55 a corresponding piece woven by the machine. The latter shows the advantage that can be gained by using very fine gauge machines, thus enabling a very close imitation of the real lace to be made by securing a very open and clear *réseau* or net, such as would be made on a coarse machine, and at the same time to keep the pattern fine and solid and standing out well from the net, as is the case with the real lace, which cannot be done by using a coarse gauge machine. In this example the machine used is a 16 point (that is 32 carriages to the inch), and the ground is made half gauge, that is 8 point, and the weaving is made the full gauge of the machine, that is 16 point. Fig. 56 gives other examples of hand- and machine-made Valenciennes lace. The machine-made lace (*b*) imitating the real (*a*) is made on a 14-point machine (that is 28 carriages to the inch), the ground being 7 point and the pattern being full gauge or 14 point. Although the principle in these examples of machine work is exactly the same, in so far that they use half gauge net and full gauge clothing to produce the contrast as mentioned above, the fabrication of these two examples is quite different, that in fig. 55 being an example of tight bobbins or weft, and slack warp threads as shown in fig. 47. Whereas the example in fig. 56 is made with slack bobbins or weft threads and tight warp threads as in fig. 48. In fig. 57 is a piece of hand-made lace of stout thread, very similar to much Cluny lace made in the Auvergne and to the

Buckinghamshire “Maltese” lace. Close to it are specimens of lace (figs. 58 and 59) made by the new patent circular lace machine of Messrs Birkin of Nottingham. This machine although very slow in production actually reproduces the real lace, at a cost slightly below that of the hand-made lace. In another branch of lace-making by machinery, mechanical ingenuity, combined with chemical treatment, has led to surprising results (figs. 53 and 50). Swiss, German and other manufacturers use machines in which a principle of the sewing-machine is involved. A fine silken tissue is thereby enriched with an elaborately raised cotton or thread embroidery. The whole fabric is then treated with chemical mordants which, whilst dissolving the silky web, do not attack the cotton or thread embroidery. A relief embroidery possessing the appearance of hand-made raised needlepoint lace is thus produced. Figs. 60 and 61 give some idea of the high quality to which this admirable counterfeit has been brought.

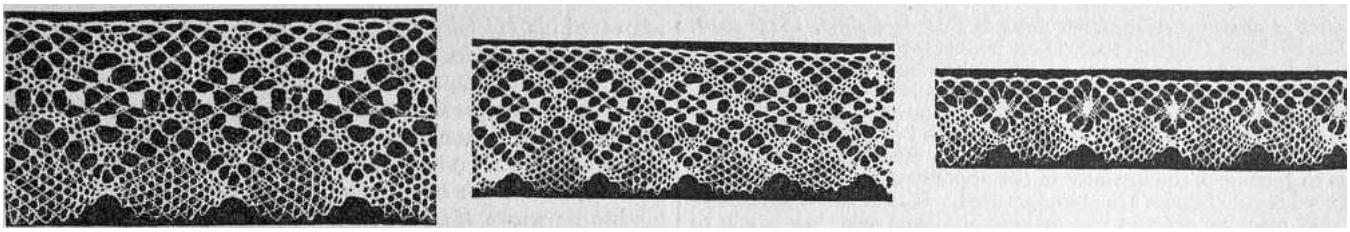


Fig. 59.—Specimens of Machine-made Torchon Lace, in the same manner as such lace is made on the pillow by hand. (Nottingham, 20th century.)

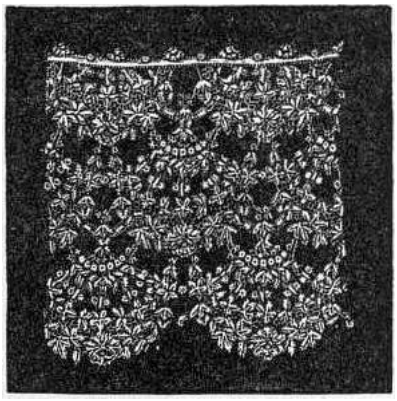


Fig. 60.—Machine-made Lace of Modern Design.

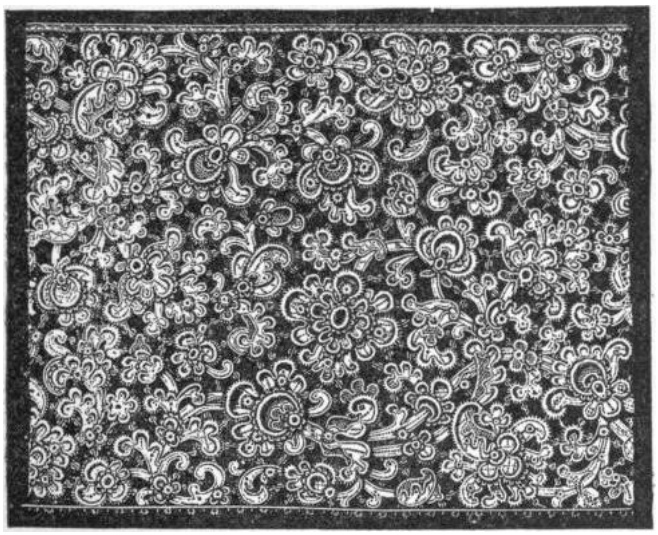


Fig. 61.—Machine-made Lace in imitation of 17th-century Needlepoint Lace, “Gros point de Venise.”

Collections of hand-made lace chiefly exist in museums and technical institutions, as for instance the Victoria and Albert Museum in London, the Musée des Arts Décoratifs in Paris, and museums at Lyons, Nuremberg, Berlin, Turin and elsewhere. In such places the opportunity is presented of tracing in chronological sequence the stages of pattern and texture development.

Literature.—The literature of the art of lace-making is considerable. The series of 16th- and 17th-century lace pattern-books, of which the more important are perhaps those by F. Vinciolo (Paris, 1587), Cesare Vecellio (Venice, 1592), and Isabetta Catanea Parasole (Venice, 1600), not to mention several kindred works of earlier and later date published in Germany and the Netherlands, supplies a large field for exploration. Signor Ongania of Venice published a limited number of facsimiles of the majority of such works. M. Alvin of Brussels issued a brochure in 1863 upon these patterns, and in the same year the marquis Girolamo d’Adda contributed two bibliographical essays upon the same subject to the *Gazette des Beaux-Arts* (vol. xv. p. 342 seq., and vol. xvii. p. 421 seq.). In 1864 Cavaliere A. Merli wrote a pamphlet (with illustrations) entitled *Origine ed uso delle trine a filo di rete*; Mons F. de Fertiault compiled a brief and rather fanciful *Histoire de la dentelle* in 1843, in which he reproduced statements to be found in Diderot’s *Encyclopédie*, subsequently quoted by Roland de la Platière. The first *Report of the Department*

of Practical Art (1853) contains a "Report on Cotton Print Works and Lace-Making" by Octavius Hudson, and in the first *Report of the Department of Science and Art* are some "Observations on Lace." Reports upon the International Exhibitions of 1851 (London) and 1867 (Paris), by M. Aubry, Mrs Palliser and others contain information concerning lace-making. The most important work first issued upon the history of lace-making is that by Mrs Bury Palliser (*History of Lace*, 1869). In this work the history is treated rather from an antiquarian than a technical point of view; and wardrobe accounts, inventories, state papers, fashionable journals, diaries, plays, poems, have been laid under contribution with surprising diligence. A new edition published in 1902 presents the work as entirely revised, rewritten and enlarged under the editorship of M. Jourdain and Alice Dryden. In 1875 the Arundel Society brought out *Ancient Needlepoint and Pillow Lace*, a folio volume of permanently printed photographs taken from some of the finest specimens of ancient lace collected for the International Exhibition of 1874. These were accompanied by a brief history of lace, written from the technical aspect of the art, by Alan S. Cole. At the same time appeared a bulky imperial 4to volume by Seguin, entitled *La Dentelle*, illustrated with wood-cuts and fifty photo-typographical plates. Seguin divides his work into four sections. The first is devoted to a sketch of the origin of laces; the second deals with pillow laces, bibliography of lace and a review of sumptuary edicts; the third relates to needle-made lace; and the fourth contains an account of places where lace has been and is made, remarks upon commerce in lace, and upon the industry of lace makers. Without sufficient conclusive evidence Seguin accords to France the palm for having excelled in producing practically all the richer sorts of laces, notwithstanding that both before and since the publication of his otherwise valuable work, many types of them have been identified as being Italian in origin. Descriptive catalogues are issued of the lace collections at South Kensington Museum, at the Science and Art Museum, Dublin, and at the Industrial Museum, Nuremberg. In 1881 a series of four Cantor Lectures on the art of lace-making were delivered before the Society of Arts by Alan S. Cole.

A Technical History of the Manufacture of Venetian Laces, by G. M. Urbani de Gheltof, with plates, was translated by Lady Layard, and published at Venice by Signor Ongania. The *History of Machine-wrought Hosiery and Lace Manufacture* (London, 1867), by Felkin, has already been referred to. There is also a technological essay upon lace made by machinery, with diagrams of lace stitches and patterns (*Technologische Studien im sächsischen Erzgebirge*, Leipzig, 1878), by Hugo Fischer. In 1886 the Libraire Renouard, Paris, published a *History of Point d'Alençon*, written by Madame G. Despierres, which gives a close and interesting account of the industry, together with a list, compiled from local records, of makers and dealers from 1602 onwards.—*Embroidery and Lace: their manufacture and history from the remotest antiquity to the present day*, by Ernest Lefebure, lace-maker and administrator of the École des Arts Décoratifs, translated and enlarged with notes by Alan S. Cole, was published in London in 1888. It is a well-illustrated handbook for amateurs, collectors and general readers.—Irish laces made from modern designs are illustrated in a *Renascence of the Irish Art of Lace-making*, published in 1888 (London). —*Anciennes Dentelles belges formant la collection de feue madame Augusta Baronne Liedts et données au Musée de Grunthuis à Bruges*, published at Antwerp in 1889, consists of a folio volume containing upwards of 181 phototypes—many full size—of fine specimens of lace. The ascriptions of country and date of origin are occasionally inaccurate, on account of a too obvious desire to credit Bruges with being the birthplace of all sorts of lace-work, much of which shown in this work is distinctly Italian in style.—The *Encyclopaedia of Needlework*, by Thérèse de Dillmont-Dornach (Alsace, 1891), is a detailed guide to several kinds of embroidery, knitting, crochet, tatting, netting and most of the essential stitches for needlepoint lace. It is well illustrated with wood-cuts and process blocks.—An exhaustive history of Russian lace-making is given in *La Dentelle russe*, by Madame Sophie Davidoff, published at Leipzig, 1895. Russian lace is principally pillow-work with rather heavy thread, and upwards of eighty specimens are reproduced by photo-lithography in this book.

A short account of the best-known varieties of *Point and Pillow Lace*, by A. M. S. (London, 1899), is illustrated with typical specimens of Italian, Flemish, French and English laces, as well as with magnified details of lace, enabling any one to identify the plaits, the twists and loops of threads in the actual making of the fabric.—*L'Industrie des tulles et dentelles mécaniques dans le Pas de Calais*, 1815-1900, by Henri Hénon (Paris, 1900), is an important volume of over 600 pages of letterpress, interspersed with abundant process blocks of the several kinds of machine nets and laces made at Calais since 1815. It opens with a short account of the Arras hand-made laces, the production of which is now almost extinct. The book was sold for the benefit of a public subscription towards the erection of a statue in Calais to Jacquard, the inventor of the apparatus by means of which all figured textile fabrics are manufactured. It is of some interest to note that machine net and lace-making at Calais owe their origin to Englishmen, amongst whom "le sieur R. Webster arrivé à St Pierre-les-Calais en Décembre, 1816, venant d'Angleterre, est l'un des premiers qui ont établi dans la communauté une fabrique de tulles," &c. *Lace-making in the Midlands: Past and Present*, by C. C. Channer and M. E. Roberts (London, 1900) upon the lace-making industry in Buckinghamshire, Bedfordshire and Northamptonshire contains many illustrations of laces made in these counties from the 17th century to the present time. *Musée rétrospectif. Dentelles à l'exposition universelle internationale de 1900 à Paris. Rapport de Mons. E. Lefebvre* contains several good illustrations, especially of important specimens of Point de France of the 17th and 18th centuries. *Le Point de France et les autres dentelliers au XVII^e^ et au XVIII^e^ siècles*, by Madame Laurence de Laprade (Paris, 1905), brings together much hitherto scattered information throwing light upon operations in many localities in France where the industry has been carried on for considerable periods. The book is well and usefully illustrated.

See also *Irische Spitzen* (30 half-tone plates), with a short historical introduction by Alan S. Cole (Stuttgart, 1902); *Pillow Lace*, a practical handbook by Elizabeth Mincoff and Margaret S. Marriage (London, 1907); *The Art of Bobbin Lace*, a practical text-book of workmanship, &c., by Louisa Tebbs (London, 1907); *Antiche trine italiane*, by Elisa Ricci (Bergamo, 1908), well illustrated; *Seven Centuries of Lace*, by Mrs John Hungerford Pollen (London and New York, 1908), very fully illustrated.

(A. S. C.)

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1 The prevalence of fashion in the above-mentioned sorts of embroidery during the 16th century is marked by the number of pattern-books then published. In Venice a work of this class was issued by Alessandro Pagannino in 1527; another of a similar nature, printed by Pierre Quinty, appeared in the same year at Cologne; and La *Fleur*

de la science de pourtraicture et patrons de broderie, façon arabicque et ytalique, was published at Paris in 1530. From these early dates until the beginning of the 17th century pattern-books for embroidery in Italy, France, Germany and England were published in great abundance. The designs contained in many of those dating from the early 16th century were to be worked for costumes and hangings, and consisted of scrolls, arabesques, birds, animals, flowers, foliage, herbs and grasses. So far, however, as their reproduction as laces might be concerned, the execution of complicated work was involved which none but practised lace-workers, such as those who arose a century later, could be expected to undertake.

2 A very complete account of how these conditions began and developed at Alençon, for instance, is given in Madame Despierre's *Histoire du Point d'Alençon* (1886) to which is appended an interesting and annotated list of merchants, designers and makers of Point d'Alençon.

3 *E.g.* The family of Camusat at Alençon from 1602 until 1795.

4 The picture, however, as Seguin has pointed out, was probably painted some thirty years later, and by Jean Matsys.

5 See the poetical skit *Révolte des passements et broderies*, written by Mademoiselle de la Tousse, cousin of Madame de Sévigné, in the middle of the 17th century, which marks the favour which foreign laces at that time commanded amongst the leaders of French fashion. It is fairly evident too that the French laces themselves, known as "bisette," "gueuse," "campane" and "mignonette," were small and comparatively insignificant works, without pretence to design.

6 Useful information has been communicated to the writer of the present article on lace by Mrs B. Wishaw of Seville.

7 See Felkin's *Machine-wrought Hosiery and Lace Manufactures*.

8 After 1650 the lace-workers at Alençon and its neighbourhood produced work of a daintier kind than that which was being made by the Venetians. As a rule the hexagonal *bride* grounds of Alençon laces are smaller than similar details in Venetian laces. The average size of a diagonal taken from angle to angle in an Alençon (or so-called Argentan) hexagon was about one-sixth of an inch, and each side of the hexagon was about one-tenth of an inch. An idea of the minuteness of the work can be formed from the fact that a side of a hexagon would be overcast with some nine or ten buttonhole stitches.

LACE-BARK TREE, a native of Jamaica, known botanically as *Lagetta lintearia*, from its native name lagetto. The inner bark consists of numerous concentric layers of interlacing fibres resembling in appearance lace. Collars and other articles of apparel have been made of the fibre, which is also used in the manufacture of whips, &c. The tree belongs to the natural order Thymelaeaceae, and is grown in hothouses in Britain.

LACEDAEMON, in historical times an alternative name of Laconia (*q.v.*). Homer uses only the former, and in some passages seems to denote by it the Achaean citadel, the Therapnae of later times, in contrast to the lower town Sparta (G. Gilbert, *Studien zur altspartanischen Geschichte*, Göttingen, 1872, p. 34 foll.). It is described by the epithets κοίλη (hollow) and κητώεσσα (spacious or hollow), and is probably connected etymologically with λάκκος, *lacus*, any hollow place. Lacedaemon is now the name of a separate department, which had in 1907 a population of 87,106.

LACÉPÈDE, BERNARD GERMAIN ÉTIENNE DE LA VILLE, Comte de (1756-1825), French naturalist, was born at Agen in Guienne on the 26th of December 1756. His education was carefully conducted by his father, and the early perusal of Buffon's *Natural History* awakened his interest in that branch of study, which absorbed his chief attention. His leisure he devoted to music, in which, besides becoming a good performer on the piano and organ, he acquired considerable mastery of composition, two of his operas (which were never published) meeting with the high approval of Gluck; in 1781-1785 he also brought out in two volumes his *Poétique de la musique*. Meantime he wrote two treaties, *Essai sur l'électricité* (1781) and *Physique générale et particulière* (1782-1784), which gained him the friendship of Buffon, who in 1785 appointed him subdemonstrator in the Jardin du Roi, and proposed to him to become the continuator of his *Histoire naturelle*. This continuation was published under the titles *Histoire des quadrupèdes ovipares et des serpents* (2 vols., 1788-1789) and *Histoire naturelle des*

reptiles (1789). After the Revolution Lacépède became a member of the legislative assembly, but during the Reign of Terror he left Paris, his life having become endangered by his disapproval of the massacres. When the Jardin du Roi was reorganized as the Jardin des Plantes, Lacépède was appointed to the chair allocated to the study of reptiles and fishes. In 1798 he published the first volume of *Histoire naturelle des poissons*, the fifth volume appearing in 1803; and in 1804 appeared his *Histoire des cétacés*. From this period till his death the part he took in politics prevented him making any further contribution of importance to science. In 1799 he became a senator, in 1801 president of the senate, in 1803 grand chancellor of the legion of honour, in 1804 minister of state, and at the Restoration in 1819 he was created a peer of France. He died at Épinay on the 6th of October 1825. During the latter part of his life he wrote *Histoire générale physique et civile de l'Europe*, published posthumously in 18 vols., 1826.

A collected edition of his works on natural history was published in 1826.

LACEWING-FLY, the name given to neuropterous insects of the families *Hemerobiidae* and *Chrysopidae*, related to the ant-lions, scorpion-flies, &c., with long filiform antennae, longish bodies and two pairs of large similar richly veined wings. The larvae are short grubs beset with hair-tufts and tubercles. They feed upon *Aphidae* or "green fly" and cover themselves with the emptied skins of their prey. Lacewing-flies of the genus *Chrysopa* are commonly called golden-eye flies.

LA CHAISE, FRANÇOIS DE (1624-1709), father confessor of Louis XIV., was born at the château of Aix in Forey on the 25th of August 1624, being the son of Georges d'Aix, seigneur de la Chaise, and of Renée de Rochefort. On his mother's side he was a grandnephew of Père Coton, the confessor of Henry IV. He became a novice of the Society of Jesus before completing his studies at the university of Lyons, where, after taking the final vows, he lectured on philosophy to students attracted by his fame from all parts of France. Through the influence of Camille de Villeroy, archbishop of Lyons, Père de la Chaise was nominated in 1674 confessor of Louis XIV., who intrusted him during the lifetime of Harlay de Champvallon, archbishop of Paris, with the administration of the ecclesiastical patronage of the crown. The confessor united his influence with that of Madame de Maintenon to induce the king to abandon his liaison with Madame de Montespan. More than once at Easter he is said to have had a convenient illness which dispensed him from granting absolution to Louis XIV. With the fall of Madame de Montespan and the ascendancy of Madame de Maintenon his influence vastly increased. The marriage between Louis XIV. and Madame de Maintenon was celebrated in his presence at Versailles, but there is no reason for supposing that the subsequent coolness between him and Madame de Maintenon arose from his insistence on secrecy in this matter. During the long strife over the temporalities of the Gallican Church between Louis XIV. and Innocent XI. Père de la Chaise supported the royal prerogative, though he used his influence at Rome to conciliate the papal authorities. He must be held largely responsible for the revocation of the Edict of Nantes, but not for the brutal measures applied against the Protestants. He exercised a moderating influence on Louis XIV.'s zeal against the Jansenists, and Saint-Simon, who was opposed to him in most matters, does full justice to his humane and honourable character. Père de la Chaise had a lasting and unalterable affection for Fénelon, which remained unchanged by the papal condemnation of the *Maximes*. In spite of failing faculties he continued his duties as confessor to Louis XIV. to the end of his long life. He died on the 20th of January 1709. The cemetery of Père-la-Chaise in Paris stands on property acquired by the Jesuits in 1826, and not, as is often stated, on property personally granted to him.

See R. Chantelauze, *Le Père de la Chaize. Études d'histoire religieuse* (Paris and Lyons, 1859).

LA CHAISE-DIEU, a town of central France, in the department of Haute Loire, 29 m. N.N.W. of Le Puy by rail. Pop. (1906) 1203. The town, which is situated among fir and pine woods, 3500 ft. above the sea, preserves remains of its ramparts and some houses of the 14th and 15th centuries, but owes its celebrity to a church, which, after the cathedral of Clermont-Ferrand, is the most remarkable Gothic building in Auvergne. The west façade, approached by a flight of steps, is flanked by two massive towers. The nave and aisles are of equal height and are separated from the choir by a stone rood screen. The choir, terminating in an apse with radiating chapel, contains the fine tomb and statue of Clement VI.,

carved stalls and some admirable Flemish tapestries of the early 16th century. There is a ruined cloister on the south side. The church, which dates from the 14th century, was built at the expense of Pope Clement VI., and belonged to a powerful Benedictine abbey founded in 1043. There are spacious monastic buildings of the 18th century. The abbey was formerly defended by fortifications, the chief survival of which is a lofty rectangular keep to the south of the choir. Trade in timber and the making of lace chiefly occupy the inhabitants of the town.

LA CHALOTAIS, LOUIS RENÉ DE CARADEUC DE (1701-1785), French jurist, was born at Rennes, on the 6th of March 1701. He was for 60 years procureur général at the parliament of Brittany. He was an ardent opponent of the Jesuits; drew up in 1761 for the parliament a memoir on the constitutions of the Order, which did much to secure its suppression in France; and in 1763 published a remarkable "Essay on National Education," in which he proposed a programme of scientific studies as a substitute for those taught by the Jesuits. The same year began the conflict between the Estates of Brittany and the governor of the province, the duc d'Aiguillon (*q.v.*). The Estates refused to vote the extraordinary imposts demanded by the governor in the name of the king. La Chalotais was the personal enemy of d'Aiguillon, who had served him an ill turn with the king, and when the parliament of Brittany sided with the Estates, he took the lead in its opposition. The parliament forbade by decrees the levy of imposts to which the Estates had not consented. The king annulling these decrees, all the members of the parliament but twelve resigned (October 1764 to May 1765). The government considered La Chalotais one of the authors of this affair. At this time the secretary of state who administered the affairs of the province, Louis Philypeaux, duc de la Vrillière, comte de Saint-Florentin (1705-1777), received two anonymous and abusive letters. La Chalotais was suspected of having written them, and three experts in handwriting declared that they were by him. The government therefore arrested him, his son and four other members of the parliament. The arrest made a great sensation. There was much talk of "despotism." Voltaire stated that the procureur général, in his prison of Saint Malo, was reduced, for lack of ink, to write his defence with a toothpick dipped in vinegar—which was apparently pure legend; but public opinion all over France was strongly aroused against the government. On the 16th of November 1765 a commission of judges was named to take charge of the trial. La Chalotais maintained that the trial was illegal; being procureur général he claimed the right to be judged by the parliament of Rennes, or failing this by the parliament of Bordeaux, according to the custom of the province. The judges did not dare to pronounce a condemnation on the evidence of experts in handwriting, and at the end of a year, things remained where they were at the first. Louis XV. then decided on a sovereign act, and brought the affair before his council, which without further formality decided to send the accused into exile. That expedient but increased the popular agitation; *philosophes*, members of the parliament, patriot Bretons and Jansenists all declared that La Chalotais was the victim of the personal hatred of the duc d'Aiguillon and of the Jesuits. The government at last gave way, and consented to recall the members of the parliament of Brittany who had resigned. This parliament, when it met again, after the formal accusation of the duc d'Aiguillon, demanded the recall of La Chalotais. This was accorded in 1775, and La Chalotais was allowed to transmit his office to his son. In this affair public opinion showed itself stronger than the absolutism of the king. The opposition to the royal power gained largely through it, and it may be regarded as one of the preludes to the revolution of 1789. La Chalotais, who was personally a violent, haughty and unsympathetic character, died at Rennes on the 12th of July 1785.

See, besides the *Comptes-Rendus des Constitutions des Jésuites* and the *Essai d'éducation nationale*, the *Mémoires de la Chalotais* (3 vols., 1766-1767). Two works containing detailed bibliographies are Marion, *La Bretagne et le duc d'Aiguillon* (Paris, 1893), and B. Pocquet, *Le Duc d'Aiguillon et La Chalotais* (Paris, 1901). See also a controversy between these two authors in the *Bulletin critique* for 1902.

LA CHARITÉ, a town of central France in the department of Nièvre, on the right bank of the Loire, 17 m. N.N.W. of Nevers on the Paris-Lyon-Méditerranée railway. Pop. (1906) 3990. La Charité possesses the remains of a fine Romanesque basilica, the church of Sainte-Croix, dating from the 11th and early 12th centuries. The plan consists of a nave, rebuilt at the end of the 17th century, transept and choir with ambulatory and side chapels. Surmounting the transept is an octagonal tower of one story, and a square Romanesque tower of much beauty flanks the main portal. There are ruins of the ramparts, which date from the 14th century. The manufacture of hosiery, boots and shoes, files and iron goods, lime and cement and woollen and other fabrics are among the industries; trade is chiefly in wood and iron.

La Charité owes its celebrity to its priory, which was founded in the 8th century and reorganized as a dependency of the abbey of Cluny in 1052. It became the parent of many priories and monasteries, some of them in England and Italy. The possession of the town was hotly contested during the wars of religion of the 16th century, at the end of which its fortifications were dismantled.

LA CHAUSSÉE, PIERRE CLAUDE NIVELLE DE (1692-1754), French dramatist, was born in Paris in 1692. In 1731 he published an *Épître à Clio*, a didactic poem in defence of Lériget de la Faye in his dispute with Antoine Houdart de la Motte, who had maintained that verse was useless in tragedy. La Chaussée was forty years old before he produced his first play, *La Fausse Antipathie* (1734). His second play, *Le Préjugé à la mode* (1735) turns on the fear of incurring ridicule felt by a man in love with his own wife, a prejudice dispelled in France, according to La Harpe, by La Chaussée's comedy. *L'École des amis* (1737) followed, and, after an unsuccessful attempt at tragedy in *Maximinien*, he returned to comedy in *Mélanide* (1741). In *Mélanide* the type known as *comédie larmoyante* is fully developed. Comedy was no longer to provoke laughter, but tears. The innovation consisted in destroying the sharp distinction then existing between tragedy and comedy in French literature. Indications of this change had been already offered in the work of Marivaux, and La Chaussée's plays led naturally to the domestic drama of Diderot and of Sedaine. The new method found bitter enemies. Alexis Piron nicknames the author "*le Révérend Père Chaussée*," and ridiculed him in one of his most famous epigrams. Voltaire maintained that the *comédie larmoyante* was a proof of the inability of the author to produce either of the recognized kinds of drama, though he himself produced a play of similar character in *L'Enfant prodigue*. The hostility of the critics did not prevent the public from shedding tears nightly over the sorrows of La Chaussée's heroine. *L'École des mères* (1744) and *La Gouvernante* (1747) form, with those already mentioned, the best of his work. The strict moral aims pursued by La Chaussée in his plays seem hardly consistent with his private preferences. He frequented the same gay society as did the comte de Caylus and contributed to the *Recueils de ces messieurs*. La Chaussée died on the 14th of May 1754. Villemain said of his style that he wrote prosaic verses with purity, while Voltaire, usually an adverse critic of his work, said he was "*un des premiers après ceux qui ont du génie*."

For the *comédie larmoyante* see G. Lanson, *Nivelle de la Chaussée et la comédie larmoyante* (1887).

LACHES (from Anglo-French *lachesse*, negligence, from *lasche*, modern *lâche*, unloosed, slack), a term for slackness or negligence, used particularly in law to signify negligence on the part of a person in doing that which he is by law bound to do, or unreasonable lapse of time in asserting a right, seeking relief, or claiming a privilege. Laches is frequently a bar to a remedy which might have been had if prosecuted in proper time. Statutes of limitation specify the time within which various classes of actions may be brought. Apart from statutes of limitation courts of equity will often refuse relief to those who have allowed unreasonable time to elapse in seeking it, on the principle *vigilantibus ac non dormientibus jura subveniunt*.

LACHINE, an incorporated town in Jacques Cartier county, Quebec, Canada, 8 m. W. of Montreal, on Lake St Louis, an expansion of the St Lawrence river, and at the upper end of the Lachine canal. Pop. (1901) 5561. It is a station on the Grand Trunk railway and a port of call for steamers plying between Montreal and the Great Lakes. It is a favourite summer resort for the people of Montreal. It was named in 1669 in mockery of its then owner, Robert Cavelier de la Salle (1643-1687), who dreamed of a westward passage to China. In 1689 it was the scene of a terrible massacre of the French by the Iroquois.

LACHISH, a town of great importance in S. Palestine, often mentioned in the Tell el-Amarna tablets. It was destroyed by Joshua for joining the league against the Gibeonites (Joshua x. 31-33) and assigned to the tribe of Judah (xv. 39). Rehoboam fortified it (2 Chron. xi. 9). King Amaziah having fled hither, was here murdered by conspirators (2 Kings xiv. 19). Sennacherib here conducted a campaign (2 Kings xviii. 13) during which Hezekiah endeavoured to make terms with him: the campaign is commemorated by bas-reliefs found in Nineveh, now in the British Museum (see G. Smith's *History of Sennacherib*, p. 69). It was

one of the last cities that resisted Nebuchadnezzar (Jer. xxxiv. 7). The meaning of Micah's denunciation (i. 13) of the city is unknown. The *Onomasticon* places it 7 m. from Eleutheropolis on the S. road, which agrees with the generally received identification, Tell el-Ḥesi, an important mound excavated for the Palestine Exploration Fund by Petrie and Bliss, 1890-1893. The name is preserved in a small Roman site in the neighbourhood, Umm Lakis, which probably represents a later dwelling-place of the descendants of the ancient inhabitants of the city.

See W. M. Flinders Petrie, *Tell el-Hesy*, and F. J. Bliss, *A Mound of many Cities*, both published by the Palestine Exploration Fund.

(R. A. S. M.)

LACHMANN, KARL KONRAD FRIEDRICH WILHELM (1793-1851), German philologist and critic, was born at Brunswick on the 4th of March 1793. He studied at Leipzig and Göttingen, devoting himself mainly to philological studies. In 1815 he joined the Prussian army as a volunteer *chasseur* and accompanied his detachment to Paris, but did not encounter the enemy. In 1816 he became an assistant master in the Friedrich Werder gymnasium at Berlin, and a *privat-docent* at the university. The same summer he became one of the principal masters in the Friedrichs-Gymnasium of Königsberg, where he assisted his colleague, the Germanist Friedrich Karl Köpke (1785-1865) with his edition of Rudolf von Ems' *Barlaam und Josaphat* (1818), and also assisted his friend in a contemplated edition of the works of Walther von der Vogelweide. In January 1818 he became professor extraordinarius of classical philology in the university of Königsberg, and at the same time began to lecture on Old German grammar and the Middle High German poets. He devoted himself during the following seven years to an extraordinarily minute study of those subjects, and in 1824 obtained leave of absence in order that he might search the libraries of middle and south Germany for further materials. In 1825 Lachmann was nominated extraordinary professor of classical and German philology in the university of Berlin (ordinary professor 1827); and in 1830 he was admitted a member of the Academy of Sciences. The remainder of his laborious and fruitful life as an author and a teacher was uneventful. He died on the 13th of March 1851.

Lachmann, who was the translator of the first volume of P. E. Müller's *Sagabibliothek des skandinavischen Altertums* (1816), is a figure of considerable importance in the history of German philology (see Rudolf von Raumer, *Geschichte der germanischen Philologie*, 1870). In his "Habilitationsschrift" *Über die ursprüngliche Gestalt des Gedichts der Nibelunge Not* (1816), and still more in his review of Hagen's *Nibelungen* and Benecke's *Bonerius*, contributed in 1817 to the *Jenaische Literaturzeitung* he had already laid down the rules of textual criticism and elucidated the phonetic and metrical principles of Middle High German in a manner which marked a distinct advance in that branch of investigation. The rigidly scientific character of his method becomes increasingly apparent in the *Auswahl aus den hochdeutschen Dichtern des dreizehnten Jahrhunderts* (1820), in the edition of Hartmann's *Iwein* (1827), in those of Walther von der Vogelweide (1827) and Wolfram von Eschenbach (1833), in the papers "Über das Hildebrandslied," "Über althochdeutsche Betonung und Verskunst," "Über den Eingang des Parzivals," and "Über drei Bruchstücke niederrheinischer Gedichte" published in the *Abhandlungen* of the Berlin Academy, and in *Der Nibelunge Not und die Klage* (1826, 11th ed., 1892), which was followed by a critical commentary in 1836. Lachmann's *Betrachtungen über Homer's Ilias*, first published in the *Abhandlungen* of the Berlin Academy in 1837 and 1841, in which he sought to show that the *Iliad* consists of sixteen independent "lays" variously enlarged and interpolated, have had considerable influence on modern Homeric criticism (see Homer), although his views are no longer accepted. His smaller edition of the New Testament appeared in 1831, 3rd ed. 1846; the larger, in two volumes, in 1842-1850. The plan of Lachmann's edition, explained by himself in the *Stud. u. Krit.* of 1830, is a modification of the unaccomplished project of Bentley. It seeks to restore the most ancient reading current in Eastern MSS., using the consent of the Latin authorities (Old Latin and Greek Western Uncials) as the main proof of antiquity of a reading where the oldest Eastern authorities differ. Besides *Propertius* (1816), Lachmann edited *Catullus* (1829); *Tibullus* (1829); *Genesius* (1834); *Terentianus Maurus* (1836); *Babrius* (1845); *Avianus* (1845); *Gaius* (1841-1842); the *Agrimensores Romani* (1848-1852); *Lucilius* (edited after his death by Vahlen, 1876); and *Lucretius* (1850). The last, which was the main occupation of the closing years of his life, from 1845, was perhaps his greatest achievement, and has been characterized by Munro as "a work which will be a landmark for scholars as long as the Latin language continues to be studied." Lachmann also translated Shakespeare's sonnets (1820) and *Macbeth* (1829).

See M. Hertz, *Karl Lachmann, eine Biographie* (1851), where a full list of Lachmann's works is given; F. Leo, *Rede zur Säcularfeier K. Lachmanns* (1893); J. Grimm, biography in *Kleine Schriften*; W. Scherer in *Allgemeine deutsche Biographie*, xvii., and J. E. Sandys, *Hist. of Classical Scholarship*, iii. (1908), pp. 127-131.

LACINIUM, PROMUNTURIUM (mod. Capo delle Colonne), 7 m S.E. of Crotona (mod.

Cotrone); the easternmost point of Bruttii (mod. Calabria). On the cape still stands a single column of the temple erected to Hera Lacinia, which is said to have been fairly complete in the 16th century, but to have been destroyed to build the episcopal palace at Cotrone. It is a Doric column with capital, about 27 ft. in height. Remains of marble roof-tiles have been seen on the spot (Livy xlii. 3) and architectural fragments were excavated in 1886-1887 by the Archaeological Institute of America. The sculptures found were mostly buried again, but a few fragments, some decorative terra-cottas and a dedicatory inscription to Hera of the 6th century B.C., in private possession at Cotrone, are described by F. von Duhn in *Notizie degli scavi*, 1897, 343 seq. The date of the erection of the temple may be given as 480-440 B.C.; it is not recorded by any ancient writer.

See R. Koldewey and O. Puchstein, *Die griechischen Tempel in Unteritalien und Sicilien* (Berlin 1899, 41).

LA CIOTAT, a coast town of south-eastern France in the department of Bouches-du-Rhône, on the west shore of the Bay of La Ciotat, 26 m. S.E. of Marseilles by rail. Pop. (1906) 10,562. The port is easily accessible and well sheltered. The large shipbuilding yards and repairing docks of the Messageries Maritimes Company give employment to between 2000 and 3000 workmen. Fishing and an active coasting trade are carried on; the town is frequented for sea-bathing. La Ciotat was in ancient times the port of the neighbouring town of *Citharista* (now the village of Ceyreste).

LA CLOCHE, JAMES DE ["Prince James Stuart"] (1644?-1669), a character who was brought into the history of England by Lord Acton in 1862 (*Home and Foreign Review*, i. 146-174: "The Secret History of Charles II."). From information discovered by Father Boero in the archives of the Jesuits in Rome, Lord Acton averred that Charles II., when a lad at Jersey, had a natural son, James. The evidence follows. On the 2nd of April 1668, as the register of the Jesuit House of Novices at Rome attests, "there entered Jacobus de la Cloche." His baggage was exiguous, his attire was clerical. He is described as "from the island of Jersey, under the king of England, aged 24." He possessed two documents in French, purporting to have been written by Charles II. at Whitehall, on the 25th of September 1665, and on the 7th of February 1667. In both Charles acknowledges James to be his natural son, he styles him "James de la Cloche de Bourg du Jersey," and avers that to recognize him publicly "would imperil the peace of the kingdoms"—why is not apparent. A third certificate of birth, in Latin, undated, was from Christina of Sweden, who declares that James, previously a Protestant, has been received into the church of Rome at Hamburg (where in 1667-1668 she was residing) on the 29th of July 1667. The next paper purports to be a letter from Charles II. of August 3/13 to Oliva, general of the Jesuits. The king writes, in French, that he has long wished to be secretly received into the church. He therefore desires that James, his son by a young lady "of the highest quality," and born to him when he was about sixteen, should be ordained a priest, come to England and receive him. Charles alludes to previous attempts of his own to be secretly admitted (1662). James must be sent secretly to London at once, and Oliva must say nothing to Christina of Sweden (then meditating a journey to Rome), and must never write to Charles except when James carries the letter. Charles next writes on August 29/September 9. He is most anxious that Christina should not meet James; if she knows Charles's design of changing his creed she will not keep it secret, and Charles will infallibly lose his life. With this letter there is another, written when the first had been sealed. Charles insists that James must not be accompanied, as novices were, when travelling, by a Jesuit socius or guardian. Charles's wife and mother have just heard that this is the rule, but the rule must be broken. James, who is to travel as "Henri de Rohan," must not come by way of France. Oliva will supply him with funds. On the back of this letter Oliva has written the draft of his brief reply to Charles (from Leghorn, October 14, 1668). He merely says that the bearer, a French gentleman (James spoke only French), will inform the king that his orders have been executed. Besides these two letters is one from Charles to James, of date August 4/14. It is addressed to "Le Prince Stuart," though none of Charles's bastards was allowed to bear the Stuart name. James is told that he may desert the clerical profession if he pleases. In that case "you may claim higher titles from us than the duke of Monmouth." (There was no higher title save prince of Wales!) If Charles and his brother, the duke of York, die childless, "the kingdoms belong to you, and parliament cannot legally oppose you, unless as, at present, they can only elect Protestant kings." This letter ought to have opened the eyes of Lord Acton and other historians who accept the myth of James de la Cloche. Charles knew that the crown of England was not elective, that there was no Exclusion Act, and that there were legal heirs if he and his brother died without issue. The last letter of Charles is dated November 18/28, and purports to have been brought from England to Oliva by James de la Cloche on his return to Rome. It reveals the fact that Oliva, despite Charles's orders, did send James by way of France, with a *socius* or guardian whom he was to pick up in France on his return to England. Charles says that James is to communicate certain matters to Oliva, and come back at once. Oliva is to give James all the money he needs, and Charles will later make an ample donation to the Jesuits. He acknowledges a debt to

Oliva of £800, to be paid in six months. The reader will remark that the king has never paid a penny to James or to Oliva, and that Oliva has never communicated directly with Charles. The truth is that all of Charles's letters are forgeries. This is certain because in all he writes frequently as if his mother, Henrietta Maria, were in London, and constantly in company with him. Now she had left England for France in 1665, and to England she never returned. As the letters—including that to "Prince Stuart"—are all forged, it is clear that de la Cloche was an impostor. His aim had been to get money from Oliva, and to pretend to travel to England, meaning to enjoy himself. He did not quite succeed, for Oliva sent a socius with him into France. His precautions to avoid a meeting with Christina of Sweden were necessary. She knew no more of him than did Charles, and would have exposed him.

The name of James de la Cloche appears no more in documents. He reached Rome in December 1668, and in January a person calling himself "Prince James Stuart" appears in Naples, accompanied by a *socius* styling himself a French knight of Malta. Both are on their way to England, but Prince James falls ill and stays in Naples, while his companion departs. The knight of Malta may be a Jesuit. In Naples, Prince James marries a girl of no position, and is arrested on suspicion of being a coiner. To his confessors (he had two in succession) he says that he is a son of Charles II. Our sources are the despatches of Kent, the English agent at Naples, and the *Lettere*, vol. iii., of Vincenzo Armanni (1674), who had his information from one of the confessors of the "Prince." The viceroy of Naples communicated with Charles II., who disowned the impostor; Prince James, however, was released, and died at Naples in August 1669, leaving a wild will, in which he claims for his son, still unborn, the "apanage" of Monmouth or Wales, "which it is usual to bestow on natural sons of the king." The son lived till about 1750, a penniless pretender, and writer of begging letters.

It is needless to pursue Lord Acton's conjectures about later mysterious appearances of James de la Cloche at the court of Charles, or to discuss the legend that his mother was a lady of Jersey—or a sister of Charles! The Jersey myths may be found in *The Man of the Mask* (1908), by Monsignor Barnes, who argued that James was the man in the iron mask (see Iron Mask). Later Monsignor Barnes, who had observed that the letter of Charles to Prince James Stuart is a forgery, noticed the impossibility that Charles, in 1668, should constantly write of his mother as resident in London, which she left for ever in 1665.

Who de la Cloche really was it is impossible to discover, but he was a bold and successful swindler, who took in, not only the general of the Jesuits, but Lord Acton and a generation of guileless historians.

(A. L.)

LA CONDAMINE, CHARLES MARIE DE (1701-1774), French geographer and mathematician, was born at Paris on the 28th of January 1701. He was trained for the military profession, but turned his attention to science and geographical exploration. After taking part in a scientific expedition in the Levant (1731), he became a member with Louis Godin and Pierre Bouguer of the expedition sent to Peru in 1735 to determine the length of a degree of the meridian in the neighbourhood of the equator. His associations with his principals were unhappy; the expedition was beset by many difficulties, and finally La Condamine separated from the rest and made his way from Quito down the Amazon, ultimately reaching Cayenne. His was the first scientific exploration of the Amazon. He returned to Paris in 1744 and published the results of his measurements and travels with a map of the Amazon in *Mém. de l'académie des sciences*, 1745 (English translation 1745-1747). On a visit to Rome La Condamine made careful measurements of the ancient buildings with a view to a precise determination of the length of the Roman foot. The journal of his voyage to South America was published in Paris in 1751. He also wrote in favour of inoculation, and on various other subjects, mainly connected with his work in South America. He died at Paris on the 4th of February 1774.

LACONIA (Gr. Λακωνική), the ancient name of the south-eastern district of the Peloponnese, of which Sparta was the capital. It has an area of some 1,048,000 acres, slightly greater than that of Somersetshire, and consists of three well-marked zones running N. and S. The valley of the Eurotas, which occupies the centre, is bounded W. by the chain of Taygetus (mod. Pentedaktylon, 7900 ft.), which starts from the Arcadian mountains on the N., and at its southern extremity forms the promontory of Taenarum (Cape Matapan). The eastern portion of Laconia consists of a far more broken range of hill country, rising in Mt. Parnon to a height of 6365 ft. and terminating in the headland of Malea. The range of Taygetus is well watered and was in ancient times covered with forests which afforded excellent hunting to the Spartans, while it had also large iron mines and quarries of an inferior bluish marble, as well as of the famous *rosso antico* of Taenarum. Far poorer are the slopes of Parnon, consisting for the most part of barren limestone uplands scantily watered. The Eurotas valley, however, is fertile, and produces at the present day maize, olives, oranges and mulberries in great abundance. Laconia has no rivers of importance except the Eurotas and its largest tributary the Oenus (mod. Kelefína). The coast, especially on

the east, is rugged and dangerous. Laconia has few good harbours, nor are there any islands lying off its shores with the exception of Cythera (Cerigo), S. of Cape Malea. The most important towns, besides Sparta and Gythium, were Bryseae, Amyclae and Pharis in the Eurotas plain, Pellana and Belbina on the upper Eurotas, Sellasia on the Oenus, Caryae on the Arcadian frontier, Prasiae, Zarax and Epidaurus Limera on the east coast, Geronthrae on the slopes of Parnon, Boeae, Asopus, Helos, Las and Teuthrone on the Laconian Gulf, and Hippola, Messa and Oetylus on the Messenian Gulf.

The earliest inhabitants of Laconia, according to tradition, were the autochthonous Leleges (*q.v.*). Minyan immigrants then settled at various places on the coast and even appear to have penetrated into the interior and to have founded Amyclae. Phoenician traders, too, visited the shores of the Laconian Gulf, and there are indications of trade at a very early period between Laconia and Crete, *e.g.* a number of blocks of green Laconian porphyry from the quarries at Croceae have been found in the palace of Minos at Cnossus. In the Homeric poems Laconia appears as the realm of an Achaean prince, Menelaus, whose capital was perhaps Therapne on the left bank of the Eurotas, S.E. of Sparta; the Achaean conquerors, however, probably contented themselves with a suzerainty over Laconia and part of Messenia (*q.v.*) and were too few to occupy the whole land. The Achaean kingdom fell before the incoming Dorians, and throughout the classical period the history of Laconia is that of its capital Sparta (*q.v.*). In 195 B.C. the Laconian coast towns were freed from Spartan rule by the Roman general T. Quinctius Flamininus, and became members of the Achaean League. When this was dissolved in 146 B.C., they remained independent under the title of the "Confederation of the Lacedaemonians" or "of the Free-Laconians" (κοινὸν τῶν Λακεδαιμονίων or Ἐλευθερολακώνων), the supreme officer of which was a στρατηγός (general) assisted by a ταμίας (treasurer). Augustus seems to have reorganized the league in some way, for Pausanias (iii. 21, 6) speaks of him as its founder. Of the twenty-four cities which originally composed the league, only eighteen remained as members by the reign of Hadrian (see Achaean League). In A.D. 395 a Gothic horde under Alaric devastated Laconia, and subsequently it was overrun by large bands of Slavic immigrants. Throughout the middle ages it was the scene of vigorous struggles between Slavs, Byzantines, Franks, Turks and Venetians, the chief memorials of which are the ruined strongholds of Mistra near Sparta, Geráki (anc. Geronthrae) and Monemvasia, "the Gibraltar of Greece," on the east coast, and Passava near Gythium. A prominent part in the War of Independence was played by the Maniates or Mainotes, the inhabitants of the rugged peninsula formed by the southern part of Taygetus. They had all along maintained a virtual independence of the Turks and until quite recently retained their medieval customs, living in fortified towers and practising the vendetta or blood-feud.

The district has been divided into two departments (nomes), Lacedaemon and Laconia, with their capitals at Sparta and Gythium respectively. Pop. of Laconia (1907) 61,522.

Archaeology.—Until 1904 archaeological research in Laconia was carried on only sporadically. Besides the excavations undertaken at Sparta, Gythium and Vaphio (*q.v.*), the most important were those at the Apollo sanctuary of Amyclae carried out by C. Tsountas in 1890 (Ἐφημ. ἀρχαιολ. 1892, 1 ff.) and in 1904 by A. Furtwängler. At Kampos, on the western side of Taygetus, a small domed tomb of the "Mycenean" age was excavated in 1890 and yielded two leaden statuettes of great interest, while at Arkina a similar tomb of poor construction was unearthed in the previous year. Important inscriptions were found at Geronthrae (Geráki), notably five long fragments of the *Edictum Diocletiani*, and elsewhere. In 1904 the British Archaeological school at Athens undertook a systematic investigation of the ancient and medieval remains in Laconia. The results, of which the most important are summarized in the article Sparta, are published in the British School *Annual*, x. ff. The acropolis of Geronthrae, a hero-shrine at Angelona in the south-eastern highlands, and the sanctuary of Ino-Pasiphae at Thalamae have also been investigated.

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(M. N. T.)

LACONIA, a city and the county-seat of Belknap county, New Hampshire, U.S.A., on both sides of the Winnepesaukee river, 28 m. N.N.E. of Concord. Pop. (1900) 8042 (1770 foreign-born); (1910) 10,183. Laconia is served by two divisions of the Boston & Maine railway, which has a very handsome granite passenger station (1892) and repair shops here. It is pleasantly situated in the lake district of central New

Hampshire, and in the summer season Lake Winnisquam on the S. and W. and Lake Winnepesaukee on the N.E. attract many visitors. The city covers an area of 24.65 sq. m. (5.47 sq. m. annexed since 1890). Within the city limits, and about 6 m. from its centre, are the grounds of the Winnepesaukee Camp-Meeting Association, and the camping place for the annual reunions of the New Hampshire Veterans of the Civil War, both at The Weirs, the northernmost point in the territory claimed by colonial Massachusetts; about 2 m. from the centre of Laconia is Lakeport (pop. 1900, 2137), which, like The Weirs, is a summer resort and a ward in the city of Laconia. Among the public institutions are the State School for Feeble-minded Children, a cottage hospital and the Laconia Public Library, lodged in the Gale Memorial Library building (1903). Another fine building is the Congregational Church (1906). The New Hampshire State Fish Hatchery is in Laconia. Water-power is furnished by the river. In 1905 Laconia ranked first among the cities of the state in the manufacture of hosiery and knit goods, and the value of these products for the year was 48.4% of the total value of the city's factory product; among its other manufactures are yarn, knitting machines, needles, sashes and blinds, axles, paper boxes, boats, gas and gasolene engines, and freight, passenger and electric cars. The total value of the factory products increased from $2,152,379 in 1900 to $3,096,878 in 1905, or 43.9%. The portion of the city N. of the river, formerly known as Meredith Bridge, was set apart from the township of Meredith and incorporated as a township under the name of Laconia in 1855; a section S. of the river was taken from the township of Gilford in 1874; and Lakeport was added in 1893, when Laconia was chartered as a city. The same Laconia was first applied in New England to the region granted in 1629 to Mason and Gorges (see MASON, JOHN).

LACONICUM (*i.e.* Spartan, *sc. balneum*, bath), the dry sweating room of the Roman thermae, contiguous to the caldarium or hot room. The name was given to it as being the only form of warm bath that the Spartans admitted. The laconicum was usually a circular room with niches in the axes of the diagonals and was covered by a conical roof with a circular opening at the top, according to Vitruvius (v. 10), "from which a brazen shield is suspended by chains, capable of being so lowered and raised as to regulate the temperature." The walls of the laconicum were plastered with marble stucco and polished, and the conical roof covered with plaster and painted blue with gold stars. Sometimes, as in the old baths at Pompeii, the laconicum was provided in an apse at one end of the caldarium, but as a rule it was a separate room raised to a higher temperature and had no bath in it. In addition to the hypocaust under the floor the wall was lined with flue tiles. The largest laconicum, about 75 ft. in diameter, was that built by Agrippa in his thermae on the south side of the Pantheon, and is referred to by Cassius (liii. 23), who states that, in addition to other works, "he constructed the hot bath chamber which he called the Laconicum Gymnasium." All traces of this building are lost; but in the additions made to the thermae of Agrippa by Septimius Severus another laconicum was built farther south, portions of which still exist in the so-called Arco di Giambella.

LACORDAIRE, JEAN BAPTISTE HENRI (1802-1861), French ecclesiastic and orator, was born at Recey-sur-Ource, Côte d'Or, on the 12th of March 1802. He was the second of a family of four, the eldest of whom, Jean Théodore (1801-1870), travelled a great deal in his youth, and was afterwards professor of comparative anatomy at Liége. For several years Lacordaire studied at Dijon, showing a marked talent for rhetoric; this led him to the pursuit of law, and in the local debates of the advocates he attained a high celebrity. At Paris he thought of going on the stage, but was induced to finish his legal training and began to practise as an advocate (1817-1824). Meanwhile Lamennais had published his *Essai sur l'Indifférence*,—a passionate plea for Christianity and in particular for Roman Catholicism as necessary for the social progress of mankind. Lacordaire read, and his ardent and believing nature, weary of the theological negations of the Encyclopaedists, was convinced. In 1823 he became a theological student at the seminary of Saint Sulpice; four years later he was ordained and became almoner of the college Henri IV. He was called from it to co-operate with Lamennais in the editorship of *L'Avenir*, a journal established to advocate the union of the democratic principle with ultramontanism. Lacordaire strove to show that Catholicism was not bound up with the idea of dynasty, and definitely allied it with a well-defined liberty, equality and fraternity. But the new propagandism was denounced from Rome in an encyclical. In the meantime Lacordaire and Montalembert, believing that, under the charter of 1830, they were entitled to liberty of instruction, opened an independent free school. It was closed in two days, and the teachers fined before the court of peers. These reverses Lacordaire accepted with quiet dignity; but they brought his relationship with Lamennais to a close. He now began the course of Christian *conférences* at the Collége Stanislas, which attracted the art and intellect of Paris; thence he went to Nôtre Dame, and for two years his sermons were the delight of the capital. His presence was dignified, his voice capable of indefinite modulation, and his gestures animated and attractive. He still preached the gospel of the people's sovereignty in civil life and the pope's supremacy in religion, but brought to his propagandism the full resources of a mind familiar with philosophy, history and literature, and indeed led the reaction against

Voltairean scepticism. He was asked to edit the *Univers*, and to take a chair in the university of Louvain, but he declined both appointments, and in 1838 set out for Rome, revolving a great scheme for christianizing France by restoring the old order of St Dominic. At Rome he donned the habit of the preaching friar and joined the monastery of Minerva. His *Mémoire pour le rétablissement en France de l'ordre des frères prêcheurs* was then prepared and dedicated to his country; at the same time he collected the materials for the life of St Dominic. When he returned to France in 1841 he resumed his preaching at Nôtre Dame, but he had small success in re-establishing the order of which he ever afterwards called himself monk. His funeral orations are the most notable in their kind of any delivered during his time, those devoted to Marshal Drouet and Daniel O'Connell being especially marked by point and clearness. He next thought that his presence in the National Assembly would be of use to his cause; but being rebuked by his ecclesiastical superiors for declaring himself a republican, he resigned his seat ten days after his election. In 1850 he went back to Rome and was made provincial of the order, and for four years laboured to make the Dominicans a religious power. In 1854 he retired to Sorrèze to become director of a private lyceum, and remained there until he died on the 22nd of November 1861. He had been elected to the Academy in the preceding year.

The best edition of Lacordaire's works is the *Œuvres complètes* (6 vols., Paris, 1872-1873), published by C. Poussielgue, which contains, besides the *Conférences*, the exquisitely written, but uncritical, Vie de Saint Dominique and the beautiful *Lettres à un jeune homme sur la vie chrétienne*. For a complete list of his published correspondence see L. Petit de Julleville's *Histoire de la langue et de la littérature française*, vii. 598.

The authoritative biography is by Ch. Foisset (2 vols., Paris, 1870). The religious aspect of his character is best shown in Père B. Chocarne's *Vie du Père Lacordaire* (2 vols., Paris, 1866—English translation by A. Th. Drane, London, 1868); see also Count C. F. R. de Montalembert's *Un Moine au XIX*^{ème} *siècle* (Paris, 1862—English translation by F. Aylward, London, 1867). There are lives by Mrs H. L. Lear (London, 1882); by A. Ricard (1 vol. of *L'École menaisienne*, Paris, 1883); by Comte O. d'Haussonville (1 vol., *Les Grands écrivains Français* series, Paris, 1897); by Gabriel Ledos (Paris, 1901); by Dora Greenwell (1867); and by the duc de Broglie (Paris, 1889). The *Correspondance inédite du Père Lacordaire*, edited by H. Villard (Paris, 1870), may also be consulted. See also Saint-Beuve in *Causeries de Lundi*. Several of Lacordaire's *Conférences* have been translated into English, among these being, *Jesus Christ* (1869); *God* (1870); *God and Man* (1872); *Life* (1875). For a theological study of the *Conférences de Nôtre Dame*, see an article by Bishop J. C. Hedley in *Dublin Review* (October 1870).

LACQUER, or LACKER, a general term for coloured and frequently opaque varnishes applied to certain metallic objects and to wood. The term is derived from the resin lac, which substance is the basis of lacquers properly so called. Technically, among Western nations, lacquering is restricted to the coating of polished metals or metallic surfaces, such as brass, pewter and tin, with prepared varnishes which will give them a golden, bronze-like or other lustre as desired. Throughout the East Indies the lacquering of wooden surfaces is universally practised, large articles of household furniture, as well as small boxes, trays, toys and papier-mâché objects, being decorated with bright-coloured and variegated lacquer. The lacquer used in the East is, in general, variously coloured sealing-wax, applied, smoothed and polished in a heated condition; and by various devices intricate marbled, streaked and mottled designs are produced. Quite distinct from these, and from all other forms of lacquer, is the lacquer work of Japan, for which see JAPAN, § *Art*.

LACRETELLE, PIERRE LOUIS DE (1751-1824), French politician and writer, was born at Metz on the 9th of October 1751. He practised as a barrister in Paris; and under the Revolution was elected as a *député suppléant* in the Constituent Assembly, and later as deputy in the Legislative Assembly. He belonged to the moderate party known as the "Feuillants," but after the 10th of August 1792 he ceased to take part in public life. In 1803 he became a member of the Institute, taking the place of La Harpe. Under the Restoration he was one of the chief editors of the *Minerve française*; he wrote also an essay, *Sur le 18 Brumaire* (1799), some *Fragments politiques et littéraires* (1817), and a treatise *Des partis politiques et des factions de la prétendue aristocratie d'aujourd'hui* (1819).

His younger brother, JEAN CHARLES DOMINIQUE DE LACRETELLE, called Lacretelle *le jeune* (1766-1855), historian and journalist, was also born at Metz on the 3rd of September 1766. He was called to Paris by his brother in 1787, and during the Revolution belonged, like him, to the party of the *Feuillants*. He was for some time secretary to the duc de la Rochefoucauld-Liancourt, the celebrated philanthropist, and afterwards joined the staff of the *Journal de Paris*, then managed by Suard, and where he had as colleagues André Chénier and Antoine Roucher. He made no attempt to hide his monarchist sympathies, and this, together with the way in which he reported the trial and death of Louis XVI., brought him in peril

of his life; to avoid this danger he enlisted in the army, but after Thermidor he returned to Paris and to his newspaper work. He was involved in the royalist movement of the 13th Vendémiaire, and condemned to deportation after the 18th Fructidor; but, thanks to powerful influence, he was left “forgotten” in prison till after the 18th Brumaire, when he was set at liberty by Fouché. Under the Empire he was appointed a professor of history in the *Faculté des lettres* of Paris (1809), and elected as a member of the Académie française (1811). In 1827 he was prime mover in the protest made by the French Academy against the minister Peyronnet’s law on the press, which led to the failure of that measure, but this step cost him, as it did Villemain, his post as *censeur royal*. Under Louis Philippe he devoted himself entirely to his teaching and literary work. In 1848 he retired to Mâcon; but there, as in Paris, he was the centre of a brilliant circle, for he was a wonderful causeur, and an equally good listener, and had many interesting experiences to recall. He died on the 26th of March 1855. His son Pierre Henri (1815-1899) was a humorous writer and politician of purely contemporary interest.

J. C. Lacretelle’s chief work is a series of histories of the 18th century, the Revolution and its sequel: *Précis historique de la Révolution française*, appended to the history of Rabaud St Étienne, and partly written in the prison of La Force (5 vols., 1801-1806); *Histoire de France pendant le XVIII^e^ siècle* (6 vols., 1808); *Histoire de l’Assemblée Constituante* (2 vols., 1821); *L’Assemblée Législative* (1822); *La Convention Nationale* (3 vols., 1824-1825); *Histoire de France depuis la restauration* (1829-1835); *Histoire du consulat et de l’empire* (4 vols., 1846). The author was a moderate and fair-minded man, but possessed neither great powers of style, nor striking historical insight, nor the special historian’s power of writing minute accuracy of detail with breadth of view. Carlyle’s sarcastic remark on Lacretelle’s history of the Revolution, that it “exists, but does not profit much,” is partly true of all his books. He had been an eyewitness of and an actor in the events which he describes, but his testimony must be accepted with caution.

LACROIX, ANTOINE FRANÇOIS ALFRED (1863-), French mineralogist and geologist, was born at Mâcon, Saône et Loire, on the 4th of February 1863. He took the degree of D. ès Sc. in Paris, 1889. In 1893 he was appointed professor of mineralogy at the *Jardin des Plantes*, Paris, and in 1896 director of the mineralogical laboratory in the *École des Hautes Études*. He paid especial attention to minerals connected with volcanic phenomena and igneous rocks, to the effects of metamorphism, and to mineral veins, in various parts of the world, notably in the Pyrenees. In his numerous contributions to scientific journals he dealt with the mineralogy and petrology of Madagascar, and published an elaborate and exhaustive volume on the eruptions in Martinique, *La Montagne Pelée et ses éruptions* (1904). He also issued an important work entitled *Mineralogie de la France et de ses Colonies* (1893-1898), and other works in conjunction with A. Michel Lévy. He was elected member of the Académie des sciences in 1904.

LACROIX, PAUL (1806-1884), French author and journalist, was born in Paris on the 27th of April 1806, the son of a novelist. He is best known under his pseudonym of P. L. Jacob, *bibliophile*, or “Bibliophile Jacob,” suggested by the constant interest he took in public libraries and books generally. Lacroix was an extremely prolific and varied writer. Over twenty historical romances alone came from his pen, and he also wrote a variety of serious historical works, including a history of Napoleon III., and the life and times of the Tsar Nicholas I. of Russia. He was the joint author with Ferdinand Séré of a five-volume work, *Le Moyen Âge et La Renaissance* (1847), a standard work on the manners, customs and dress of those times, the chief merit of which lies in the great number of illustrations it contains. He also wrote many monographs on phases of the history of culture. Over the signature Pierre Dufour was published an exhaustive *Histoire de la Prostitution* (1851-1852), which has always been attributed to Lacroix. His works on bibliography were also extremely numerous. In 1885 he was appointed librarian of the Arsenal Library, Paris. He died in Paris on the 16th of October 1884.

LACROMA (Serbo-Croatian *Lokrum*), a small island in the Adriatic Sea, forming part of the Austrian kingdom of Dalmatia, and lying less than half a mile south of Ragusa. Though barely 1¼ m. in length, Lacroma is remarkable for the beauty of its subtropical vegetation. It was a favourite resort of the archduke Maximilian, afterwards emperor of Mexico (1832-1867), who restored the château and park; and of the Austrian crown prince Rudolph (1857-1889). It contains an 11th-century Benedictine monastery;

and the remains of a church, said by a very doubtful local tradition to have been founded by Richard I. of England (1157-1199), form part of the imperial château.

See *Lacroma*, an illustrated descriptive work by the crown princess Stéphanie (afterwards Countess Lónyay) (Vienna, 1892).

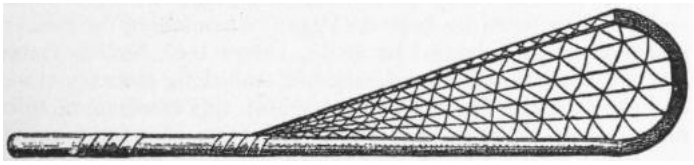
LA CROSSE, a city and the county-seat of La Crosse county, Wisconsin, U.S.A., about 180 m. W.N.W. of Milwaukee, and about 120 m. S.E. of St Paul, Minnesota, on the E. bank of the Mississippi river, at the mouth of the Black and of the La Crosse rivers. Pop. (1900) 28,895; (1910 census) 30,417. Of the total population in 1900, 7222 were foreign-born, 3130 being German and 2023 Norwegian, and 17,555 were of foreign-parentage (both parents foreign-born), including 7853 of German parentage, 4422 of Norwegian parentage, and 1062 of Bohemian parentage. La Crosse is served by the Chicago & North Western, the Chicago, Milwaukee & St Paul, the Chicago, Burlington & Quincy, the La Crosse & South Eastern, and the Green Bay & Western railways, and by river steamboat lines on the Mississippi. The river is crossed here by a railway bridge (C.M. & St P.) and wagon bridge. The city is situated on a prairie, extending back from the river about 2½ m. to bluffs, from which fine views may be obtained. Among the city's buildings and institutions are the Federal Building (1886-1887), the County Court House (1902-1903), the Public Library (with more than 20,000 volumes), the City Hall (1891), the High School Building (1905-1906), the St Francis, La Crosse and Lutheran hospitals, a Young Men's Christian Association Building, a Young Women's Christian Association Building, a U.S. Weather Station (1907), and a U.S. Fish Station (1905). La Crosse is the seat of a state Normal School (1909). Among the city's parks are Pettibone (an island in the Mississippi), Riverside, Burns, Fair Ground and Myrick. The city is the see of a Roman Catholic bishop. La Crosse is an important lumber and grain market, and is the principal wholesale distributing centre for a large territory in S.W. Wisconsin, N. Iowa and Minnesota. Proximity to both pine and hardwood forests early made it one of the most important lumber manufacturing places in the North-west; but this industry has now been displaced by other manufactures. The city has grain elevators, flour mills (the value of flour and grist mill products in 1905 was $2,166,116), and breweries (product value in 1905, $1,440,659). Other important manufactures are agricultural implements ($542,425 in 1905), lumber and planing mill products, leather, woollen, knit and rubber goods, tobacco, cigars and cigarettes, carriages, foundry and machine-shop products, copper and iron products, cooperage, pearl buttons, brooms and brushes. The total value of the factory product in 1905 was $8,139,432, as against $7,676,581 in 1900. The city owns and operates its water-works system, the wagon bridge (1890-1891) across the Mississippi, and a toll road (2½ m. long) to the village of La Crescent, Minn.

Father Hennepin and du Lhut visited or passed the site of La Crosse as early as 1680, but it is possible that adventurous *coureurs-des-bois* preceded them. The first permanent settlement was made in 1841, and La Crosse was made the county-seat in 1855 and was chartered as a city in 1856.

LACROSSE, the national ball game of Canada. It derives its name from the resemblance of its chief implement used, the curved netted stick, to a bishop's crozier. It was borrowed from the Indian tribes of North America. In the old days, according to Catlin, the warriors of two tribes in their war-paint would form the sides, often 800 or 1000 strong. The goals were placed from 500 yds. to ½ m. apart with practically no side boundaries. A solemn dance preceded the game, after which the ball was tossed into the air and the two sides rushed to catch it on "crosses," similar to those now in use. The medicine-men acted as umpires, and the squaws urged on the men by beating them with switches. The game attracted much attention from the early French settlers in Canada. In 1763, after Canada had become British, the game was used by the aborigines to carry out an ingenious piece of treachery. On the 4th of June, when the garrison of Fort Michilimackinac (now Mackinac) was celebrating the king's birthday, it was invited by the Ottawas, under their chief Pontiac, to witness a game of "baggataway" (lacrosse). The players gradually worked their way close to the gates, when, throwing aside their crosses and seizing their tomahawks which the squaws suddenly produced from under their blankets, they rushed into the fort and massacred all the inmates except a few Frenchmen.

The game found favour among the British settlers, but it was not until 1867, the year in which Canada became a Dominion, that G. W. Beers, a prominent player, suggested that Lacrosse should be recognized as the national game, and the National Lacrosse Association of Canada was formed. From that time the game has flourished vigorously in Canada and to a less extent in the United States. In 1868 an English Lacrosse Association was formed, but, although a team of Indians visited the United Kingdom in 1867, it was not until sometime later that the game became at all popular in Great Britain. Its progress was much encouraged by visits of teams representing the Toronto Lacrosse Club in 1888 and 1902, the methods of the Canadians and their wonderful "short-passing" exciting much admiration. In 1907 the Capitals of Ottawa visited England, playing six matches, all of which were won by the Canadians. The match North v.

South has been played annually in England since 1882. A county championship was inaugurated in 1905. A North of England League, embracing ten clubs, began playing league matches in 1897; and a match between the universities of Oxford and Cambridge has been played annually since 1903. A match between England and Ireland was played annually from 1881 to 1904.



The Crosse.

Implements of the Game.—The ball is made of india-rubber sponge, weighs between 4¼ and 4½ oz., and measures 8 to 8½ in. in circumference. The "crosse" is formed of a light staff of hickory wood, the top being bent to form a kind of hook, from the tip of which a thong is drawn and made fast to the shaft about 2 ft. from the other end. The oval triangle thus formed is covered with a network of gut or rawhide, loose enough to hold the ball but not to form a bag. At no part must the crosse measure more than 12 in. in breadth, and no metal must be used in its manufacture. It may be of any length to suit the player. The goals are set up not less than 100 nor more than 150 yds. apart, the goal-posts being 6 ft. high and the same distance apart. They are set up in the middle of the "goal-crease," a space of 12 ft. square marked with chalk. A net extends from the top rail and sides of the posts back to a point 6 ft. behind the middle of the line between the posts. Boundaries are agreed upon by the captains. Shoes may have india-rubber soles, but must be without spikes.

The Game.—The object of the game is to send the ball, by means of the crosse, through the enemy's goal-posts as many times as possible during the two periods of play, precisely as in football and hockey. There are twelve players of each side. In every position save that of goal there are two men, one of each side, whose duties are to "mark" and neutralize each other's efforts. The game is opened by the act of "facing," in which the two centres, each with his left shoulder towards his opponents' goal, hold their crosses, wood downwards, on the ground, the ball being placed between them. When the signal is given the centres draw their crosses sharply inwards in order to gain possession of the ball. The ball may be kicked or struck with the crosse, as at hockey, but the goal-keeper alone may handle it, and then only to block and not to throw it. Although the ball may be thrown with the crosse for a long distance—220 yds. is about the limit—long throws are seldom tried, it being generally more advantageous for a player to run with the ball resting on the crosse, until he can pass it to a member of his side who proceeds with the attack, either by running, passing to another, or trying to throw the ball through the opponents' goal. The crosse, usually held in both hands, is made to retain the ball by an ingenious rocking motion only acquired by practice. As there is no "off-side" in Lacrosse, a player may pass the ball to the front, side or rear. No charging is allowed, but one player may interfere with another by standing directly in front of him ("body-check"), though without holding, tripping or striking with the crosse. No one may interfere with a player who is not in possession of the ball. Fouls are penalized either by the suspension of the offender until a goal has been scored or until the end of the game; or by allowing the side offended against a "free position." When a "free position" is awarded each player must stand in the position where he is, excepting the goal-keeper who may get back to his goal, and any opponent who may be nearer the player getting the ball than 5 yds.; this player must retire to that distance from the one who has been given the "free position," who then proceeds with the game as he likes when the referee says "play." This penalty may not be carried out nearer than 10 yds. from the goal. If the ball crosses a boundary the referee calls "stand," and all players stop where they are, the ball being then "faced" not less than 4 yds. within the boundary line by the two nearest players.

See the official publications of the English Lacrosse Union; and *Lacrosse* by W. C. Schmeisser, in Spalding's "Athletic Library." Also *Manners, Customs and Condition of the North American Indians*, by George Catlin.

LA CRUZ, RAMÓN DE

(1731-1794), Spanish dramatist, was born at Madrid on the 28th of March 1731. He was a clerk in the ministry of finance, and is the author of three hundred *sainetes*, little farcical sketches of city life, written to be played between the acts of a longer play. He published a selection in ten volumes (Madrid, 1786-1791), and died on the 5th of March 1794. The best of his pieces, such as *Las Tertulias de Madrid*, are delightful specimens of satiric observation.

See E. Cotardo y Mori, *Don Ramón de la Cruz y sus obras* (Madrid, 1899); C. Cambronero, *Sainetes inédites existentes en la Biblioteca Municipal de Madrid* (Madrid, 1900).

LACRYMATORY (from Lat. *lacrima*, a tear), a class of small vessels of terra-cotta, or, more frequently, of glass, found in Roman and late Greek tombs, and supposed to have been bottles into which mourners dropped their tears. They contained unguents, and to the use of unguents at funeral ceremonies the finding of so many of these vessels in tombs is due. They are shaped like a spindle, or a flask with a long small neck and a body in the form of a bulb.

LACTANTIUS FIRMIANUS (*c.* 260-*c.* 340), also called Lucius Caelius (or Caecilius) Lactantius Firmianus, was a Christian writer who from the beauty of his style has been called the "Christian Cicero." His history is very obscure. He was born of heathen parents in Africa about 260, and became a pupil of Arnobius, whom he far excelled in style though his knowledge of the Scriptures was equally slight. About 290 he went to Nicomedia in Bithynia while Diocletian was emperor, to teach rhetoric, but found little work to do in that Greek-speaking city. In middle age he became a convert to Christianity, and about 306 he went to Gaul (Trèves) on the invitation of Constantine the Great, and became tutor to his eldest son, Crispus. He probably died about 340.

Lactantius' chief work, *Divinarum Institutionum Libri Septem*, is an "apology" for and an introduction to Christianity, written in exquisite Latin, but displaying such ignorance as to have incurred the charge of favouring the Arian and Manichaean heresies. It seems to have been begun in Nicomedia about 304 and finished in Gaul before 311. Two long eulogistic addresses and most of the brief apostrophes to the emperor are from a later hand, which has added some dualistic touches. The seven books of the institutions have separate titles given to them either by the author or by a later editor. The first, *De Falsa Religione*, and the second, *De Origine Erroris*, attack the polytheism of heathendom, show the unity of the God of creation and providence, and try to explain how men have been corrupted by demons. The third book, *De Falsa Sapientia*, describes and criticizes the various systems of prevalent philosophy. The fourth book, *De Vera Sapientia et Religione*, insists upon the inseparable union of true wisdom and true religion, and maintains that this union is made real in the person of Christ. The fifth book, *De Justitia*, maintains that true righteousness is not to be found apart from Christianity, and that it springs from piety which consists in the knowledge of God. The sixth book, *De Vero Cultu*, describes the true worship of God, which is righteousness, and consists chiefly in the exercise of Christian love towards God and man. The seventh book, *De Vita Beata*, discusses, among a variety of subjects, the chief good, immortality, the second advent and the resurrection. Jerome states that Lactantius wrote an epitome of these *Institutions*, and such a work, which may well be authentic, was discovered in MS. in the royal library at Turin in 1711 by C. M. Pfaff.

Besides the *Institutions* Lactantius wrote several treatises: (1) *De Ira Dei*, addressed to one Donatus and directed against the Epicurean philosophy. (2) *De Opificio Dei sive de Formatione Hominis*, his earliest work, and one which reveals very little Christian influence. He exhorts a former pupil, Demetrianus, not to be led astray by wealth from virtue; and he demonstrates the providence of God from the adaptability and beauty of the human body. (3) A celebrated incendiary treatise, *De Mortibus Persecutorum*, which describes God's judgments on the persecutors of his church from Nero to Diocletian, and has served as a model for numberless writings. *De Mort. Persecut.* is not in the earlier editions of Lactantius; it was discovered and printed by Baluze in 1679. Many critics ascribe it to an unknown Lucius Caecilius; there are certainly serious differences of grammar, style and temper between it and the writings already mentioned. It was probably composed in Nicomedia, *c.* 315. Jerome speaks of Lactantius as a poet, and several poems have been attributed to him:—*De Ave Phoenice* (which Harnack thinks makes use of 1 Clement), *De Passione Domini* and *De Resurrectione* (*Domini*) or *De Pascha ad Felicem Episcopum*. The first of these may belong to Lactantius's heathen days, the second is a product of the Renaissance (*c.* 1500), the third was written by Venantius Fortunatus in the 6th century.

Editions: O. F. Fritzsche in E. G. Gersdorf's *Bibl. patr. eccl.* x., xi. (Leipzig, 1842-1844); Migne, *Patr. Lat.* vi., vii.; S. Brandt and G. Laubmann in the Vienna *Corpus Script. Eccles. Lat.* xix., xxvii. 1 and 2 (1890-93-97). Translation: W. Fletcher in *Ante-Nicene Fathers*, vii. Literature: the German histories of early Christian literature, by A. Harnack, O. Bardenhewer, A. Ebert, A. Ehrhard, G. Kruger's *Early Chr. Lit.* p. 307 and Hauck-Herzog's R*ealencyk.* vol. xi., give guides to the copious literature on the subject.

LACTIC ACID (hydroxypropionic acid), $C_3H_6O_3$. Two lactic acids are known, differing from each other in the position occupied by the hydroxyl group in the molecule; they are known respectively as α-hydroxypropionic acid (fermentation or inactive lactic acid), $CH_3{\cdot}CH(OH){\cdot}CO_2H$, and β-hydroxypropionic acid (hydracrylic acid), (*q.v.*), $CH_2(OH){\cdot}CH_2{\cdot}CO_2H$. Although on structural grounds there should be only two hydroxypropionic acids, as a matter of fact four lactic acids are known. The third isomer (sarcolactic acid) is found in meat extract (J. v. Liebig), and may be prepared by the action of *Penicillium glaucum* on a solution of ordinary ammonium lactate. It is identical with α-hydroxypropionic acid in almost every

respect, except with regard to its physical properties. The fourth isomer, formed by the action of *Bacillus laevo-lacti* on cane-sugar, resembles sarcolactic acid in every respect, except in its action on polarized light (see STEREOISOMERISM).

Fermentation, or *ethylidene lactic acid*, was isolated by K. W. Scheele (*Trans. Stockholm Acad.* 1780) from sour milk (Lat. *lac*, *lactis*, milk, whence the name). About twenty-four years later Bouillon Lagrange, and independently A. F. de Fourcroy and L. N. Vauquelin, maintained that Scheele's new acid was nothing but impure acetic acid. This notion was combated by J. Berzelius, and finally refuted (in 1832) by J. v. Liebig and E. Mitscherlich, who, by the elementary analyses of lactates, proved the existence of this acid as a distinct compound. It may be prepared by the lactic fermentation of starches, sugars, gums, &c., the sugar being dissolved in water and acidified by a small quantity of tartaric acid and then fermented by the addition of sour milk, with a little putrid cheese. Zinc carbonate is added to the mixture (to neutralize the acid formed), which is kept warm for some days and well stirred. On boiling and filtering the product, zinc lactate crystallizes out of the solution. The acid may also be synthesized by the decomposition of alanine (α-aminopropionic acid) by nitrous acid (K. Strecker, *Ann.*, 1850, 75, p. 27); by the oxidation of propylene glycol (A. Wurtz); by boiling α-chlorpropionic acid with caustic alkalis, or with silver oxide and water; by the reduction of pyruvic acid with sodium amalgam; or from acetaldehyde by the cyanhydrin reaction (J. Wislicenus, *Ann.*, 1863, 128, p. 13)

$$CH_3{\cdot}CHO \rightarrow CH_3{\cdot}CH(OH){\cdot}CN \rightarrow CH_3{\cdot}CH(OH){\cdot}CO_2H.$$

It forms a colourless syrup, of specific gravity 1.2485 (15°/4°), and decomposes on distillation under ordinary atmospheric pressure; but at very low pressures (about 1 mm.) it distils at about 85° C., and then sets to a crystalline solid, which melts at about 18° C. It possesses the properties both of an acid and of an alcohol. When heated with dilute sulphuric acid to 130° C., under pressure, it is resolved into formic acid and acetaldehyde. Chromic acid oxidizes it to acetic acid and carbon dioxide; potassium permanganate oxidizes it to pyruvic acid; nitric acid to oxalic acid, and a mixture of manganese dioxide and sulphuric acid to acetaldehyde and carbon dioxide. Hydrobromic acid converts it into α-brompropionic acid, and hydriodic acid into propionic acid.

Lactide, $O<\begin{matrix}CH(CH_3)\cdot CO\\ CO\cdot CH(CH_3)\end{matrix}>O$, a crystalline solid, of melting-point 124° C., is one of the products obtained by the distillation of lactic acid.

LACTONES, the cyclic esters of hydroxy acids, resulting from the internal elimination of water between the hydroxyl and carboxyl groups, this reaction taking place when the hydroxy acid is liberated from its salts by a mineral acid. The α and β-hydroxy acids do not form lactones, the tendency for lactone formation appearing first with the γ-hydroxy acids, thus γ-hydroxybutyric acid, $CH_2OH{\cdot}CH_2{\cdot}CH_2{\cdot}CO_2H$, yields γ-butyrolactone, $\overline{CH_2{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}O}$. These compounds may also be prepared by the distillation of the γ-halogen fatty acids, or by the action of alkaline carbonates on these acids, or from βγ- or γδ-unsaturated acids by digestion with hydrobromic acid or dilute sulphuric acid. The lactones are mostly liquids which are readily soluble in alcohol, ether and water. On boiling with water, they are partially reconverted into the hydroxy acids. They are easily saponified by the caustic alkalis.

On the behaviour of lactones with ammonia, see H. Meyer, *Monatshefte*, 1899, 20, p. 717; and with phenylhydrazine and hydrazine hydrate, see R. Meyer, *Ber.*, 1893, 26, p. 1273; L. Gattermann, *Ber.*, 1899, 32, p. 1133, E. Fischer, Ber., 1889, 22, p. 1889.

γ-*Butyrolactone* is a liquid which boils at 206° C. It is miscible with water in all proportions and is volatile in steam, γ-*valerolactone*, $\overline{CH_3{\cdot}CH{\cdot}CH_2{\cdot}CH_2{\cdot}CO{\cdot}O}$, is a liquid which boils at 207-208° C. δ-*lactones* are also known, and may be prepared by distilling the δ-chlor acids.

LA CUEVA, JUAN DE (1550?-1609?), Spanish dramatist and poet, was born at Seville, and towards 1579 began writing for the stage. His plays, fourteen in number, were published in 1588, and are the earliest manifestations of the dramatic methods developed by Lope de Vega. Abandoning the Senecan model hitherto universal in Spain, Cueva took for his themes matters of national legend, historic tradition, recent victories and the actualities of contemporary life: this amalgam of epical and realistic elements, and the introduction of a great variety of metres, prepared the way for the Spanish romantic drama of the 17th century. A peculiar interest attaches to *El Infamador*, a play in which the character of Leucino anticipates the classic type of Don Juan. As an initiative force, Cueva is a figure of great historical importance; his epic poem, *La Conquista de Bética* (1603), shows his weakness as an artist. The last work to which his name is attached is the *Ejemplar poético* (1609), and he is believed to have died shortly after its publication.

See the editions of *Saco de Roma* and *El Infamador*, by E. de Ochoa, in the *Tesoro del teatro español* (Paris, 1838), vol. i. pp. 251-285; and of *Ejemplar poético*, by J. J. López de Sedano, in the *Parnaso español*, vol. viii. pp. 1-68; also E. Walberg, "Juan de la Cueva et son Ejemplar poético" in the *Acta Universitatis Lundensis* (Lund, 1904), vol. xxix.; "Poèmes inédits de Juan de la Cueva (Viaje de Sannio,)" edited by F. A. Wulff, in the *Acta Universitatis Lundensis* (Lund, 1886-1887), vol. xxiii.; F. A. Wulff, "De la rimas de Juan de la Cueva, Primera Parte" in the *Homenaje á Menéndez y Pelayo* (Madrid, 1899), vol. ii. pp. 143-148.

(J. F.-K.)

LACUNAR, the Latin name in architecture for a panelled or coffered ceiling or soffit. The word is derived from *lacuna*, a cavity or hollow, a blank, hiatus or gap. The panels or coffers of a ceiling are by Vitruvius called *lacunaria*.

LACUZON (O. Fr. *la cuzon*, disturbance), the name given to the Franc-Comtois leader Claude Prost (1607-1681), who was born at Longchaumois (department of Jura) on the 17th of June 1607. He gained his first military experience when the French invaded Burgundy in 1636, harrying the French troops from the castles of Montaigu and St Laurent-la-Roche, and devastating the frontier districts of Bresse and Bugey with fire and sword (1640-1642). In the first invasion of Franche-Comté by Louis XIV. in 1668 Lacuzon was unable to make any effective resistance, but he played an important part in Louis's second invasion. In 1673 he defended Salins for some time; after the capitulation of the town he took refuge in Italy. He died at Milan on the 21st of December 1681.

LACY, FRANZ MORITZ, Count (1725-1801), Austrian field marshal, was born at St Petersburg on the 21st of October 1725. His father, Peter, Count Lacy, was a distinguished Russian soldier, who belonged to an Irish family, and had followed the fortunes of the exiled James II. Franz Moritz was educated in Germany for a military career, and entered the Austrian service. He served in Italy, Bohemia, Silesia and the Netherlands during the War of the Austrian Succession, was twice wounded, and by the end of the war was a lieut.-colonel. At the age of twenty-five he became full colonel and chief of an infantry regiment. In 1756 with the opening of the Seven Years' War he was again on active service, and in the first battle (Lobositz) he distinguished himself so much that he was at once promoted major-general. He received his third wound on this occasion and his fourth at the battle of Prague in 1757. Later in 1757 Lacy bore a conspicuous part in the great victory of Breslau, and at Leuthen, where he received his fifth wound, he covered the retreat of the defeated army. Soon after this began his association with Field-Marshal Daun, the new generalissimo of the empress's forces, and these two commanders, powerfully assisted later by the genius of Loudon, made head against Frederick the Great for the remainder of the war. A general staff was created, and Lacy, a lieutenant field-marshal at thirty-two, was made chief of staff (quartermaster-general) to Daun. That their cautiousness often degenerated into timidity may be admitted —Leuthen and many other bitter defeats had taught the Austrians to respect their great opponent—but they showed at any rate that, having resolved to wear out the enemy by Fabian methods, they were strong enough to persist in their resolve to the end. Thus for some years the life of Lacy, as of Daun and Loudon, is the story of the war against Prussia (see Seven Years' War). After Hochkirch (October 15, 1758) Lacy received the grand cross of the Maria Theresa order. In 1759 both Daun and Lacy fell into disfavour for failing to win victories, and Lacy owed his promotion to Feldzeugmeister only to the fact that Loudon had just received this rank for the brilliant conduct of his detachment at Kunersdorf. His responsibilities told heavily on Lacy in the ensuing campaigns, and his capacity for supreme command was doubted even by Daun, who refused to give him the command when he himself was wounded at the battle of Torgau.

After the peace of Hubertusburg a new sphere of activity was opened, in which Lacy's special gifts had the greatest scope. Maria Theresa having placed her son, the emperor Joseph II., at the head of Austrian military affairs, Lacy was made a field-marshal, and given the task of reforming and administering the army (1766). He framed new regulations for each arm, a new code of military law, a good supply system. As the result of his work the Austrian army was more numerous, far better equipped, and cheaper than it had ever been before. Joseph soon became very intimate with his military adviser, but this did not prevent his mother, after she became estranged from the young emperor, from giving Lacy her full confidence. His activities were not confined to the army. He was in sympathy with Joseph's innovations, and was regarded by Maria Theresa as a prime mover in the scheme for the partition of Poland. But his self-imposed work

broke down Lacy's health, and in 1773, in spite of the remonstrances of Maria Theresa and of the emperor, he laid down all his offices and went to southern France. On returning he was still unable to resume office, though as an unofficial adviser in political and military matters he was far from idle. In the brief and uneventful War of the Bavarian Succession, Lacy and Loudon were the chief Austrian commanders against the king of Prussia, and when Joseph II. at Maria Theresa's death, became the sovereign of the Austrian dominions as well as emperor, Lacy remained his most trusted friend. More serious than the War of the Bavarian Succession was the Turkish war which presently broke out. Lacy was now old and worn out, and his tenure of command therein was not marked by any greater measure of success than in the case of the other Austrian generals. His active career was at an end, although he continued his effective interest in the affairs of the state and the army throughout the reign of Joseph's successor, Leopold I. His last years were spent in retirement at his castle of Neuwaldegg near Vienna. He died at Vienna on the 24th of November 1801.

See memoir by A. v. Arneth in *Allgemeine deutsche Biographie* (Leipzig, 1883).

LACY, HARRIETTE DEBORAH (1807-1874), English actress, was born in London, the daughter of a tradesman named Taylor. Her first appearance on the stage was at Bath in 1827 as Julia in *The Rivals*, and she was immediately given leading parts there in both comedy and tragedy. Her first London appearance was in 1830 as Nina, in Dimond's *Carnival of Naples*. Her Rosalind, Aspatia (to Macready's Melantius) in *The Bridal*, and Lady Teazle to the Charles Surface of Walter Lacy (1809-1898)—to whom she was married in 1839—confirmed her position and popularity. She was the original Helen in *The Hunchback* (1832), and also created Nell Gwynne in Jerrold's play of that name, and the heroine in his *Housekeeper*. She was considered the first Ophelia of her day. She retired in 1848.

LACY, MICHAEL ROPHINO (1795-1867), Irish musician, son of a merchant, was born at Bilbao and appeared there in public as a violinist in 1801. He was sent to study in Paris under Kreutzer, and soon began a successful career, being known as "*Le Petit Espagnol*." He played in London for some years after 1805, and then became an actor, but in 1818 resumed the musical profession, and in 1820 became leader of the ballet at the King's theatre, London. He composed or adapted from other composers a number of operas and an oratorio, *The Israelites in Egypt*. He died in London on the 20th of September 1867.

LACYDES OF CYRENE, Greek philosopher, was head of the Academy at Athens in succession to Arcesilaus about 241 B.C. Though some regard him as the founder of the New Academy, the testimony of antiquity is that he adhered in general to the theory of Arcesilaus, and, therefore, that he belonged to the Middle Academy. He lectured in a garden called the Lacydeum, which was presented to him by Attalus I. of Pergamum, and for twenty-six years maintained the traditions of the Academy. He is said to have written treatises, but nothing survives. Before his death he voluntarily resigned his position to his pupils, Euander and Telecles. Apart from a number of anecdotes distinguished rather for sarcastic humour than for probability, Lacydes exists for us as a man of refined character, a hard worker and an accomplished orator. According to Athenaeus (x. 438) and Diogenes Laërtius (iv. 60) he died from excessive drinking, but the story is discredited by the eulogy of Eusebius (*Praep. Ev.* xiv. 7), that he was in all things moderate.

See Cicero, *Acad.* ii. 6; and Aelian, *V.H.* ii. 41; also articles ACADEMY, ARCESILAUS, CARNEADES.

LADAKH AND BALTISTAN, a province of Kashmir, India. The name Ladak, commonly but less correctly spelt Ladakh, and sometimes Ladag, belongs primarily to the broad valley of the upper Indus in

West Tibet, but includes several surrounding districts in political connexion with it; the present limits are between 75° 40′ and 80° 30′ E., and between 32° 25′ and 36° N. It is bounded N. by the Kuenlun range and the slopes of the Karakoram, N.W. and W. by the dependency of Baltistan or Little Tibet, S.W. by Kashmir proper, S. by British Himalayan territory, and E. by the Tibetan provinces of Ngari and Rudok. The whole region lies very high, the valleys of Rupshu in the south-east being 15,000 ft., and the Indus near Leh 11,000 ft., while the average height of the surrounding ranges is 19,000 ft. The proportion of arable and even possible pasture land to barren rock and gravel is very small. Pop., including Baltistan (1901) 165,992, of whom 30,216 in Ladakh proper are Buddhists, whereas the Baltis have adopted the Shiah form of Islam.

The natural features of the country may be best explained by reference to two native terms, under one or other of which every part is included; viz. *changtang*, *i.e.* “northern, or high plain,” where the amount of level ground is considerable, and *rong*, *i.e.* “deep valley,” where the contrary condition prevails. The former predominates in the east, diminishing gradually westwards. There, although the vast alluvial deposits which once filled the valley to a remarkably uniform height of about 15,000 ft. have left their traces on the mountain sides, they have undergone immense denudation, and their débris now forms secondary deposits, flat bottoms or shelving slopes, the only spots available for cultivation or pasture. These masses of alluvium are often either metamorphosed to a subcrystalline rock still showing the composition of the strata, or simply consolidated by lime.

Grand scenery is exceptional, for the valleys are confined, and from the higher points the view is generally of a confused mass of brown or yellow hills, absolutely barren, and of no great apparent height. The parallelism characteristic of the Himalayan ranges continues here, the direction being north-west and south-east. A central range divides the Indus valley, here 4 to 8 m. wide, from that of its north branch the Shyok, which with its fertile tributary valley of Nubra is again bounded on the north by the Karakoram. This central ridge is mostly syenitic gneiss, and north-east from it are found, successively, Silurian slates, Carboniferous shales and Triassic limestones, the gneiss recurring at the Turkestan frontier. The Indus lies along the line which separates the crystalline rocks from the Eocene sandstones and shales of the lower range of hills on the left bank, the lofty mountains behind them consisting of parallel bands of rocks from Silurian to Cretaceous.

Several lakes in the east districts at about 14,000 ft. have been of much greater extent, and connected with the river systems of the country, but they are now mostly without outlet, saline, and in process of desiccation.

Leh is the capital of Ladakh, and the road to Leh from Srinagar lies up the lovely Sind valley to the sources of the river at the Zoji La Pass (11,300 ft.) in the Zaskar range. This is the range which, skirting the southern edge of the upland plains of Deosai in Baltistan, divides them from the valley of Kashmir, and then continues to Nanga Parbat (26,620 ft.) and beyond that mountain stretches to the north of Swat and Bajour. To the south-east it is an unbroken chain till it merges into the line of snowy peaks seen from Simla and the plains of India—the range which reaches past Chini to the famous peaks of Gangotri, Nandadevi and Nampa. It is the most central and conspicuous range in the Himalaya. The Zoji La, which curves from the head of the Sind valley on to the bleak uplands of Dras (where lies the road to the trough of the Indus and Leh), is, in spite of its altitude, a pass on which little snow lies; but for local accumulations, it would be open all the year round. It affords a typical instance of that cutting-back process by which a river-head may erode a channel through a watershed into the plateau behind, there being no steep fall towards the Indus on the northern side of the range. From the Zoji La the road continues by easy gradients, following the line of the Dras drainage, to the Indus, when it turns up the valley to Leh. From Leh there are many routes into Tibet, the best known being that from the Indus valley to the Tibetan plateau, by the Chang La, to Lake Pangkong and Rudok (14,000 ft.). Rudok occupies a forward position on the western Tibetan border analogous to that of Leh in Kashmir. The chief trade route to Lhasa from Leh, however, follows the line offered by the valleys of the Indus and the Brahmaputra (or Tsanpo), crossing the divide between these rivers north of Lake Manasarowar.

The observatory at Leh is the most elevated observatory in Asia. “The atmosphere of the Indus valley is remarkably clear and transparent, and the heat of the sun is very great. There is generally a difference of more than 60° between the reading of the exposed sun thermometer *in vacuo* and the air temperature in the shade, and this difference has occasionally exceeded 90°.... The mean annual temperature at Leh is 40°, that of the coldest months (January and February) only 18° and 19°, but it rises rapidly from February to July, in which month it reaches 62° with a mean diurnal maximum of 80° both in that month and August, and an average difference of 29° or 30° between the early morning and afternoon. The mean highest temperature of the year is 90°, varying between 84° and 93° in the twelve years previous to 1893. On the other hand, in the winter the minimum thermometer falls occasionally below 0°, and in 1878 reached as low as 17° below zero. The extreme range of recorded temperature is therefore not less than 110°. The air is as dry as Quetta, and rather more uniformly so.... The amount of rain and snow is insignificant. The average rain (and snow) fall is only 2.7 in. in the year.”[1] The winds are generally light, and depend on the local direction of the valleys. At Leh, which stands at the entrance of the valley leading to the Kardang Pass, the most common directions are between south and west in the daytime and summer, and from north-east in the night, especially in the later months of the year. In January and February the air is generally calm, and April and May are the most windy months of the year.

Vegetation is confined to valleys and sheltered spots, where a stunted growth of tamarisk and *Myricaria*, *Hippophae* and *Elaeagnus*, furze, and the roots of *burtsi*, a salsolaceous plant, supply the traveller with much-needed firewood. The trees are the pencil cedar (*Juniperus excelsa*), the poplar and willow (both extensively planted, the latter sometimes wild), apple, mulberry, apricot and walnut. Irrigation is skilfully managed, the principal products being wheat, a beardless variety of barley called *grim*, millet, buckwheat, pease, beans and turnips. Lucerne and prangos (an umbelliferous plant) are used as fodder.

Among domestic animals are the famous shawl goat, two kinds of sheep, of which the larger (*huniya*) is used for carrying burdens, and is a principal source of wealth, the yak and the dso, a valuable hybrid between the yak and common cow. Among wild animals are the kiang or wild ass, ibex, several kinds of wild sheep, antelope (*Pantholops*), marmot, hare and other Tibetan fauna.

The present value of the trade between British India and Tibet passing through Ladakh is inconsiderable. Ladakh, however, is improving in its trade prospects apart from Tibet. It is curious that both Ladakh and Tibet import a considerable amount of treasure, for on the borders of western Tibet and within a radius of 100 or 200 m. of Leh there centres a gold-mining industry which apparently only requires scientific development to render it enormously productive. Here the surface soil has been for many centuries washed for gold by bands of Tibetan miners, who never work deeper than 20 to 50 ft., and whose methods of washing are of the crudest description. They work in winter, chiefly because of the binding power of frost on the friable soil, suffering great hardships and obtaining but a poor return for their labour. But the remoteness of Ladakh and its extreme altitude still continue to bar the way to substantial progress, though its central position naturally entitles it to be a great trade mart.

The adjoining territory of Baltistan forms the west extremity of Tibet, whose natural limits here are the Indus from its abrupt southward bend in 74° 45′ E., and the mountains to the north and west, separating a comparatively peaceful Tibetan population from the fiercer Aryan tribes beyond. Mahommedan writers about the 16th century speak of Baltistan as “Little Tibet,” and of Ladakh as “Great Tibet,” thus ignoring the really Great Tibet altogether. The Balti call Gilgit “a Tibet,” and Dr Leitner says that the Chilasi call themselves Bot or Tibetans; but, although these districts may have been overrun by the Tibetans, or have received rulers of that race, the ethnological frontier coincides with the geographical one given. Baltistan is a mass of lofty mountains, the prevailing formation being gneiss. In the north is the Baltoro glacier, the largest out of the arctic regions, 35 m. long, contained between two ridges whose highest peaks to the south are 25,000 and to the north 28,265 ft. The Indus, as in Lower Ladakh, runs in a narrow gorge, widening for nearly 20 m. after receiving the Shyok. The capital, Skardu, a scattered collection of houses, stands here, perched on a rock 7250 ft. above the sea. The house roofs are flat, occupied only in part by a second story, the remaining space being devoted to drying apricots, the chief staple of the main valley, which supports little cultivation. But the rapid slope westwards is seen generally in the vegetation. Birch, plane, spruce and *Pinus excelsa* appear; the fruits are finer, including pomegranate, pear, peach, vine and melon, and where irrigation is available, as in the North Shigar, and at the deltas of the tributary valleys, the crops are more luxuriant and varied.

History.—The earliest notice of Ladakh is by the Chinese pilgrim Fa-hien, A.D. 400, who, travelling in search of a purer faith, found Buddhism flourishing there, the only novelty to him being the prayer- 59
cylinder, the efficacy of which he declares is incredible. Ladakh formed part of the Tibetan empire until its disruption in the 10th century, and since then has continued ecclesiastically subject, and sometimes tributary, to Lhasa. Its inaccessibility saved it from any Mussulman invasion until 1531, when Sultan Said of Kashgar marched an army across the Karakoram, one division fighting its way into Kashmir and wintering there. Next year they invaded eastern Tibet, where nearly all perished from the effects of the climate.

Early in the 17th century Ladakh was invaded by its Mahommedan neighbours of Baltistan, who plundered and destroyed the temples and monasteries; and again, in 1685-1688, by the Sokpa, who were expelled only by the aid of the lieutenant of Aurangzeb in Kashmir, Ladakh thereafter becoming tributary. The gyalpo or king then made a nominal profession of Islam, and allowed a mosque to be founded at Leh, and the Kashmiris have ever since addressed his successors by a Mahommedan title. When the Sikhs took Kashmir, Ladakh, dreading their approach, offered allegiance to Great Britain. It was, however, conquered and annexed in 1834-1841 by Gulab Singh of Jammu—the unwar-like Ladakhis, even with nature fighting on their side, and against indifferent generalship, being no match for the Dogra troops. These next turned their arms successfully against the Baltis (who in the 18th century were subject to the Mogul), and were then tempted to revive the claims of Ladakh to the Chinese provinces of Rudok and Ngari. This, however, brought down an army from Lhasa, and after a three days’ fight the Indian force was almost annihilated—chiefly indeed by frostbite and other sufferings, for the battle was fought in mid-winter, 15,000 ft. above the sea. The Chinese then marched on Leh, but were soon driven out again, and peace was finally made on the basis of the old frontier. The widespread prestige of China is illustrated by the fact that tribute, though disguised as a present, is paid to her, for Ladakh, by the maharaja of Kashmir.

The principal works to be consulted are F. Drew, *The Jummoo and Kashmir Territories*; Cunningham, *Ladak*; Major J. Biddulph, *The Tribes of the Hindoo Koosh*; Ramsay, *Western Tibet*; Godwin-Austen, “The Mountain Systems of the Himalaya,” vol. vi., *Proc. R.G.S.* (1884); W. Lawrence, *The Valley of Kashmir* (1895); H. F. Blandford, *The Climate and Weather of India* (1889).

(T. H. H.*)

1 H. F. Blandford, *Climate and Weather of India* (London, 1889).

LADD, GEORGE TRUMBULL (1842-), American philosopher, was born in Painesville, Lake county, Ohio, on the 19th of January 1842. He graduated at Western Reserve College in 1864 and at Andover Theological Seminary in 1869; preached in Edinburg, Ohio, in 1869-1871, and in the Spring Street Congregational Church of Milwaukee in 1871-1879; and was professor of philosophy at Bowdoin

College in 1879-1881, and Clark professor of metaphysics and moral philosophy at Yale from 1881 till 1901, when he took charge of the graduate department of philosophy and psychology; he became professor emeritus in 1905. In 1879-1882 he lectured on theology at Andover Theological Seminary, and in 1883 at Harvard, where in 1895-1896 he conducted a graduate seminary in ethics. He lectured in Japan in 1892, 1899 (when he also visited the universities of India) and 1906-1907. He was much influenced by Lotze, whose *Outlines of Philosophy* he translated (6 vols., 1877), and was one of the first to introduce (1879) the study of experimental psychology into America, the Yale psychological laboratory being founded by him.

PUBLICATIONS.—*The Principles of Church Polity* (1882); *The Doctrine of Sacred Scripture* (1884); *What is the Bible?* (1888); *Essays on the Higher Education* (1899), defending the "old" (Yale) system against the Harvard or "new" education, as praised by George H. Palmer; *Elements of Physiological Psychology* (1889, rewritten as *Outlines of Physiological Psychology*, in 1890); *Primer of Psychology* (1894); *Psychology, Descriptive and Explanatory* (1894); and *Outlines of Descriptive Psychology* (1898); in a "system of philosophy," *Philosophy of the Mind* (1891); *Philosophy of Knowledge* (1897); *A Theory of Reality* (1899); *Philosophy of Conduct* (1902); and *Philosophy of Religion* (2 vols., 1905); *In Korea with Marquis Ito* (1908); and *Knowledge, Life and Reality* (1909).

LADDER, (O. Eng. *hlaeder*; of Teutonic origin, cf. Dutch *leer*, Ger. *Leiter*; the ultimate origin is in the root seen in "lean," Gr. κλῖμαξ), a set of steps or "rungs" between two supports to enable one to get up and down; usually made of wood and sometimes of metal or rope. Ladders are generally movable, and differ from a staircase also in having only treads and no "risers." The term "Jacob's ladder," taken from the dream of Jacob in the Bible, is applied to a rope ladder with wooden steps used at sea to go aloft, and to a common garden plant of the genus *Polemonium* on account of the ladder-like formation of the leaves. The flower known in England as Solomon's seal is in some countries called the "ladder of heaven."

LADING (from "to lade," O. Eng. *hladan*, to put cargo on board; cf. "load"), BILL OF, the document given as receipt by the master of a merchant vessel to the consignor of goods, as a guarantee for their safe delivery to the consignee. (See AFFREIGHTMENT.)

LADISLAUS [I.], Saint (1040-1095), king of Hungary, the son of Béla I., king of Hungary, and the Polish princess Richeza, was born in Poland, whither his father had sought refuge, but was recalled by his elder brother Andrew I. to Hungary (1047) and brought up there. He succeeded to the throne on the death of his uncle Geza in 1077, as the eldest member of the royal family, and speedily won for himself a reputation scarcely inferior to that of Stephen I., by nationalizing Christianity and laying the foundations of Hungary's political greatness. Instinctively recognizing that Germany was the natural enemy of the Magyars, Ladislaus formed a close alliance with the pope and all the other enemies of the emperor Henry IV., including the anti-emperor Rudolph of Swabia and his chief supporter Welf, duke of Bavaria, whose daughter Adelaide he married. She bore him one son and three daughters, one of whom, Piriska, married the Byzantine emperor John Comnenus. The collapse of the German emperor in his struggle with the pope left Ladislaus free to extend his dominions towards the south, and colonize and Christianize the wildernesses of Transylvania and the lower Danube. Hungary was still semi-savage, and her native barbarians were being perpetually recruited from the hordes of Pechenegs, Kumanians and other races which swept over her during the 11th century. Ladislaus himself had fought valiantly in his youth against the Pechenegs, and to defend the land against the Kumanians, who now occupied Moldavia and Wallachia as far as the Alt, he built the fortresses of Turnu-Severin and Gyula Féhervár. He also planted in Transylvania the Szeklers, the supposed remnant of the ancient Magyars from beyond the Dnieper, and founded the bishoprics of Nagy-Várad, or Gross-Wardein, and of Agram, as fresh foci of Catholicism in south Hungary and the hitherto uncultivated districts between the Drave and the Save. He subsequently conquered Croatia, though here his authority was questioned by the pope, the Venetian republic and the Greek emperor. Ladislaus died suddenly in 1095 when about to take part in the first Crusade. No other Hungarian king was so generally beloved. The whole nation mourned for him for three years, and regarded him as a saint long before his canonization. A whole cycle of legends is associated with his name.

See J. Babik, *Life of St Ladislaus* (Hung.) (Eger, 1892); György Pray, *Dissertatio de St Ladislao*

(Pressburg, 1774); Antál Gánóczy, *Diss. hist. crit. de St Ladislao* (Vienna, 1775).

(R. N. B.)

LADISLAUS IV., The Kumanian (1262-1290), king of Hungary, was the son of Stephen V., whom he succeeded in 1272. From his tenth year, when he was kidnapped from his father's court by the rebellious vassals, till his assassination eighteen years later, his whole life, with one bright interval of military glory was unrelieved tragedy. His minority, 1272-1277, was an alternation of palace revolutions and civil wars, in the course of which his brave Kumanian mother Elizabeth barely contrived to keep the upper hand. In this terrible school Ladislaus matured precociously. At fifteen he was a man, resolute, spirited, enterprising, with the germs of many talents and virtues, but rough, reckless and very imperfectly educated. He was married betimes to Elizabeth of Anjou, who had been brought up at the Hungarian court. The marriage was a purely political one, arranged by his father and a section of the Hungarian magnates to counterpoise hostile German and Czech influences. During the earlier part of his reign, 60
Ladislaus obsequiously followed the direction of the Neapolitan court in foreign affairs. In Hungary itself a large party was in favour of the Germans, but the civil wars which raged between the two factions from 1276 to 1278 did not prevent Ladislaus, at the head of 20,000 Magyars and Kumanians, from co-operating with Rudolph of Habsburg in the great battle of Durnkrüt (August 26th, 1278), which destroyed, once for all, the empire of the Přemyslidae. A month later a papal legate arrived in Hungary to inquire into the conduct of the king, who was accused by his neighbours, and many of his own subjects, of adopting the ways of his Kumanian kinsfolk and thereby undermining Christianity. Ladislaus was not really a pagan, or he would not have devoted his share of the spoil of Durnkrüt to the building of the Franciscan church at Pressburg, nor would he have venerated as he did his aunt St Margaret. Political enmity was largely responsible for the movement against him, yet the result of a very careful investigation (1279-1281) by Philip, bishop of Fermo, more than justified many of the accusations brought against Ladislaus. He clearly preferred the society of the semi-heathen Kumanians to that of the Christians; wore, and made his court wear, Kumanian dress; surrounded himself with Kumanian concubines, and neglected and ill-used his ill-favoured Neapolitan consort. He was finally compelled to take up arms against his Kumanian friends, whom he routed at Hodmézö (May 1282) with fearful loss; but, previously to this, he had arrested the legate, whom he subsequently attempted to starve into submission, and his conduct generally was regarded as so unsatisfactory that, after repeated warnings, the Holy See resolved to supersede him by his Angevin kinsfolk, whom he had also alienated, and on the 8th of August 1288 Pope Nicholas IV. proclaimed a crusade against him. For the next two years all Hungary was convulsed by a horrible civil war, during which the unhappy young king, who fought for his heritage to the last with desperate valour, was driven from one end of his kingdom to the other like a hunted beast. On the 25th of December 1289 he issued a manifesto to the lesser gentry, a large portion of whom sided with him, urging them to continue the struggle against the magnates and their foreign supporters; but on the 10th of July 1290 he was murdered in his camp at Korosszeg by the Kumanians, who never forgave him for deserting them.

See Karoly Szabó, *Ladislaus the Cumanian* (Hung.), (Budapest, 1886); and Acsády, *History of the Hungarian Realm*, i. 2 (Budapest, 1903). The latter is, however, too favourable to Ladislaus.

(R. N. B.)

LADISLAUS V. (1440-1457), king of Hungary and Bohemia, the only son of Albert, king of Hungary, and Elizabeth, daughter of the emperor Sigismund, was born at Komárom on the 22nd of February 1440, four months after his father's death, and was hence called Ladislaus Posthumus. The estates of Hungary had already elected Wladislaus III. of Poland their king, but Ladislaus's mother caused the holy crown to be stolen from its guardians at Visegrad, and compelled the primate to crown the infant king at Székesfejérvár on the 15th of May 1440; whereupon, for safety's sake, she placed the child beneath the guardianship of his uncle the emperor Frederick III. On the death of Wladislaus III. (Nov. 10th, 1444), Ladislaus V. was elected king by the Hungarian estates, though not without considerable opposition, and a deputation was sent to Vienna to induce the emperor to surrender the child and the holy crown; but it was not till 1452 that Frederick was compelled to relinquish both. The child was then transferred to the pernicious guardianship of his maternal grandfather Ulrich Cillei, who corrupted him soul and body and inspired him with a jealous hatred of the Hunyadis. On the 28th of October 1453 he was crowned king of Bohemia, and henceforth spent most of his time at Prague and Vienna. He remained supinely indifferent to the Turkish peril; at the instigation of Cillei did his best to hinder the defensive preparations of the great Hunyadi, and fled from the country on the tidings of the siege of Belgrade. On the death of Hunyadi he made Cillei governor of Hungary at the diet of Futtak (October 1456), and when that traitor paid with his life for his murderous attempt on Laszló Hunyadi at Belgrade, Ladislaus procured the decapitation of young Hunyadi (16th of March 1457), after a mock trial which raised such a storm in Hungary that the king fled to Prague, where he died suddenly (Nov. 23rd, 1457), while making preparations for his marriage with Magdalena, daughter of Charles VII. of France. He is supposed to have been poisoned by his political opponents in Bohemia.

See F. Palacky, *Zeugenverhör über den Tod König Ladislaus von Ungarn u. Böhmen* (Prague, 1856); Ignacz Acsády, *History of the Hungarian State* (Hung.), vol. i. (Budapest, 1903).

LA DIXMERIE, NICOLAS BRICAIRE DE (*c.* 1730-1791), French man of letters, was born at Lamothe (Haute-Marne). While still young he removed to Paris, where the rest of his life was spent in literary activity. He died on the 26th of November 1791. His numerous works include *Contes philosophiques et moraux* (1765), *Les Deux Âges du goût et du génie sous Louis XIV. et sous Louis XV.* (1769), a parallel and contrast, in which the decision is given in favour of the latter; *L'Espagne littéraire* (1774); *Éloge de Voltaire* (1779) and *Éloge de Montaigne* (1781).

LADO ENCLAVE, a region of the upper Nile formerly administered by the Congo Free State, but since 1910 a province of the Anglo-Egyptian Sudan. It has an area of about 15,000 sq. m., and a population estimated at 250,000 and consisting of Bari, Madi, Kuku and other Nilotic Negroes. The enclave is bounded S.E. by the north-west shores of Albert Nyanza—as far south as the port of Mahagi—E. by the western bank of the Nile (Bahr-el-Jebel) to the point where the river is intersected by 5° 30′ N., which parallel forms its northern frontier from the Nile westward to 30° E. This meridian forms the west frontier to 4° N., the frontier thence being the Nile-Congo watershed to the point nearest to Mahagi and from that point direct to Albert Nyanza.

The country is a moderately elevated plateau sloping northward from the higher ground marking the Congo-Nile watershed. The plains are mostly covered with bush, with stretches of forest in the northern districts. Traversing the plateau are two parallel mountainous chains having a general north to south direction. One chain, the Kuku Mountains (average height 2000 ft.), approaches close to the Nile and presents, as seen from the river, several apparently isolated peaks. At other places these mountains form precipices which stretch in a continuous line like a huge wall. From Dufile in 3° 34′ N. to below the Bedden Rapids in 4° 40′ N. the bed of the Nile is much obstructed and the river throughout this reach is unnavigable (see Nile). Below the Bedden Rapids rises the conical hill of Rejaf, and north of that point the Nile valley becomes flat. Ranges of hill, however, are visible farther westwards, and a little north of 5° N. is Jebel Lado, a conspicuous mountain 2500 ft. high and some 12 m. distant from the Nile. It has given its name to the district, being the first hill seen from the Nile in the ascent of some 1000 m. from Khartum. On the river at Rejaf, at Lado, and at Kiro, 28 m. N. of Lado, are government stations and trading establishments. The western chain of hills has loftier peaks than those of Kuku, Jebel Loka being about 3000 ft. high. This western chain forms a secondary watershed separating the basin of the Yei, a large river, some 400 m. in length, which runs almost due north to join the Nile, from the other streams of the enclave, which have an easterly or north-easterly direction and join the Nile after comparatively short courses.

The northern part of the district was first visited by Europeans in 1841-1842, when the Nile was ascended by an expedition despatched by Mehemet Ali to the foot of the rapids at Bedden. The neighbouring posts of Gondokoro, on the east bank of the Nile, and Lado, soon became stations of the Khartum ivory and slave traders. After the discovery of Albert Nyanza by Sir Samuel Baker in 1864, the whole country was overrun by Arabs, Levantines, Turks and others, whose chief occupation was slave raiding. The region was claimed as part of the Egyptian Sudan, but it was not until the arrival of Sir Samuel Baker at Gondokoro in 1870 as governor of the equatorial provinces, that any effective control of the slave traders was attempted. Baker was succeeded by General C. G. Gordon, who established a separate administration for the Bahr-el-Ghazal. In 1878 Emin Pasha became governor of the Equatorial Province, a term henceforth confined to the region adjoining the main Nile above the Sobat confluence, and the region south of the Bahr-el-Ghazal province. (The whole of the Lado Enclave thus formed part of Emin's old province.) Emin made his headquarters at Lado, whence he was driven in 1885 by the Mahdists. He then removed to Wadelai, a station farther south, but in 1889 the pasha, to whose aid H. M. Stanley had conducted an expedition from the Congo, evacuated the country and with Stanley made his way to the east coast. While the Mahdists remained in possession at Rejaf, Great Britain in virtue of her position in Uganda claimed the upper Nile region as within the British sphere; a claim admitted by Germany in 1890. In February 1894 the union jack was hoisted at Wadelai, while in May of the same year Great Britain granted to Leopold II., as sovereign of the Congo State, a lease of large areas lying west of the upper Nile inclusive of the Bahr-el-Ghazal and Fashoda. Pressed however by France, Leopold II. agreed to occupy only that part of the leased area east of 30° E. and south of 5° 30′ N., and in this manner the actual limits of the Lado Enclave, as it was thereafter called, were fixed. Congo State forces had penetrated to the Nile valley as early as 1891, but it was not until 1897, when on the 17th of February Commandant Chaltin inflicted a decisive defeat on the Mahdists at Rejaf, that their occupation of the Lado Enclave was assured. After the withdrawal of the French from Fashoda, Leopold II. revived (1899) his

claim to the whole of the area, leased to him in 1894. In this claim he was unsuccessful, and the lease, by a new agreement made with Great Britain in 1906, was annulled (see AFRICA, § 5). The king however retained the enclave, with the stipulation that six months after the termination of his reign it should be handed over to the Anglo-Sudanese government (see *Treaty Series*, No. 4, 1906).

See *Le Mouvement géographique* (Brussels) *passim*, and especially articles in the 1910 issues.

LADOGA (formerly NEVO), a lake of northern Russia, between 59° 56′ and 61° 46′ N., and 29° 53′ and 32° 50′ E., surrounded by the governments of St Petersburg and Olonets, and of Viborg in Finland. It has the form of a quadrilateral, elongated from N.W. to S.E. Its eastern and southern shores are flat and marshy, the north-western craggy and fringed by numerous small rocky islands, the largest of which are Valamo and Konnevitz, together having an area of 14 sq. m. Ladoga is 7000 sq. m. in area, that is, thirty-one times as large as the Lake of Geneva; but, its depth being less, it contains only nineteen times as much water as the Swiss lake. The greatest depth, 730 ft., is in a trough in the north-western part, the average depth not exceeding 250 to 350 ft. The level of Lake Ladoga is 55 ft. above the Gulf of Finland, but it rises and falls about 7 ft., according to atmospheric conditions, a phenomenon very similar to the *seiches* of the Lake of Geneva being observed in connexion with this.

The western and eastern shores consist of boulder clay, as well as a narrow strip on the southern shore, south of which runs a ridge of crags of Silurian sandstones. The hills of the north-western shore afford a variety of granites and crystalline slates of the Laurentian system, whilst Valamo island is made up of a rock which Russian geologists describe as orthoclastic hypersthenite. The granite and marble of Serdobol, and the sandstone of Putilovo, are much used for buildings at St Petersburg; copper and tin from the Pitkäranta mine are exported.

No fewer than seventy rivers enter Ladoga, pouring into it the waters of numberless smaller lakes which lie at higher levels round it. The Volkhov, which conveys the waters of Lake Ilmen, is the largest; Lake Onega discharges its waters by the Svir; and the Saima system of lakes of eastern Finland contributes the Vuoxen and Taipale rivers; the Syas brings the waters from the smaller lakes and marshes of the Valdai plateau. Ladoga discharges its surplus water by means of the Neva, which flows from its south-western corner into the Gulf of Finland, rolling down its broad channel 104,000 cubic ft. of water per second.

The water of Ladoga is very pure and cold; in May the surface temperature does not exceed 36° Fahr., and even in August it reaches only 50° and 53°, the average yearly temperature of the air at Valamo being 36.8°. The lake begins to freeze in October, but it is only about the end of December that it is frozen in its deeper parts; and it remains ice-bound until the end of March, though broad icefields continue to float in the middle of the lake until broken up by gales. Only a small part of the Ladoga ice is discharged by the Neva; but it is enough to produce in the middle of June a return of cold in the northern capital. The thickness of the ice does not exceed 3 or 4 ft.; but during the alternations of cold and warm weather, with strong gales, in winter, stacks of ice, 70 and 80 ft. high, are raised on the shores and on the icefields. The water is in continuous rotatory motion, being carried along the western shore from north to south, and along the eastern from south to north. The vegetation on the shores is poor; immense forests, which formerly covered them, are now mostly destroyed. But the fauna of the lake is somewhat rich; a species of seal which inhabits its waters, as well as several species of arctic crustaceans, recall its former connexion with the Arctic Ocean. The sweet water *Diatomaceae* which are found in great variety in the ooze of the deepest parts of the lake also have an arctic character.

Fishing is very extensively carried on. Navigation, which is practicable for only one hundred and eighty days in the year, is rather difficult owing to fogs and gales, which are often accompanied, even in April and September, with snow-storms. The prevailing winds blow from N.W. and S.W.; N.E. winds cause the water to rise in the south-western part, sometimes 3 to 5 ft. Steamers ply regularly in two directions from St Petersburg—to the monasteries of Konnevitz and Valamo, and to the mouth of the Svir, whence they go up that river to Lake Onega and Petrozavodsk; and small vessels transport timber, firewood, planks, iron, kaolin, granite, marble, fish, hay and various small wares from the northern shore to Schlüsselburg, and thence to St Petersburg. Navigation on the lake being too dangerous for small craft, canals with an aggregate length of 104 m. were dug in 1718-1731, and others in 1861-1886 having an aggregate length of 101 m. along its southern shore, uniting with the Neva at Schlüsselburg the mouths of the rivers Volkhov, Syas and Svir, all links in the elaborate system of canals which connect the upper Volga with the Gulf of Finland.

The population (35,000) on the shores of the lake is sparse, and the towns—Schlüsselburg (5285 inhabitants in 1897); New Ladoga (4144); Kexholm (1325) and Serdobol—are small. The monasteries of Valamo, founded in 992, on the island of the same name, and Konnevskiy, on Konnevitz island, founded in 1393, are visited every year by many thousands of pilgrims.

(P. A. K.; J. T. BE.)

LADY (O. Eng. *hlaéfdige*, Mid. Eng. *láfdi*, *lāvedi*; the first part of the word is *hláf*, loaf, bread, as in the corresponding *hláford*, lord; the second part is usually taken to be from the root dig-, to knead, seen also in "dough"; the sense development from bread-kneader, bread-maker, to the ordinary meaning, though not clearly to be traced historically, may be illustrated by that of "lord"), a term of which the main applications are two, (1) as the correlative of "lord" (*q.v.*) in certain of the usages of that word, (2) as the correlative of "gentleman" (*q.v.*). The primary meaning of mistress of a household is, if not obsolete, in present usage only a vulgarism. The special use of the word as a title of the Virgin Mary, usually "Our Lady," represents the Lat. *Domina Nostra*. In Lady Day and Lady Chapel the word is properly a genitive, representing the O. Eng. *hlaéfdigan*. As a title of nobility the uses of "lady" are mainly paralleled by those of "lord." It is thus a less formal alternative to the full title giving the specific rank, of marchioness, countess, viscountess or baroness, whether as the title of the husband's rank by right or courtesy, or as the lady's title in her own right. In the case of the younger sons of a duke or marquess, who by courtesy have lord prefixed to their Christian and family name, the wife is known by the husband's Christian and family name with Lady prefixed, *e.g.* Lady John B.; the daughters of dukes, marquesses and earls are by courtesy Ladies; here that title is prefixed to the Christian and family name of the lady, *e.g.* Lady Mary B., and this is preserved if the lady marry a commoner, *e.g.* Mr and Lady Mary C. "Lady" is also the customary title of the wife of a baronet or knight; the proper title, now only used in legal documents or on sepulchral monuments, is "dame" (*q.v.*); in the latter case the usage is to prefix Dame to the Christian name of the wife followed by the surname of the husband, thus Dame Eleanor B., but in the former, Lady with the surname of the husband only, Sir A. and Lady B. During the 15th and 16th centuries "princesses" or daughters of the blood royal were usually known by their Christian names with "the Lady" prefixed, *e.g.* the Lady Elizabeth.

While "lord" has retained its original application as a title of nobility or rank without extension, an example which has been followed in Spanish usage by "don," "lady" has been extended in meaning to be the feminine correlative of "gentleman" throughout its sense developments, and in this is paralleled by *Dame* in German, *madame* in French, *donna* in Spanish, &c. It is the general word for any woman of a certain social position (see GENTLEMAN).

LADYBANK, a police burgh of Fifeshire, Scotland, 5½ m. S.W. of Cupar by the North British railway, ½ m. from the left bank of the Eden. Pop. (1901) 1340. Besides having a station on the main line to Dundee, it is also connected with Perth and Kinross and is a railway junction of some importance and possesses a locomotive depot. It is an industrial centre, linen weaving, coal mining and malting being the principal industries. KETTLE, a village 1 m. S., has prehistoric barrows and a fort. At COLLESSIE, 2½ m. N. by W., a standing stone, a mound and traces of ancient camps exist, while urns and coins have been found. Between the parishes of Collessie and Monimail the boundary line takes the form of a crescent known as the Bow of Fife. MONIMAIL contains the Mount, the residence of Sir David Lindsay the poet (1490-1555). Its lofty site is now marked by a clump of trees. Here, too, is the Doric pillar, 100 ft. high, raised to the memory of John Hope, 4th earl of Hopetoun. Melville House, the seat of the earls of Leven, lies amidst beautiful woods.

LADYBRAND, a town of the Orange Free State, 80 m. E. of Bloemfontein by rail. Another railway connects it with Natal via Harrismith. Pop. (1904) 3862, of whom 2334 were whites. The town is pleasantly situated at the foot of a flat-topped hill (the Platberg), about 4 m. W. of the Caledon river, which separates the province from Basutoland. Ladybrand is the centre of a rich arable district, has a large wheat market and is also a health resort, the climate, owing to the proximity of the Maluti Mountains, being bracing even during the summer months (November-March). Coal and petroleum are found in the neighbourhood. It is named after the wife of Sir J. H. Brand, president of the Orange Free State.

LADY-CHAPEL, the chapel dedicated to the Blessed Virgin and attached to churches of large size. Generally the chapel was built eastward of the high altar and formed a projection from the main building, as in Winchester, Salisbury, Exeter, Wells, St Albans, Chichester, Peterborough and Norwich cathedrals,—in the two latter cases now destroyed. The earliest Lady-chapel built was that in the Saxon cathedral of Canterbury; this was transfered in the rebuilding by Archbishop Lanfranc to the west end of the nave, and again shifted in 1450 to the chapel on the east side of the north transept. The Lady-chapel at Ely cathedral

is a distinct building attached to the north transept; at Rochester the Lady-chapel is west of the south transept. Probably the largest Lady-chapel was that built by Henry III. in 1220 at Westminster Abbey, which was 30 ft. wide, much in excess of any foreign example, and extended to the end of the site now occupied by Henry VII.'s chapel. Among other notable English examples of Lady-chapels are those at Ottery-St-Mary, Thetford, Bury St Edmund's, Wimborne, Christ-church, Hampshire; in Compton Church, Surrey, and Compton Martin, Somersetshire, and Darenth, Kent, it was built over the chancel. At Croyland Abbey there were two Lady-chapels. Lady-chapels exist in most of the French cathedrals and churches, where they form part of the chevet; in Belgium they were not introduced before the 14th century; in some cases they are of the same size as the other chapels of the chevet, but in others, probably rebuilt at a later period, they became much more important features, and in Italy and Spain during the Renaissance period constitute some of its best examples.

LADY DAY, originally the name for all the days in the church calendar marking any event in the Virgin Mary's life, but now restricted to the feast of the Annunciation, held on the 25th of March in each year. Lady Day was in medieval and later times the beginning of the legal year in England. In 1752 this was altered to the 1st of January, but the 25th of March remains one of the Quarter Days; though in some parts old Lady Day, on the 6th of April, is still the date for rent paying. See Annunciation.

LADYSMITH, a town of Natal, 189 m. N.W. of Durban by rail, on the left bank of the Klip tributary of the Tugela. Pop. (1904) 5568, of whom 2269 were whites. It lies 3284 ft. above the sea and is encircled by hills, while the Drakensberg are some 30 m. distant to the N.W. Ladysmith is the trading centre of northern Natal, and is the chief railway junction in the province, the main line from the south dividing here. One line crosses Van Reenen's pass into the Orange Free State, the other runs northwards to the Transvaal. There are extensive railway workshops. Among the public buildings are the Anglican church and the town hall. The church contains tablets with the names of 3200 men who perished in the defence and relief of the town in the South African War (see below), while the clock tower of the town hall, partially destroyed by a Boer shell, is kept in its damaged condition.

Ladysmith, founded in 1851, is named after Juana, Lady Smith, wife of Sir Harry Smith, then governor of Cape Colony. It stands near the site of the camp of the Dutch farmers who in 1848 assembled for the purpose of trekking across the Drakensberg. Here they were visited by Sir Harry Smith, who induced the majority of the farmers to remain in Natal. The growth of the town, at first slow, increased with the opening of the railway from Durban in 1886 and the subsequent extension of the line to Johannesburg.

In the first and most critical stage of the South African War of 1899-1902 (see Transvaal) Ladysmith was the centre of the struggle. During the British concentration on the town there were fought the actions of Talana (or Dundee) on the 20th, Elandslaagte on the 21st and Rietfontein on the 24th of October 1899. On the 30th of October the British sustained a serious defeat in the general action of Lombard's Kop or Farquhar's Farm, and Sir George White decided to hold the town, which had been fortified, against investment and siege until he was relieved directly or indirectly by Sir Redvers Buller's advance. The greater portion of Buller's available troops were despatched to Natal in November, with a view to the direct relief of Ladysmith, which meantime the Boers had closely invested. His first attempt was repelled on the 15th of December in the battle of Colenso, his second on the 24th of January 1900 by the successful Boer counterstroke against Spion Kop, and his third was abandoned without serious fighting (Vaalkranz, Feb. 5). But two or three days after Vaalkranz, almost simultaneously with Lord Roberts's advance on Bloemfontein Sir Redvers Buller resumed the offensive in the hills to the east of Colenso, which he gradually cleared of the enemy, and although he was checked after reaching the Tugela below Colenso (Feb. 24) he was finally successful in carrying the Boer positions (Pieter's Hill) on the 27th and relieving Ladysmith, which during these long and anxious months (Nov. 1-Feb. 28) had suffered very severely from want of food, and on one occasion (Caesar's Camp, Jan. 6, 1900) had only with heavy losses and great difficulty repelled a powerful Boer assault. The garrison displayed its unbroken resolution on the last day of the investment by setting on foot a mobile column, composed of all men who were not too enfeebled to march out, in order to harass the Boer retreat. This expedition was however countermanded by Buller.

LAELIUS, the name of a Roman plebeian family, probably settled at Tibur (Tivoli). The chief members were:—

Gaius Laelius, general and statesman, was a friend of the elder Scipio, whom he accompanied on his Spanish campaign (210-206 B.C.). In Scipio's consulship (205), Laelius went with him to Sicily, whence he conducted an expedition to Africa. In 203 he defeated the Massaesylian prince Syphax, who, breaking his alliance with Scipio, had joined the Carthaginians, and at Zama (202) rendered considerable service in command of the cavalry. In 197 he was plebeian aedile and in 196 praetor of Sicily. As consul in 190 he was employed in organizing the recently conquered territory in Cisalpine Gaul. Placentia and Cremona were repeopled, and a new colony founded at Bononia. He is last heard of in 170 as ambassador to Transalpine Gaul. Though little is known of his personal qualities, his intimacy with Scipio is proof that he must have been a man of some importance. Silius Italicus (*Punica*, xv. 450) describes him as a man of great endowments, an eloquent orator and a brave soldier.

See Index to Livy; Polybius x. 3. 9, 39, xi. 32, xiv. 4. 8, xv. 9. 12, 14; Appian, *Hisp.* 25-29; Cicero, *Philippica*, xi. 7.

His son, Gaius Laelius, is known chiefly as the friend of the younger Scipio, and as one of the speakers in Cicero's *De senectute*, *De amicitia* (or *Laelius*) and *De Republica*. He was surnamed *Sapiens* ("the wise"), either from his scholarly tastes or because, when tribune, he "prudently" withdrew his proposal (151 B.C.) for the relief of the farmers by distributions of land, when he saw that it was likely to bring about disturbances. In the third Punic War (147) he accompanied Scipio to Africa, and distinguished himself at the capture of the Cothon, the military harbour of Carthage. In 145 he carried on operations with moderate success against Viriathus in Spain; in 140 he was elected consul. During the Gracchan period, as a staunch supporter of Scipio and the aristocracy, Laelius became obnoxious to the democrats. He was associated with P. Popillius Laenas in the prosecution of those who had supported Tiberius Gracchus, and in 131 opposed the bill brought forward by C. Papirius Carbo to render legal the election of a tribune to a second year of office. The attempts of his enemies, however, failed to shake his reputation. He was a highly accomplished man and belonged to the so-called "Scipionic circle." He studied philosophy under the Stoics Diogenes Babylonius and Panaetius of Rhodes; he was a poet, and the plays of Terence, by reason of their elegance of diction, were sometimes attributed to him. With Scipio he was mainly instrumental in introducing the study of the Greek language and literature into Rome. He was a gifted orator, though his refined eloquence was perhaps less suited to the forum than to the senate. He delivered speeches *De Collegiis* (145) against the proposal of the tribune C. Licinius Crassus to deprive the priestly colleges of their right of co-optation and to transfer the power of election to the people; *Pro Publicanis* (139), on behalf of the farmers of the revenue; against the proposal of Carbo noticed above; *Pro Se*, a speech in his own defence, delivered in answer to Carbo and Gracchus; funeral orations, amongst them two on his friend Scipio. Much information is given concerning him in Cicero, who compares him to Socrates.

See Index to Cicero; Plutarch, *Tib. Gracchus*, 8; Appian, *Punica*, 126; Horace, *Sat.* ii. 1. 72; Quintilian, *Instit.* xii. 10. 10; Suetonius, *Vita Terentii*; Terence, *Adelphi*, Prol. 15, with the commentators.

LAENAS, the name of a plebeian family in ancient Rome, notorious for cruelty and arrogance. The two most famous of the name[1] are:—

Gaius Popillius Laenas, consul in 172 B.C. He was sent to Greece in 174 to allay the general disaffection, but met with little success. He took part in the war against Perseus, king of Macedonia (Livy xliii. 17, 22). When Antiochus Epiphanes, king of Syria, invaded Egypt, Laenas was sent to arrest his progress. Meeting him near Alexandria, he handed him the decree of the senate, demanding the evacuation of Egypt. Antiochus having asked time for consideration, Laenas drew a circle round him with his staff, and told him he must give an answer before he stepped out of it. Antiochus thereupon submitted (Livy xlv. 12; Polybius xxix. 11; Cicero, *Philippica*, viii. 8; Vell. Pat. i. 10).

Publius Popillius Laenas, son of the preceding. When consul in 132 B.C. he incurred the hatred of the democrats by his harsh measures as head of a special commission appointed to take measures against the accomplices of Tiberius Gracchus. In 123 Gaius Gracchus brought in a bill prohibiting all such commissions, and declared that, in accordance with the old laws of appeal, a magistrate who pronounced sentence of death against a citizen, without the people's assent, should be guilty of high treason. It is not known whether the bill contained a retrospective clause against Laenas, but he left Rome and sentence of banishment from Italy was pronounced against him. After the restoration of the aristocracy the enactments against him were cancelled, and he was recalled (121).

See Cicero, *Brutus*, 25. 34, and *De domo sua*, 31; Vell. Pat. ii. 7; Plutarch, *C. Gracchus*, 4.

1 The name is said by Cicero to be derived from *laena*, the sacerdotal cloak carried by Marcus Popillius (consul 359) when he went to the forum to quell a popular rising.

LAER (or LAAR), PIETER VAN (1613-*c.* 1675), Dutch painter, was born at Laaren in Holland. The influence of a long stay in Rome begun at an early age is seen in his landscape and backgrounds, but in his subjects he remained true to the Dutch tradition, choosing generally lively scenes from peasant life, as markets, feasts, bowling scenes, farriers' shops, robbers, hunting scenes and peasants with cattle. From this taste, or from his personal deformity, he was nicknamed Bamboccio by the Italians. On his return to Holland about 1639, he lived chiefly at Amsterdam and Haarlem, in which latter city he died in 1674 or 1675. His pictures are marked by skilful composition and good drawing; he was especially careful in perspective. His colouring, according to Crowe, is "generally of a warm, brownish tone, sometimes very clear, but oftener heavy, and his execution broad and spirited." Certain etched plates are also attributed to him.

LAESTRYGONES, a mythical race of giants and cannibals. According to the *Odyssey* (x. 80) they dwelt in the farthest north, where the nights were so short that the shepherd who was driving out his flock met another driving it in. This feature of the tale contains some hint of the long nightless summer in the Arctic regions, which perhaps reached the Greeks through the merchants who fetched amber from the Baltic coasts. Odysseus in his wanderings arrived at the coast inhabited by the Laestrygones, and escaped with only one ship, the rest being sunk by the giants with masses of rock. Their chief city was Telepylus, founded by a former king Lamus, their ruler at that time being Antiphates. This is a purely fanciful name, but Lamus takes us into a religious world where we can trace the origin of the legend, and observe the god of an older religion becoming the subject of fairy tales (see LAMIA) in a later period.

The later Greeks placed the country of the Laestrygones in Sicily, to the south of Aetna, near Leontini; but Horace (*Odes*, iii. 16. 34) and other Latin authors speak of them as living in southern Latium, near Formiae, which was supposed to have been founded by Lamus.

LAETUS, JULIUS POMPONIUS [Giulio Pomponio Leto], (1425-1498), Italian humanist, was born at Salerno. He studied at Rome under Laurentius Valla, whom he succeeded (1457) as professor of eloquence in the Gymnasium Romanum. About this time he founded an academy, the members of which adopted Greek and Latin names, met on the Quirinal to discuss classical questions and celebrated the birthday of Romulus. Its constitution resembled that of an ancient priestly college, and Laetus was styled pontifex maximus. The pope (Paul II.) viewed these proceedings with suspicion, as savouring of paganism, heresy and republicanism. In 1468 twenty of the academicians were arrested during the carnival; Laetus, who had taken refuge in Venice, was sent back to Rome, imprisoned and put to the torture, but refused to plead guilty to the charges of infidelity and immorality. For want of evidence, he was acquitted and allowed to resume his professorial duties; but it was forbidden to utter the name of the academy even in jest. Sixtus IV. permitted the resumption of its meetings, which continued to be held till the sack of Rome (1527) by Constable Bourbon during the papacy of Clement VII. Laetus continued to teach in Rome until his death on the 9th of June 1498. As a teacher, Laetus, who has been called the first head of a philological school, was extraordinarily successful; in his own words, like Socrates and Christ, he expected to live on in the person of his pupils, amongst whom were many of the most famous scholars of the period. His works, written in pure and simple Latin, were published in a collected form (*Opera Pomponii Laeti varia*, 1521). They contain treatises on the Roman magistrates, priests and lawyers, and a compendium of Roman history from the death of the younger Gordian to the time of Justin III. Laetus also wrote commentaries on classical authors, and promoted the publication of the editio princeps of Virgil at Rome in 1469.

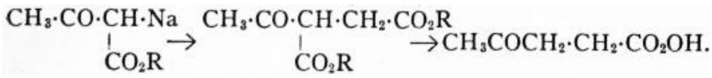
See *The Life of Leto* by Sabellicus (Strassburg, 1510); G. Voigt, *Die Wiederbelebung des klassischen Alterthums*, ii.; F. Gregorovius, *Geschichte der Stadt Rom im Mittelalter*, vii. (1894), p. 576, for an account of the academy; Sandys, *History of Classical Scholarship* (1908), ii. 92.

LAEVIUS (? *c.* 80 B.C.), a Latin poet of whom practically nothing is known. The earliest reference to him is perhaps in Suetonius (*De grammaticis*, 3), though it is not certain that the Laevius Milissus there

referred to is the same person. Definite references do not occur before the 2nd century (Fronto, *Ep. ad M. Caes.* i. 3; Aulus Gellius, *Noct. Att.* ii. 24, xii. 10, xix. 9; Apuleius, *De magia*, 30; Porphyrion, *Ad Horat. carm.* iii. 1, 2). Some sixty miscellaneous lines are preserved (see Bährens, *Fragm. poët. rom.* pp. 287-293), from which it is difficult to see how ancient critics could have regarded him as the master of Ovid or Catullus. Gellius and Ausonius state that he composed an *Erotopaegnia*, and in other sources he is credited with *Adonis*, *Alcestis*, *Centauri*, *Helena*, *Ino*, *Protesilaudamia*, *Sirenocirca*, *Phoenix*, which may, however, be only the parts of the *Erotopaegnia*. They were not serious poems, but light and often licentious skits on the heroic myths.

See O. Ribbeck, *Geschichte der römischen Dichtung*, i.; H. de la Ville de Mirmont, *Étude biographique et littéraire sur le poète Laevius* (Paris, 1900), with critical ed. of the fragments, and remarks on vocabulary and syntax; A. Weichert, *Poëtarum latinorum reliquiae* (Leipzig, 1830); M. Schanz, *Geschichte der römischen Litteratur* (2nd ed.), pt. i. p. 163; W. Teuffel, *Hist. of Roman Literature* (Eng. tr.), § 150, 4; a convenient summary in F. Plessis, *La Poésie latine* (1909), pp. 139-142.

LAEVULINIC ACID (β-acetopropionic acid), $C_5H_8O_3$ or $CH_3CO·CH_2·CH_2·CO_2H$, a ketonic acid prepared from laevulose, inulin, starch, &c., by boiling them with dilute hydrochloric or sulphuric acids. It may be synthesized by condensing sodium acetoacetate with monochloracetic ester, the acetosuccinic ester produced being then hydrolysed with dilute hydrochloric acid (M. Conrad, *Ann.*, 1877, 188, p. 222).



It may also be prepared by heating the anhydride of γ-methyloxy-glutaric acid with concentrated sulphuric acid, and by oxidation of methyl heptenone and of geraniol. It crystallizes in plates, which melt at 32.5-33° C. and boil at 148-149° (15 mm.) (A. Michael, *Jour. prak. Chem.*, 1891 [2], 44, p. 114). It is readily soluble in alcohol, ether and water. The acid, when distilled slowly, is decomposed and yields α- and β-angelica lactones. When heated with hydriodic acid and phosphorus, it yields n-valeric acid; and with iodine and caustic soda solution it gives iodoform, even in the cold. With hydroxylamine it yields an oxime, which by the action of concentrated sulphuric acid rearranges itself to N-methylsuccinimide $[CH_2·CO]_2N·CH_3$.

LA FARGE, JOHN (1835-1910), American artist, was born in New York, on the 31st of March 1835, of French parentage. He received instruction in drawing from his grandfather, Binsse de St Victor, a painter of miniatures; studied law and architecture; entered the atelier of Thomas Couture in Paris, where he remained a short time, giving especial attention to the study and copying of old masters at the Louvre; and began by making illustrations to the poets (1859). An intimacy with the artist William M. Hunt had a strong influence on him, the two working together at Newport, Rhode Island. La Farge painted landscape, still life and figure alike in the early sixties. But from 1866 on he was for some time incapacitated for work, and when he regained strength he did some decorative work for Trinity church, Boston, in 1876, and turned his attention to stained glass, becoming president of the Society of Mural Painters. Some of his important commissions include windows for St Thomas's church (1877), St Peter's church, the Paulist church, the Brick church (1882), the churches of the Incarnation (1885) and the Ascension (1887), New York; Trinity church, Buffalo, and the "Battle Window" in Memorial Hall at Harvard; ceilings and windows for the house of Cornelius Vanderbilt, windows for the houses of W. H. Vanderbilt and D. O. Mills, and panels for the house of Whitelaw Reid, New York; panels for the Congressional Library, Washington; Bowdoin College, the Capitol at St Paul, Minn., besides designs for many stained glass windows. He was also a prolific painter in oil and water colour, the latter seen notably in some water-colour sketches, the result of a voyage in the South Seas, shown in 1895. His influence on American art was powerfully exhibited in such men as Augustus St Gaudens, Wilton Lockwood, Francis Lathrop and John Humphreys Johnston. He became president of the Society of American Artists, a member of the National Academy of Design in 1869; an officer of the Legion of Honour of France; and received many medals and decorations. He published *Considerations on Painting* (New York, 1895), *Hokŭsai: A Talk about Hokŭsai* (New York, 1897), and *An Artist's Letters from Japan* (New York, 1897).

See Cecilia Waern, *John La Farge, Artist and Writer* (London, 1896, No. 26 of *The Portfolio*).

LA FARINA, GIUSEPPE (1815-1863), Italian author and politician, was born at Messina. On account of the part he took in the insurrection of 1837 he had to leave Sicily, but returning in 1839 he conducted various newspapers of liberal tendencies, until his efforts were completely interdicted, when he removed to Florence. In 1840 he had published *Messina ed i suoi monumenti*, and after his removal to Florence he brought out *La Germania coi suoi monumenti* (1842), *L' Italia coi suoi monumenti* (1842), *La Svizzera storica ed artistica* (1842-1843), La China, 4 vols. (1843-1847), and *Storia d' Italia*, 7 vols. (1846-1854). In 1847 he established at Florence a democratic journal, *L' Alba*, in the interests of Italian freedom and unity, but on the outbreak of the revolution in Sicily in 1848 he returned thither and was elected deputy and member of the committee of war. In August of that year he was appointed minister of public instruction and later of war and marine. After vigorously conducting a campaign against the Bourbon troops, he was forced into exile, and repaired to France in 1849. In 1850 he published his *Storia documentata della Rivoluzione Siciliana del 1848-1849*, and in 1851-1852 his *Storia d' Italia dal 1815 al 1848*, in 6 vols. He returned to Italy in 1854 and settled at Turin, and in 1856 he founded the *Piccolo Corriere d' Italia*, an organ which had great influence in propagating the political sentiments of the Società Nazionale Italiana, of which he ultimately was chosen president. With Daniele Manin (*q.v.*), one of the founders of that society, he advocated the unity of Italy under Victor Emmanuel even before Cavour, with whom at one time he had daily interviews, and organized the emigration of volunteers from all parts of Italy into the Piedmontese army. He also negotiated an interview between Cavour and Garibaldi, with the result that the latter was appointed commander of the Cacciatori delle Alpi in the war of 1859. Later he supported Garibaldi's expedition to Sicily, where he himself went soon after the occupation of Palermo, but he failed to bring about the immediate annexation of the island to Piedmont as Cavour wished. In 1860 he was chosen a member of the first Italian parliament and was subsequently made councillor of state. He died on the 5th of September 1863.

See A. Franchi, *Epistolario di Giuseppe La Farina* (2 vols., 1869) and L. Carpi, *Il Risorgimento Italiano*, vol. i. (Milan, 1884).

LA FAYETTE, GILBERT MOTIER DE (1380-1462), marshal of France, was brought up at the court of Louis II., 3rd duke of Bourbon. He served under Marshal Boucicaut in Italy, and on his return to France after the evacuation of Genoa in 1409 became seneschal of the Bourbonnais. In the English wars he was with John I., 4th duke of Bourbon, at the capture of Soubise in 1413, and of Compiègne in 1415. The duke then made him lieutenant-general in Languedoc and Guienne. He failed to defend Caen and Falaise in the interest of the dauphin (afterwards Charles VII.) against Henry V. in 1417 and 1418, but in the latter year he held Lyons for some time against Jean sans Peur, duke of Burgundy. A series of successes over the English and Burgundians on the Loire was rewarded in 1420 with the government of Dauphiny and the office of marshal of France. La Fayette commanded the Franco-Scottish troops at the battle of Baugé (1422), though he did not, as has been sometimes stated, slay Thomas, duke of Clarence, with his own hand. In 1424 he was taken prisoner by the English at Verneuil, but was released shortly afterwards, and fought with Joan of Arc at Orleans and Patay in 1429. The marshal had become a member of the grand council of Charles VII., and with the exception of a short disgrace about 1430, due to the ill-will of Georges de la Trémouille, he retained the royal favour all his life. He took an active part in the army reform initiated by Charles VII., and the establishment of military posts for the suppression of brigandage. His last campaign was against the English in Normandy in 1449. He died on the 23rd of February 1462. His line was continued by Gilbert IV. de La Fayette, son of his second marriage with Jeanne de Joyeuse.

LA FAYETTE, LOUISE DE (*c.* 1616-1665), was one of the fourteen children of John, comte de La Fayette, and Marguerite de Bourbon-Busset. Louise became maid of honour to Anne of Austria, and Richelieu sought to attract the attention of Louis XIII. to her in the hope that she might counterbalance the influence exercised over him by Marie de Hautefort. The affair did not turn out as the minister wished. The king did indeed make her the confidante of his affairs and of his resentment against the cardinal, but she, far from repeating his confidences to the minister, set herself to encourage the king in his resistance to Richelieu's dominion. She refused, nevertheless, to become Louis's mistress, and after taking leave of the king in Anne of Austria's presence retired to the convent of the Filles de Sainte-Marie in 1637. Here she was repeatedly visited by Louis, with whom she maintained a correspondence. Richelieu intercepted the letters, and by omissions and falsifications succeeded in destroying their mutual confidence. The cessation of their intercourse was regretted by the queen, who had been reconciled with her husband through the influence of Louise. At the time of her death in January 1665 Mlle de La Fayette was superior

of a convent of her order which she had founded at Chaillot.

See *Mémoires de Madame de Motteville*; Victor Cousin, *Madame de Hautefort* (Paris, 1868); L'Abbé Sorin, *Louise-Angèle de La Fayette* (Paris, 1893).

LA FAYETTE, MARIE JOSEPH PAUL YVES ROCH GILBERT DU MOTIER.

MARQUIS DE (1757-1834), was born at the château of Chavaniac in Auvergne, France, on the 6th of September 1757. His father[1] was killed at Minden in 1759, and his mother and his grandfather died in 1770, and thus at the age of thirteen he was left an orphan with a princely fortune. He married at sixteen Marie Adrienne Françoise de Noailles (d. 1807), daughter of the duc d'Ayen and granddaughter of the duc de Noailles, then one of the most influential families in the kingdom. La Fayette chose to follow the career of his father, and entered the Guards.

La Fayette was nineteen and a captain of dragoons when the English colonies in America proclaimed their independence. "At the first news of this quarrel," he afterwards wrote in his memoirs, "my heart was enrolled in it." The count de Broglie, whom he consulted, discouraged his zeal for the cause of liberty. Finding his purpose unchangeable, however, he presented the young enthusiast to Johann Kalb, who was also seeking service in America, and through Silas Deane, American agent in Paris, an arrangement was concluded, on the 7th of December 1776, by which La Fayette was to enter the American service as major-general. At this moment the news arrived of grave disasters to the American arms. La Fayette's friends again advised him to abandon his purpose. Even the American envoys, Franklin and Arthur Lee, who had superseded Deane, withheld further encouragement and the king himself forbade his leaving. At the instance of the British ambassador at Versailles orders were issued to seize the ship La Fayette was fitting out at Bordeaux, and La Fayette himself was arrested. But the ship was sent from Bordeaux to a neighbouring port in Spain, La Fayette escaped from custody in disguise, and before a second *lettre de cachet* could reach him he was afloat with eleven chosen companions. Though two British cruisers had been sent in pursuit of him, he landed safely near Georgetown, S.C., after a tedious voyage of nearly two months, and hastened to Philadelphia, then the seat of government of the colonies.

When this lad of nineteen, with the command of only what little English he had been able to pick up on his voyage, presented himself to Congress with Deane's authority to demand a commission of the highest rank after the commander-in-chief, his reception was a little chilly. Deane's contracts were so numerous, and for officers of such high rank, that it was impossible for Congress to ratify them without injustice to Americans who had become entitled by their service to promotion. La Fayette appreciated the situation as soon as it was explained to him, and immediately expressed his desire to serve in the American army upon two conditions—that he should receive no pay, and that he should act as a volunteer. These terms were so different from those made by other foreigners, they had been attended with such substantial sacrifices, and they promised such important indirect advantages, that Congress passed a resolution, on the 31st of July 1777, "that his services be accepted, and that, in consideration of his zeal, illustrious family and connexions, he have the rank and commission of major-general of the United States." Next day La Fayette met Washington, whose lifelong friend he became. Congress intended his appointment as purely honorary, and the question of giving him a command was left entirely to Washington's discretion. His first battle was Brandywine (*q.v.*) on the 11th of September 1777, where he showed courage and activity and received a wound. Shortly afterwards he secured what he most desired, the command of a division—the immediate result of a communication from Washington to Congress of November 1, 1777, in which he said:—

> "The marquis de La Fayette is extremely solicitous of having a command equal to his rank. I do not know in what light Congress will view the matter, but it appears to me, from a consideration of his illustrious and important connexions, the attachment which he has manifested for our cause, and the consequences which his return in disgust might produce, that it will be advisable to gratify his wishes, and the more so as several gentlemen from France who came over under some assurances have gone back disappointed in their expectations. His conduct with respect to them stands in a favourable point of view—having interested himself to remove their uneasiness and urged the impropriety of their making any unfavourable representations upon their arrival at home. Besides, he is sensible, discreet in his manners, has made great proficiency in our language, and from the disposition he discovered at the battle of Brandywine possesses a large share of bravery and military ardour."

Of La Fayette's military career in the United States there is not much to be said. Though the commander of a division, he never had many troops in his charge, and whatever military talents he possessed were not of the kind which appeared to conspicuous advantage on the theatre to which his wealth and family influence rather than his soldierly gifts had called him. In the first months of 1778 he commanded troops detailed for the projected expedition against Canada. His retreat from Barren Hill (May 28, 1778) was commended as masterly; and he fought at the battle of Monmouth (June 28,) and received from Congress a formal recognition of his services in the Rhode Island expedition (August 1778).

The treaties of commerce and defensive alliance, signed by the insurgents and France on the 6th of February 1778, were promptly followed by a declaration of war by England against the latter, and La Fayette asked leave to revisit France and to consult his king as to the further direction of his services. This leave was readily granted; it was not difficult for Washington to replace the major-general, but it was impossible to find another equally competent, influential and devoted champion of the American cause

near the court of Louis XVI. In fact, he went on a mission rather than a visit. He embarked on the 11th of January 1779, was received with enthusiasm, and was made a colonel in the French cavalry. On the 4th of March following Franklin wrote to the president of Congress: “The marquis de La Fayette ... is infinitely esteemed and beloved here, and I am persuaded will do everything in his power to merit a continuance of the same affection from America.” He won the confidence of Vergennes.

La Fayette was absent from America about six months, and his return was the occasion of a complimentary resolution of Congress. From April until October 1781 he was charged with the defence of Virginia, in which Washington gave him the credit of doing all that was possible with the forces at his disposal; and he showed his zeal by borrowing money on his own account to provide his soldiers with necessaries. The battle of Yorktown, in which La Fayette bore an honourable if not a distinguished part, was the last of the war, and terminated his military career in the United States. He immediately obtained leave to return to France, where it was supposed he might be useful in negotiations for a general peace. He was also occupied in the preparations for a combined French and Spanish expedition against some of the British West India Islands, of which he had been appointed chief of staff, and a formidable fleet assembled at Cadiz, but the armistice signed on the 20th of January 1783 between the belligerents put a stop to the expedition. He had been promoted (1781) to the rank of *maréchal de camp* (major-general) in the French army, and he received every token of regard from his sovereign and his countrymen. He visited the United States again in 1784, and remained some five months as the guest of the nation.

La Fayette did not appear again prominently in public life until 1787, though he did good service to the French Protestants, and became actively interested in plans to abolish slavery. In 1787 he took his seat in the Assembly of Notables. He demanded, and he alone signed the demand, that the king convoke the states-general, thus becoming a leader in the French Revolution. He showed Liberal tendencies both in that assembly and after its dispersal, and in 1788 was deprived, in consequence, of his active command. In 1789 La Fayette was elected to the states-general, and took a prominent part in its proceedings. He was chosen vice-president of the National Assembly, and on the 11th of July 1789 presented a declaration of rights, modelled on Jefferson’s Declaration of Independence in 1776. On the 15th of July, the second day of the new régime, La Fayette was chosen by acclamation colonel-general of the new National Guard of Paris. He also proposed the combination of the colours of Paris, red and blue, and the royal white, into the famous tricolour cockade of modern France (July 17). For the succeeding three years, until the end of the constitutional monarchy in 1792, his history is largely the history of France. His life was beset with very great responsibility and perils, for he was ever the minister of humanity and order among a frenzied people who had come to regard order and humanity as phases of treason. He rescued the queen from the hands of the populace on the 5th and 6th of October 1789, saved many humbler victims who had been condemned to death, and he risked his life in many unsuccessful attempts to rescue others. Before this, disgusted with enormities which he was powerless to prevent, he had resigned his commission; but so impossible was it to replace him that he was induced to resume it. In the Constituent Assembly he pleaded for the abolition of arbitrary imprisonment, for religious tolerance, for popular representation, for the establishment of trial by jury, for the gradual emancipation of slaves, for the freedom of the press, for the abolition of titles of nobility, and the suppression of privileged orders. In February 1790 he refused the supreme command of the National Guard of the kingdom. In May he founded the “Society of 1789” which afterwards became the Feuillants Club. He took a prominent part in the celebration of July 14, 1790, the first anniversary of the destruction of the Bastille. After suppressing an *émeute* in April 1791 he again resigned his commission, and was again compelled to retain it. He was the friend of liberty as well as of order, and when Louis XVI. fled to Varennes he issued orders to stop him. Shortly afterwards he was made lieutenant-general in the army. He commanded the troops in the suppression of another *émeute*, on the occasion of the proclamation of the constitution (September 18, 1791), after which, feeling that his task was done, he retired into private life. This did not prevent his friends from proposing him for the mayoralty of Paris in opposition to Pétion.

When, in December 1791, three armies were formed on the western frontier to attack Austria, La Fayette was placed in command of one of them. But events moved faster than La Fayette’s moderate and humane republicanism, and seeing that the lives of the king and queen were each day more and more in danger, he definitely opposed himself to the further advance of the Jacobin party, intending eventually to use his army for the restoration of a limited monarchy. On the 19th of August 1792 the Assembly declared him a traitor. He was compelled to take refuge in the neutral territory of Liége, whence as one of the prime movers in the Revolution he was taken and held as a prisoner of state for five years, first in Prussian and afterwards in Austrian prisons, in spite of the intercession of America and the pleadings of his wife. Napoleon, however, though he had a low opinion of his capacities, stipulated in the treaty of Campo Formio (1797) for La Fayette’s release. He was not allowed to return to France by the Directory. He returned in 1799; in 1802 voted against the life consulate of Napoleon; and in 1804 he voted against the imperial title. He lived in retirement during the First Empire, but returned to public affairs under the First Restoration and took some part in the political events of the Hundred Days. From 1818 to 1824 he was deputy for the Sarthe, speaking and voting always on the Liberal side, and even becoming a *carbonaro*. He then revisited America (July 1824-September 1825) where he was overwhelmed with popular applause and voted the sum of $200,000 and a township of land. From 1825 to his death he sat in the Chamber of Deputies for Meaux. During the revolution of 1830 he again took command of the National Guard and pursued the same line of conduct, with equal want of success, as in the first revolution. In 1834 he made his last speech—on behalf of Polish political refugees. He died at Paris on the 20th of May 1834. In 1876 in the city of New York a monument was erected to him, and in 1883 another was erected at Puy.

Few men have owed more of their success and usefulness to their family rank than La Fayette, and still fewer have abused it less. He never achieved distinction in the field, and his political career proved him to be incapable of ruling a great national movement; but he had strong convictions which always impelled him to study the interests of humanity, and a pertinacity in maintaining them, which, in all the strange

vicissitudes of his eventful life, secured him a very unusual measure of public respect. No citizen of a foreign country has ever had so many and such warm admirers in America, nor does any statesman in France appear to have ever possessed uninterruptedly for so many years so large a measure of popular influence and respect. He had what Jefferson called a "canine appetite" for popularity and fame, but in him the appetite only seemed to make him more anxious to merit the fame which he enjoyed. He was brave to rashness; and he never shrank from danger or responsibility if he saw the way open to spare life or suffering, to protect the defenceless, to sustain the law and preserve order.

His son, Georges Washington Motier de La Fayette (1779-1849), entered the army and was aide-de-camp to General Grouchy through the Austrian, Prussian and Polish (1805-07) campaigns. Napoleon's distrust of his father rendering promotion improbable, Georges de La Fayette retired into private life in 1807 until the Restoration, when he entered the Chamber of Representatives and voted consistently on the Liberal side. He was away from Paris during the revolution of July 1830, but he took an active part in the "campaign of the banquets," which led up to that of 1848. He died in December of the next year. His son, Oscar Thomas Gilbert Motier de La Fayette (1815-1881), was educated at the École Polytechnique, and served as an artillery officer in Algeria. He entered the Chamber of Representatives in 1846 and voted, like his father, with the extreme Left. After the revolution of 1848 he received a post in the provisional government, and as a member of the Constituent Assembly he became secretary of the war committee. After the dissolution of the Legislative Assembly in 1851, he retired from public life, but emerged on the establishment of the third republic, becoming a life senator in 1875. His brother Edmond Motier de La Fayette (1818-1890) shared his political opinions. He was one of the secretaries of the Constituent Assembly, and a member of the senate from 1876 to 1888.

See *Mémoires historiques et pièces authentiques sur M. de La Fayette pour servir à l'histoire des révolutions* (Paris, An II., 1793-1794); B. Sarrans, *La Fayette et la Révolution de 1830, histoire des choses et des hommes de Juillet* (Paris, 1834); *Mémoires, correspondances et manuscrits de La Fayette*, published by his family (6 vols., Paris, 1837-1838); Regnault Warin, *Mémoires pour servir à la vie du général La Fayette* (Paris, 1824); A. Bardoux, *La jeunesse de La Fayette* (Paris, 1892); *Les Dernières années de La Fayette* (Paris, 1893); E. Charavaray, *Le Général La Fayette* (Paris, 1895); A. Levasseur, *La Fayette en Amérique* 1824 (Paris, 1829); J. Cloquet, *Souvenirs de la vie privée du général La Fayette* (Paris, 1836); Max Büdinger, *La Fayette in Oesterreich* (Vienna, 1898); and M. M. Crawford, *The Wife of Lafayette* (1908); Bayard Tuckerman, *Life of Lafayette* (New York, 1889); Charlemagne Tower, *The Marquis de La Fayette in the American Revolution* (Philadelphia, 1895).

1 The family of La Fayette, to the cadet branch of which he belonged, received its name from an estate in Aix, Auvergne, which belonged in the 13th century to the Motier family.

LA FAYETTE, MARIE-MADELEINE PIOCHE DE LA VERGNE, Comtesse de

(1634-1692), French novelist, was baptized in Paris, on the 18th of March 1634. Her father, Marc Pioche de la Vergne, commandant of Havre, died when she was sixteen, and her mother seems to have been more occupied with her own than her daughter's interests. Mme de la Vergne married in 1651 the chevalier de Sévigné, and Marie thus became connected with Mme de Sévigné, who was destined to be a lifelong friend. She studied Greek, Latin and Italian, and inspired in one of her tutors, Gilles de Ménage, an enthusiastic admiration which he expressed in verse in three or four languages. Marie married in 1655 François Motier, comte de La Fayette. They lived on the count's estates in Auvergne, according to her own account (in a letter to Ménage) quite happily; but after the birth of her two sons her husband disappeared so effectually that it was long supposed that he died about 1660, though he really lived until 1683. Mme de La Fayette had returned to Paris, and about 1665 contracted an intimacy with the duc de la Rochefoucauld, then engaged on his *Maximes*. The constancy and affection that marked this liaison on both sides justified it in the eyes of society, and when in 1680 La Rochefoucauld died Mme de La Fayette received the sincerest sympathy. Her first novel, *La Princesse de Montpensier*, was published anonymously in 1662; *Zayde* appeared in 1670 under the name of J. R. de Segrais; and in 1678 her masterpiece, *La Princesse de Clèves*, also under the name of Segrais. The history of the modern novel of sentiment begins with the *Princesse de Clèves*. The interminable pages of Mlle de Scudéry with the *Précieuses* and their admirers masquerading as Persians or ancient Romans had already been discredited by the burlesques of Paul Scarron and Antoine Furetière. It remained for Mme de La Fayette to achieve the more difficult task of substituting something more satisfactory than the disconnected episodes of the *roman comique*. This she accomplished in a story offering in its shortness and simplicity a complete contrast to the extravagant and lengthy romances of the time. The interest of the story depends not on incident but on the characters of the personages. They act in a perfectly reasonable way and their motives are analysed with the finest discrimination. No doubt the semi-autobiographical character of the material partially explains Mme de La Fayette's refusal to acknowledge the book. Contemporary critics, even Mme de Sévigné amongst them, found fault with the avowal made by Mme de Clèves to her husband. In answer to these criticisms, which her anonymity prevented her from answering directly, Mme de La Fayette wrote her last novel, the *Comtesse de Tende*.

The character of her work and her history have combined to give an impression of melancholy and sweetness that only represents one side of her character, for a correspondence brought to light comparatively recently showed her as the acute diplomatic agent of Jeanne de Nemours, duchess of Savoy,

at the court of Louis XIV. She had from her early days also been intimate with Henrietta of England, duchess of Orleans, under whose immediate direction she wrote her *Histoire de Madame Henriette d'Angleterre*, which only appeared in 1720. She wrote memoirs of the reign of Louis XIV., which, with the exception of two chapters, for the years 1688 and 1689 (published at Amsterdam, 1731), were lost through her son's carelessness. Madame de La Fayette died on the 25th of May 1692.

See Sainte-Beuve, *Portraits de femmes*; the comte d'Haussonville, *Madame de La Fayette* (1891), in the series of *Grands écrivains français*; M. de Lescure's notice prefixed to an edition of the *Princesse de Clèves* (1881); and a critical edition of the historical memoirs by Eugène Asse (1890). See also L. Rea, *Marie Madeleine, comtesse de La Fayette* (1908).

LAFAYETTE, a city and the county-seat of Tippecanoe county, Indiana, U.S.A., situated at the former head of navigation on the Wabash river, about 64 m. N.W. of Indianapolis. Pop. (1900) 18,116, of whom 2266 were foreign-born; (1910 census) 20,081. It is served by the Chicago, Indianapolis & Louisville, the Cleveland, Cincinnati, Chicago & St Louis, the Lake Erie & Western, and the Wabash railways, and by the Terre Haute, Indianapolis & Eastern (electric), and the Fort Wayne & Wabash Valley (electric) railways. The river is not now navigable at this point. Lafayette is in the valley of the Wabash river, which is sunk below the normal level of the plain, the surrounding heights being the walls of the Wabash basin. The city has an excellent system of public schools, a good public library, two hospitals, the Wabash Valley Sanitarium (Seventh Day Adventist), St Anthony's Home for old people and two orphan asylums. It is the seat of Purdue University, a co-educational, technical and agricultural institution, opened in 1874 and named in honour of John Purdue (1802-1876), who gave it $150,000. This university is under state control, and received the proceeds of the Federal agricultural college grant of 1862 and of the second Morrill Act of 1890; in connexion with it there is an agricultural experiment station. It had in 1908-1909 180 instructors, 1900 students, and a library of 25,000 volumes and pamphlets. Just outside the city is the State Soldiers' Home, where provision is also made for the wives and widows of soldiers; in 1908 it contained 553 men and 700 women. The city lies in the heart of a rich agricultural region, and is an important market for grain, produce and horses. Among its manufactures are beer, foundry and machine shop products (the Chicago, Indianapolis & Louisville railway has shops here), straw board, telephone apparatus, paper, wagons, packed meats, canned goods, flour and carpets; the value of the factory product increased from $3,514,276 in 1900 to $4,631,415 in 1905, or 31.8%. The municipality owns its water works.

Lafayette is about 5 m. N.E. of the site of the ancient Wea (Miami) Indian village known as Ouiatanon, where the French established a post about 1720. The French garrison gave way to the English about 1760; the stockade fort was destroyed during the conspiracy of Pontiac, and was never rebuilt. The headquarters of Tecumseh and his brother, the "Prophet," were established 7 m. N. of Lafayette near the mouth of the Tippecanoe river, and the settlement there was known as the "Prophet's Town." Near this place, and near the site of the present village of Battle Ground (where the Indiana Methodists now have a summer encampment and a camp meeting in August), was fought on the 7th of November 1811 the battle of Tippecanoe, in which the Indians were decisively defeated by Governor William Henry Harrison, the whites losing 188 in killed and wounded and the Indians about an equal number. The battle ground is owned by the state; in 1907 the state legislature and the United States Congress each appropriated $12,500 for a monument, which took the form of a granite shaft 90 ft. high. The first American settlers on the site of Lafayette appeared about 1820, and the town was laid out in 1825, but for many years its growth was slow. The completion of the Wabash and Erie canal marked a new era in its development, and in 1854 Lafayette was incorporated.

LA FERTÉ, the name of a number of localities in France, differentiated by agnomens. La Ferté Imbault (department of Loir-et-Cher) was in the possession of Jacques d'Étampes (1590-1668), marshal of France and ambassador in England, who was known as the marquis of La Ferté Imbault. La Ferté Nabert (the modern La Ferté Saint Aubin, department of Loiret) was acquired in the 16th century by the house of Saint Nectaire (corrupted to Senneterre), and erected into a duchy in the peerage of France (*duché-pairie*) in 1665 for Henri de Saint Nectaire, marshal of France. It was called La Ferté Lowendal after it had been acquired by Marshal Lowendal in 1748.

LA FERTÉ-BERNARD, a town of western France, in the department of Sarthe, on the Huisne, 27 m. N.E. of Le Mans, on the railway from Paris to that town. Pop. (1906) 4358. La Ferté carries on cloth manufacture and flour-milling and has trade in horses and cattle. Its church of Nôtre Dame has a choir (16th century) with graceful apse-chapels of Renaissance architecture and remarkable windows of the same period; the remainder of the church is in the Flamboyant Gothic style. The town hall occupies the superstructure and flanking towers of a fortified gateway of the 15th century.

La Ferté-Bernard owes its origin and name to a stronghold (*fermeté*) built about the 11th century and afterwards held by the family of Bernard. In 1424 it did not succumb to the English troops till after a four months' siege. It belonged in the 16th century to the family of Guise and supported the League, but was captured by the royal forces in 1590.

LA FERTÉ-MILON, a town of northern France in the department of Aisne on the Ourcq, 47 m. W. by S. of Reims by rail. Pop. (1906) 1563. The town has imposing remains comprising one side flanked by four towers of an unfinished castle built about the beginning of the 15th century by Louis of Orleans, brother of Charles VI. The churches of St Nicholas and Notre-Dame, chiefly of the 16th century, both contain fine old stained glass. Jean Racine, the poet, was born in the town, and a statue by David d'Augers has been erected to him.

LAFFITTE, JACQUES (1767-1844), French banker and politician, was born at Bayonne on the 24th of October 1767, one of the ten children of a carpenter. He became clerk in the banking house of Perregaux in Paris, was made a partner in the business in 1800, and in 1804 succeeded Perregaux as head of the firm. The house of Perregaux, Laffitte et Cie. became one of the greatest in Europe, and Laffitte became regent (1809), then governor (1814) of the Bank of France and president of the Chamber of Commerce (1814). He raised large sums of money for the provisional government in 1814 and for Louis XVIII. during the Hundred Days, and it was with him that Napoleon deposited five million francs in gold before leaving France for the last time. Rather than permit the government to appropriate the money from the Bank he supplied two million from his own pocket for the arrears of the imperial troops after Waterloo. He was returned by the department of the Seine to the Chamber of Deputies in 1816, and took his seat on the Left. He spoke chiefly on financial questions; his known Liberal views did not prevent Louis XVIII. from insisting on his inclusion on the commission on the public finances. In 1818 he saved Paris from a financial crisis by buying a large amount of stock, but next year, in consequence of his heated defence of the liberty of the press and the electoral law of 1867, the governorship of the Bank was taken from him. One of the earliest and most determined of the partisans of a constitutional monarchy under the duke of Orleans, he was deputy for Bayonne in July 1830, when his house in Paris became the headquarters of the revolutionary party. When Charles X., after retracting the hated ordinances, sent the comte d'Argout[1] to Laffitte to negotiate a change of ministry, the banker replied, "It is too late. There is no longer a Charles X.," and it was he who secured the nomination of Louis Philippe as lieutenant-general of the kingdom. On the 3rd of August he became president of the Chamber of Deputies, and on the 9th he received in this capacity Louis Philippe's oath to the new constitution. The clamour of the Paris mob for the death of the imprisoned ministers of Charles X., which in October culminated in riots, induced the more moderate members of the government—including Guizot, the duc de Broglie and Casimir-Périer—to hand over the administration to a ministry which, possessing the confidence of the revolutionary Parisians, should be in a better position to save the ministers from their fury. On the 5th of November, accordingly, Laffitte became minister-president of a government pledged to progress (*mouvement*), holding at the same time the portfolio of finance. The government was torn between the necessity for preserving order and the no less pressing necessity (for the moment) of conciliating the Parisian populace; with the result that it succeeded in doing neither one nor the other. The impeached ministers were, indeed, saved by the courage of the Chamber of Peers and the attitude of the National Guard; but their safety was bought at the price of Laffitte's popularity. His policy of a French intervention in favour of the Italian revolutionists, by which he might have regained his popularity, was thwarted by the diplomatic policy of Louis Philippe. The resignation of Lafayette and Dupont de l'Eure still further undermined the government, which, incapable even of keeping order in the streets of Paris, ended by being discredited with all parties. At length Louis Philippe, anxious to free himself from the hampering control of the agents of his fortune, thought it safe to parade his want of confidence in the man who had made him king. Thereupon, in March 1831, Laffitte resigned, begging pardon of God and man for the part he had played in raising Louis Philippe to the throne. He left office politically and financially a ruined man. His affairs were wound up in 1836, and next year he created a credit bank, which prospered as long as he lived, but failed in 1848. He died in Paris on the 26th of May 1844.

See P. Thureau-Dangin, *La Monarchie de Juillet* (vol. i. 1884).

1 Apollinaire Antoine Maurice, comte d'Argout (1782-1858), afterwards reconciled to the July monarchy, and a member of the Laffitte Casimir-Périer and Thiers cabinets.

LAFFITTE, PIERRE (1823-1903), French Positivist, was born on the 21st of February 1823 at Béguey (Gironde). Residing at Paris as a teacher of mathematics, he became a disciple of Comte, who appointed him his literary executor. On the schism of the Positivist body which followed Comte's death, he was recognized as head of the section which accepted the full Comtian doctrine; the other section adhering to Littré, who rejected the religion of humanity as inconsistent with the materialism of Comte's earlier period. From 1853 Laffitte delivered Positivist lectures in the room formerly occupied by Comte in the rue Monsieur le Prince. He published *Les Grands Types de l'humanité* (1875) and *Cours de philosophie première* (1889). In 1893 he was appointed to the new chair founded at the Collège de France for the exposition of the general history of science, and it was largely due to his inspiration that a statue to Comte was erected in the Place de la Sorbonne in 1902. He died on the 4th of January 1903.

LA FLÈCHE, a town of western France, capital of an arrondissement in the department of Sarthe on the Loire, 31 m. S.S.W. of Le Mans by rail. Pop. (1906) town 7800; commune 10,663. The chief interest of the town lies in the Prytanée, a famous school for the sons of officers, originally a college founded for the Jesuits in 1607 by Henry IV. The buildings, including a fine chapel, were erected from 1620 to 1653 and are surrounded by a park. A bronze statue of Henry IV. stands in the marketplace. La Flèche is the seat of a sub-prefect and of a tribunal of first instance, and carries on tanning, flour-milling, and the manufacture of paper, starch, wooden shoes and gloves. It is an agricultural market.

The lords of La Flèche became counts of Maine about 1100, but the lordship became separate from the county and passed in the 16th century to the family of Bourbon and thus to Henry IV.

LAFONT, PIERRE CHÉRI (1797-1873), French actor, was born at Bordeaux on the 15th of May 1797. Abandoning his profession as assistant ship's doctor in the navy, he went to Paris to study singing and acting. He had some experience at a small theatre, and was preparing to appear at the Opéra Comique when the director of the Vaudeville offered him an engagement. Here he made his *début* in 1821 in *La Somnambule*, and his good looks and excellent voice soon brought him into public favour. After several years at the Nouveautés and the Vaudeville, on the burning of the latter in 1838 he went to England, and married, at Gretna Green, Jenny Colon, from whom he was soon divorced. On his return to Paris he joined the Variétés, where he acted for fifteen years in such plays as *Le Chevalier de Saint Georges*, *Le Lion empaillé*, *Une dernière conquête*, &c. Another engagement at the Vaudeville followed, and one at the Gaiété, and he ended his brilliant career at the Gymnase in the part of the noble father in such plays as Les *Vieux Garçons* and *Nos bons villageois*. He died in Paris on the 19th of April 1873.

LA FONTAINE, JEAN DE (1621-1695), French poet, was born at Château Thierry in Champagne, probably on the 8th of July 1621. His father was Charles de La Fontaine, "maître des eaux et forêts"—a kind of deputy-ranger—of the duchy of Château Thierry; his mother was Françoise Pidoux. On both sides his family was of the highest provincial middle class, but was not noble; his father was also fairly wealthy. Jean, the eldest child, was educated at the *collège* (grammar-school) of Reims, and at the end of his school days he entered the Oratory in May 1641, and the seminary of Saint-Magloire in October of the same year; but a very short sojourn proved to him that he had mistaken his vocation. He then apparently studied law, and is said to have been admitted as *avocat*, though there does not seem to be

actual proof of this. He was, however, settled in life, or at least might have been so, somewhat early. In 1647 his father resigned his rangership in his favour, and arranged a marriage for him with Marie Héricart, a girl of sixteen, who brought him twenty thousand livres, and expectations. She seems to have been both handsome and intelligent, but the two did not get on well together. There appears to be absolutely no ground for the vague scandal as to her conduct, which was, for the most part long afterwards, raised by gossips or personal enemies of La Fontaine. All that is positively said against her is that she was a negligent housewife and an inveterate novel reader; La Fontaine himself was constantly away from home, was certainly not strict in point of conjugal fidelity, and was so bad a man of business that his affairs became involved in hopeless difficulty, and a *séparation de biens* had to take place in 1658. This was a perfectly amicable transaction for the benefit of the family; by degrees, however, the pair, still without any actual quarrel, ceased to live together, and for the greater part of the last forty years of La Fontaine's life he lived in Paris while his wife dwelt at Château Thierry, which, however, he frequently visited. One son was born to them in 1653, and was educated and taken care of wholly by his mother.

Even in the earlier years of his marriage La Fontaine seems to have been much at Paris, but it was not till about 1656 that he became a regular visitor to the capital. The duties of his office, which were only occasional, were compatible with this non-residence. It was not till he was past thirty that his literary career began. The reading of Malherbe, it is said, first awoke poetical fancies in him, but for some time he attempted nothing but trifles in the fashion of the time—epigrams, ballades, rondeaux, &c. His first serious work was a translation or adaptation of the *Eunuchus of Terence* (1654). At this time the Maecenas of French letters was the Superintendant Fouquet, to whom La Fontaine was introduced by Jacques Jannart, a connexion of his wife's. Few people who paid their court to Fouquet went away empty-handed, and La Fontaine soon received a pension of 1000 livres (1659), on the easy terms of a copy of verses for each quarter's receipt. He began too a medley of prose and poetry, entitled *Le Songe de Vaux*, on Fouquet's famous country house. It was about this time that his wife's property had to be separately secured to her, and he seems by degrees to have had to sell everything of his own; but, as he never lacked powerful and generous patrons, this was of small importance to him. In the same year he wrote a ballad, *Les Rieurs du Beau-Richard*, and this was followed by many small pieces of occasional poetry addressed to various personages from the king downwards. Fouquet soon incurred the royal displeasure, but La Fontaine, like most of his literary protégés, was not unfaithful to him, the well-known elegy *Pleurez, nymphes de Vaux*, being by no means the only proof of his devotion. Indeed it is thought not improbable that a journey to Limoges in 1663 in company with Jannart, and of which we have an account written to his wife, was not wholly spontaneous, as it certainly was not on Jannart's part. Just at this time his affairs did not look promising. His father and himself had assumed the title of esquire, to which they were not strictly entitled, and, some old edicts on the subject having been put in force, an informer procured a sentence against the poet fining him 2000 livres. He found, however, a new protector in the duke and still more in the duchess of Bouillon, his feudal superiors at Château Thierry, and nothing more is heard of the fine. Some of La Fontaine's liveliest verses are addressed to the duchess, Anne Mancini, the youngest of Mazarin's nieces, and it is even probable that the taste of the duke and duchess for Ariosto had something to do with the writing of his first work of real importance, the first book of the *Contes*, which appeared in 1664. He was then forty-three years old, and his previous printed productions had been comparatively trivial, though much of his work was handed about in manuscript long before it was regularly published. It was about this time that the quartette of the Rue du Vieux Colombier, so famous in French literary history, was formed. It consisted of La Fontaine, Racine, Boileau and Molière, the last of whom was almost of the same age as La Fontaine, the other two considerably younger. Chapelle was also a kind of outsider in the coterie. There are many anecdotes, some pretty obviously apocryphal, about these meetings. The most characteristic is perhaps that which asserts that a copy of Chapelain's unlucky *Pucelle* always lay on the table, a certain number of lines of which was the appointed punishment for offences against the company. The coterie furnished under feigned names the personages of La Fontaine's version of the Cupid and Psyche story, which, however, with *Adonis*, was not printed till 1669. Meanwhile the poet continued to find friends. In 1664 he was regularly commissioned and sworn in as gentleman to the duchess dowager of Orleans, and was installed in the Luxembourg. He still retained his rangership, and in 1666 we have something like a reprimand from Colbert suggesting that he should look into some malpractices at Château Thierry. In the same year appeared the second book of the *Contes*, and in 1668 the first six books of the *Fables*, with more of both kinds in 1671. In this latter year a curious instance of the docility with which the poet lent himself to any influence was afforded by his officiating, at the instance of the Port-Royalists, as editor of a volume of sacred poetry dedicated to the prince de Conti. A year afterwards his situation, which had for some time been decidedly flourishing, showed signs of changing very much for the worse. The duchess of Orleans died, and he apparently had to give up his rangership, probably selling it to pay debts. But there was always a providence for La Fontaine. Madame de la Sablière, a woman of great beauty, of considerable intellectual power and of high character, invited him to make his home in her house, where he lived for some twenty years. He seems to have had no trouble whatever about his affairs thenceforward; and could devote himself to his two different lines of poetry, as well as to that of theatrical composition.

In 1682 he was, at more than sixty years of age, recognized as one of the first men of letters of France. Madame de Sévigné, one of the soundest literary critics of the time, and by no means given to praise mere novelties, had spoken of his second collection of *Fables* published in the winter of 1678 as divine; and it is pretty certain that this was the general opinion. It was not unreasonable, therefore, that he should present himself to the Academy, and, though the subjects of his *Contes* were scarcely calculated to propitiate that decorous assembly, while his attachment to Fouquet and to more than one representative of the old Frondeur party made him suspect to Colbert and the king, most of the members were his personal friends. He was first proposed in 1682, but was rejected for Dangeau. The next year Colbert died and La Fontaine was again nominated. Boileau was also a candidate, but the first ballot gave the fabulist sixteen votes against seven only for the critic. The king, whose assent was necessary, not merely for election but for a

second ballot in case of the failure of an absolute majority, was ill-pleased, and the election was left pending. Another vacancy occurred, however, some months later, and to this Boileau was elected. The king hastened to approve the choice effusively, adding, “Vous pouvez incessamment recevoir La Fontaine, il a promis d’être sage.” His admission was indirectly the cause of the only serious literary quarrel of his life. A dispute took place between the Academy and one of its members, Antoine Furetière, on the subject of the latter’s French dictionary, which was decided to be a breach of the Academy’s corporate privileges. Furetière, a man of no small ability, bitterly assailed those whom he considered to be his enemies, and among them La Fontaine, whose unlucky *Contes* made him peculiarly vulnerable, his second collection of these tales having been the subject of a police condemnation. The death of the author of the *Roman Bourgeois*, however, put an end to this quarrel. Shortly afterwards La Fontaine had a share in a still more famous affair, the celebrated Ancient-and-Modern squabble in which Boileau and Perrault were the chiefs, and in which La Fontaine (though he had been specially singled out by Perrault for favourable comparison with Aesop and Phaedrus) took the Ancient side. About the same time (1685-1687) he made the acquaintance of the last of his many hosts and protectors, Monsieur and Madame d’Hervart, and fell in love with a certain Madame Ulrich, a lady of some position but of doubtful character. This acquaintance was accompanied by a great familiarity with Vendôme, Chaulieu and the rest of the libertine coterie of the Temple; but, though Madame de la Sablière had long given herself up almost entirely to good works and religious exercises, La Fontaine continued an inmate of her house until her death in 1693. What followed is told in one of the best known of the many stories bearing on his childlike nature. Hervart on hearing of the death, had set out at once to find La Fontaine. He met him in the street in great sorrow, and begged him to make his home at his house. “J’y allais” was La Fontaine’s answer. He had already undergone the process of conversion during a severe illness the year before. An energetic young priest, M. Poucet, had brought him, not indeed to understand, but to acknowledge the impropriety of the *Contes*, and it is said that the destruction of a new play of some merit was demanded and submitted to as a proof of repentance. A pleasant story is told of the young duke of Burgundy, Fénelon’s pupil, who was then only eleven years old, sending 50 louis to La Fontaine as a present of his own motion. But, though La Fontaine recovered for the time, he was broken by age and infirmity, and his new hosts had to nurse rather than to entertain him, which they did very carefully and kindly. He did a little more work, completing his *Fables* among other things; but he did not survive Madame de la Sablière much more than two years, dying on the 13th of April 1695, at the age of seventy-three. He was buried in the cemetery of the Holy Innocents. His wife survived him nearly fifteen years.

The curious personal character of La Fontaine, like that of some other men of letters, has been enshrined in a kind of legend by literary tradition. At an early age his absence of mind and indifference to business gave a subject to Tallemant des Réaux. His later contemporaries helped to swell the tale, and the 18th century finally accepted it, including the anecdotes of his meeting his son, being told who he was, and remarking, “Ah, yes, I thought I had seen him somewhere!” of his insisting on fighting a duel with a supposed admirer of his wife, and then imploring him to visit at his house just as before; of his going into company with his stockings wrong side out, &c., with, for a contrast, those of his awkwardness and silence, if not positive rudeness, in company. It ought to be remembered, as a comment on the unfavourable description by La Bruyère, that La Fontaine was a special friend and ally of Benserade, La Bruyère’s chief literary enemy. But after all deductions much will remain, especially when it is remembered that one of the chief authorities for these anecdotes is Louis Racine, a man who possessed intelligence and moral worth, and who received them from his father, La Fontaine’s attached friend for more than thirty years. Perhaps the best worth recording of all these stories is one of the Vieux Colombier quartette, which tells how Molière, while Racine and Boileau were exercising their wits upon “le bonhomme” or “le bon” (by both which titles La Fontaine was familiarly known), remarked to a bystander, “Nos beaux esprits ont beau faire, ils n’effaceront pas le bonhomme.” They have not.

The works of La Fontaine, the total bulk of which is considerable, fall no less naturally than traditionally into three divisions, the *Fables*, the *Contes* and the miscellaneous works. Of these the first may be said to be known universally, the second to be known to all lovers of French literature, the third to be with a few exceptions practically forgotten. This distribution of the judgment of posterity is as usual just in the main, but not wholly. There are excellent things in the *Œuvres Diverses*, but their excellence is only occasional, and it is not at the best equal to that of the *Fables* or the *Contes*. It was thought by contemporary judges who were both competent and friendly that La Fontaine attempted too many styles, and there is something in the criticism. His dramatic efforts are especially weak. The best pieces usually published under his name—*Ragotin*, *Le Florentin*, *La Coupe enchantée*, were originally fathered not by him but by Champmeslé, the husband of the famous actress who captivated Racine and Charles de Sévigné. His avowed work was chiefly in the form of opera, a form of no great value at its best. *Psyche* has all the advantages of its charming story and of La Fontaine’s style, but it is perhaps principally interesting nowadays because of the framework of personal conversation already alluded to. The mingled prose and verse of the *Songe de Vaux* is not uninteresting, but its best things, such as the description of night—

“Laissant tomber les fleurs et ne les semant pas,”

which has enchanted French critics, are little more than conceits, though as in this case sometimes very beautiful conceits. The elegies, the epistles, the epigrams, the ballades, contain many things which would be very creditable to a minor poet or a writer of vers de société, but even if they be taken according to the wise rule of modern criticism, each in its kind, and judged simply according to their rank in that kind, they fall far below the merits of the two great collections of verse narratives which have assured La Fontaine’s immortality.

Between the actual literary merits of the two there is not much to choose, but the change of manners and the altered standard of literary decency have thrown the *Contes* into the shade. These tales are identical in general character with those which amused Europe from the days of the early *fabliau* writers. Light love, the misfortunes of husbands, the cunning of wives, the breach of their vows by ecclesiastics, constitute the staple of their subject. In some respects La Fontaine is the best of such tale-tellers, while he

is certainly the latest who deserves such excuse as may be claimed by a writer who does not choose indecent subjects from a deliberate knowledge that they are considered indecent, and with a deliberate desire to pander to a vicious taste. No one who followed him in the style can claim this excuse; he can, and the way in which contemporaries of stainless virtue such as Madame de Sévigné speak of his work shows that, though the new public opinion was growing up, it was not finally accepted. In the *Contes* La Fontaine for the most part attempts little originality of theme. He takes his stories (varying them, it is true, in detail not a little) from Boccaccio, from Marguerite, from the *Cent Nouvelles Nouvelles*, &c. He applies to them his marvellous power of easy sparkling narration, and his hardly less marvellous faculty of saying more or less outrageous things in the most polite and gentlemanly manner. These *Contes* have indeed certain drawbacks. They are not penetrated by the half pagan ardour for physical beauty and the delights of sense which animates and excuses the early Italian Renaissance. They have not the subtle mixture of passion and sensuality, of poetry and appetite, which distinguishes the work of Marguerite and of the Pléiade. They are emphatically *contes pour rire*, a genuine expression of the *esprit gaulois* of the fabliau writers and of Rabelais, destitute of the grossness of envelope which had formerly covered that spirit. A comparison of "La Fiancée du roi de Garbe" with its original in Boccaccio (especially if the reader takes M. Émile Montégut's admirable essay as a commentary) will illustrate better than anything else what they have and what they have not. Some writers have pleaded hard for the admission of actual passion of the poetical sort in such pieces as "La Courtisane amoureuse," but as a whole it must be admitted to be absent.

The *Fables*, with hardly less animation and narrative art than the *Contes*, are free from disadvantages (according to modern notions) of subject, and exhibit the versatility and fecundity of the author's talent perhaps even more fully. La Fontaine had many predecessors in the fable and especially in the beast fable. In his first issue, comprising what are now called the first six books, he adhered to the path of these predecessors with some closeness; but in the later collections he allowed himself far more liberty, and it is in these parts that his genius is most fully manifested. The boldness of the politics is as much to be considered as the ingenuity of the moralizing, as the intimate knowledge of human nature displayed in the substance of the narratives, or as the artistic mastery shown in their form. It has sometimes been objected that the view of human character which La Fontaine expresses is unduly dark, and resembles too much that of La Rochefoucauld, for whom the poet certainly had a profound admiration. The discussion of this point would lead us too far here. It may only be said that satire (and La Fontaine is eminently a satirist) necessarily concerns itself with the darker rather than with the lighter shades. Indeed the objection has become pretty nearly obsolete with the obsolescence of what may be called the sentimental-ethicalschool of criticism. Its last overt expression was made by Lamartine, excellently answered by Sainte-Beuve. Exception has also been taken to the *Fables* on more purely literary, but hardly less purely arbitrary grounds by Lessing. Perhaps the best criticism ever passed upon La Fontaine's *Fables* is that of Silvestre de Sacy, to the effect that they supply three several delights to three several ages: the child rejoices in the freshness and vividness of the story, the eager student of literature in the consummate art with which it is told, the experienced man of the world in the subtle reflections on character and life which it conveys. Nor has any one, with the exception of a few paradoxers like Rousseau and a few sentimentalists like Lamartine, denied that the moral tone of the whole is as fresh and healthy as its literary interest is vivid. The book has therefore naturally become the standard reading book of French both at home and abroad, a position which it shares in verse with the *Télémaque* of Fénelon in prose. It is no small testimony to its merit that not even this use or misuse has interfered with its popularity.

The general literary character of La Fontaine is, with allowance made for the difference of subject, visible equally in the *Fables* and in the *Contes*. Perhaps one of the hardest sayings in French literature for an English student is the dictum of Joubert to the effect that "*Il y a dans La Fontaine une plénitude de poésie qu'on ne trouve nulle part dans les autres auteurs français.*" The difficulty arises from the ambiguity of the terms. For inventiveness of fancy and for diligent observation of the rules of art La Fontaine deserves, if not the first, almost the first place among French poets. In his hands the oldest story becomes novel, the most hackneyed moral piquant, the most commonplace details fresh and appropriate. As to the second point there has not been such unanimous agreement. It used to be considered that La Fontaine's ceaseless diversity of metre, his archaisms, his licences in rhyme and orthography, were merely ingenious devices for the sake of easy writing, intended to evade the trammels of the stately couplet and *rimes difficiles* enjoined by Boileau. Lamartine in the attack already mentioned affects contempt of the "vers boiteux, disloqués, inégaux, sans symmétrie ni dans l'oreille ni sur la page." This opinion may be said to have been finally exploded by the most accurate metrical critic and one of the most skilful metrical practitioners that France has ever had, Théodore de Banville; and it is only surprising that it should ever have been entertained by any professional maker of verse. La Fontaine's irregularities are strictly regulated, his cadences carefully arranged, and the whole effect may be said to be (though, of course, in a light and tripping measure instead of a stately one) similar to that of the stanzas of the English pindaric ode in the hands of Dryden or Collins. There is therefore nothing against La Fontaine on the score of invention and nothing on the score of art. But something more, at least according to English standards, is wanted to make up a "plenitude of poesy," and this something more La Fontaine seldom or never exhibits. In words used by Joubert himself elsewhere, he never "transports." The faculty of transporting is possessed and used in very different manners by different poets. In some it takes the form of passion, in some of half mystical enthusiasm for nature, in some of commanding eloquence, in some of moral fervour. La Fontaine has none of these things: he is always amusing, always sensible, always clever, sometimes even affecting, but at the same time always more or less prosaic, were it not for his admirable versification. He is not a great poet, perhaps not even a great humorist; but he is the most admirable teller of light tales in verse that has ever existed in any time or country; and he has established in his verse-tale a model which is never likely to be surpassed.

La Fontaine did not during his life issue any complete edition of his works, nor even of the two greatest and most important divisions of them. The most remarkable of his separate publications have already been noticed. Others were the *Poëme de la captivité de St Malc* (1673), one of the pieces inspired by the Port-Royalists, the *Poëme du Quinquina* (1692), a piece of task work also, though of a very different kind, and a number of pieces published either in small pamphlets or with the works of other men. Among the latter may be singled out the pieces published by the poet with the works of his friend Maucroix (1685). The year

after his death some posthumous works appeared, and some years after his son's death the scattered poems, letters, &c., with the addition of some unpublished work bought from the family in manuscript, were carefully edited and published as *Œuvres diverses* (1729). During the 18th century two of the most magnificent illustrated editions ever published of any poet reproduced the two chief works of La Fontaine. The *Fables* were illustrated by Oudry (1755-1759), the *Contes* by Eisen (1762). This latter under the title of "Edition des Fermiers-Généraux" fetches a high price. During the first thirty years of the 19th century Walckenaer, a great student of French 17th-century classics, published for the house of Didot three successive editions of La Fontaine, the last (1826-1827) being perhaps entitled to the rank of the standard edition, as his *Histoire de la vie et des ouvrages de La Fontaine* is the standard biography and bibliography. The later editions of M. Marty-Laveaux in the *Bibliothèque elzévirienne*, A. Pauly in the *Collection des classiques françaises* of M. Lemerre and L. Moland in that of M. Garnier supply in different forms all that can be wished. The second is the handsomest, the third, which is complete, perhaps the most generally useful. Editions, selections, translations, &c., of the *Fables*, especially for school use, are innumerable; but an illustrated edition published by the *Librairie des Bibliophiles* (1874) deserves to be mentioned as not unworthy of its 18th-century predecessors. The works of M. Grouchy, *Documents inédits sur La Fontaine* (1893); of G. Lafenestre, *Jean de La Fontaine* (1895); and of Émile Faguet, *Jean de La Fontaine* (1900), should be mentioned.

(G. Sa.)

LAFONTAINE, SIR LOUIS HIPPOLYTE, Bart. (1807-1864), Canadian statesman and judge, third son of Antoine Ménard LaFontaine (1772-1813) and Marie-J-Fontaine Bienvenue, was born at Boucherville in the province of Quebec on the 4th of October 1807. LaFontaine was educated at the Collège de Montréal under the direction of the Sulpicians, and was called to the bar of the province of Lower Canada on the 18th of August 1829. He married firstly Adèle, daughter of A. Berthelot of Quebec; and, secondly, Jane, daughter of Charles Morrison, of Berthier, by whom he had two sons. In 1830 he was elected a member of the House of Assembly for the county of Terrebonne, and became an ardent supporter of Louis Joseph Papineau in opposing the administration of the governor-in-chief, which led to the rebellion of 1837. LaFontaine, however, did not approve the violent methods of his leader, and after the hostilities at Saint Denis he presented a petition to Lord Gosford requesting him to summon the assembly and to adopt measures to stem the revolutionary course of events in Lower Canada. The rebellion broke out afresh in the autumn of 1838; the constitution of 1791 was suspended; LaFontaine was imprisoned for a brief period; and Papineau, who favoured annexation by the United States, was in exile. At this crisis in Lower Canada the French Canadians turned to LaFontaine as their leader, and under his direction maintained their opposition to the special council, composed of nominees of the crown. In 1839 Lord Sydenham, the governor-general, offered the solicitor generalship to LaFontaine, which he refused; and after the Union of 1841 LaFontaine was defeated in the county of Terrebonne through the governor's influence. During the next year he obtained a seat in the assembly of the province of Canada, and on the death of Sydenham he was called by Sir Charles Bagot to form an administration with Robert Baldwin. The ministry resigned in November 1843, as a protest against the actions of Lord Metcalfe, who had succeeded Bagot. In 1848 LaFontaine formed a new administration with Baldwin, and remained in office until 1851, when he retired from public life. It was during the ministry of LaFontaine-Baldwin that the Amnesty Bill was passed, which occasioned grave riots in Montreal, personal violence to Lord Elgin and the destruction of the parliament buildings. After the death of Sir James Stuart in 1853 LaFontaine was appointed chief justice of Lower Canada and president of the seigneurial court, which settled the vexed question of land tenure in Canada; and in 1854 he was created a baronet. He died at Montreal on the 26th of February 1864.

LaFontaine was well versed in constitutional history and French law; he reasoned closely and presented his conclusions with directness. He was upright in his conduct, sincerely attached to the traditions of his race, and laboured conscientiously to establish responsible government in Canada. His principal works are: *L'Analyse de l'ordonnance du conseil spécial sur les bureaux d'hypothèques* (Montreal, 1842); *Observations sur les questions seigneuriales* (Montreal, 1854); see *LaFontaine*, by A. DeCelles (Toronto, 1906).

(A. G. D.)

LAFOSSE, CHARLES DE (1640-1716), French painter, was born in Paris. He was one of the most noted and least servile pupils of Le Brun, under whose direction he shared in the chief of the great decorative works undertaken in the reign of Louis XIV. Leaving France in 1662, he spent two years in Rome and three in Venice, and the influence of his prolonged studies of Veronese is evident in his "Finding of Moses" (Louvre), and in his "Rape of Proserpine" (Louvre), which he presented to the Royal Academy as his diploma picture in 1673. He was at once named assistant professor, and in 1674 the full responsibilities of the office devolved on him, but his engagements did not prevent his accepting in 1689 the invitation of Lord Montagu to decorate Montagu House. He visited London twice, remaining on the second occasion—together with Rousseau and Monnoyer—more than two years. William III. vainly strove

to detain him in England by the proposal that he should decorate Hampton Court, for Le Brun was dead, and Mansart pressed Lafosse to return to Paris to take in hand the cupola of the Invalides. The decorations of Montagu House are destroyed, those of Versailles are restored, and the dome of the Invalides (engraved, Picart and Cochin) is now the only work existing which gives a full measure of his talent. During his latter years Lafosse executed many other important decorations in public buildings and private houses, notably in that of Crozat, under whose roof he died on the 13th of December 1716.

LAGARDE, PAUL ANTON DE (1827-1891), German biblical scholar and orientalist, was born at Berlin on the 2nd of November 1827. His real name was Bötticher, Lagarde being his mother's name. At Berlin (1844-1846) and Halle (1846-1847) he studied theology, philosophy and oriental languages. In 1852 his studies took him to London and Paris. In 1854 he became a teacher at a Berlin public school, but this did not interrupt his biblical studies. He edited the *Didascalia apostolorum syriace* (1854), and other Syriac texts collected in the British Museum and in Paris. In 1866 he received three years' leave of absence to collect fresh materials, and in 1869 succeeded Heinrich Ewald as professor of oriental languages at Göttingen. Like Ewald, Lagarde was an active worker in a variety of subjects and languages; but his chief aim, the elucidation of the Bible, was almost always kept in view. He edited the Aramaic translation (known as the Targum) of the Prophets according to the Codex Reuchlinianus preserved at Carlsruhe, *Prophetae chaldaice* (1872), the *Hagiographa chaldaice* (1874), an Arabic translation of the Gospels, *Die vier Evangelien, arabisch aus der Wiener Handschrift herausgegeben* (1864), a Syriac translation of the Old Testament Apocrypha, *Libri V. T. apocryphi syriace* (1861), a Coptic translation of the Pentateuch, *Der Pentateuch koptisch* (1867), and a part of the Lucianic text of the Septuagint, which he was able to reconstruct from manuscripts for nearly half the Old Testament. He devoted himself ardently to oriental scholarship, and published *Zur Urgeschichte der Armenier* (1854) and *Armenische Studien* (1877). He was also a student of Persian, publishing *Isaias persice* (1883) and *Persische Studien* (1884). He followed up his Coptic studies with *Aegyptiaca* (1883), and published many minor contributions to the study of oriental languages in *Gesammelte Abhandlungen* (1866), *Symmicta* (i. 1877, ii. 1880), *Semitica* (i. 1878, ii. 1879), *Orientalia* (1879-1880) and *Mittheilungen* (1884). Mention should also be made of the valuable *Onomastica sacra* (1870; 2nd ed., 1887). Lagarde also took some part in politics. He belonged to the Prussian Conservative party, and was a violent anti-Semite. The bitterness which he felt appeared in his writings. He died at Göttingen on the 22nd of December 1891.

See the article in Herzog-Hauck, *Realencyklopädie*; and cf. Anna de Lagarde, *Paul de Lagarde* (1894).

LAGASH, or Sirpurla, one of the oldest centres of Sumerian civilization in Babylonia. It is represented by a rather low, long line of ruin mounds, along the dry bed of an ancient canal, some 3 m. E. of the Shatt-el-Haī and a little less than 10 m. N. of the modern Turkish town of Shatra. These ruins were discovered in 1877 by Ernest de Sarzec, at that time French consul at Basra, who was allowed, by the Montefich chief, Nasir Pasha, the first Wali-Pasha, or governor-general, of Basra, to excavate at his pleasure in the territories subject to that official. At the outset on his own account, and later as a representative of the French government, under a Turkish firman, de Sarzec continued excavations at this site, with various intermissions, until his death in 1901, after which the work was continued under the supervision of the Commandant Cros. The principal excavations were made in two larger mounds, one of which proved to be the site of the temple, E-Ninnu, the shrine of the patron god of Lagash, Nin-girsu or Ninib. This temple had been razed and a fortress built upon its ruins, in the Greek or Seleucid period, some of the bricks found bearing the inscription in Aramaic and Greek of a certain Hadad-nadin-akhe, king of a small Babylonian kingdom. It was beneath this fortress that the numerous statues of Gudea were found, which constitute the gem of the Babylonian collections at the Louvre. These had been decapitated and otherwise mutilated, and thrown into the foundations of the new fortress. From this stratum came also various fragments of bas reliefs of high artistic excellence. The excavations in the other larger mound resulted in the discovery of the remains of buildings containing objects of all sorts in bronze and stone, dating from the earliest Sumerian period onward, and enabling us to trace the art history of Babylonia to a date some hundreds of years before the time of Gudea. Apparently this mound had been occupied largely by store houses, in which were stored not only grain, figs, &c., but also vessels, weapons, sculptures and every possible object connected with the use and administration of palace and temple. In a small outlying mound de Sarzec discovered the archives of the temple, about 30,000 inscribed clay tablets, containing the business records, and revealing with extraordinary minuteness the administration of an ancient Babylonian temple, the character of its property, the method of farming its lands, herding its flocks, and its commercial and industrial dealings and enterprises; for an ancient Babylonian temple was a great industrial, commercial, agricultural and stock-raising establishment. Unfortunately, before these archives could be removed, the galleries containing them were rifled by the Arabs, and large numbers of the tablets were sold to antiquity dealers, by whom they have been scattered all over Europe and America. From the

inscriptions found at Tello, it appears that Lagash was a city of great importance in the Sumerian period, some time probably in the 4th millennium B.C. It was at that time ruled by independent kings, Ur-Nina and his successors, who were engaged in contests with the Elamites on the east and the kings of Kengi and Kish on the north. With the Semitic conquest it lost its independence, its rulers becoming *patesis*, dependent rulers, under Sargon and his successors; but it still remained Sumerian and continued to be a city of much importance, and, above all, a centre of artistic development. Indeed, it was in this period and under the immediately succeeding supremacy of the kings of Ur, Ur-Gur and Dungi, that it reached its highest artistic development. At this period, also, under its *patesis*, Ur-bau and Gudea, Lagash had extensive commercial communications with distant realms. According to his own records, Gudea brought cedars from the Amanus and Lebanon mountains in Syria, diorite or dolorite from eastern Arabia, copper and gold from central and southern Arabia and from Sinai, while his armies, presumably under his overlord, Ur-Gur, were engaged in battles in Elam on the east. His was especially the era of artistic development. Some of the earlier works of Ur-Nina, En-anna-tum, Entemena and others, before the Semitic conquest, are also extremely interesting, especially the famous stele of the vultures and a great silver vase ornamented with what may be called the coat of arms of Lagash, a lion-headed eagle with wings outspread, grasping a lion in each talon. After the time of Gudea, Lagash seems to have lost its importance; at least we know nothing more about it until the construction of the Seleucid fortress mentioned, when it seems to have become part of the Greek kingdom of Characene. The objects found at Tello are the most valuable art treasures up to this time discovered in Babylonia.

See E. de Sarzec, *Découvertes en Chaldée* (1887 foll.).

(J. P. Pe.)

LAGHMAN, a district of Afghanistan, in the province of Jalalabad, between Jalalabad and Kabul, on the northern side of the Peshawar road, one of the richest and most fertile tracts in Afghanistan. It is the valley of the Kabul river between the Tagao and the Kunar and merges on the north into Kafiristan. The inhabitants, Ghilzais and Tajiks, are supposed to be the cleverest business people in the country. Sugar, cotton and rice are exported to Kabul. The Laghman route between Kabul and India crossing the Kunar river into the Mohmand country is the route followed by Alexander the Great and Baber; but it has now been supplanted by the Khyber.

LAGOON (Fr. *lagune*, Lat. *lacuna*, a pool), a term applied to (1) a sheet of salt or brackish water near the sea, (2) a sheet of fresh water of no great depth or extent, (3) the expanse of smooth water enclosed by an atoll. Sea lagoons are formed only where the shores are low and protected from wave action. Under these conditions a bar may be raised above sea-level or a spit may grow until its end touches the land. The enclosed shallow water is then isolated in a wide stretch, the seaward banks broaden, and the lagoon becomes a permanent area of still shallow water with peculiar faunal features. In the old lake plains of Australia there are occasional wide and shallow depressions where water collects permanently. Large numbers of aquatic birds, black swans, wild duck, teal, migrant spoon-bills or pelicans, resort to these fresh-water lagoons.

LAGOS, the western province of Southern Nigeria, a British colony and protectorate in West Africa. The province consists of three divisions: (1) the coast region, including Lagos Island, being the former colony of Lagos; (2) small native states adjacent to the colony; and (3) the Yoruba country, farther inland. The total area is some 27,000 sq. m., or about the size of Scotland. The province is bounded S. by the Gulf of Guinea, (from 2° 46′ 55″ to 4° 30′ E.); W. by the French colony of Dahomey; N. and E. by other provinces of Nigeria.

Physical Features.—The coast is low, marshy and malarious, and all along the shore the great Atlantic billows cause a dangerous surf. Behind the coast-line stretches a series of lagoons, in which are small islands, that of Lagos having an area of 3¾ sq. m. Beyond the lagoons and mangrove swamps is a broad zone of dense primeval forest—"the bush"—which completely separates the arable lands from the coast lagoons. The water-parting of the streams flowing north to the Niger, and south to the Gulf of Guinea, is the main physical feature. The general level of Yorubaland is under 2000 ft. But towards the east, about the upper course of the river Oshun, the elevation is higher. Southward from the divide the land, which is intersected by the nearly parallel courses of the rivers Ogun, Omi, Oshun, Oni and Oluwa, falls in

continuous undulations to the coast, the open cultivated ground gradually giving place to forest tracts, where the most characteristic tree is the oil-palm. Flowering trees, certain kinds of rubber vines, and shrubs are plentiful. In the northern regions the shea-butter tree is found. The fauna resembles that of the other regions of the Guinea coast, but large game is becoming scarce. Leopards, antelopes and monkeys are common, and alligators infest the rivers.

The lagoons, lying between the outer surf-beaten beach and the inner shore line, form a navigable highway of still waters, many miles in extent. They are almost entirely free from rock, though they are often shallow, with numerous mud banks. The most extensive are Lekki in the east, and Ikoradu (Lagos) in the west. At its N.W. extremity the Lagos lagoon receives the Ogun, the largest river in Yorubaland, whose current is strong enough to keep the seaward channel open throughout the year. Hence the importance of the port of Lagos, which lies in smooth water at the northern end of this channel. The outer entrance is obstructed by a dangerous sand bar.

Climate and Health.—The climate is unhealthy, especially for Europeans. The rainfall has not been ascertained in the interior. In the northern districts it is probably considerably less than at Lagos, where it is about 70 in. a year. The variation is, however, very great. In 1901 the rainfall was 112 in., in 1902 but 47, these figures being respectively the highest and lowest recorded in a period of seventeen years. The mean temperature at Lagos is 82.5° F., the range being from 68° to 91°. At certain seasons sudden heavy squalls of wind and rain that last for a few hours are common. The hurricane and typhoon are unknown. The principal diseases are malarial fever, smallpox, rheumatism, peripheral neuritis, dysentery, chest diseases and guinea-worm. Fever not unfrequently assumes the dangerous form known as “black-water fever.” The frequency of smallpox is being much diminished outside the larger towns in the interior, in which vaccination is neglected. The absence of plague, yellow fever, cholera, typhoid fever and scarlatina is noteworthy. A mild form of yaws is endemic.

Inhabitants.—The population is estimated at 1,750,000. The Yoruba people, a Negro race divided into many tribes, form the majority of the inhabitants. Notwithstanding their political feuds and their proved capacity as fighting men, the Yoruba are distinguished above all the surrounding races for their generally peaceful disposition, industry, friendliness, courtesy and hospitality towards strangers. They are also intensely patriotic. Physically they resemble closely their Ewe and Dahomey neighbours, but are of somewhat lighter complexion, taller and of less pronounced Negro features. They exhibit high administrative ability, possess a marked capacity for trade, and have made remarkable progress in the industrial arts. The different tribes are distinguished by tattoo markings, usually some simple pattern of two or more parallel lines, disposed horizontally or vertically on the cheeks or other parts of the face. The feeling for religion is deeply implanted among the Yoruba. The majority are pagans, or dominated by pagan beliefs, but Islam has made great progress since the cessation of the Fula wars, while Protestant and Roman Catholic missions have been at work since 1848 at Abeokuta, Oyo, Ibadan and other large towns. Samuel Crowther, the first Negro bishop in the Anglican church, who was distinguished as an explorer, geographer and linguist, was a native of Yorubaland, rescued (1822) by the English from slavery and educated at Sierra Leone (see YORUBAS).

Towns.—Besides Lagos (*q.v.*), pop. about 50,000, the chief towns in the colony proper are Epe, pop. 16,000, on the northern side of the lagoons, and Badagry (a notorious place during the slave-trade period) and Lekki, both on the coast. Inland the chief towns are Abeokuta (*q.v.*), pop. about 60,000, and Ibadan (*q.v.*), pop. estimated at 150,000.

Agriculture and Trade.—The chief wealth of the country consists in forest produce, the staple industries being the collection of palm-kernels and palm oil. Besides the oil-palm forests large areas are covered with timber trees, the wood chiefly cut for commercial purposes being a kind of mahogany. The destruction of immature trees and the fluctuations in price render this a very uncertain trade. The rubber industry was started in 1894, and in 1896 the rubber exported was valued at £347,000. In 1899, owing to reckless methods of tapping the vines, 75% of the rubber plants died. Precautions were then taken to preserve the remainder and allow young plants to grow. The collection of rubber recommenced in 1904 and the industry again became one of importance. A considerable area is devoted to cocoa plantations, all owned by native cultivators. Coffee and tobacco of good quality are cultivated and shea-butter is largely used as an illuminant. The Yoruba country is the greatest agricultural centre in West Africa. For home consumption the Yoruba grow yams, maize and millet, the chief articles of food, cassava, sweet potatoes, sesame and beans. Model farms have been established for experimental culture and for the tuition of the natives. A palatable wine is obtained from the *Raphia vinifera* and native beers are also brewed. Imported spirits are largely consumed. There are no manufactures on a large scale save the making of “country cloths” (from cotton grown, spun and woven in the country) and mats. Pottery and agricultural implements are made, and tanning, dyeing and forging practised in the towns, and along the rivers and lagoons boats and canoes are built. Fishing is extensively engaged in, the fish being dried and sent up country. Except iron there are no valuable minerals in the country.

The cotton plant from which the “country cloths” are made is native to the country, the soil of which is capable of producing the very finest grades of cotton. The Egba branch of the Yoruba have always grown the plant. In 1869 the cotton exported was valued at £76,957, but owing to low prices the natives ceased to grow cotton for export, so that in 1879 the value of exported cotton was only £526. In 1902 planting for export was recommenced by the Egba on scientific lines, and was started in the Abeokuta district with encouraging results.

The Yoruba profess to be unable to alienate land in perpetuity, but native custom does not preclude leasing, and land concessions have been taken up by Europeans on long leases. Some concessions are only for cutting and removing timber; others permit of cultivation. The northern parts of the protectorate are specially suitable for stock raising and poultry culture.

The chief exports are palm-kernels, palm-oil, timber, rubber and cocoa. Palm-kernels alone constitute

more than a half in value of the total exports, and with palm-oil over three-fourths. The trade in these products is practically confined to Great Britain and Germany, the share of the first-named being 25% to Germany's 75%. Minor exports are coffee, "country cloths," maize, shea-butter and ivory.

Cotton goods are the most important of the imports, spirits coming next, followed by building material, haberdashery and hardware and tobacco. Over 90% of the cotton goods are imported from Great Britain, whilst nearly the same proportion of the spirit imports come from Germany. Nearly all the liquors consist of "Trade Spirits," chiefly gin, rum and a concoction called "alcohol," introduced (1901) to meet the growing taste of the people for stronger liquor. This stuff contained 90% of pure alcohol and sometimes over 4% of fusel oil. To hinder the sale of this noxious compound legislation was passed in 1903 prohibiting the import of liquor containing more than ½% of fusel oil, whilst the states of Abeokuta and Ibadan prohibited the importation of liquor stronger than proof. The total trade of the country in 1905 was valued at £2,224,754, the imports slightly exceeding the exports. There is a large transit trade with Dahomey.

Communications.—Lagos is well supplied with means of communication. A 3 ft. 6 in. gauge railway starts from Iddo Island, and extends past Abeokuta, 64 m. from Lagos, Ibadan (123 m.), Oshogbo (175 m.), to Illorin (247 m.) in Northern Nigeria, whence the line is continued to Jebba and Zunguru (see NIGERIA). Abeokuta is served by a branch line, 1½ m. long, from Aro on the main line. Railway bridges connect Iddo Island both with the mainland and with Lagos Island (see Lagos, town). This line was begun in 1896 and opened to Ibadan in 1901. In 1905 the building of the section Ibadan-Illorin was undertaken. The railway was built by the government and cost about £7000 per mile. The lagoons offer convenient channels for numerous small craft, which, with the exception of steam-launches, are almost entirely native-built canoes. Branch steamers run between the Forcados mouth of the Niger and Lagos, and also between Lagos and Porto Novo, in French territory, and do a large transit trade. Various roads through the bush have been made by the government. There is telegraphic communication with Europe, Northern Nigeria and South Africa, and steamships ply regularly between Lagos and Liverpool, and Lagos and Hamburg (see LAGOS, town).

Administration, Justice, Education, &c.—The small part of the province which constitutes "the colony of Southern Nigeria" is governed as a crown colony. Elsewhere the native governments are retained, the chiefs and councils of elders receiving the advice and support of British commissioners. There is also an advisory native central council which meets at Lagos. The great majority of the civil servants are natives of the country, some of whom have been educated in England. The legal status of slavery is not recognized by the law courts and dealing in slaves is suppressed. As an institution slavery is dying out, and only exists in a domestic form.

The cost of administration is met, mainly, by customs, largely derived from the duties on imported spirits. From the railways, a government monopoly, a considerable net profit is earned. Expenditure is mainly under the heads of railway administration, other public works, military and police, health, and education. The revenue increased in the ten years 1895-1905 from £142,049 to £410,250. In the same period the expenditure rose from £144,484 to £354,254.

The defence of the province is entrusted to the Lagos battalion of the West African Frontier Force, a body under the control of the Colonial Office in London and composed of Hausa (four-fifths) and Yoruba. It is officered from the British army.

The judicial system in the colony proper is based on that of England. The colonial supreme court, by agreement with the rulers of Abeokuta, Ibadan and other states in the protectorate, tries, with the aid of native assessors, all cases of importance in those countries. Other cases are tried by mixed courts, or, where Yoruba alone are concerned, by native courts.

There is a government board of education which maintains a few schools and supervises those voluntarily established. These are chiefly those of various missionary societies, who, besides primary schools, have a few secondary schools. The Mahommedans have their own schools. Grants from public funds are made to the voluntary schools. Considerable attention is paid to manual training, the laws of health and the teaching of English, which is spoken by about one-fourth of the native population.

History.—Lagos Island was so named by the Portuguese explorers of the 15th century, because of the numerous lagoons or lakes on this part of the coast. The Portuguese, and after them the French, had settlements here at various points. In the 18th century Lagos Lagoon became the chief resort of slavers frequenting the Bight of Benin, this portion of the Gulf of Guinea becoming known pre-eminently as the Slave Coast. British traders established themselves at Badagry, 40 m. W. of Lagos, where in 1851 they were attacked by Kosoko, the Yoruba king of Lagos Island. As a result a British naval force seized Lagos after a sharp fight and deposed the king, placing his cousin, Akitoye, on the throne. A treaty was concluded under which Akitoye bound himself to put down the slave trade. This treaty was not adhered to, and in 1861 Akitoye's son and successor, King Docemo, was induced to give up his territorial jurisdiction and accept a pension of 1200 bags of cowries, afterwards commuted to £1000 a year, which pension he drew until his death in 1885. Immediately after the proclamation of the British annexation, a steady current of immigration from the mainland set in, and a flourishing town arose on Lagos Island. Iddo Island was acquired at the same time as Lagos Island, and from 1862 to 1894 various additions by purchase or cession were made to the colony. In 1879 the small kingdom of Kotonu was placed under British protection. Kotonu lies south and east of the Denham Lagoon (see DAHOMEY). In 1889 it was exchanged with the French for the kingdom of Pokra which is to the north of Badagry. In the early years of the colony Sir John Glover, R.N., who was twice governor (1864-1866 and 1871-1872), did much pioneer work and earned the confidence of the natives to a remarkable degree. Later Sir C. A. Moloney (governor 1886-1890) opened up relations with the Yoruba and other tribes in the hinterland. He despatched two commissioners whose duty it was to conclude commercial treaties and use British influence to put a stop to inter-tribal fighting and the closing of the trade routes. In 1892 the Jebu, who acted as middlemen between the colony and the Yoruba, closed several trade routes. An expedition sent against them resulted

in their subjugation and the annexation of part of their country. An order in council issued in 1899 extended the protectorate over Yorubaland. The tribes of the hinterland have largely welcomed the British protectorate and military expeditions have been few and unimportant. (For the history of the Yoruba states see YORUBAS.)

Lagos was made a separate government in 1863; in 1866 it was placed in political dependence upon Sierra Leone; in 1874 it became (politically) an integral part of the Gold Coast Colony, whilst in 1886 it was again made a separate government, administered as a crown colony. In Sir William Macgregor, M.D., formerly administrator of British New Guinea, governor 1899-1904, the colony found an enlightened ruler. He inaugurated the railway system, and drew much closer the friendly ties between the British and the tribes of the protectorate. Meantime, since 1884, the whole of the Niger delta, lying immediately east of Lagos, as well as the Hausa states and Bornu, had been acquired by Great Britain. Unification of the British possessions in Nigeria being desirable, the delta regions and Lagos were formed in 1906 into one government (see NIGERIA).

See C. P. Lucas, *Historical Geography of the British Colonies*, vol. iii. *West Africa* (Oxford, 1896); the annual *Reports* issued by the Colonial Office, London; A. B. Ellis, *The Yoruba-speaking Peoples* (London, 1894); Lady Glover, *The Life of Sir John Hawley Glover* (London, 1897). Consult also the works cited under NIGERIA and DAHOMEY.

LAGOS, a seaport of West Africa, capital of the British colony and protectorate of Southern Nigeria, in 6° 26′ N., 3° 23′ E. on an island in a lagoon named Lagos also. Between Lagos and the mainland is Iddo Island. An iron bridge for road and railway traffic 2600 ft. long connects Lagos and Iddo Islands, and another iron bridge, 917 ft. long, joins Iddo Island to the mainland. The town lies but a foot or two above sea-level. The principal buildings are a large government house, the law courts, the memorial hall erected to commemorate the services of Sir John Glover, used for public meetings and entertainments, an elaborate club-house provided from public funds, and the police quarters. There are many substantial villas that serve as quarters for the officers of the civil service, as well as numerous solidly-built handsome private buildings. The streets are well kept; the town is supplied with electric light, and there is a good water service. The chief stores and depôts for goods are all on the banks of the lagoon. The swamps of which originally Lagos Island entirely consisted have been reclaimed. In connexion with this work a canal, 25 ft. wide, has been cut right through the island and a sea-wall built round its western half. There is a commodious public hospital, of the cottage type, on a good site. There is a racecourse, which also serves as a general public recreation ground. Shifting banks of sand form a bar at the sea entrance of the lagoon. Extensive works were undertaken in 1908 with a view to making Lagos an open port. A mole has been built at the eastern entrance to the harbour and dredgers are at work on the bar, which can be crossed by vessels drawing 13 ft. Large ocean-going steamers anchor not less than 2 m. from land, and goods and passengers are there transhipped into smaller steamers for Lagos. Heavy cargo is carried by the large steamers to Forcados, 200 m. farther down the coast, transhipped there into branch boats, and taken via the lagoons to Lagos. The port is 4279 m. from Liverpool, 1203 from Freetown, Sierra Leone (the nearest safe port westward), and 315 from Cape Coast.

The inhabitants, about 50,000, include, besides the native tribes, Sierra Leonis, Fanti, Krumen and the descendants of some 6000 Brazilian *emancipados* who were settled here in the early days of British rule. The Europeans number about 400. Rather more than half the populace are Moslems.

LAGOS, a seaport of southern Portugal, in the district of Faro (formerly the province of Algarve); on the Atlantic Ocean, and on the estuary of the small river Lagos, here spanned by a fine stone bridge. Pop. (1900) 8291. The city is defended by fortifications erected in the 17th century. It is supplied with water by an aqueduct 800 yds. long. The harbour is deep, capacious, and completely sheltered on the north and west; it is frequently visited by the British Channel fleet. Vines and figs are extensively cultivated in the neighbourhood, and Lagos is the centre of important sardine and tunny fisheries. Its trade is chiefly carried on by small coasting vessels, as there is no railway. Lagos is on or near the site of the Roman *Lacobriga*. Since the 15th century it has held the formal rank and title of city. Cape St Vincent, the ancient *Promontorium Sacrum*, and the south-western extremity of the kingdom, is 22 m. W. It is famous for its connexion with Prince Henry (*q.v.*), the Navigator, who here founded the town of Sagres in 1421; and for several British naval victories, the most celebrated of which was won in 1797 by Admiral Jervis (afterwards Earl St Vincent) over a larger Spanish squadron. In 1759 Admiral Boscawen defeated a French fleet off Lagos. The great earthquake of 1755 destroyed a large part of the city.

LA GRÂCE, or Les Grâces, a game invented in France during the first quarter of the 19th century and called there *le jeu des Grâces*. It is played with two light sticks about 16 in. long and a wicker ring, which is projected into the air by placing it over the sticks crossed and then separating them rapidly. The ring is caught upon the stick of another player and thrown back, the object being to prevent it from falling to the ground.

LA GRAND' COMBE, a town of southern France, in the department of Gard on the Gardon, 39 m. N.N.W. of Nîmes by rail. Pop. (1906) town, 6406; commune, 11,292. There are extensive coal mines in the vicinity.

LAGRANGE, JOSEPH LOUIS (1736-1813), French mathematician, was born at Turin, on the 25th of January 1736. He was of French extraction, his great grandfather, a cavalry captain, having passed from the service of France to that of Sardinia, and settled in Turin under Emmanuel II. His father, Joseph Louis Lagrange, married Maria Theresa Gros, only daughter of a rich physician at Cambiano, and had by her eleven children, of whom only the eldest (the subject of this notice) and the youngest survived infancy. His emoluments as treasurer at war, together with his wife's fortune, provided him with ample means, which he lost by rash speculations, a circumstance regarded by his son as the prelude to his own good fortune; for had he been rich, he used to say, he might never have known mathematics.

The genius of Lagrange did not at once take its true bent. His earliest tastes were literary rather than scientific, and he learned the rudiments of geometry during his first year at the college of Turin, without difficulty, but without distinction. The perusal of a tract by Halley (*Phil. Trans*. xviii. 960) roused his enthusiasm for the analytical method, of which he was destined to develop the utmost capabilities. He now entered, unaided save by his own unerring tact and vivid apprehension, upon a course of study which, in two years, placed him on a level with the greatest of his contemporaries. At the age of nineteen he communicated to Leonhard Euler his idea of a general method of dealing with "isoperimetrical" problems, known later as the Calculus of Variations. It was eagerly welcomed by the Berlin mathematician, who had the generosity to withhold from publication his own further researches on the subject, until his youthful correspondent should have had time to complete and opportunity to claim the invention. This prosperous opening gave the key-note to Lagrange's career. Appointed, in 1754, professor of geometry in the royal school of artillery, he formed with some of his pupils—for the most part his seniors—friendships based on community of scientific ardour. With the aid of the marquis de Saluces and the anatomist G. F. Cigna, he founded in 1758 a society which became the Turin Academy of Sciences. The first volume of its memoirs, published in the following year, contained a paper by Lagrange entitled *Recherches sur la nature et la propagation du son*, in which the power of his analysis and his address in its application were equally conspicuous. He made his first appearance in public as the critic of Newton, and the arbiter between d'Alembert and Euler. By considering only the particles of air found in a right line, he reduced the problem of the propagation of sound to the solution of the same partial differential equations that include the motions of vibrating strings, and demonstrated the insufficiency of the methods employed by both his great contemporaries in dealing with the latter subject. He further treated in a masterly manner of echoes and the mixture of sounds, and explained the phenomenon of grave harmonics as due to the occurrence of beats so rapid as to generate a musical note. This was followed, in the second volume of the *Miscellanea Taurinensia* (1762) by his "Essai d'une nouvelle méthode pour déterminer les maxima et les minima des formules intégrales indéfinies," together with the application of this important development of analysis to the solution of several dynamical problems, as well as to the demonstration of the mechanical principle of "least action." The essential point in his advance on Euler's mode of investigating curves of maximum or minimum consisted in his purely analytical conception of the subject. He not only freed it from all trammels of geometrical construction, but by the introduction of the symbol δ gave it the efficacy of a new calculus. He is thus justly regarded as the inventor of the "method of variations"—a name supplied by Euler in 1766.

By these performances Lagrange found himself, at the age of twenty-six, on the summit of European fame. Such a height had not been reached without cost. Intense application during early youth had weakened a constitution never robust, and led to accesses of feverish exaltation culminating, in the spring

of 1761, in an attack of bilious hypochondria, which permanently lowered the tone of his nervous system. Rest and exercise, however, temporarily restored his health, and he gave proof of the undiminished vigour of his powers by carrying off, in 1764, the prize offered by the Paris Academy of Sciences for the best essay on the libration of the moon. His treatise was remarkable, not only as offering a satisfactory explanation of the coincidence between the lunar periods of rotation and revolution, but as containing the first employment of his radical formula of mechanics, obtained by combining with the principle of d'Alembert that of virtual velocities. His success encouraged the Academy to propose, in 1766, as a theme for competition, the hitherto unattempted theory of the Jovian system. The prize was again awarded to Lagrange; and he earned the same distinction with essays on the problem of three bodies in 1772, on the secular equation of the moon in 1774, and in 1778 on the theory of cometary perturbations.

He had in the meantime gratified a long felt desire by a visit to Paris, where he enjoyed the stimulating delight of conversing with such mathematicians as A. C. Clairault, d'Alembert, Condorcet and the Abbé Marie. Illness prevented him from visiting London. The post of director of the mathematical department of the Berlin Academy (of which he had been a member since 1759) becoming vacant by the removal of Euler to St Petersburg, the latter and d'Alembert united to recommend Lagrange as his successor. Euler's eulogium was enhanced by his desire to quit Berlin, d'Alembert's by his dread of a royal command to repair thither; and the result was that an invitation, conveying the wish of the "greatest king in Europe" to have the "greatest mathematician" at his court, was sent to Turin. On the 6th of November 1766, Lagrange was installed in his new position, with a salary of 6000 francs, ample leisure for scientific research, and royal favour sufficient to secure him respect without exciting envy. The national jealousy of foreigners, was at first a source of annoyance to him; but such prejudices were gradually disarmed by the inoffensiveness of his demeanour. We are told that the universal example of his colleagues, rather than any desire for female society, impelled him to matrimony; his choice being a lady of the Conti family, who, by his request, joined him at Berlin. Soon after marriage his wife was attacked by a lingering illness, to which she succumbed, Lagrange devoting all his time, and a considerable store of medical knowledge, to her care.

The long series of memoirs—some of them complete treatises of great moment in the history of science—communicated by Lagrange to the Berlin Academy between the years 1767 and 1787 were not the only fruits of his exile. His *Mécanique analytique*, in which his genius most fully displayed itself, was produced during the same period. This great work was the perfect realization of a design conceived by the author almost in boyhood, and clearly sketched in his first published essay.[1] Its scope may be briefly described as the reduction of the theory of mechanics to certain general formulae, from the simple development of which should be derived the equations necessary for the solution of each separate problem.[2] From the fundamental principle of virtual velocities, which thus acquired a new significance, Lagrange deduced, with the aid of the calculus of variations, the whole system of mechanical truths, by processes so elegant, lucid and harmonious as to constitute, in Sir William Hamilton's words, "a kind of scientific poem." This unification of method was one of matter also. By his mode of regarding a liquid as a material system characterized by the unshackled mobility of its minutest parts, the separation between the mechanics of matter in different forms of aggregation finally disappeared, and the fundamental equation of forces was for the first time extended to hydrostatics and hydrodynamics.[3] Thus a universal science of matter and motion was derived, by an unbroken sequence of deduction, from one radical principle; and analytical mechanics assumed the clear and complete form of logical perfection which it now wears.

A publisher having with some difficulty been found, the book appeared at Paris in 1788 under the supervision of A. M. Legendre. But before that time Lagrange himself was on the spot. After the death of Frederick the Great, his presence was competed for by the courts of France, Spain and Naples, and a residence in Berlin having ceased to possess any attraction for him, he removed to Paris in 1787. Marie Antoinette warmly patronized him. He was lodged in the Louvre, received the grant of an income equal to that he had hitherto enjoyed, and, with the title of "veteran pensioner" in lieu of that of "foreign associate" (conferred in 1772), the right of voting at the deliberations of the Academy. In the midst of these distinctions, a profound melancholy seized upon him. His mathematical enthusiasm was for the time completely quenched, and during two years the printed volume of his *Mécanique*, which he had seen only in manuscript, lay unopened beside him. He relieved his dejection with miscellaneous studies, especially with that of chemistry, which, in the new form given to it by Lavoisier, he found "aisée comme l'algèbre." The Revolution roused him once more to activity and cheerfulness. Curiosity impelled him to remain and watch the progress of such a novel phenomenon; but curiosity was changed into dismay as the terrific character of the phenomenon unfolded itself. He now bitterly regretted his temerity in braving the danger. "Tu l'as voulu" he would repeat self-reproachfully. Even from revolutionary tribunals, however, the name of Lagrange uniformly commanded respect. His pension was continued by the National Assembly, and he was partially indemnified for the depreciation of the currency by remunerative appointments. Nominated president of the Academical commission for the reform of weights and measures, his services were retained when its "purification" by the Jacobins removed his most distinguished colleagues. He again sat on the commission of 1799 for the construction of the metric system, and by his zealous advocacy of the decimal principle largely contributed to its adoption.

Meanwhile, on the 31st of May 1792 he married Mademoiselle Lemonnier, daughter of the astronomer of that name, a young and beautiful girl, whose devotion ignored disparity of years, and formed the one tie with life which Lagrange found it hard to break. He had no children by either marriage. Although specially exempted from the operation of the decree of October 1793, imposing banishment on foreign residents, he took alarm at the fate of J. S. Bailly and A. L. Lavoisier, and prepared to resume his former situation in Berlin. His design was frustrated by the establishment of and his official connexion with the École Normale, and the École Polytechnique. The former institution had an ephemeral existence; but amongst the benefits derived from the foundation of the École Polytechnique one of the greatest, it has been observed,[4] was the restoration of Lagrange to mathematics. The remembrance of his teachings was long

treasured by such of his auditors—amongst whom were J. B. J. Delambre and S. F. Lacroix—as were capable of appreciating them. In expounding the principles of the differential calculus, he started, as it were, from the level of his pupils, and ascended with them by almost insensible gradations from elementary to abstruse conceptions. He seemed, not a professor amongst students, but a learner amongst learners; pauses for thought alternated with luminous exposition; invention accompanied demonstration; and thus originated his *Théorie des fonctions analytiques* (Paris, 1797). The leading idea of this work was contained in a paper published in the *Berlin Memoirs* for 1772.[5] Its object was the elimination of the, to some minds, unsatisfactory conception of the infinite from the metaphysics of the higher mathematics, and the substitution for the differential and integral calculus of an analogous method depending wholly on the serial development of algebraical functions. By means of this "calculus of derived functions" Lagrange hoped to give to the solution of all analytical problems the utmost "rigour of the demonstrations of the ancients";[6] but it cannot be said that the attempt was successful. The validity of his fundamental position was impaired by the absence of a well-constituted theory of series; the notation employed was inconvenient, and was abandoned by its inventor in the second edition of his *Mécanique*; while his scruples as to the admission into analytical investigations of the idea of limits or vanishing ratios have long since been laid aside as idle. Nowhere, however, were the keenness and clearness of his intellect more conspicuous than in this brilliant effort, which, if it failed in its immediate object, was highly effective in secondary results. His purely abstract mode of regarding functions, apart from any mechanical or geometrical considerations, led the way to a new and sharply characterized development of the higher analysis in the hands of A. Cauchy, C. G. Jacobi, and others.[7] The *Théorie des fonctions* is divided into three parts, of which the first explains the general doctrine of functions, the second deals with its application to geometry, and the third with its bearings on mechanics.

On the establishment of the Institute, Lagrange was placed at the head of the section of geometry; he was one of the first members of the Bureau des Longitudes; and his name appeared in 1791 on the list of foreign members of the Royal Society. On the annexation of Piedmont to France in 1796, a touching compliment was paid to him in the person of his aged father. By direction of Talleyrand, then minister for foreign affairs, the French commissary repaired in state to the old man's residence in Turin, to congratulate him on the merits of his son, whom they declared "to have done honour to mankind by his genius, and whom Piedmont was proud to have produced, and France to possess." Bonaparte, who styled him "la haute pyramide des sciences mathématiques," loaded him with personal favours and official distinctions. He became a senator, a count of the empire, a grand officer of the legion of honour, and just before his death received the grand cross of the order of réunion.

The preparation of a new edition of his *Mécanique* exhausted his already falling powers. Frequent fainting fits gave presage of a speedy end, and on the 8th of April 1813 he had a final interview with his friends B. Lacépède, G. Monge and J. A. Chaptal. He spoke with the utmost calm of his approaching death; "c'est une dernière fonction," he said, "qui n'est ni pénible ni désagréable." He nevertheless looked forward to a future meeting, when he promised to complete the autobiographical details which weakness obliged him to interrupt. They remained untold, for he died two days later on the 10th of April, and was buried in the Pantheon, the funeral oration being pronounced by Laplace and Lacépède.

Amongst the brilliant group of mathematicians whose magnanimous rivalry contributed to accomplish the task of generalization and deduction reserved for the 18th century, Lagrange occupies an eminent place. It is indeed by no means easy to distinguish and apportion the respective merits of the competitors. This is especially the case between Lagrange and Euler on the one side, and between Lagrange and Laplace on the other. The calculus of variations lay undeveloped in Euler's mode of treating isoperimetrical problems. The fruitful method, again, of the variation of elements was introduced by Euler, but adopted and perfected by Lagrange, who first recognized its supreme importance to the analytical investigation of the planetary movements. Finally, of the grand series of researches by which the stability of the solar system was ascertained, the glory must be almost equally divided between Lagrange and Laplace. In analytical invention, and mastery over the calculus, the Turin mathematician was admittedly unrivalled. Laplace owned that he had despaired of effecting the integration of the differential equations relative to secular inequalities until Lagrange showed him the way. But Laplace unquestionably surpassed his rival in practical sagacity and the intuition of physical truth. Lagrange saw in the problems of nature so many occasions for analytical triumphs; Laplace regarded analytical triumphs as the means of solving the problems of nature. One mind seemed the complement of the other; and both, united in honourable rivalry, formed an instrument of unexampled perfection for the investigation of the celestial machinery. What may be called Lagrange's first period of research into planetary perturbations extended from 1774 to 1784 (see Astronomy: *History*). The notable group of treatises communicated, 1781-1784, to the Berlin Academy was designed, but did not prove to be his final contribution to the theory of the planets. After an interval of twenty-four years the subject, re-opened by S. D. Poisson in a paper read on the 20th of June 1808, was once more attacked by Lagrange with all his pristine vigour and fertility of invention. Resuming the inquiry into the invariability of mean motions, Poisson carried the approximation, with Lagrange's formulae, as far as the squares of the disturbing forces, hitherto neglected, with the same result as to the stability of the system. He had not attempted to include in his calculations the orbital variations of the disturbing bodies; but Lagrange, by the happy artifice of transferring the origin of coordinates from the centre of the sun to the centre of gravity of the sun and planets, obtained a simplification of the formulae, by which the same analysis was rendered equally applicable to each of the planets severally. It deserves to be recorded as one of the numerous coincidences of discovery that Laplace, on being made acquainted by Lagrange with his new method, produced analogous expressions, to which his independent researches had led him. The final achievement of Lagrange in this direction was the extension of the method of the variation of arbitrary constants, successfully used by him in the investigation of periodical as well as of secular inequalities, to any system whatever of mutually interacting bodies.[8] "Not without astonishment," even to himself, regard being had to the great generality of the differential equations, he reached a result so wide as to include, as a particular case, the solution of the planetary problem recently obtained by him. He proposed to apply the same principles to the calculation of the disturbances produced in the rotation of the planets by external

action on their equatorial protuberances, but was anticipated by Poisson, who gave formulae for the variation of the elements of rotation strictly corresponding with those found by Lagrange for the variation of the elements of revolution. The revision of the *Mécanique analytique* was undertaken mainly for the purpose of embodying in it these new methods and final results, but was interrupted, when two-thirds completed, by the death of its author.

In the advancement of almost every branch of pure mathematics Lagrange took a conspicuous part. The calculus of variations is indissolubly associated with his name. In the theory of numbers he furnished solutions of many of P. Fermat's theorems, and added some of his own. In algebra he discovered the method of approximating to the real roots of an equation by means of continued fractions, and imagined a general process of solving algebraical equations of every degree. The method indeed fails for equations of an order above the fourth, because it then involves the solution of an equation of higher dimensions than they proposed. Yet it possesses the great and characteristic merit of generalizing the solutions of his predecessors, exhibiting them all as modifications of one principle. To Lagrange, perhaps more than to any other, the theory of differential equations is indebted for its position as a science, rather than a collection of ingenious artifices for the solution of particular problems. To the calculus of finite differences he contributed the beautiful formula of interpolation which bears his name; although substantially the same result seems to have been previously obtained by Euler. But it was in the application to mechanical questions of the instrument which he thus helped to form that his singular merit lay. It was his just boast to have transformed mechanics (defined by him as a "geometry of four dimensions") into a branch of analysis, and to have exhibited the so-called mechanical "principles" as simple results of the calculus. The method of "generalized coordinates," as it is now called, by which he attained this result, is the most brilliant achievement of the analytical method. Instead of following the motion of each individual part of a material system, he showed that, if we determine its configuration by a sufficient number of variables, whose number is that of the degrees of freedom to move (there being as many equations as the system has degrees of freedom), the kinetic and potential energies of the system can be expressed in terms of these, and the differential equations of motion thence deduced by simple differentiation. Besides this most important contribution to the general fabric of dynamical science, we owe to Lagrange several minor theorems of great elegance,—among which may be mentioned his theorem that the kinetic energy imparted by given impulses to a material system under given constraints is a maximum. To this entire branch of knowledge, in short, he successfully imparted that character of generality and completeness towards which his labours invariably tended.

His share in the gigantic task of verifying the Newtonian theory would alone suffice to immortalize his name. His co-operation was indeed more indispensable than at first sight appears. Much as was done *by* him, what was done *through* him was still more important. Some of his brilliant rival's most conspicuous discoveries were implicitly contained in his writings, and wanted but one step for completion. But that one step, from the abstract to the concrete, was precisely that which the character of Lagrange's mind indisposed him to make. As notable instances may be mentioned Laplace's discoveries relating to the velocity of sound and the secular acceleration of the moon, both of which were led close up to by Lagrange's analytical demonstrations. In the *Berlin Memoirs* for 1778 and 1783 Lagrange gave the first direct and theoretically perfect method of determining cometary orbits. It has not indeed proved practically available; but his system of calculating cometary perturbations by means of "mechanical quadratures" has formed the starting-point of all subsequent researches on the subject. His determination[9] of maximum and minimum values for the slowly varying planetary eccentricities was the earliest attempt to deal with the problem. Without a more accurate knowledge of the masses of the planets than was then possessed a satisfactory solution was impossible; but the upper limits assigned by him agreed closely with those obtained later by U. J. J. Leverrier.[10] As a mathematical writer Lagrange has perhaps never been surpassed. His treatises are not only storehouses of ingenious methods, but models of symmetrical form. The clearness, elegance and originality of his mode of presentation give lucidity to what is obscure, novelty to what is familiar, and simplicity to what is abstruse. His genius was one of generalization and abstraction; and the aspirations of the time towards unity and perfection received, by his serene labours, an embodiment denied to them in the troubled world of politics.

Bibliography.—Lagrange's numerous scattered memoirs have been collected and published in seven 4to volumes, under the title *Œuvres de Lagrange, publiées sous les soins de M. J. A. Serret* (Paris, 1867-1877). The first, second and third sections of this publication comprise respectively the papers communicated by him to the Academies of Sciences of Turin, Berlin and Paris; the fourth includes his miscellaneous contributions to other scientific collections, together with his additions to Euler's *Algebra*, and his *Leçons élémentaires* at the École Normale in 1795. Delambre's notice of his life, extracted from the *Mém. de l'Institut*, 1812, is prefixed to the first volume. Besides the separate works already named are *Résolution des équations numériques* (1798, 2nd ed., 1808, 3rd ed., 1826), and *Leçons sur le calcul des fonctions* (1805, 2nd ed., 1806), designed as a commentary and supplement to the first part of the *Théorie des fonctions*. The first volume of the enlarged edition of the *Mécanique* appeared in 1811, the second, of which the revision was completed by MM Prony and Binet, in 1815. A third edition, in 2 vols., 4to, was issued in 1853-1855, and a second of the *Théorie des fonctions* in 1813.

See also J. J. Virey and Potel, *Précis historique* (1813); Th. Thomson's *Annals of Philosophy* (1813-1820), vols. ii. and iv.; H. Suter, *Geschichte der math. Wiss.* (1873); E. Dühring, *Kritische Gesch. der allgemeinen Principien der Mechanik* (1877, 2nd ed.); A. Gautier, *Essai historique sur le problème des trois corps* (1817); R. Grant, *History of Physical Astronomy*, &c.; Pietro Cossali, *Éloge* (Padua, 1813); L. Martini, *Cenni biográfici* (1840); *Moniteur du 26 Février* (1814); W. Whewell, *Hist. of the Inductive Sciences*, ii. *passim*; J. Clerk Maxwell, *Electricity and Magnetism*, ii. 184; A. Berry, *Short Hist. of Astr.*, p. 313; J. S. Bailly, *Hist. de l'astr. moderne*, iii. 156, 185, 232; J. C. Poggendorff, *Biog. Lit. Handwörterbuch*.

(A. M. C.)

1 *Œuvres*, i. 15.

2 *Méc. An.*, Advertisement to 1st ed.

3 E. Dühring, *Kritische Gesch. der Mechanik*, 220, 367; Lagrange, *Méc. An.* i. 166-172, 3rd ed.

4 Notice by J. Delambre, *Œuvres de Lagrange*, i. p. xlii.

5 *Œuvres*, iii. 441.

6 *Théorie des fonctions*, p. 6.

7 H. Suter, *Geschichte der math. Wiss.* ii. 222-223.

8 *Œuvres*, vi. 771.

9 *Œuvres*, v. 211 seq.

10 Grant, *History of Physical Astronomy*, p. 117.

LAGRANGE-CHANCEL [Chancel], FRANÇOIS JOSEPH (1677-1758), French dramatist and satirist, was born at Périgueux on the 1st of January 1677. He was an extremely precocious boy, and at Bordeaux, where he was educated, he produced a play when he was nine years old. Five years later his mother took him to Paris, where he found a patron in the princesse de Conti, to whom he dedicated his tragedy of *Jugurtha* or, as it was called later, *Adherbal* (1694). Racine had given him advice and was present at the first performance, although he had long lived in complete retirement. Other plays followed: *Oreste et Pylade* (1697), *Méléagre* (1699), *Amasis* (1701), and *Ino et Mélicerte* (1715). Lagrange hardly realized the high hopes raised by his precocity, although his only serious rival on the tragic stage was Campistron, but he obtained high favour at court, becoming *maître d'hôtel* to the duchess of Orleans. This prosperity ended with the publication in 1720 of his *Philippiques*, odes accusing the regent, Philip, duke of Orleans, of the most odious crimes. He might have escaped the consequences of this libel but for the bitter enmity of a former patron, the duc de La Force. Lagrange found sanctuary at Avignon, but was enticed beyond the boundary of the papal jurisdiction, when he was arrested and sent as a prisoner to the isles of Sainte Marguerite. He contrived, however, to escape to Sardinia and thence to Spain and Holland, where he produced his fourth and fifth *Philippiques*. On the death of the Regent he was able to return to France. He was part author of a *Histoire de Périgord* left unfinished, and made a further contribution to history, or perhaps, more exactly, to romance, in a letter to Élie Fréron on the identity of the Man with the Iron Mask. Lagrange's family life was embittered by a long lawsuit against his son. He died at Périgueux at the end of December 1758.

He had collected his own works (5 vols., 1758) some months before his death. His most famous work, the *Philippiques*, was edited by M. de Lescure in 1858, and a sixth philippic by M. Diancourt in 1886.

LA GRANJA, or San Ildefonso, a summer palace of the kings of Spain; on the south-eastern border of the province of Segovia, and on the western slopes of the Sierra de Guadarrama, 7 m. by road S.E. of the city of Segovia. The royal estate is 3905 ft. above sea-level. The scenery of this region, especially in the gorge of the river Lozoya, with its granite rocks, its dense forest of pines, firs and birches, and its red-tiled farms, more nearly resembles the highlands of northern Europe than any other part of Spain. La Granja has an almost alpine climate, with a clear, cool atmosphere and abundant sunshine. Above the palace rise the wooded summits of the Guadarrama, culminating in the peak of Peñalara (7891 ft.); in front of it the wide plains of Segovia extend northwards. The village of San Ildefonso, the oldest part of the estate, was founded in 1450 by Henry IV., who built a hunting lodge and chapel here. In 1477 the chapel was presented by Ferdinand and Isabella to the monks of the Parral, a neighbouring Hieronymite monastery. The original *granja* (*i.e.* grange or farm), established by the monks, was purchased in 1719 by Philip V., after the destruction of his summer palace at Valsain, the ancient *Vallis Sapinorum*, 2 m. S. Philip determined to convert the estate into a second Versailles. The palace was built between 1721 and 1723. Its façade is fronted by a colonnade in which the pillars reach to the roof. The state apartments contain some valuable 18th-century furniture, but the famous collection of sculptures was removed to Madrid in 1836, and is preserved there in the Museo del Prado. At La Granja it is represented by facsimiles in plaster. The collegiate church adjoining the palace dates from 1724, and contains the tombs of Philip V. and his consort Isabella Farnese. An artificial lake called El Mar, 4095 ft. above sea-level, irrigates the gardens, which are imitated from those of Versailles, and supplies water for the fountains. These, despite the antiquated and sometimes tasteless style of their ornamentation, are probably the finest in the world; it is noteworthy that, owing to the high level of the lake, no pumps or other mechanism are needed to supply pressure. There are twenty-six fountains besides lakes and waterfalls. Among the most remarkable are the group of "Perseus, Andromeda and the Sea-Monster," which sends up a jet of water 110 ft. high, the "Fame," which reaches 125 ft., and the very elaborate "Baths of Diana." It is of the last that Philip V. is said to have remarked, "It has cost me three millions and amused me three minutes." Most of the fountains were made by order of Queen Isabella in 1727, during the king's absence. The glass factory of

San Ildefonso was founded by Charles III.

It was in La Granja that Philip V. resigned the crown to his son in January 1724, to resume it after his son's death seven months later; that the treaties of 1777, 1778, 1796 and 1800 were signed (see SPAIN: *History*); that Ferdinand VII. summoned Don Carlos to the throne in 1832, but was induced to alter the succession in favour of his own infant daughter Isabella, thus involving Spain in civil war; and that in 1836 a military revolt compelled the Queen-regent Christina to restore the constitution of 1812.

LAGRENÉE, LOUIS JEAN FRANÇOIS (1724-1805), French painter, was a pupil of Carle Vanloo. Born at Paris on the 30th of December 1724, in 1755 he became a member of the Royal Academy, presenting as his diploma picture the "Rape of Deianira" (Louvre). He visited St Petersburg at the call of the empress Elizabeth, and on his return was named in 1781 director of the French Academy at Rome; he there painted the "Indian Widow," one of his best-known works. In 1804 Napoleon conferred on him the cross of the legion of honour, and on the 19th of June 1805 he died in the Louvre, of which he was honorary keeper.

LA GUAIRA, or LA GUAYRA (sometimes LAGUAIRA, &c.), a town and port of Venezuela, in the Federal district, 23 m. by rail and 6½ m. in a direct line N. of Caracas. Pop. (1904, estimate) 14,000. It is situated between a precipitous mountain side and a broad, semicircular indentation of the coast line which forms the roadstead of the port. The anchorage was long considered one of the most dangerous on the Caribbean coast, and landing was attended with much danger. The harbour has been improved by the construction of a concrete breakwater running out from the eastern shore line 2044 ft., built up from an extreme depth of 46 ft. or from an average depth of 29½ ft., and rising 19½ ft. above sea-level. This encloses an area of 76½ acres, having an average depth of nearly 28 ft. The harbour is further improved by 1870 ft. of concrete quays and 1397 ft. of retaining sea-wall, with several piers (three covered) projecting into deep water. These works were executed by a British company, known as the La Guaira Harbour Corporation, Ltd., and were completed in 1891 at a cost of about one million sterling. The concession is for 99 years and the additional charges which the company is authorized to impose are necessarily heavy. These improvements and the restrictions placed upon the direct trade between West Indian ports and the Orinoco have greatly increased the foreign trade of La Guaira, which in 1903 was 52% of that of the four *puertos habilitados* of the republic. The shipping entries of that year numbered 217, of which 203 entered with general cargo and 14 with coal exclusively. The exports included 152,625 bags coffee, 114,947 bags cacao and 152,891 hides. For 1905-1906 the imports at La Guaira were valued officially at £767,365 and the exports at £663,708. The city stands on sloping ground stretching along the circular coast line with a varying width of 130 to 330 ft. and having the appearance of an amphitheatre. The port improvements added 18 acres of reclaimed land to La Guaira's area, and the removal of old shore batteries likewise increased its available breadth. In this narrow space is built the town, composed in great part of small, roughly-made cabins, and narrow, badly-paved streets, but with good business houses on its principal street. From the mountain side, reddish-brown in colour and bare of vegetation, the solar heat is reflected with tremendous force, the mean annual temperature being 84° F. The seaside towns of Maiquetia, 2 m. W. and Macuto, 3 m. E., which have better climatic and sanitary conditions and are connected by a narrow-gauge railway, are the residences of many of the wealthier merchants of La Guaira.

La Guaira was founded in 1588, was sacked by filibusters under Amias Preston in 1595, and by the French under Grammont in 1680, was destroyed by the great earthquake of the 26th of March 1812, and suffered severely in the war for independence. In 1903, pending the settlement of claims of Great Britain, Germany and Italy against Venezuela, La Guaira was blockaded by a British-German-Italian fleet.

LA GUÉRONNIÈRE, LOUIS ÉTIENNE ARTHUR DUBREUIL HÉLION, VICOMTE DE (1816-1875), French politician, was the scion of a noble Poitevin family. Although by birth and education attached to Legitimist principles, he became closely associated with Lamartine, to whose organ, *Le Bien Public*, he was a principal contributor. After the stoppage of this paper he wrote for *La Presse*, and in 1850 edited *Le Pays*. A character sketch of Louis Napoleon in this journal caused differences with Lamartine, and La Guéronnière became more and more closely identified with the policy of the prince president. Under the Empire he was a member of the council of state (1853), senator (1861), ambassador

at Brussels (1868), and at Constantinople (1870), and grand officer of the legion of honour (1866). He died in Paris on the 23rd of December 1875. Besides his *Études et portraits politiques contemporains* (1856) his most important works are those on the foreign policy of the Empire: *La France, Rome et Italie* (1851), *L'Abandon de Rome* (1862), *De la politique intérieure et extérieure de la France* (1862).

His elder brother, Alfred Dubreuil Hélion, Comte de La Guéronnière (1810-1884), who remained faithful to the Legitimist party, was also a well-known writer and journalist. He was consistent in his opposition to the July Monarchy and the Empire, but in a series of books on the crisis of 1870-1871 showed a more favourable attitude to the Republic.

LAGUERRE, JEAN HENRI GEORGES (1858-), French lawyer and politician, was born in Paris on the 24th of June 1858. Called to the bar in 1879, he distinguished himself by brilliant pleadings in favour of socialist and anarchist leaders, defending Prince Kropotkine at Lyons in 1883, Louise Michel in the same year; and in 1886, with A. Millerand as colleague he defended Ernest Roche and Duc Quercy, the instigators of the Decazeville strike. His strictures on the *procureur de la République* on this occasion being declared libellous he was suspended for six months and in 1890 he again incurred suspension for an attack on the attorney-general, Quesnay de Beaurepaire. He also pleaded in the greatest criminal cases of his time, though from 1893 onwards exclusively in the provinces, his exclusion from the Parisian bar having been secured on the pretext of his connexion with *La Presse*. He entered the Chamber of Deputies for Apt in 1883 as a representative of the extreme revisionist programme, and was one of the leaders of the Boulangist agitation. He had formerly written for Georges Clemenceau's organ *La Justice*, but when Clemenceau refused to impose any shibboleth on the radical party he became director of *La Presse*. He rallied to the republican party in May 1801, some months before General Boulanger's suicide. He was not re-elected to the Chamber in 1893. Laguerre was an excellent lecturer on the revolutionary period of French history, concerning which he had collected many valuable and rare documents. He interested himself in the fate of the "Little Dauphin" (Louis XVII.), whose supposed remains, buried at Ste Marguerite, he proved to be those of a boy of fourteen.

LAGUNA, or La Laguna, an episcopal city and formerly the capital of the island of Teneriffe, in the Spanish archipelago of the Canary Islands. Pop. (1900) 13,074. Laguna is 4 m. N. by W. of Santa Cruz, in a plain 1800 ft. above sea-level, surrounded by mountains. Snow is unknown here, and the mean annual temperature exceeds 63° F.; but the rainfall is very heavy, and in winter the plain is sometimes flooded. The humidity of the atmosphere, combined with the warm climate and rich volcanic soil, renders the district exceptionally fertile; wheat, wine and tobacco, oranges and other fruits, are produced in abundance. Laguna is the favourite summer residence of the wealthier inhabitants of Santa Cruz. Besides the cathedral, the city contains several picturesque convents, now secularized, a fine modern town hall, hospitals, a large public library and some ancient palaces of the Spanish nobility. Even the modern buildings have often an appearance of antiquity, owing to the decay caused by damp, and the luxuriant growth of climbing plants.

LA HARPE, JEAN FRANÇOIS DE (1739-1803), French critic, was born in Paris of poor parents on the 20th of November 1739. His father, who signed himself Delharpe, was a descendant of a noble family originally of Vaud. Left an orphan at the age of nine, La Harpe was taken care of for six months by the sisters of charity, and his education was provided for by a scholarship at the Collège d'Harcourt. When nineteen he was imprisoned for some months on the charge of having written a satire against his protectors at the college. La Harpe always denied his guilt, but this culminating misfortune of an early life spent entirely in the position of a dependent had possibly something to do with the bitterness he evinced in later life. In 1763 his tragedy of *Warwick* was played before the court. This, his first play, was perhaps the best he ever wrote. The many authors whom he afterwards offended were always able to observe that the critic's own plays did not reach the standard of excellence he set up. *Timoléon* (1764), *Pharamond* (1765) and *Gustave Wasa* (1766) were failures. *Mélanie* was a better play, but was never represented. The success of *Warwick* led to a correspondence with Voltaire, who conceived a high opinion of La Harpe, even allowing him to correct his verses. In 1764 La Harpe married the daughter of a coffee house keeper. This marriage, which proved very unhappy and was dissolved, did not improve his position.

They were very poor, and for some time were guests of Voltaire at Ferney. When, after Voltaire's death, La Harpe in his praise of the philosopher ventured on some reasonable, but rather ill-timed, criticism of individual works, he was accused of treachery to one who had been his constant friend. In 1768 he returned from Ferney to Paris, where he began to write for the *Mercure*. He was a born fighter and had small mercy on the authors whose work he handled. But he was himself violently attacked, and suffered under many epigrams, especially those of Lebrun-Pindare. No more striking proof of the general hostility can be given than his reception (1776) at the Academy, which Sainte-Beuve calls his "execution." Marmontel, who received him, used the occasion to eulogize La Harpe's predecessor, Charles Pierre Colardeau, especially for his pacific, modest and indulgent disposition. The speech was punctuated by the applause of the audience, who chose to regard it as a series of sarcasms on the new member. Eventually La Harpe was compelled to resign from the *Mercure*, which he had edited from 1770. On the stage he produced *Les Barmécides* (1778), *Philoctète*, *Jeanne de Naples* (1781), *Les Brames* (1783), *Coriolan* (1784), *Virginie* (1786). In 1786 he began a course of literature at the newly-established Lycée. In these lectures, published as the *Cours de littérature ancienne et moderne*, La Harpe is at his best, for he found a standpoint more or less independent of contemporary polemics. He is said to be inexact in dealing with the ancients, and he had only a superficial knowledge of the middle ages, but he is excellent in his analysis of 17th-century writers. Sainte-Beuve found in him the best critic of the French school of tragedy, which reached its perfection in Racine. La Harpe was a disciple of the "*philosophes*"; he supported the extreme party through the excesses of 1792 and 1793. In 1793 he edited the *Mercure de France* which adhered blindly to the revolutionary leaders. But in April 1794 he was nevertheless seized as a "suspect." In prison he underwent a spiritual crisis which he described in convincing language, and he emerged an ardent Catholic and a reactionist in politics. When he resumed his chair at the Lycée, he attacked his former friends in politics and literature. He was imprudent enough to begin the publication (1801-1807) of his *Correspondance littéraire* (1774-1791) with the grand-duke, afterwards the emperor Paul of Russia. In these letters he surpassed the brutalities of the *Mercure*. He contracted a second marriage, which was dissolved after a few weeks by his wife. He died on the 11th of February 1803 in Paris, leaving in his will an incongruous exhortation to his fellow countrymen to maintain peace and concord. Among his posthumous works was a *Prophétie de Cazotte* which Sainte-Beuve pronounces his best work. It is a sombre description of a dinner-party of notables long before the Revolution, when Jacques Cazotte is made to prophesy the frightful fates awaiting the various individuals of the company.

Among his works not already mentioned are:—*Commentaire sur Racine* (1795-1796), published in 1807; *Commentaire sur le théâtre de Voltaire* of earlier date (published posthumously in 1814), and an epic poem *La Religion* (1814). His *Cours de littérature* has been often reprinted. To the edition of 1825-1826 is prefixed a notice by Pierre Daunou. See also Sainte-Beuve, *Causeries du lundi*, vol. v.; G. Peignot, *Recherches historiques, bibliographiques et littéraires ... sur La Harpe* (1820).

LAHIRE, LAURENT DE (1606-1656), French painter, was born at Paris on the 27th of February 1606. He became a pupil of Lallemand, studied the works of Primaticcio at Fontainebleau, but never visited Italy, and belongs wholly to that transition period which preceded the school of Simon Vouet. His picture of Nicolas V. opening the crypt in which he discovers the corpse of St Francis of Assisi standing (Louvre) was executed in 1630 for the Capuchins of the Marais; it shows a gravity and sobriety of character which marked Lahire's best work, and seems not to have been without influence on Le Sueur. The Louvre contains eight other works, and paintings by Lahire are in the museums of Strasburg, Rouen and Le Mans. His drawings, of which the British Museum possesses a fine example, "Presentation of the Virgin in the Temple," are treated as seriously as his paintings, and sometimes show simplicity and dignity of effect. The example of the Capuchins, for whom he executed several other works in Paris, Rouen and Fécamp, was followed by the goldsmiths' company, for whom he produced in 1635 "St Peter healing the Sick" (Louvre) and the "Conversion of St Paul" in 1637. In 1646, with eleven other artists, he founded the French Royal Academy of Painting and Sculpture. Richelieu called Lahire to the Palais Royal; Chancellor Séguier, Tallemant de Réaux and many others entrusted him with important works of decoration; for the Gobelins he designed a series of large compositions. Lahire painted also a great number of portraits, and in 1654 united in one work for the town-hall of Paris those of the principal dignitaries of the municipality. He died on the 28th of December 1656.

LAHN, a river of Germany, a right-bank tributary of the Rhine. Its source is on the Jagdberg, a summit of the Rothaar Mountains, in the cellar of a house (Lahnhof), at an elevation of 1975 ft. It flows at first eastward and then southward to Giessen, then turns south-westward and with a winding course reaches the Rhine between the towns of Oberlahnstein and Niederlahnstein. Its valley, the lower part of which divides the Taunus hills from the Westerwald, is often very narrow and picturesque; among the towns and sites of interest on its banks are Marburg and Giessen with their universities, Wetzlar with its cathedral,

Runkel with its castle, Limburg with its cathedral, the castles of Schaumburg, Balduinstein, Laurenburg, Langenau, Burgstein and Nassau, and the well-known health resort of Ems. The Lahn is about 135 m. long; it is navigable from its mouth to Giessen, and is partly canalized. A railway follows the valley practically throughout. In 1796 there were here several encounters between the French under General Jourdan and the troops of the archduke Johan, which resulted in the retreat of the French across the Rhine.

LAHNDA (properly *Lahndā* or *Lahindā*, western, or *Lahndē-dī bōlī*, the language of the West), an Indo-Aryan language spoken in the western Punjab. In 1901 the number of speakers was 3,337,917. Its eastern boundary is very indefinite as the language gradually merges into the Panjabi immediately to the east, but it is conventionally taken as the river Chenab from the Kashmir frontier to the town of Ramnagar, and thence as a straight line to the south-west corner of the district of Montgomery. Lahnda is also spoken in the north of the state of Bahawalpur and of the province of Sind, in which latter locality it is known as Siraiki. Its western boundary is, roughly speaking, the river Indus, across which the language of the Afghan population is Pashto (Pushtu), while the Hindu settlers still speak Lahnda. In the Derajat, however, Lahnda is the principal language of all classes in the plains west of the river.

Lahnda is also known as Western Panjabi and as Jatki, or the language of the Jats, who form the bulk of the population whose mother-tongue it is. In the Derajat it is called Hindko or the language of Hindus. In 1819 the Serampur missionaries published a Lahnda version of the New Testament. They called the language Uchchī, from the important town of Uch near the confluence of the Jhelam and the Chenab. This name is commonly met with in old writings. It has numerous dialects, which fall into two main groups, a northern and a southern, the speakers of which are separated by the Salt Range. The principal varieties of the northern group are Hindki (the same in meaning as Hindko) and Pōthwārī. In the southern group the most important are Khētrānī, Multānī, and the dialect of Shahpur. The language possesses no literature.

Lahnda belongs to the north-western group of the outer band of Indo-Aryan languages (*q.v.*), the other members being Kashmiri (*q.v.*) and Sindhi, with both of which it is closely connected. See SINDHI; also HINDOSTANI.

(G. A. GR.)

LA HOGUE, BATTLE OF, the name now given to a series of encounters which took place from the 19th to the 23rd (O.S.) of May 1692, between an allied British and Dutch fleet and a French force, on the northern and eastern sides of the Cotentin in Normandy. A body of French troops, and a number of Jacobite exiles, had been collected in the Cotentin. The government of Louis XIV. prepared a naval armament to cover their passage across the Channel. This force was to have been composed of the French ships at Brest commanded by the count of Tourville, and of a squadron which was to have joined him from Toulon. But the Toulon ships were scattered by a gale, and the combination was not effected. The count of Tourville, who had put to sea to meet them, had with him only 45 or 47 ships of the line. Yet when the reinforcement failed to join him, he steered up Channel to meet the allies, who were known to be in strength. On the 15th of May the British fleet of 63 sail of the line, under command of Edward Russell, afterwards earl of Orford, was joined at St Helens by the Dutch squadron of 36 sail under Admiral van Allemonde. The apparent rashness of the French admiral in seeking an encounter with very superior numbers is explained by the existence of a general belief that many British captains were discontented, and would pass over from the service of the government established by the Revolution of 1688 to their exiled king, James II. It is said that Tourville had orders from Louis XIV. to attack in any case, but the story is of doubtful authority. The British government, aware of the Jacobite intrigues in its fleet, and of the prevalence of discontent, took the bold course of appealing to the loyalty and patriotism of its officers. At a meeting of the flag-officers on board the "Britannia," Russell's flag-ship, on the 15th of May, they protested their loyalty, and the whole allied fleet put to sea on the 18th. On the 19th of May, when Cape Barfleur, the north-eastern point of the Cotentin, was 21 m. S.W. of them, they sighted Tourville, who was then 20 m. to the north of Cape La Hague, the north-western extremity of the peninsula, which must not be confounded with La Houque, or La Hogue, the place at which the fighting ended. The allies were formed in a line from S.S.W. to N.N.E. heading towards the English coast, the Dutch forming the White or van division, while the Red or centre division under Russell, and the Blue or rear under Sir John Ashby, were wholly composed of British ships. The wind was from the S.W. and the weather hazy. Tourville bore down and attacked about mid-day, directing his main assault on the centre of the allies, but telling off some ships to watch the van and rear of his enemy. As this first encounter took place off Cape Barfleur, the battle was formerly often called by the name. On the centre, where Tourville was directly opposed to Russell, the fighting was severe. The British flag-ship the "Britannia" (100), and the French, the "Soleil Royal" (100), were both completely crippled. After several hours of conflict, the French admiral, seeing himself outnumbered, and that the allies could outflank him and pass through the necessarily wide

intervals in his extended line, drew off without the loss of a ship. The wind now fell and the haze became a fog. Till the 23rd, the two fleets remained off the north coast of the Cotentin, drifting west with the ebb tide or east with the flood, save when they anchored. During the night of the 19th/20th some British ships became entangled, in the fog, with the French, and drifted through them on the tide, with loss. On the 23rd both fleets were near La Hague. About half the French, under D'Amfreville, rounded the cape, and fled to St Malo through the dangerous passage known as the Race of Alderney (le Ras Blanchard). The others were unable to get round the cape before the flood tide set in, and were carried to the eastward. Tourville now transferred his own flag, and left his captains free to save themselves as they best could. He left the "Soleil Royal," and sent her with two others to Cherbourg, where they were destroyed by Sir Ralph Delaval. The others now ran round Cape Barfleur, and sought refuge on the east side of the Cotentin at the anchorage of La Houque, called by the English La Hogue, where the troops destined for the invasion were encamped. Here 13 of them were burnt by Sir George Rooke, in the presence of the French generals and of the exiled king James II. From the name of the place where the last blow was struck, the battle has come to be known by the name of La Hogue.

Sufficient accounts of the battle may be found in Lediard's *Naval History* (London, 1735), and for the French side in Tronde's *Batailles navales de la France* (Paris, 1867). The escape of D'Amfreville's squadron is the subject of Browning's poem "Hervé Riel."

(D. H.)

LAHORE, an ancient city of British India, the capital of the Punjab, which gives its name to a district and division. It lies in 31° 35′ N. and 74° 20′ E. near the left bank of the River Ravi, 1706 ft. above the sea, and 1252 m. by rail from Calcutta. It is thus in about the same latitude as Cairo, but owing to its inland position is considerably hotter than that city, being one of the hottest places in India in the summer time. In the cold season the climate is pleasantly cool and bright. The native city is walled, about 1¼ m. in length W. to E. and about ¾ m. in breadth N. to S. Its site has been occupied from early times, and much of it stands high above the level of the surrounding country, raised on the remains of a succession of former habitations. Some old buildings, which have been preserved, stand now below the present surface of the ground. This is well seen in the mosque now called Masjid Niwin (or sunken) built in 1560, the mosque of Mullah Rahmat, 7 ft. below, and the Shivali, a very old Hindu temple, about 12 ft. below the surrounding ground. Hindu tradition traces the origin of Lahore to Loh or Lava, son of Rama, the hero of the *Ramayana*. The absence of mention of Lahore by Alexander's historians, and the fact that coins of the Graeco-Bactrian kings are not found among the ruins, lead to the belief that it was not a place of any importance during the earliest period of Indian history. On the other hand, Hsüan Tsang, the Chinese Buddhist, notices the city in his *Itinerary* (A.D. 630); and it seems probable, therefore, that Lahore first rose into prominence between the 1st and 7th centuries A.D. Governed originally by a family of Chauhan Rajputs, a branch of the house of Ajmere, Lahore fell successively under the dominion of the Ghazni and Ghori sultans, who made it the capital of their Indian conquests, and adorned it with numerous buildings, almost all now in ruins. But it was under the Mogul empire that Lahore reached its greatest size and magnificence. The reigns of Humayun, Akbar, Jahangir, Shah Jahan and Aurangzeb form the golden period in the annals and architecture of the city. Akbar enlarged and repaired the fort, and surrounded the town with a wall, portions of which remain, built into the modern work of Ranjit Singh. Lahore formed the capital of the Sikh empire of that monarch. At the end of the second Sikh War, with the rest of the Punjab, it came under the British dominion.

The architecture of Lahore cannot compare with that of Delhi. Jahangir in 1622-1627 erected the Khwabgah or "sleeping-place," a fine palace much defaced by the Sikhs but to some extent restored in modern times; the Moti Masjid or "pearl mosque" in the fort, used by Ranjit Singh and afterwards by the British as a treasure-house; and also the tomb of Anarkali, used formerly as the station church and now as a library. Shah Jahan erected a palace and other buildings near the Khwabgah, including the beautiful pavilion called the Naulakha from its cost of nine lakhs, which was inlaid with precious stones. The mosque of Wazir Khan (1634) provides the finest example of *kashi* or encaustic tile work. Aurangzeb's Jama Masjid, or "great mosque," is a huge bare building, stiff in design, and lacking the detailed ornament typical of buildings at Delhi. The buildings of Ranjit Singh, especially his mausoleum, are common and meretricious in style. He was, moreover, responsible for much of the despoiling of the earlier buildings. The streets of the native city are narrow and tortuous, and are best seen from the back of an elephant. Two of the chief features of Lahore lie outside its walls at Shahdara and Shalamar Gardens respectively. Shahdara, which contains the tomb of the emperor Jahangir, lies across the Ravi some 6 m. N. of the city. It consists of a splendid marble cenotaph surrounded by a grove of trees and gardens. The Shalamar Gardens, which were laid out in A.D. 1637 by Shah Jahan, lie 6 m. E. of the city. They are somewhat neglected except on festive occasions, when the fountains are playing and the trees are lit up by lamps at night.

The modern city of Lahore, which contained a population of 202,964 in 1901, may be divided into four parts: the native city, already described; the civil station or European quarter, known as Donald Town; the Anarkali bazaar, a suburb S. of the city wall; and the cantonment, formerly called Mian Mir. The main street of the civil station is a portion of the grand trunk road from Calcutta to Peshawar, locally known as the Mall. The chief modern buildings along this road, west to east, are the Lahore museum, containing a fine collection of Graeco-Buddhist sculptures, found by General Cunningham in the Yusufzai country, and arranged by Mr Lockwood Kipling, a former curator of the museum; the cathedral, begun by Bishop

French, in Early English style, and consecrated in 1887; the Lawrence Gardens and Montgomery Halls, surrounded by a garden that forms the chief meeting-place of Europeans in the afternoon; and opposite this government house, the official residence of the lieutenant-governor of the Punjab; next to this is the Punjab club for military men and civilians. Three miles beyond is the Lahore cantonment, where the garrison is stationed, except a company of British infantry, which occupies the fort. It is the headquarters of the 3rd division of the northern army. Lahore is an important junction on the North-Western railway system, but has little local trade or manufacture. The chief industries are silk goods, gold and silver lace, metal work and carpets which are made in the Lahore gaol. There are also cotton mills, flour mills, an ice-factory, and several factories for mineral waters, oils, soap, leather goods, &c. Lahore is an important educational centre. Here are the Punjab University with five colleges, medical and law colleges, a central training college, the Aitchison Chiefs' College for the sons of native noblemen, and a number of other high schools and technical and special schools.

The District of Lahore has an area of 3704 sq. m., and its population in 1901 was 1,162,109, consisting chiefly of Punjabi Mahommedans with a large admixture of Hindus and Sikhs. In the north-west the district includes a large part of the barren Rechna Doab, while south of the Ravi is a desolate alluvial tract, liable to floods. The Manjha plateau, however, between the Ravi and the Beas, has been rendered fertile by the Bari Doab canal. The principal crops are wheat, pulse, millets, maize, oil-seeds and cotton. There are numerous factories for ginning and pressing cotton. Irrigation is provided by the main line of the Bari Doab canal and its branches, and by inundation-cuts from the Sutlej. The district is crossed in several directions by lines of the North-Western railway. Lahore, Kasur, Chunian and Raiwind are the chief trade centres.

The Division of Lahore extends along the right bank of the Sutlej from the Himalayas to Multan. It comprises the six districts of Sialkot, Gujranwala, Montgomery, Lahore, Amritsar and Gurdaspur. Total area, 17,154 sq. m.; pop. (1901) 5,598,463. The commissioner for the division also exercises political control over the hill slate of Chamba. The common language of the rural population and of artisans is Punjabi; while Urdu or Hindustani is spoken by the educated classes. So far from the seaboard, the range between extremes of winter and summer temperature in the sub-tropics is great. The mean temperature in the shade in June is about 92° F., in January about 50°. In midsummer the thermometer sometimes rises to 115° in the shade, and remains on some occasions as high as 105° throughout the night. In winter the morning temperature is sometimes as low as 20°. The rainfall is uncertain, ranging from 8 in. to 25, with an average of 15 in. The country as a whole is parched and arid, and greatly dependent on irrigation.

LA HOZ Y MOTA, JUAN CLAUDIO DE (1630?-1710?), Spanish dramatist, was born in Madrid. He became a knight of Santiago in 1653, and soon afterwards succeeded his father as *regidor* of Burgos. In 1665 he was nominated to an important post at the Treasury, and in his later years acted as official censor of the Madrid theatres. On the 13th of August 1709 he signed his play entitled *Josef, salvador de Egipto*, and is presumed to have died in the following year. Hoz is not remarkable for originality of conception, but his recasts of plays by earlier writers are distinguished by an adroitness which accounts for the esteem in which he was held by his contemporaries. *El Montañés Juan Pascal* and *El castigo de la miseria*, reprinted in the *Biblioteca de Autores Españoles*, give a just idea of his adaptable talent.

LAHR, a town in the grand-duchy of Baden, on the Schutter, about 9 m. S. of Offenburg, and on the railway Dinglingen-Lahr. Pop. (1900) 13,577. One of the busiest towns in Baden, it carries on manufactures of tobacco and cigars, woollen goods, chicory, leather, pasteboard, hats and numerous other articles, has considerable trade in wine, while among its other industries are printing and lithography. Lahr first appears as a town in 1278, and after several vicissitudes it passed wholly to Baden in 1803.

See Stein, *Geschichte und Beschreibung der Stadt Lahr* (Lahr, 1827); and Sütterlin, *Lahr und seine Umgebung* (Lahr, 1904).

LAIBACH (Slovenian, *Ljubljana*), capital of the Austrian duchy of Carniola, 237 m. S.S.W. of Vienna by rail. Pop. (1900) 36,547, mostly Slovene. It is situated on the Laibach, near its influx into the Save, and

consists of the town proper and eight suburbs. Laibach is an episcopal see, and possesses a cathedral in the Italian style, several beautiful churches, a town hall in Renaissance style and a castle, built in the 15th century, on the Schlossberg, an eminence which commands the town. Laibach is the principal centre of the national Slovenian movement, and it contains a Slovene theatre and several societies for the promotion of science and literature in the native tongue. The Slovenian language is in general official use, and the municipal administration is purely Slovenian. The industries include manufactures of pottery, bricks, oil, linen and woollen cloth, fire-hose and paper.

Laibach is supposed to occupy the site of the ancient Emona or Aemona, founded by the emperor Augustus in 34 B.C. It was besieged by Alaric in 400, and in 451 it was desolated by the Huns. In 900 Laibach suffered much from the Magyars, who were, however, defeated there in 914. In the 12th century the town passed into the hands of the dukes of Carinthia; in 1270 it was taken by Ottocar of Bohemia; and in 1277 it came under the Habsburgs. In the early part of the 15th century the town was several times besieged by the Turks. The bishopric was founded in 1461. On the 17th of March 1797 and again on the 3rd of June 1809 Laibach was taken by the French, and from 1809 to 1813 it became the seat of their general government of the Illyrian provinces. From 1816 to 1849 Laibach was the capital of the kingdom of Illyria. The town is also historically known from the congress of Laibach, which assembled here in 1821 (see below). Laibach suffered severely on the 14th of April 1895 from an earthquake.

Congress or Conference of Laibach.—Before the break-up of the conference of Troppau (*q.v.*), it had been decided to adjourn it till the following January, and to invite the attendance of the king of Naples, Laibach being chosen as the place of meeting. Castlereagh, in the name of Great Britain, had cordially approved this invitation, as “implying negotiation” and therefore as a retreat from the position taken up in the Troppau Protocol. Before leaving Troppau, however, the three autocratic powers, Russia, Austria and Prussia, had issued, on the 8th of December 1820, a circular letter, in which they reiterated the principles of the Protocol, *i.e.* the right and duty of the powers responsible for the peace of Europe to intervene to suppress any revolutionary movement by which they might conceive that peace to be endangered (Hertslet, No. 105). Against this view Castlereagh once more protested in a circular despatch of the 19th of January 1821, in which he clearly differentiated between the objectionable general principles advanced by the three powers, and the particular case of the unrest in Italy, the immediate concern not of Europe at large, but of Austria and of any other Italian powers which might consider themselves endangered (Hertslet, No. 107).

The conference opened on the 26th of January 1821, and its constitution emphasized the divergences revealed in the above circulars. The emperors of Russia and Austria were present in person, and with them were Counts Nesselrode and Capo d’Istria, Metternich and Baron Vincent; Prussia and France were represented by plenipotentiaries. But Great Britain, on the ground that she had no immediate interest in the Italian question, was represented only by Lord Stewart, the ambassador at Vienna, who was not armed with full powers, his mission being to watch the proceedings and to see that nothing was done beyond or in violation of the treaties. Of the Italian princes, Ferdinand of Naples and the duke of Modena came in person; the rest were represented by plenipotentiaries.

It was soon clear that a more or less open breach between Great Britain and the other powers was inevitable, Metternich was anxious to secure an apparent unanimity of the powers to back the Austrian intervention in Naples, and every device was used to entrap the English representative into subscribing a formula which would have seemed to commit Great Britain to the principles of the other allies. When these devices failed, attempts were made unsuccessfully to exclude Lord Stewart from the conferences on the ground of defective powers. Finally he was forced to an open protest, which he caused to be inscribed on the journals, but the action of Capo d’Istria in reading to the assembled Italian ministers, who were by no means reconciled to the large claims implied in the Austrian intervention, a declaration in which as the result of the “intimate union established by solemn acts between all the European powers” the Russian emperor offered to the allies “the aid of his arms, should new revolutions threaten new dangers,” an attempt to revive that idea of a “universal union” based on the Holy Alliance (*q.v.*) against which Great Britain had consistently protested.

The objections of Great Britain were, however, not so much to an Austrian intervention in Naples as to the far-reaching principles by which it was sought to justify it. King Ferdinand had been invited to Laibach, according to the circular of the 8th of December, in order that he might be free to act as “mediator between his erring peoples and the states whose tranquillity they threatened.” The cynical use he made of his “freedom” to repudiate obligations solemnly contracted is described elsewhere (see Naples, *History*). The result of this action was the Neapolitan declaration of war and the occupation of Naples by Austria, with the sanction of the congress. This was preceded, on the 10th of March, by the revolt of the garrison of Alessandria and the military revolution in Piedmont, which in its turn was suppressed, as a result of negotiations at Laibach, by Austrian troops. It was at Laibach, too, that, on the 19th of March, the emperor Alexander received the news of Ypsilanti’s invasion of the Danubian principalities, which heralded the outbreak of the War of Greek Independence, and from Laibach Capo d’Istria addressed to the Greek leader the tsar’s repudiation of his action.

The conference closed on the 12th of May, on which date Russia, Austria and Prussia issued a declaration (Hertslet, No. 108) “to proclaim to the world the principles which guided them” in coming “to the assistance of subdued peoples,” a declaration which once more affirmed the principles of the Troppau Protocol. In this lay the European significance of the Laibach conference, of which the activities had been mainly confined to Italy. The issue of the declaration without the signatures of the representatives of Great Britain and France proclaimed the disunion of the alliance, within which—to use Lord Stewart’s words—there existed “a triple understanding which bound the parties to carry forward their own views in spite of any difference of opinion between them and the two great constitutional governments.”

No separate history of the congress exists, but innumerable references are to be found in general

histories and in memoirs, correspondence, &c., of the time. See Sir E. Hertslet, *Map of Europe* (London, 1875); Castlereagh, *Correspondence*; Metternich, *Memoirs*; N. Bianchi, *Storia documentata della diplomazia Europea in Italia* (8 vols., Turin, 1865-1872); Gentz's correspondence (see GENTZ, F. VON). Valuable unpublished correspondence is preserved at the Record Office in the volumes marked F. O., Austria, Lord Stewart, January to February 1821, and March to September 1821.

(W. A. P.)

LAIDLAW, WILLIAM (1780-1845), friend and amanuensis of Sir Walter Scott, was born at Blackhouse, Selkirkshire, on the 19th of November 1780, the son of a sheep farmer. After an elementary education in Peebles he returned to work upon his father's farm. James Hogg, the shepherd poet, who was employed at Blackhouse for some years, became Laidlaw's friend and appreciative critic. Together they assisted Scott by supplying material for his *Border Minstrelsy*, and Laidlaw, after two failures as a farmer in Midlothian and Peebleshire, became Scott's steward at Abbotsford. He also acted as Scott's amanuensis at different times, taking down a large part of *The Bride of Lammermoor*, *The Legend of Montrose* and *Ivanhoe* from the author's dictation. He died at Contin near Dingwall, Ross-shire, on the 18th of May 1845. Of his poetry, little is known except *Lucy's Flittin'* in Hogg's *Forest Minstrel*.

LAING, ALEXANDER GORDON (1793-1826), Scottish explorer, the first European to reach Timbuktu, was born at Edinburgh on the 27th of December 1793. He was educated by his father, William Laing, a private teacher of classics, and at Edinburgh University. In 1811 he went to Barbados as clerk to his maternal uncle Colonel (afterwards General) Gabriel Gordon. Through General Sir George Beckwith, governor of Barbados, he obtained an ensigncy in the York Light Infantry. He was employed in the West Indies, and in 1822 was promoted to a company in the Royal African Corps. In that year, while with his regiment at Sierra Leone, he was sent by the governor, Sir Charles MacCarthy, to the Mandingo country, with the double object of opening up commerce and endeavouring to abolish the slave trade in that region. Later in the same year Laing visited Falaba, the capital of the Sulima country, and ascertained the source of the Rokell. He endeavoured to reach the source of the Niger, but was stopped by the natives. He was, however, enabled to fix it with approximate accuracy. He took an active part in the Ashanti War of 1823-24, and was sent home with the despatches containing the news of the death in action of Sir Charles MacCarthy. Henry, 3rd Earl Bathurst, then secretary for the colonies, instructed Captain Laing to undertake a journey, via Tripoli and Timbuktu, to further elucidate the hydrography of the Niger basin. Laing left England in February 1825, and at Tripoli on the 14th of July following he married Emma Warrington, daughter of the British consul. Two days later, leaving his bride behind, he started to cross the Sahara, being accompanied by a sheikh who was subsequently accused of planning his murder. Ghadames was reached, by an indirect route, in October 1825, and in December Laing was in the Tuat territory, where he was well received by the Tuareg. On the 10th of January 1826 he left Tuat, and made for Timbuktu across the desert of Tanezroft. Letters from him written in May and July following told of sufferings from fever and the plundering of his caravan by Tuareg, Laing being wounded in twenty-four places in the fighting. Another letter dated from Timbuktu on the 21st of September announced his arrival in that city on the preceding 18th of August, and the insecurity of his position owing to the hostility of the Fula chieftain Bello, then ruling the city. He added that he intended leaving Timbuktu in three days' time. No further news was received from the traveller. From native information it was ascertained that he left Timbuktu on the day he had planned and was murdered on the night of the 26th of September 1826. His papers were never recovered, though it is believed that they were secretly brought to Tripoli in 1828. In 1903 the French government placed a tablet bearing the name of the explorer and the date of his visit on the house occupied by him during his thirty-eight days' stay in Timbuktu.

While in England in 1824 Laing prepared a narrative of his earlier journeys, which was published in 1825 and entitled *Travels in the Timannee, Kooranko and Soolima Countries, in Western Africa*.

LAING, DAVID (1793-1878), Scottish antiquary, the son of William Laing, a bookseller in Edinburgh, was born in that city on the 20th of April 1793. Educated at the Canongate Grammar School, when fourteen he was apprenticed to his father. Shortly after the death of the latter in 1837, Laing was elected to the librarianship of the Signet Library, which post he retained till his death. Apart from an extraordinary general bibliographical knowledge, Laing was best known as a lifelong student of the

literary and artistic history of Scotland. He published no original volumes, but contented himself with editing the works of others. Of these, the chief are—*Dunbar's Works* (2 vols., 1834), with a supplement added in 1865; *Robert Baillie's Letters and Journals* (3 vols., 1841-1842); *John Knox's Works* (6 vols., 1846-1864); *Poems and Fables of Robert Henryson* (1865); *Andrew of Wyntoun's Orygynale Cronykil of Scotland* (3 vols., 1872-1879); *Sir David Lyndsay's Poetical Works* (3 vols., 1879). Laing was for more than fifty years a member of the Society of Antiquaries of Scotland, and he contributed upwards of a hundred separate papers to their *Proceedings*. He was also for more than forty years secretary to the Bannatyne Club, many of the publications of which were edited by him. He was struck with paralysis in 1878 while in the Signet Library, and it is related that, on recovering consciousness, he looked about and asked if a proof of Wyntoun had been sent from the printers. He died a few days afterwards, on the 18th of October, in his eighty-sixth year. His library was sold by auction, and realized £16,137. To the university of Edinburgh he bequeathed his collection of MSS.

See the Biographical Memoir prefixed to *Select Remains of Ancient, Popular and Romance Poetry of Scotland*, edited by John Small (Edinburgh, 1885); also T. G. Stevenson, *Notices of David Laing with List of his Publications, &c.* (privately printed 1878).

LAING, MALCOLM (1762-1818), Scottish historian, son of Robert Laing, and elder brother of Samuel Laing the elder, was born on his paternal estate on the Mainland of Orkney. Having studied at the grammar school of Kirkwall and at Edinburgh University, he was called to the Scotch bar in 1785, but devoted his time mainly to historical studies. In 1793 he completed the sixth and last volume of Robert Henry's *History of Great Britain*, the portion which he wrote being in its strongly liberal tone at variance with the preceding part of the work; and in 1802 he published his *History of Scotland from the Union of the Crowns to the Union of the Kingdoms*, a work showing considerable research. Attached to the *History* was a dissertation on the Gowrie conspiracy, and another on the supposed authenticity of Ossian's poems. In another dissertation, prefixed to a second and corrected edition of the *History* published in 1804, Laing endeavoured to prove that Mary, queen of Scots, wrote the Casket Letters, and was partly responsible for the murder of Lord Darnley. In the same year he edited the *Life and Historie of King James VI.*, and in 1805 brought out in two volumes an edition of Ossian's poems. Laing, who was a friend of Charles James Fox, was member of parliament for Orkney and Shetland from 1807 to 1812. He died on the 6th of November 1818.

LAING, SAMUEL (1810-1897), British author and railway administrator, was born at Edinburgh on the 12th of December 1810. He was the nephew of Malcolm Laing, the historian of Scotland; and his father, Samuel Laing (1780-1868), was also a well-known author, whose books on Norway and Sweden attracted much attention. Samuel Laing the younger entered St John's College, Cambridge, in 1827, and after graduating as second wrangler and Smith's prizeman, was elected a fellow, and remained at Cambridge temporarily as a coach. He was called to the bar in 1837, and became private secretary to Mr Labouchere (afterwards Lord Taunton), the president of the Board of Trade. In 1842 he was made secretary to the railway department, and retained this post till 1847. He had by then become an authority on railway working, and had been a member of the Dalhousie Railway Commission; it was at his suggestion that the "parliamentary" rate of a penny a mile was instituted. In 1848 he was appointed chairman and managing director of the London, Brighton & South Coast Railway, and his business faculty showed itself in the largely increased prosperity of the line. He also became chairman (1852) of the Crystal Palace Company, but retired from both posts in 1855. In 1852 he entered parliament as a Liberal for Wick, and after losing his seat in 1857, was re-elected in 1859, in which year he was appointed financial secretary to the Treasury; in 1860 he was made finance minister in India. On returning from India, he was re-elected to parliament for Wick in 1865. He was defeated in 1868, but in 1873 he was returned for Orkney and Shetland, and retained his seat till 1885. Meanwhile he had been reappointed chairman of the Brighton line in 1867, and continued in that post till 1894, being generally recognized as an admirable administrator. He was also chairman of the Railway Debenture Trust and the Railway Share Trust. In later life he became well known as an author, his *Modern Science and Modern Thought* (1885), *Problems of the Future* (1889) and *Human Origins* (1892) being widely read, not only by reason of the writer's influential position, experience of affairs and clear style, but also through their popular and at the same time well-informed treatment of the scientific problems of the day. Laing died at Sydenham on the 6th of August 1897.

LAING'S [or LANG'S] **NEK**, a pass through the Drakensberg, South Africa, immediately north of Majuba (*q.v.*), at an elevation of 5400 to 6000 ft. It is the lowest part of a ridge which slopes from Majuba to the Buffalo river, and before the opening of the railway in 1891 the road over the nek was the main artery of communication between Durban and Pretoria. The railway pierces the nek by a tunnel 2213 ft. long. When the Boers rose in revolt in December 1880 they occupied Laing's Nek to oppose the entry of British reinforcements into the Transvaal. On the 28th of January 1881 a small British force endeavoured to drive the Boers from the pass, but was forced to retire.

LAIRD, MACGREGOR (1808-1861), Scottish merchant, pioneer of British trade on the Niger, was born at Greenock in 1808, the younger son of William Laird, founder of the Birkenhead firm of shipbuilders of that name. In 1831 Laird and certain Liverpool merchants formed a company for the commercial development of the Niger regions, the lower course of the Niger having been made known that year by Richard and John Lander. In 1832 the company despatched two small ships to the Niger, one, the "Alburkah," a paddle-wheel steamer of 55 tons designed by Laird, being the first iron vessel to make an ocean voyage. Macgregor Laird went with the expedition, which was led by Richard Lander and numbered forty-eight Europeans, of whom all but nine died from fever or, in the case of Lander, from wounds. Laird went up the Niger to the confluence of the Benue (then called the Shary or Tchadda), which he was the first white man to ascend. He did not go far up the river but formed an accurate idea as to its source and course. The expedition returned to Liverpool in 1834, Laird and Surgeon R. A. K. Oldfield being the only surviving officers besides Captain (then Lieut.) William Allen, R.N., who accompanied the expedition by order of the Admiralty to survey the river. Laird and Oldfield published in 1837 in two volumes the *Narrative of an Expedition into the Interior of Africa by the River Niger ... in 1832, 1833, 1834*. Commercially the expedition had been unsuccessful, but Laird had gained experience invaluable to his successors. He never returned to Africa but henceforth devoted himself largely to the development of trade with West Africa and especially to the opening up of the countries now forming the British protectorates of Nigeria. One of his principal reasons for so doing was his belief that this method was the best means of stopping the slave trade and raising the social condition of the Africans. In 1854 he sent out at his own charges, but with the support of the British government, a small steamer, the "Pleiad," which under W. B. Baikie made so successful a voyage that Laird induced the government to sign contracts for annual trading trips by steamers specially built for navigation of the Niger and Benue. Various stations were founded on the Niger, and though government support was withdrawn after the death of Laird and Baikie, British traders continued to frequent the river, which Laird had opened up with little or no personal advantage. Laird's interests were not, however, wholly African. In 1837 he was one of the promoters of a company formed to run steamships between England and New York, and in 1838 the "Sirius," sent out by this company, was the first ship to cross the Atlantic from Europe entirely under steam. Laird died in London on the 9th of January 1861.

His elder brother, JOHN LAIRD (1805-1874), was one of the first to use iron in the construction of ships; in 1829 he made an iron lighter of 60 tons which was used on canals and lakes in Ireland; in 1834 he built the paddle steamer "John Randolph" for Savannah, U.S.A., stated to be the first iron ship seen in America. For the East India Company he built in 1839 the first iron vessel carrying guns and he was also the designer of the famous "Birkenhead." A Conservative in politics, he represented Birkenhead in the House of Commons from 1861 to his death.

LAÏS, the name of two Greek courtesans, generally distinguished as follows. (1) The elder, a native of Corinth, born *c.* 480 B.C., was famous for her greed and hardheartedness, which gained her the nickname of *Axinē* (the axe). Among her lovers were the philosophers Aristippus and Diogenes, and Eubatas (or Aristoteles) of Cyrene, a famous runner. In her old age she became a drunkard. Her grave was shown in the Craneion near Corinth, surmounted by a lioness tearing a ram. (2) The younger, daughter of Timandra the mistress of Alcibiades, born at Hyccara in Sicily *c.* 420 B.C., taken to Corinth during the Sicilian expedition. The painter Apelles, who saw her drawing water from the fountain of Peirene, was struck by her beauty, and took her as a model. Having followed a handsome Thessalian to his native land, she was slain in the temple of Aphrodite by women who were jealous of her beauty. Many anecdotes are told of a Laïs by Athenaeus, Aelian, Pausanias, and she forms the subject of many epigrams in the Greek Anthology; but, owing to the similarity of names, there is considerable uncertainty to whom they refer. The name itself, like Phryne, was used as a general term for a courtesan.

See F. Jacobs, *Vermischte Schriften*, iv. (1830).

LAISANT, CHARLES ANNE (1841-), French politician, was born at Nantes on the 1st of November 1841, and was educated at the École Polytechnique as a military engineer. He defended the fort of Issy at the siege of Paris, and served in Corsica and in Algeria in 1873. In 1876 he resigned his commission to enter the Chamber as deputy for Nantes in the republican interest, and in 1879 he became director of the *Petit Parisien*. For alleged libel on General Courtot de Cissey in this paper he was heavily fined. In the Chamber he spoke chiefly on army questions; and was chairman of a commission appointed to consider army legislation, resigning in 1887 on the refusal of the Chamber to sanction the abolition of exemptions of any kind. He then became an adherent of the revisionist policy of General Boulanger and a member of the League of Patriots. He was elected Boulangist deputy for the 18th Parisian arrondissement in 1889. He did not seek re-election in 1893, but devoted himself thenceforward to mathematics, helping to make known in France the theories of Giusto Bellavitis. He was attached to the staff of the École Polytechnique, and in 1903-1904 was president of the French Association for the Advancement of Science.

In addition to his political pamphlets *Pourquoi et comment je suis Boulangiste* (1887) and *L'Anarchie bourgeoise* (1887), he published mathematical works, among them *Introduction à l'étude des quarternions* (1881) and *Théorie et applications des équipollences* (1887).

LAI-YANG, a city in the Chinese province of Shan-tung, in 37° N., 120° 55′ E., about the middle of the eastern peninsula, on the highway running south from Chi-fu to Kin-Kia or Ting-tsu harbour. It is surrounded by well-kept walls of great antiquity, and its main streets are spanned by large *pailous* or monumental arches, some dating from the time of the emperor Tai-ting-ti of the Yuan dynasty (1324). There are extensive suburbs both to the north and south, and the total population is estimated at 50,000. The so-called Ailanthus silk produced by *Saturnia cynthia* is woven at Lai-yang into a strong fabric; and the manufacture of the peculiar kind of wax obtained from the la-shu or wax-tree insect is largely carried on in the vicinity.

LAKANAL, JOSEPH (1762-1845), French politician, was born at Serres (Ariège) on the 14th of July 1762. His name, originally Lacanal, was altered to distinguish him from his Royalist brothers. He joined one of the teaching congregations, and for fourteen years taught in their schools. When elected by his native department to the Convention in 1792 he was acting as vicar to his uncle Bernard Font (1723-1800), the constitutional bishop of Pamiers. In the Convention he held apart from the various party sections, although he voted for the death of Louis XVI. He rendered great service to the Revolution by his practical knowledge of education. He became a member of the Committee of Public Instruction early in 1793, and after carrying many useful decrees on the preservation of national monuments, on the military schools, on the reorganization of the Museum of Natural History and other matters, he brought forward on the 26th of June his *Projet d'éducation nationale* (printed at the Imprimerie Nationale), which proposed to lay the burden or primary education on the public funds, but to leave secondary education to private enterprise. Provision was also made for public festivals, and a central commission was to be entrusted with educational questions. The scheme, in the main the work of Sieyès, was refused by the Convention, who submitted the whole question to a special commission of six, which under the influence of Robespierre adopted a report by Michel le Peletier de Saint Fargeau shortly before his tragic death. Lakanal, who was a member of the commission, now began to work for the organization of higher education, and abandoning the principle of his *Projet* advocated the establishment of state-aided schools for primary, secondary and university education. In October 1793 he was sent by the Convention to the south-western departments and did not return to Paris until after the revolution of Thermidor. He now became president of the Education Committee and promptly abolished the system which had had Robespierre's support. He drew up schemes for departmental normal schools, for primary schools (reviving in substance the *Projet*) and central schools. He presently acquiesced in the supersession of his own system, but continued his educational reports after his election to the Council of the Five Hundred. In 1799 he was sent by the Directory to organize the defence of the four departments on the left bank of the Rhine threatened by invasion. Under the Consulate he resumed his professional work, and after Waterloo retired to America, where he became president of the university of Louisiana. He returned to France in 1834, and shortly afterwards, in spite of his advanced age, married a second time. He died in Paris on the 14th of February 1845; his widow survived till 1881. Lakanal was an original member of the Institute of

France. He published in 1838 an *Exposé sommaire des travaux de Joseph Lakanal*.

His *éloge* at the Academy of Moral and Political Science, of which he was a member, was pronounced by the comte de Rémusat (February 16, 1845), and a *Notice historique* by F. A. M. Mignet was read on the 2nd of May 1857. See also notices by Émile Darnaud (Paris, 1874), "Marcus" (Paris, 1879), P. Legendre in *Hommes de la révolution* (Paris, 1882), E. Guillon, *Lakanal et l'instruction publique* (Paris, 1881). For details of the reports submitted by him to the government see M. Tourneux, "Histoire de l'instruction publique, actes et déliberations de la convention, &c." in *Bibliog. de l'hist. de Paris* (vol. iii., 1900); also A. Robert and G. Cougny, *Dictionnaire des parlementaires* (vol. ii., 1890).

LAKE, GERARD LAKE, 1st Viscount (1744-1808), British general, was born on the 27th of July 1744. He entered the foot guards in 1758, becoming lieutenant (captain in the army) 1762, captain (lieut.-colonel) in 1776, major 1784, and lieut.-colonel in 1792, by which time he was a general officer in the army. He served with his regiment in Germany in 1760-1762 and with a composite battalion in the Yorktown campaign of 1781. After this he was equerry to the prince of Wales, afterwards George IV. In 1790 he became a major-general, and in 1793 was appointed to command the Guards Brigade in the duke of York's army in Flanders. He was in command at the brilliant affair of Lincelles, on the 18th of August 1793, and served on the continent (except for a short time when seriously ill) until April 1794. He had now sold his lieut.-colonelcy in the guards, and had become colonel of the 53rd foot and governor of Limerick. In 1797 he was promoted lieut.-general. In the following year the Irish rebellion broke out. Lake, who was then serving in Ireland, succeeded Sir Ralph Abercromby in command of the troops in April 1798, issued a proclamation ordering the surrender of all arms by the civil population of Ulster, and on the 21st of June routed the rebels at Vinegar Hill (near Enniscorthy, Co. Wexford). He exercised great, but perhaps not unjustified, severity towards all rebels found in arms. Lord Cornwallis now assumed the chief command in Ireland, and in August sent Lake to oppose the French expedition which landed at Killala Bay. On the 29th of the same month Lake arrived at Castlebar, but only in time to witness the disgraceful rout of the troops under General Hely-Hutchinson (afterwards 2nd earl of Donoughmore); but he retrieved this disaster by compelling the surrender of the French at Ballinamuck, near Cloone, on the 8th of September. In 1799 Lake returned to England, and soon afterwards obtained the command in chief in India. He took over his duties at Calcutta in July 1801, and applied himself to the improvement of the Indian army, especially in the direction of making all arms, infantry, cavalry and artillery, more mobile and more manageable. In 1802 he was made a full general.

On the outbreak of war with the Mahratta confederacy in 1803 General Lake took the field against Sindhia, and within two months defeated the Mahrattas at Coel, stormed Aligahr, took Delhi and Agra, and won the great victory of Laswari (November 1st, 1803), where the power of Sindhia was completely broken, with the loss of thirty-one disciplined battalions, trained and officered by Frenchmen, and 426 pieces of ordnance. This defeat, followed a few days later by Major-General Arthur Wellesley's victory at Argaum, compelled Sindhia to come to terms, and a treaty with him was signed in December 1803. Operations were, however, continued against his confederate, Holkar, who, on the 17th of November 1804, was defeated by Lake at Farrukhabad. But the fortress of Bhurtpore held out against four assaults early in 1805, and Cornwallis, who succeeded Wellesley as governor-general in July of that year—superseding Lake at the same time as commander-in-chief—determined to put an end to the war. But after the death of Cornwallis in October of the same year, Lake pursued Holkar into the Punjab and compelled him to surrender at Amritsar in December 1805. Wellesley in a despatch attributed much of the success of the war to Lake's "matchless energy, ability and valour." For his services Lake received the thanks of parliament, and was rewarded by a peerage in September 1804. At the conclusion of the war he returned to England, and in 1807 he was created a viscount. He represented Aylesbury in the House of Commons from 1790 to 1802, and he also was brought into the Irish parliament by the government as member for Armagh in 1799 to vote for the Union. He died in London on the 20th of February 1808.

See H. Pearse, *Memoir of the Life and Services of Viscount Lake* (London, 1908); G. B. Malleson, *Decisive Battles of India* (1883); J. Grant Duff, *History of the Mahrattas* (1873); short memoir in *From Cromwell to Wellington*, ed. Spenser Wilkinson.

LAKE. Professor Forel of Switzerland, the founder of the science of limnology (Gr. λίμνη, a lake), defines a lake (Lat. *lacus*) as a mass of still water situated in a depression of the ground, without direct communication with the sea. The term is sometimes applied to widened parts of rivers, and sometimes to bodies of water which lie along sea-coasts, even at sea-level and in direct communication with the sea. The terms *pond*, *tarn*, *loch* and *mere* are applied to smaller lakes according to size and position. Some lakes are so large that an observer cannot see low objects situated on the opposite shore, owing to the lake-surface assuming the general curvature of the earth's surface. Lakes are nearly universally distributed,

but are more abundant in high than in low latitudes. They are abundant in mountainous regions, especially in those which have been recently glaciated. They are frequent along rivers which have low gradients and wide flats, where they are clearly connected with the changing channel of the river. Low lands in proximity to the sea, especially in wet climates, have numerous lakes, as, for instance, Florida. Lakes may be either fresh or salt, according to the nature of the climate, some being much more salt than the sea itself. They occur in all altitudes; Lake Titicaca in South America is 12,500 ft. above sea-level, and Yellowstone Lake in the United States is 7741 ft. above the sea; on the other hand, the surface of the Caspian Sea is 86 ft., the Sea of Tiberias 682 ft. and the Dead Sea 1292 ft. below the level of the ocean.

The primary source of lake water is atmospheric precipitation, which may reach the lakes through rain, melting ice and snow, springs, rivers and immediate run-off from the land-surfaces. The surface of the earth, with which we are directly in touch, is composed of lithosphere, hydrosphere and atmosphere, and these interpenetrate. Lakes, rivers, the water-vapour of the atmosphere and the water of hydration of the lithosphere, must all be regarded as outlying portions of the hydrosphere, which is chiefly made up of the great oceans. Lakes may be compared to oceanic islands. Just as an oceanic island presents many peculiarities in its rocks, soil, fauna and flora, due to its isolation from the larger terrestrial masses, so does a lake present peculiarities and an individuality in its physical, chemical and biological features, owing to its position and separation from the waters of the great oceans.

Origin of Lakes.—From the geological point of view, lakes may be arranged into three groups: (A) Rock-Basins, (B) Barrier-Basins and (C) Organic Basins.

A. Rock-Basins have been formed in several ways:—

1. *By slow movements of the earth's crust*, during the formation of mountains; the Lake of Geneva in Switzerland and the Lake of Annecy in France are due to the subsidence or warping of part of the Alps; on the other hand, Lakes Stefanie, Rudolf, Albert Nyanza, Tanganyika and Nyasa in Africa, and the Dead Sea in Asia Minor, are all believed to lie in a great rift or sunken valley.

2. *By Volcanic Agencies.*—Crater-lakes formed on the sites of dormant volcanoes may be from a few yards to several miles in width, have generally a circular form, and are often without visible outlet. Excellent examples of such lakes are to be seen in the province of Rome (Italy) and in the central plateau of France, where M. Delebecque found the Lake of Issarlès 329 ft. in depth. The most splendid crater-lake is found on the summit of the Cascade range of Southern Oregon (U.S.A.). This lake is 2000 ft. in depth.

3. *By Subsidence due to Subterranean Channels and Caves in Limestone Rocks.*—When the roofs of great limestone caves or underground lakes fall in, they produce at the surface what are called *limestone sinks*. Lakes similar to these are also found in regions abounding in rock-salt deposits; the Jura range offers many such lakes.

4. *By Glacier Erosion.*—A. C. Ramsay has shown that innumerable lakes of the northern hemisphere do not lie in fissures produced by underground disturbances, nor in areas of subsidence, nor in synclinal folds of strata, but are the results of glacial erosion. Many flat alluvial plains above gorges in Switzerland, as well as in the Highlands of Scotland, were, without doubt, what Sir Archibald Geikie calls glen-lakes, or true rock-basins, which have been filled up by sand and mud brought into them by their tributary streams.

B. Barrier-Basins.—These may be due to the following causes:—

1. *A landslip* often occurs in mountainous regions, where strata, dipping towards the valley, rest on soft layers; the hard rocks slip into the valley after heavy rains, damming back the drainage, which then forms a barrier-basin. Many small lakes high up in the Alps and Pyrenees are formed by a river being dammed back in this way.

2. *By a Glacier.*—In Alaska, in Scandinavia and in the Alps a glacier often bars the mouth of a tributary valley, the stream flowing therein is dammed back, and a lake is thus formed. The best-known lake of this kind is the Märjelen Lake in the Alps, near the great Aletsch Glacier. Lake Castain in Alaska is barred by the Malaspina Glacier; it is 2 or 3 m. long and 1 m. in width when at its highest level; it discharges through a tunnel 9 m. in length beneath the ice-sheet. The famous parallel roads of Glen Roy in Scotland are successive terraces formed along the shores of a glacial lake during the waning glacial epoch. Lake Agassiz, which during the glacial period occupied the valley of the Red River, and of which the present Lake Winnipeg is a remnant, was formed by an ice-dam along the margin of two great ice-sheets. It is estimated to have been 700 m. in length, and to have covered an area of 110,000 sq. m., thus exceeding the total area of the five great North American lakes: Superior (31,200), Michigan (22,450), Huron with Georgian Bay (23,800), Erie (9960) and Ontario (7240).

3. *By the Lateral Moraine of an Actual Glacier.*—These lakes sometimes occur in the Alps of Central Europe and in the Pyrenees Mountains.

4. *By the Frontal Moraine of an Ancient Glacier.*—The barrier in this case consists of the last moraine left by the retreating glacier. Such lakes are abundant in the northern hemisphere, especially in Scotland and the Alps.

5. *By Irregular Deposition of Glacial Drift.*—After the retreat of continental glaciers great masses of glacial drift are left on the land-surfaces, but, on account of the manner in which these masses were deposited, they abound in depressions that become filled with water. Often these lakes are without visible outlets, the water frequently percolating through the glacial drift. These lakes are so numerous in the north-eastern part of North America that one can trace the southern boundary of the great ice-sheet by following the southern limit of the lake-strewn region, where lakes may be counted by tens of thousands, varying from the size of a tarn to that of the great Laurentian lakes above mentioned.

6. *By Sand drifted into Dunes.*—It is a well-known fact that sand may travel across a country for several miles in the direction of the prevailing winds. When these sand-dunes obstruct a valley a lake may be formed. A good example of such a lake is found in Moses Lake in the state of Washington; but the sand-

dunes may also fill up or submerge river-valleys and lakes, for instance, in the Sahara, where the Shotts are like vast lakes in the early morning, and in the afternoon, when much evaporation has taken place, like vast plains of white salt.

7. *By Alluvial Matter deposited by Lateral Streams.*—If the current of a main river be not powerful enough to sweep away detrital matter brought down by a lateral stream, a dam is formed causing a lake. These lakes are frequently met with in the narrow valleys of the Highlands of Scotland.

8. *By Flows of Lava.*—Lakes of this kind are met with in volcanic regions.

C. Organic Basins.—In the vast tundras that skirt the Arctic Ocean in both the old and the new world, a great number of frozen ponds and lakes are met with, surrounded by banks of vegetation. Snow-banks are generally accumulated every season at the same spots. During summer the growth of the tundra vegetation is very rapid, and the snow-drifts that last longest are surrounded by luxuriant vegetation. When such accumulations of snow finally melt, the vegetation on the place they occupied is much less than along their borders. Year after year such places become more and more depressed, comparatively to the general surface, where vegetable growth is more abundant, and thus give origin to lakes.

It is well known that in coral-reef regions small bays are cut off from the ocean by the growth of corals, and thus ultimately fresh-water basins are formed.

Life History of Lakes.—From the time of its formation a lake is destined to disappear. The historical period has not been long enough to enable man to have watched the birth, life and death of any single lake of considerable size, still by studying the various stages of development a fairly good idea of the course they run can be obtained.

In humid regions two processes tend to the extinction of a lake, viz. the deposition of detrital matter in the lake, and the lowering of the lake by the cutting action of the outlet stream on the barrier. These outgoing streams, however, being very pure and clear, all detrital matter having been deposited in the lake, have less eroding power than inflowing streams. One of the best examples of the action of the filling-up process is presented by Lochs Doine, Voil and Lubnaig in the Callander district of Scotland. In post-glacial times these three lochs formed, without doubt, one continuous sheet of water, which subsequently became divided into three different basins by the deposition of sediment. Loch Doine has been separated from Loch Voil by alluvial cones laid down by two opposite streams. At the head of Loch Doine there is an alluvial flat that stretches for 1½ m., formed by the Lochlarig river and its tributaries. The long stretch of alluvium that separates Loch Voil from Loch Lubnaig has been laid down by Calair Burn in Glen Buckie, by the Kirkton Burn at Balquhidder, and by various streams on both sides of Strathyre. Loch Lubnaig once extended to a point ¾ m. beyond its present outlet, the level of the loch being lowered about 20 ft. by the denuding action of the river Leny on its rocky barrier.

In arid regions, where the rainfall is often less than 10 ins. in the year, the action of winds in the transport of sand and dust is more in evidence than that of rivers, and the effects of evaporation greater than of precipitation. Salt and bitter lakes prevail in these regions. Many salt lakes, such as the Dead Sea and the Great Salt Lake, are descended from fresh-water ancestors, while others, like the Caspian and Aral Seas, are isolated portions of the ocean. Lakes of the first group have usually become salt through a decrease in the rainfall of the region in which they occur. The water begins to get salt when the evaporation from the lake exceeds the inflow. The inflowing waters bring in a small amount of saline and alkaline matter, which becomes more and more concentrated as the evaporation increases. In lakes of the second group the waters were salt at the outset. If inflow exceeds evaporation they become fresher, and may ultimately become quite fresh. If the evaporation exceeds the inflow they diminish in size, and their waters become more and more salt and bitter. The first lake which occupied the basin of the Great Salt Lake of Utah appears to have been fresh, then with a change of climate to have become a salt lake. Another change of climate taking place, the level of the lake rose until it overflowed, the outlet being by the Snake river; the lake then became fresh. This expanded lake has been called Lake Bonneville, which covered an area of about 17,000 sq. m. Another change of climate in the direction of aridity reduced the level of the lake below the level of the outlet, the waters became gradually salt, and the former great fresh-water lake has been reduced gradually to the relatively small Great Salt Lake of the present day. The sites of extinct salt lakes yield salt in commercial quantities.

The Water of Lakes.—(*a*) *Composition.*—It is interesting to compare the quantity of solid matter in, and the chemical composition of, the water of fresh and salt lakes:—

	Total Solids by Evaporation expressed in Grams per Litre.
Great Salt Lake (Russell)	238.12
Lake of Geneva (Delebecque)	0.1775

The following analysis of a sample of the water of the Great Salt Lake (Utah, U.S.A.) is given by I. C. Russell:—

	Grams per Litre.		Probable Combination.
Na	75.825	NaCl	192.860
K	3.925	K_2SO_4	8.756
Li	0.021	Li_2SO_4	0.166
Mg	4.844	$MgCl_2$	15.044
Ca	2.424	$MgSO_4$	5.216
Cl	128.278	$CaSO_4$	8.240
SO_3	12.522	$Fe_2O_3 + Al_2O_3$	0.004

O in sulphate	2.494	SiO_2	0.018
$Fe_2O_3 + Al_2O_3$	0.004	Surplus SO_3	0.051
SiO_2	0.018		
Bo_2O_3	trace		
Br_3	faint trace		

The following analyses of the waters of other salt lakes are given by Mr J. Y. Buchanan (Art. “Lake,” *Ency. Brit.*, 9th Ed.), an analysis of sea-water from the Suez Canal being added for comparison:—

	Koko-nor.	Aral Sea	Caspian Sea.		Urmia Sea.	Dead Sea.	Lake Van.	Suez Canal Ismailia.
			Open.	Karabugas.				
Specific Gravity	1.00907	..	1.01106	1.26217	1.17500	..	1.01800	1.03898
Percentage of Salt	1.11	1.09	1.30	28.5	22.28	22.13	1.73	5.1
Name of Salt.	Grams of Salt per 1000 Grams of Water.							
Bicarbonate of Lime	0.6804	0.2185	0.1123	..	..	..	..	0.0072
Bicarbonate of Iron	0.0053	..	0.0014	..	..	..	..	0.0069
Bicarbonate of Magnesia	0.6598	..	..	..	..	..	0.4031	..
Carbonate of Soda	..	..	..	..	..	..	5.3976	..
Phosphate of Lime	0.0028	..	0.0021	..	..	..	5.3976	0.0029
Sulphate of Lime	..	1.3499	0.9004	..	0.7570	0.8600	..	1.8593
Sulphate of Magnesia	0.9324	2.9799	3.0855	61.9350	13.5460	..	0.2592	3.2231
Sulphate of Soda	1.7241	..	..	..	..	..	2.5673	..
Sulphate of Potash	..	..	..	..	..	..	0.5363	..
Chloride of Sodium	6.9008	6.2356	8.1163	83.2840	192.4100	76.5000	8.0500	40.4336
Chloride of Potassium	0.2209	0.1145	0.1339	9.9560	..	23.3000	..	0.6231
Chloride of Rubidium	0.0055	..	0.0034	0.2510	..	..	..	0.0265
Chloride of Magnesium	..	0.0003	0.6115	129.3770	15.4610	95.6000	..	4.7632
Chloride of Calcium	..	..	..	..	0.5990	22.4500	..	..
Bromide of Magnesium	0.0045	..	0.0081	0.1930	..	2.3100	..	0.0779
Silica	0.0098	..	0.0024	..	..	0.2400	0.0761	0.0027
Total Solid Matter	11.1463	10.8987	12.9773	284.9960	222.2600	221.2600	17.2899	51.0264

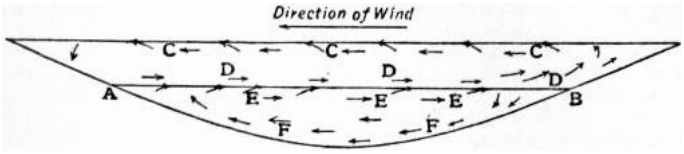
This table embraces examples of several types of salt lakes. In the Koko-nor, Aral and open Caspian Seas we have examples of the moderately salt, non-saturated waters. In the Karabugas, a branch gulf of the Caspian, Urmia and the Dead Seas we have examples of saturated waters containing principally chlorides. Lake Van is an example of the alkaline seas which also occur in Egypt, Hungary and other countries. Their peculiarity consists in the quantity of carbonate of soda dissolved in their waters, which is collected by the inhabitants for domestic and commercial purposes.

The following analyses by Dr Bourcart give an idea of the chemical composition of the water of fresh-water lakes in grams per litre:—

	Tanay.	Bleu.	Märjelen.	St Gothard.
SiO_2	0.003	0.0042	0.0014	0.0008
$Fe_2O_3 + Al_2O_3$	0.0012	0.0006	0.0008	trace
NaCl	0.0017	..	..	..
Na_2SO_4	0.0011	0.0038	0.0031	0.00085
Na_2CO_3	..	..	..	0.00128
K_2SO_4	0.0021	0.0028	0.0044	..
K_2CO_3	..	..	0.0003	0.00130
$MgSO_4$	0.006	0.0305	..	..
$MgCO_3$	0.0046	0.0158	0.0008	0.00015
$CaSO_4$	..	..	..	..
$CaCO_3$	0.107	0.1189	0.0061	0.00178
MnO	0.001	..	..	..

(*b*) *Movements and Temperature of Lake-Waters.*—(1) In addition to the rise and fall of the surface-level of lakes due to rainfall and evaporation, there is a transference of water due to the action of wind which results in raising the level at the end to which the wind is blowing. In addition to the well-known progressive waves there are also stationary waves or “seiches” which are less apparent. A seiche is a standing oscillation of a lake, usually in the direction of the longest diameter, but occasionally transverse. In a motion of this kind every particle of the water of the lake oscillates synchronously with every other, the periods and phases being the same for all, and the orbits similar but of different dimensions and not similarly situated. Seiches were first discovered in 1730 by Fatio de Duillier, a well-known Swiss engineer, and were first systematically studied by Professor Forel in the Lake of Geneva. Large numbers of observations have been made by various observers in lakes in many parts of the world. Henry observed a fifteen-hour seiche in Lake Erie, which is 396 kilometres in length, and Endros recorded a seiche of fourteen seconds in a small pond only 111 metres in length. Although these waves cause periodical rising and falling of the water-level, they are generally inconspicuous, and can only be recorded by a registering apparatus, a limnograph. Standard work has been done in the study of seiches by the Lake Survey of Scotland under the immediate direction of Professor Chrystal, who has given much attention to the hydrodynamical theories of the phenomenon. Seiches are probably due to several factors acting together or separately, such as sudden variations of atmospheric pressure, changes in the strength or direction of the wind. Explanations such as lunar attraction and earthquakes have been shown to be untenable as a general cause of seiches.

2. *The water temperature of lakes* may change with the season from place to place and from layer to layer; these changes are brought about by insolation, by terrestrial radiation, by contract with the atmosphere, by rain, by the inflow of rivers and other factors, but the most important of all these are insolation and terrestrial radiation. Fresh water has its greatest density at a temperature of 39.2° F., so that water both above and below this temperature floats to the surface, and this physical fact largely determines the water stratification in a lake. In salt lakes the maximum density point is much lower, and does not come into play. In the tropical type of fresh-water lake the temperature is always higher than 39° F., and the temperature decreases as the depth increases. In the polar type the temperature is always lower than 39° F., and the temperature increases from the surface downwards. In the temperate type the distribution of temperature in winter resembles the polar type, and in summer the tropical type. In Loch Ness and other deep Scottish lochs the temperature in March and April is 41° to 42° F., and is then nearly uniform from top to bottom. As the sun comes north, and the mean air temperature begins to be higher than the surface temperature, the surface waters gain heat, and this heating goes on till the month of August. About this time the mean air temperature falls below the surface temperature, and the loch begins to part with its heat by radiation and conduction. The temperature of the deeper layers beyond 300 ft. is only slightly affected throughout the whole year. In the autumn the waters of the loch are divided into two compartments, the upper having a temperature from 49° to 55° F., the deeper a temperature from 41° to 45°. Between these lies the discontinuity-layer (*Sprungschicht* of the Germans), where there is a rapid fall of temperature within a very short distance. In August this discontinuity-layer is well marked, and lies at a depth of about 150 ft.; as the season advances this layer gradually sinks deeper, and the layer of uniform temperature above it increases in depth, and slowly loses heat, until finally the whole loch assumes a nearly uniform temperature. Many years ago Sir John Murray showed by means of temperature observations the manner in which large bodies of water were transferred from the windward to the leeward end of a loch, and subsequent observations seem to show that, before the discontinuity-layer makes its appearance, the currents produced by winds are distributed through the whole mass of the loch. When, however, this layer appears, the loch is divided into two current-systems, as shown in the following diagram:—



Current systems in a loch induced by wind at the surface. (After Wedderburn.)

AB, Discontinuity layer.
C, Surface current.
D, Primary return current.
E, Secondary surface current.
F, Secondary return current.

Another effect of the separation of the loch into two compartments by the surface of discontinuity is to render possible the temperature-seiche. The surface-current produced by the wind transfers a large quantity of warm water to the lee end of the loch, with the result that the surface of discontinuity is deeper at the lee than at the windward end. When the wind ceases, a temperature-seiche is started, just as an ordinary seiche is started in a basin of water which has been tilted. This temperature-seiche has been studied experimentally and rendered visible by superimposing a layer of paraffin on a layer of water.

Wedderburn estimates the quantity of heat that enters Loch Ness and is given out again during the year to be approximately sufficient to raise about 30,000 million gallons of water from freezing-point to boiling-point. Lakes thus modify the climate of the region in which they occur, both by increasing its humidity and by decreasing its range of temperature. They cool and moisten the atmosphere by evaporation during summer, and when they freeze in winter a vast amount of latent heat is liberated, and moderates the fall of temperature.

Lakes act as reservoirs for water, and so tend to restrain floods, and to promote regularity of flow. They become sources of mechanical power, and as their waters are purified by allowing the sediment which enters them to settle, they become valuable sources of water-supply for towns and cities. In temperate regions small and shallow lakes are likely to freeze all over in winter, but deep lakes in similar regions do not generally freeze, owing to the fact that the low temperature of the air does not continue long enough to cool down the entire body of water to the maximum density point. Deep lakes are thus the best sources of water-supply for cities, for in summer they supply relatively cool water and in winter relatively warm water. Besides, the number of organisms in deep lakes is less than in small shallow lakes, in which there is a much higher temperature in summer, and consequently much greater organic growth. The deposits, which are formed along the shores and on the floors of lakes, depend on the geological structure and nature of the adjacent shores.

Biology.—Compared with the waters of the ocean those of lakes may safely be said to contain relatively few animals and plants. Whole groups of organisms—the Echinoderms, for instance—are unrepresented. In the oceans there is a much greater uniformity in the physical and chemical conditions than obtains in lakes. In lakes the temperature varies widely. To underground lakes light does not penetrate, and in these some of the organisms may be blind, for example, the blind crayfish (*Cambarus pellucidus*) and the blind fish (*Amblyopsis spelaeus*) of the Kentucky caves. The majority of lakes are fresh, while some are so salt that no organisms have been found in them. The peaty matter in other lakes is so abundant that light does not penetrate to any great depth, and the humic acids in solution prevent the development of some species. Indeed, every lake has an individuality of its own, depending upon climate, size, nature of the bottom, chemical composition and connexion with other lakes. While the ocean contains many families and genera not represented in lakes, almost every genus in lakes is represented in the ocean.

The vertebrates, insects and flowering plants inhabiting lakes vary much according to latitude, and are comparatively well known to zoologists and botanists. The micro-fauna and flora have only recently been studied in detail, and we cannot yet be said to know much about tropical lakes in this respect. Mr James Murray, who has studied the Scottish lakes, records in over 400 Scottish lochs 724 species (the fauna including 447 species, all invertebrates, and the flora comprising 277 species) belonging to the following groups; the list must not be regarded as in any way complete:—

Fauna.			*Flora.*		
Mollusca	7	species	Phanerogamia	65	species
Hydrachnida	17	”	Equisetaceae	1	”
Tardigrada	30	”	Selaginellaceae	1	”
Insecta	7	”	Characeae	6	”
Crustacea	78	”	Musci	18	”
Bryozoa	7	”	Hepaticae	2	”
Worms	25	”	Florideae	2	”
Rotifera	181	”	Chlorophyceae	142	”
Gastrotricha	2	”	Bacillariaceae	26	”
Coelenterata	1	”	Myxophyceae	10	”
Porifera	1	”	Peridiniaceae	4	”
Protozoa	91	”			
	447	”		277	”

These organisms are found along the shores, in the deep waters, and in the surface waters of the lakes.

The *littoral region* is the most populous part of lakes; the existence of a rooted vegetation is only possible there, and this in turn supports a rich littoral fauna. The greater heat of the water along the margins also favours growth. The great majority of the species in Scottish lochs are met with in this region. Insect larvae of many kinds are found under stones or among weeds. Most of the Cladocera, and the Copepoda of the genus *Cyclops*, and the Harpacticidae are only found in this region. Water-mites, nearly all the Rotifers, Gastrotricha, Tardigrada and Molluscs are found here, and Rhizopods are abundant. A large number of the littoral species in Loch Ness extends down to a depth of about 300 ft.

The abyssal region, in Scottish lochs, lies, as a rule, deeper than 300 ft., and in this deep region a well-marked association of animals appears in the muds on the bottom, but none of them are peculiar to it: they all extend into the littoral zone, from which they were originally derived. In Loch Ness the following sparse population was recorded:—

1 Mollusc:	*Pisidium pusillum* (Gmel).
3 Crustacea:	*Cyclops viridis*, Jurine.
	Candona candida (Müll).
	Cypria ophthalmica, Jurine.
3 Worms:	*Stylodrilus gabreteae*, Vejd.
	Oligochaete, not determined.
	Automolos morgiensis (Du Plessis).
1 Insect:	*Chironomus* (larva).
Infusoria:	Several, ectoparasites on *Pisidium* and *Cyclops*, not determined.

In addition, the following were found casually at great depths in Loch Ness: *Hydra*, *Limnaea peregra*, *Proales daphnicola* and *Lynceus affinis*.

The *pelagic region* of the Scottish lakes is occupied by numerous microscopic organisms, belonging to the Zooplankton and Phytoplankton. Of the former group 30 species belonging to the Crustacea, Rotifera and Protozoa were recorded in Loch Ness. Belonging to the second group 150 species were recorded, of which 120 were Desmids. Some of these species of plankton organisms are almost universal in the Scottish lochs, while others are quite local. Some of the species occur all the year through, while others have only been recorded in summer or in winter. The great development of Algae in the surface waters, called “flowering of the water” (*Wasserblüthe*), was observed in August in Loch Lomond; a distinct “flowering,” due to Chlorophyceae, has been observed in shallow lochs as early as July. It is most common in August and September, but has also been observed in winter.

The plankton animals which are dominant or common, both over Scotland and the rest of Europe, are:—

Diaptomus gracilis.
Daphnia kyalina.
Diaphanosoma brachyurum.
Leptodora kindtii.
Conochilus unicornis.
Asplanchna priodonta.
Polyarthra platyptera.
Anuraea cochlearis.
Notholca longispina.
Ceratium hirundinella.
Asterionella.

All of these, according to Dr Lund, belong to the general plankton association of the European plain, or are even cosmopolitan.

The Scottish plankton on the whole differs from the plankton of the central European plateau, and from the cosmopolitan fresh-water plankton, in the extraordinary richness of the Phytoplankton in species of Desmids, in the conspicuous arctic element among the Crustacea, in the absence or comparative rarity of the species commonest in the general European plankton. Another peculiarity is the local distribution of some of the Crustacea and many of the Desmids.

The derivation of the whole lacustrine population of the Scottish lochs does not seem to present any difficulty. The abyssal forms have been traced to the littoral zone without any perceptible modifications. The plankton organisms are a mingling of European and arctic species. The cosmopolitan species may enter the lochs by ordinary migration. It is probable that if the whole plankton could be annihilated, it would be replaced by ordinary migration within a few years. The eggs and spores of many species can be dried up without injury, and may be carried through the air as dust from one lake to another; others, which would not bear desiccation, might be carried in mud adhering to the feet of aquatic birds and in various other ways. The arctic species may be survivors from a period when arctic conditions prevailed over a great part of Europe. What are known as “relicts” of a marine fauna have not been found in the Scottish fresh-water lochs.

It is somewhat remarkable that none of the organisms living in fresh-water lochs has been observed to exhibit the phenomenon of phosphorescence, although similar organisms in the salt-water lochs a few miles distant exhibit brilliant phosphorescence. At similar depths in the sea-lochs there is usually a great abundance of life when compared with that found in fresh-water lochs.

Length, Depth, Area and Volume of Lakes.—In the following table will be found the length, depth, area and volume of some of the principal lakes of the world.[1] Sir John Murray estimates The volume of water in the 560 Scottish lochs recently surveyed at 7 cub. m., and the approximate volume of water in all the lakes of the world at about 2000 cub. m., so that this last number is but a small fraction of the volume of the ocean, which he previously estimated at 324 million cub. m. It may be recalled that the total rainfall on the land of the globe is estimated at 29,350 cub. m., and the total discharge from the rivers of the globe at 6524 cub. m.

British Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
I. *England*—		Max.	Mean.		
Windermere	10.50	219	78.5	5.69	12,250
Ullswater	7.35	205	83	3.44	7,870
Wastwater	3.00	258	134.5	1.12	4,128
Coniston Water	5.41	184	79	1.89	4,000
Crummock Water	2.50	144	87.5	0.97	2,343
Ennerdale Water	2.40	148	62	1.12	1,978
Bassenthwaite Water	3.83	70	18	2.06	1,023
Derwentwater	2.87	72	18	2.06	1,010
Haweswater	2.33	103	39.5	0.54	589
Buttermere	1.26	94	54.5	0.36	537
II. *Wales*—					
Llyn Cawlyd	1.62	222	109.1	0.18	941
Llyn Cwellyn	1.20	122	74.1	0.35	713
Llyn Padarn	2.00	94	52.4	0.43	632
Llyn Llydaw	1.11	190	77.4	0.19	409
Llyn Peris	1.10	114	63.9	0.19	344
Llyn Dulyn	0.31	189	104.2	0.05	156
III. *Scotland*—					
Ness	24.23	754	433.02	21.78	263,162
Lomond	22.64	623	121.29	27.45	92,805
Morar	11.68	1017	284.00	10.30	81,482
Tay	14.55	508	199.08	10.19	56,550
Awe	25.47	307	104.95	14.85	43,451
Maree	13.46	367	125.30	11.03	38,539
Lochy	9.78	531	228.95	5.91	37,726
Rannoch	9.70	440	167.46	7.37	34,387
Shiel	17.40	420	132.73	7.56	27,986
Arkaig	12.00	359	152.71	6.24	26,573
Earn	6.46	287	137.83	3.91	14,421
Treig	5.10	436	207.37	2.41	13,907
Shin	17.22	162	51.04	8.70	12,380
Fannich	6.92	282	108.76	3.60	10,920
Assynt	6.36	282	101.10	3.10	8,731
Quoich	6.95	281	104.60	2.86	8,345
Glass	4.03	365	159.07	1.86	8,265
Fionn (Carnmore)	5.76	144	57.79	3.52	5,667
Laggan	7.04	174	67.68	2.97	5,601
Loyal	4.46	217	65.21	2.55	4,628
IV. *Ireland*—					
Neagh	17	102	40	153	161,000
Erne (Lower)	24	226	43	43	62,000
Erne (Upper)	13	89	10	15	5,000
Corrib	27	152	30	68	59,000
Mask	10	191	52	35	55,000
Derg	24	119	30	49	47,000

European Continental Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
		Max.	Mean.		
Ladoga	125	732	300	7000	43,200,000
Onega	145	740	200	3800	21,000,000
Vener	93	292	108	2149	6,357,000
Geneva	45	1015	506	225	3,175,000
Vetter	68	413	128	733	2,543,000
Mjösen	57	1483	..	139	2,882,000
Garda	38	1124	446	143	1,766,000
Constance	42	827	295	208	1,711,000
Ochrida	19	942	479	105	1,391,000
Maggiore	42	1220	574	82	1,310,000
Como	30	1345	513	56	794,000
Hornafvan	7	1391	253	93	777,000

African Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
		Max.	Mean.		
Victoria Nyanza	200	240	..	26,200	5,800,000
Nyasa	350	2580	..	14,200	396,000,000
Tanganyika	420	2100	..	12,700	283,000,000

Asiatic Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
		Max.	Mean.		
Aral	265	222	52	24,400	43,600,000
Baikal	330	5413	..	11,580	274,000,000
Balkash	323	33	..	7,000	4,880,000
Urmia	80	50	15	1,750	732,000

American Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
		Max.	Mean.		
Superior	412	1008	475	31,200	413,000,000
Huron	263	730	250	23,800	166,000,000
Michigan	335	870	325	22,450	203,000,000
Erie	240	210	70	9,960	19,500,000
Ontario	190	738	300	7,240	61,000,000
Titicaca	120	924	347	3,200	30,900,000

New Zealand Lakes

	Length in Miles.	Depth in Feet.		Area in sq. m.	Volume in million cub. ft.
		Max.	Mean.		
Taupo	25	534	367	238.0	2,435,000
Wakatipu	49	1242	707	112.3	2,205,000
Manapouri	19	1458	328	56.0	512,000
Rotorua	7.5	120	39	31.6	34,000
Waikarimoana	7.25	846	397	14.7	166,000
Wairaumoana	5.25	375	175	6.1	30,000
Rotoiti	10.7	230	69	14.2	27,000

Authorities.—F. A. Forel, "Handbuch der Seenkunde: allgemeine Limnologie," *Bibliothek geogr. Handbücher* (Stuttgart, 1901), *Le Léman, monographie limnologique* (3 vols., Lausanne, 1892-1901); A. Delebecque, *Les Lacs français*, text and plates (Paris, 1898); H. R. Mill, "Bathymetrical Survey of the English Lakes," *Geogr. Journ.* vol. vi. pp. 46 and 135 (1895); Jehu, "Bathymetrical and Geological Study of

the Lakes of Snowdonia," *Trans. Roy. Soc. Edin.* vol. xl. p. 419 (1902); Sir John Murray and Laurence Pullar, "Bathymetrical Survey of the Freshwater Lochs of Scotland," *Geogr. Journ.* (1900 to 1908, re-issued in six volumes, Edinburgh, 1910); W. Halbfass, "Die Morphometrie der europäischen Seen," *Zeitschr. Gesell. Erdkunde Berlin* (Jahrg. 1903, p. 592; 1904, p. 204); I. C. Russell, *Lakes of North America* (Boston and London, 1895); O. Zacharias, "Forschungsberichte aus der biologischen Station zu Plön" (Stuttgart); F. E. Bourcart, *Les Lacs alpins suisses: étude chimique et physique* (Geneva, 1906); G. P. Magrini, *Limnologia* (Milan, 1907).

(J. Mu.)

1 Divergence between certain of these figures and those quoted elsewhere in this work may be accounted for by the slightly different results arrived at by various authorities.

LAKE CHARLES, a city of Louisiana, U.S.A., capital of Calcasieu Parish, 30 m. from the Gulf of Mexico and about 218 m. (by rail) W. of New Orleans. Pop. (1889) 838, (1890) 3442, (1900) 6680 (2407 negroes); (1910) 11,449. It is served by the Louisiana & Texas (Southern Pacific System), the St Louis, Watkins & Gulf, the Louisiana & Pacific and the Kansas City Southern railways. The city is charmingly situated on the shore of Lake Charles, and on the Calcasieu river, which with some dredging can be made navigable for large vessels for 132 m. from the Gulf. It is a winter resort. Among the principal buildings are a Carnegie library, the city hall, the Government building, the court house, St Patrick's sanatorium, the masonic temple and the Elks' club. Lake Charles is in the prairie region of southern Louisiana, to the N. of which, covering a large part of the state, are magnificent forests of long-leaf pine, and lesser lowland growths of oak, ash, magnolia, cypress and other valuable timber. The Watkins railway extending to the N.E. and the Kansas City Southern extending to the N.W. have opened up the very best of the forest. The country to the S. and W. is largely given over to rice culture. Lake Charles is the chief centre of lumber manufacture in the state, and has rice mills, car shops and an important trade in wool. Ten miles W. are sulphur mines (product in 1907 about 362,000 tons), which with those of Sicily produce a large part of the total product of the world. Jennings, about 34 m. to the E., is the centre of oil fields, once very productive but now of diminishing importance. Welsh, 23 m. E., is the centre of a newer field; and others lie to the N. Lake Charles was settled about 1852, largely by people from Iowa and neighbouring states, was incorporated as a town in 1857 under the name of Charleston and again in 1867 under its present name, and was chartered as a city in 1886. The city suffered severely by fire in April 1910.

LAKE CITY, a town and the county-seat of Columbia county, Florida, U.S.A., 59 m. by rail W. by S. of Jacksonville. Pop. (1900) 4013, of whom 2159 were negroes; (1905) 6509; (1910) 5032. Lake City is served by the Atlantic Coast Line, the Seaboard Air Line and the Georgia Southern & Florida railways. There are ten small lakes in the neighbourhood, and the town is a winter and health resort. It is the seat of Columbia College (Baptist, 1907); the Florida Agricultural College was opened here in 1883, became the university of Florida in 1903, and in 1905 was abolished by the Buckman Law. Vegetables and fruits grown for the northern markets, sea-island cotton and tobacco are important products of the surrounding country, and Lake City has some trade in cotton, lumber, phosphates and turpentine. The town was first settled about 1826 as Alligator; it was incorporated in 1854; adopted the present name in 1859; and in 1901, with an enlarged area, was re-incorporated.

LAKE DISTRICT, in England, a district containing all the principal English lakes, and variously termed the Lake Country, Lakeland and "the Lakes." It falls within the north-western counties of Cumberland, Westmorland and Lancashire (Furness district), about one-half being within the first of these. Although celebrated far outside the confines of Great Britain as a district of remarkable and strongly individual physical beauty, its area is only some 700 sq. m., a circle with radius of 15 m. from the central point covering practically the whole. Within this circle, besides the largest lake, Windermere, is the highest point in England, Scafell Pike; yet Windermere is but 10½ m. in length, and covers an area of 5.69 sq. m., while Scafell Pike is only 3210 ft. in height. But the lakes show a wonderful variety of character, from open expanse and steep rock-bound shores to picturesque island-groups and soft wooded banks; while the mountains have always a remarkable dignity, less from the profile of their summits than from the bold sweeping lines of their flanks, unbroken by vegetation, and often culminating in sheer cliffs

or crags. At their feet, the flat green valley floors of the higher elevations give place in the lower parts to lovely woods. The streams are swift and clear, and numerous small waterfalls are characteristic of the district. To the north, west and south, a flat coastal belt, bordering the Irish Sea, with its inlets Morecambe Bay and Solway Firth, and broadest in the north, marks off the Lake District, while to the east the valleys of the Eden and the Lune divide it from the Pennine mountain system. Geologically, too, it is individual. Its centre is of volcanic rocks, complex in character, while the Coal-measures and New Red Sandstone appear round the edges. The district as a whole is grooved by a main depression, running from north to south along the valleys of St John, Thirlmere, Grasmere and Windermere, surmounting a pass (Dunmail Raise) of only 783 ft.; while a secondary depression, in the same direction, runs along Derwentwater, Borrowdale, Wasdale and Wastwater, but here Sty Head Pass, between Borrowdale and Wasdale, rises to 1600 ft. The centre of the 15-m. radius lies on the lesser heights between Langstrath and Dunmail Raise, which may, however, be the crown of an ancient dome of rocks, "the dissected skeleton of which, worn by the warfare of air and rain and ice, now alone remains" (Dr H. R. Mill, "Bathymetrical Survey of the English Lakes," *Geographical Journal*, vi. 48). The principal features of the district may be indicated by following this circle round from north, by west, south and east.

The river Derwent (*q.v.*), rising in the tarns and "gills" or "ghylls" (small streams running in deeply-grooved clefts) north of Sty Head Pass and the Scafell mass flows north through the wooded Borrowdale and forms Derwentwater and Bassenthwaite. These two lakes are in a class apart from all the rest, being broader for their length, and quite shallow (about 18 ft. average and 70 ft. maximum), as distinct from the long, narrow and deep troughs occupied by the other chief lakes, which average from 40 to 135 ft. deep. Derwentwater (*q.v.*), studded with many islands, is perhaps the most beautiful of all. Borrowdale is joined on the east by the bare wild dale of Langstrath, and the Greta joins the Derwent immediately below Derwentwater; the town of Keswick lying near the junction. Derwentwater and Bassenthwaite occupy a single depression, a flat alluvial plain separating them. From Seatoller in Borrowdale a road traverses Honister Pass (1100 ft.), whence it descends westward, beneath the majestic Honister Crags, where green slate is quarried, into the valley containing Buttermere (94 ft. max. depth) and Crummock Water (144 ft.), drained by the Cocker. Between this and the Derwent valley the principal height is Grasmoor (2791 ft.); southward a steep narrow ridge (High Style, 2643) divides it from Ennerdale, containing Ennerdale Water (148 ft. max. depth), which is fed by the Liza and drained by the Ehen. A splendid range separates this dale from Wasdale and its tributary Mosedale, including Great Gable (2949 ft.), Pillar (2927), with the precipitous Pillar Rock on the Ennerdale flank and Steeple (2746). Wasdale Head, between Gable and the Scafell range, is peculiarly grand, with dark grey screes and black crags frowning above its narrow bottom. On this side of Gable is the fine detached rock, Napes Needle. Wastwater, 3 m. in length, is the deepest lake of all (258 ft.), its floor, like those of Windermere and Ullswater, sinking below sea-level. Its east shore consists of a great range of screes. East of Wasdale lies the range of Scafell (*q.v.*), its chief points being Scafell (3162 ft.), Scafell Pike (3210), Lingmell (2649) and Great End (2984), while the line is continued over Esk Hause Pass (2490) along a fine line of heights (Bow Fell, 2960; Crinkle Crags, 2816), to embrace the head of Eskdale. The line then descends to Wrynose Pass (1270 ft.), from which the Duddon runs south through a vale of peculiar richness in its lower parts; while the range continues south to culminate in the Old Man of Coniston (2633) with the splendid Dow Crags above Goats Water. The pleasant vale of Yewdale drains south to Coniston Lake (5½ m. long, 184 ft. max. depth), east of which a lower, well-wooded tract, containing two beautiful lesser lakes, Tarn Hows and Esthwaite Water, extends to Windermere (*q.v.*). This lake collects waters by the Brathay from Langdale, the head of which, between Bow Fell and Langdale Pikes (2401 ft.), is very fine; and by the Rothay from Dunmail Raise and the small lakes of Grasmere and Rydal Water, embowered in woods. East of the Rothay valley and Thirlmere lies the mountain mass including Helvellyn (3118 ft.), Fairfield (2863) and other points, with magnificent crags at several places on the eastern side towards Grisedale and Patterdale. These dales drain to Ullswater (205 ft. max., second to Windermere in area), and so north-east to the Eden. To the east and south-east lies the ridge named High Street (2663 ft.), from the Roman road still traceable from south to north along its summit, and sloping east again to the sequestered Hawes Water (103 ft. max.), a curiously shaped lake nearly divided by the delta of the Measand Beck. There remains the Thirlmere valley. Thirlmere itself was raised in level, and adapted by means of a dam at the north end, as a reservoir for the water-supply of Manchester in 1890-1894. It drains north by St John's Vale into the Greta, north of which again rises a mountain-group of which the chief summits are Saddleback or Blencathra (2847 ft.) and the graceful peak of Skiddaw (3054). The most noteworthy waterfalls are—Scale Force (Dano-Norwegian *fors*, *foss*), beside Crummock, Lodore near Derwentwater, Dungeon Gill Force, beside Langdale, Dalegarth Force in Eskdale, Aira near Ullswater, sung by Wordsworth, Stock Gill Force and Rydal Falls near Ambleside.

The principal centres in the Lake District are Keswick (Derwentwater), Ambleside, Bowness, Windermere and Lakeside (Windermere), Coniston and Boot (Eskdale), all of which, except Ambleside and Bowness (which nearly joins Windermere) are accessible by rail. The considerable village of Grasmere lies beautifully at the head of the lake of that name; and above Esthwaite is the small town of Hawkshead, with an ancient church, and picturesque houses curiously built on the hill-slope and sometimes spanning the streets. There are regular steamer services on Windermere and Ullswater. Coaches and cars traverse the main roads during the summer, but many of the finest dales and passes are accessible only on foot or by ponies. All the mountains offer easy routes to pedestrians, but some of them, as Scafell, Pillar, Gable (Napes Needle), Pavey Ark above Langdale and Dow Crags near Coniston, also afford ascents for experienced climbers.

This mountainous district, having the sea to the west, records an unusually heavy rainfall. Near Seathwaite, below Styhead Pass, the largest annual rainfall in the British Isles is recorded, the average (1870-1899) being 133.53 in., while 173.7 was measured in 1903 and 243.98 in. in 1872. At Keswick the annual mean is 60.02, at Grasmere about 80 ins. The months of maximum rainfall at Seathwaite are November, December and January and September.

Fish taken in the lakes include perch, pike, char and trout in Windermere, Ennerdale, Bassenthwaite, Derwentwater, &c., and the gwyniad or fresh-water herring in Ullswater. The industries of the Lake District include slate quarrying and some lead and zinc mining, and weaving, bobbin-making and pencil-

making.

Setting aside London and Edinburgh, no locality in the British Isles is so intimately associated with the history of English literature as the Lake District. In point of time the poet whose name is first connected with the region is Gray, who wrote a journal of his tour in 1769. But it was Wordsworth, a native of Cumberland, born on the outskirts of the Lake District itself, who really made it a Mecca for lovers of English poetry. Out of his long life of eighty years, sixty were spent amid its lakes and mountains, first as a schoolboy at Hawkshead, and afterwards as a resident at Grasmere (1799-1813) and Rydal Mount (1813-1850). In the churchyard of Grasmere the poet and his wife lie buried; and very near to them are the remains of Hartley Coleridge (son of the poet), who himself lived many years at Keswick, Ambleside and Grasmere. Southey, the friend of Wordsworth, was a resident of Keswick for forty years (1803-1843), and was buried in Crosthwaite churchyard. Samuel Taylor Coleridge lived some time at Keswick, and also with the Wordsworths at Grasmere. From 1807 to 1815 Christopher North (John Wilson) was settled at Windermere. De Quincey spent the greater part of the years 1809 to 1828 at Grasmere, in the first cottage which Wordsworth had inhabited. Ambleside, or its environs, was also the place of residence of Dr Arnold (of Rugby), who spent there the vacations of the last ten years of his life; and of Harriet Martineau, who built herself a house there in 1845. At Keswick Mrs Lynn Linton was born in 1822. Brantwood, a house beside Coniston Lake, was the home of Ruskin during the last years of his life. In addition to these residents or natives of the locality, Shelley, Scott, Nathaniel Hawthorne, Clough, Crabb Robinson, Carlyle, Keats, Tennyson, Matthew Arnold, Mrs Hemans, Gerald Massey and others of less reputation made longer or shorter visits, or were bound by ties of friendship with the poets already mentioned. The Vale of St John, near Keswick, recalls Scott's *Bridal of Triermain*. But there is a deeper connexion than this between the Lake District and English letters. German literature tells of several literary schools, or groups of writers animated by the same ideas, and working in the spirit of the same principles and by the same poetic methods. The most notable instance—indeed it is almost the only instance—of the kind in English literature is the Lake School of Poets. Of this school the acknowledged head and founder was Wordsworth, and the tenets it professed are those laid down by the poet himself in the famous preface to the edition of *The Lyrical Ballads* which he published in 1800. Wordsworth's theories of poetry—the objects best suited for poetic treatment, the characteristics of such treatment and the choice of diction suitable for the purpose—may be said to have grown out of the soil and substance of the lakes and mountains, and out of the homely lives of the people, of Cumberland and Westmoreland.

See CUMBERLAND, LANCASHIRE, WESTMORLAND. The following is a selection from the literature of the subject: Harriet Martineau, *The English Lakes* (Windermere, 1858); Mrs Lynn Linton, *The Lake Country* (London, 1864); E. Waugh, *Rambles in the Lake Country* (1861) and *In the Lake Country* (1880); W. Knight, *Through the Wordsworth Country* (London, 1890); H. D. Rawnsley, *Literary Associations of the English Lakes* (2 vols., Glasgow, 1894) and *Life and Nature of the English Lakes* (Glasgow, 1899); Stopford Brooke, *Dove Cottage, Wordsworth's Home from 1800 to 1808*; A. G. Bradley, *The Lake District, its Highways and Byeways* (London, 1901); Sir John Harwood, *History of the Thirlmere Water Scheme* (1895); for mountain-climbing, Col. J. Brown, *Mountain Ascents in Westmorland and Cumberland* (London, 1888); Haskett-Smith, *Climbing in the British Isles*, part, i.; Owen G. Jones, *Rock-climbing in the English Lake District*, 2nd ed. by W. M. Crook (Keswick, 1900).

LAKE DWELLINGS,

the term employed in archaeology for habitations constructed, not on the dry land, but within the margins of lakes or creeks at some distance from the shore.

The villages of the Guajiros in the Gulf of Maracaibo are described by Goering as composed of houses with low sloping roofs perched on lofty piles and connected with each other by bridges of planks. Each house consisted of two apartments; the floor was formed of split stems of trees set close together and covered with mats; they were reached from the shore by dug-out canoes poled over the shallow waters, and a notched tree trunk served as a ladder. The custom is also common in the estuaries of the Orinoco and Amazon. A similar system prevails in New Guinea. Dumont d'Urville describes four such villages in the Bay of Dorei, containing from eight to fifteen blocks or clusters of houses, each block separately built on piles, and consisting of a row of distinct dwellings. C. D. Cameron describes three villages thus built on piles in Lake Mohrya, or Moria, in Central Africa, the motive here being to prevent surprise by bands of slave-catchers. Similar constructions have been described by travellers, among the Dyaks of Borneo, in Celebes, in the Caroline Islands, on the Gold Coast of Africa, and in other places.

Hippocrates, writing in the 5th century B.C., says of the people of the Phasis that their country is hot and marshy and subject to frequent inundations, and that they live in houses of timber and reeds constructed in the midst of the waters, and use boats of a single tree trunk. Herodotus, writing also in the 5th century B.C., describes the people of Lake Prasias as living in houses constructed on platforms supported on piles in the middle of the lake, which are approached from the land by a single narrow bridge. Abulfeda the geographer, writing in the 13th century, notices the fact that part of the Apamaean Lake was inhabited by Christian fishermen who lived on the lake in wooden huts built on piles, and Sir John Lubbock (Lord Avebury) mentions that the Rumelian fishermen on Lake Prasias "still inhabit wooden cottages built over the water, as in the time of Herodotus."

The records of the wars in Ireland in the 16th century show that the petty chieftains of that time had their defensive strongholds constructed in the "freshwater lochs" of the country, and there is record evidence of a similar system in the western parts of Scotland. The archaeological researches of the past

fifty years have shown that such artificial constructions in lakes were used as defensive dwellings by the Celtic people from an early period to medieval times (see Crannog). Similar researches have also established the fact that in prehistoric times nearly all the lakes of Switzerland, and many in the adjoining countries—in Savoy and the north of Italy, in Austria and Hungary and in Mecklenburg and Pomerania—were peopled, so to speak, by lake-dwelling communities, living in villages constructed on platforms supported by piles at varying distances from the shores. The principal groups are those in the Lakes of Bourget, Geneva, Neuchâtel, Bienne, Zürich and Constance lying to the north of the Alps, and in the Lakes Maggiore, Varese, Iseo and Garda lying to the south of that mountain range. Many smaller lakes, however, contain them, and they are also found in peat moors on the sites of ancient lakes now drained or silted up, as at Laibach in Carniola. In some of the larger lakes the number of settlements has been very great. Fifty are enumerated in the Lake of Neuchâtel, thirty-two in the Lake of Constance, twenty-four in the Lake of Geneva, and twenty in the Lake of Bienne. The site of the lake dwelling of Wangen, in the Untersee, Lake of Constance, forms a parallelogram more than 700 paces in length by about 120 paces in breadth. The settlement at Morges, one of the largest in the Lake of Geneva, is 1200 ft. long by 150 ft. in breadth. The settlement of Sutz, one of the largest in the Lake of Bienne, extends over six acres, and was connected with the shore by a gangway nearly 100 yds. long and about 40 ft. wide.

The substructure which supported the platforms on which the dwellings were placed was most frequently of piles driven into the bottom of the lake. Less frequently it consisted of a stack of brushwood or fascines built up from the bottom and strengthened by stakes penetrating the mass so as to keep it from spreading. When piles were used they were the rough stems of trees of a length proportioned to the depth of the water, sharpened sometimes by fire and at other times chopped to a point by hatchets. On their level tops the beams supporting the platforms were laid and fastened by wooden pins, or inserted in mortices cut in the heads of the piles. In some cases the whole construction was further steadied and strengthened by cross beams, notched into the piles below the supports of the platform. The platform itself was usually composed of rough layers of unbarked stems, but occasionally it was formed of boards split from larger stems. When the mud was too soft to afford foothold for the piles they were mortised into a framework of tree trunks placed horizontally on the bottom of the lake. On the other hand, when the bottom was rocky so that the piles could not be driven, they were steadied at their bases by being enveloped in a mound of loose stones, in the manner in which the foundations of piers and breakwaters are now constructed. In cases where piles have not been used, as at Niederwil and Wauwyl, the substructure is a mass of fascines or faggots laid parallel and crosswise upon one another with intervening layers of brushwood or of clay and gravel, a few piles here and there being fixed throughout the mass to serve as guides or stays. At Niederwil the platform was formed of split boards, many of which were 2 ft. broad and 2 or 3 in. in thickness.

On these substructures were the huts composing the settlement; for the peculiarity of these lake dwellings is that they were pile villages, or clusters of huts occupying a common platform. The huts themselves were quadrilateral in form. The size of each dwelling is in some cases marked by boards resting edgeways on the platform, like the skirting boards over the flooring of the rooms in a modern house. The walls, which were supported by posts, or by piles of greater length, were formed of wattle-work, coated with clay. The floors were of clay, and in each floor there was a hearth constructed of flat slabs of stone. The roofs were thatched with bark, straw, reeds or rushes. As the superstructures are mostly gone, there is no evidence as to the position and form of the doorways, or the size, number and position of the windows, if there were any. In one case, at Schussenried, the house, which was of an oblong quadrangular form, about 33 by 23 ft., was divided into two rooms by a partition. The outer room, which was the smaller of the two, was entered by a doorway 3 ft. in width facing the south. The access to the inner room was by a similar door through the partition. The walls were formed of split tree-trunks set upright and plastered with clay; and the flooring of similar timbers bedded in clay. In other cases the remains of the gangways or bridges connecting the settlements with the shore have been discovered, but often the village appears to have been accessible only by canoes. Several of these single-tree canoes have been found, one of which is 43 ft. in length and 4 ft. 4 in. in its greatest width. It is impossible to estimate with any degree of certainty the number of separate dwellings of which any of these villages may have consisted, but at Niederwil they stood almost contiguously on the platform, the space between them not exceeding 3 ft. in width. The size of the huts also varied considerably. At Niederwil they were 20 ft. long and 12 ft. wide, while at Robenhausen they were about 27 ft. long by about 22 ft. wide.

The character of the relics shows that in some cases the settlements have been the dwellings of a people using no materials but stone, bone and wood for their implements, ornaments and weapons; in others, of a people using bronze as well as stone and bone; and in others again the occasional use of iron is disclosed. But, though the character of the relics is thus changed, there is no corresponding change in the construction and arrangements of the dwellings. The settlement in the Lake of Moosseedorf, near Bern, affords the most perfect example of a lake dwelling of the Stone age. It was a parallelogram 70 ft. long by 50 ft. wide, supported on piles, and having a gangway built on faggots connecting it with the land. The superstructure had been destroyed by fire. The implements found in the relic bed under it were axe-heads of stone, with their haftings of stag’s horn and wood; a flint saw, set in a handle of fir wood and fastened with asphalt; flint flakes and arrow-heads; harpoons of stag’s horn with barbs; awls, needles, chisels, fish-hooks and other implements of bone; a comb of yew wood 5 in. long; and a skate made out of the leg bone of a horse. The pottery consisted chiefly of roughly-made vessels, some of which were of large size, others had holes under the rims for suspension, and many were covered with soot, the result of their use as culinary vessels. Burnt wheat, barley and linseed, with many varieties of seeds and fruits, were plentifully mingled with the bones of the stag, the ox, the swine, the sheep and the goat, representing the ordinary food of the inhabitants, while remains of the beaver, the fox, the hare, the dog, the bear, the horse, the elk and the bison were also found.

The settlement of Robenhausen, in the moor which was formerly the bed of the ancient Lake of

Pfäffikon, seems to have continued in occupation after the introduction of bronze. The site covers nearly 3 acres, and is estimated to have contained 100,000 piles. In some parts three distinct successions of inhabited platforms have been traced. The first had been destroyed by fire. It is represented at the bottom of the lake by a layer of charcoal mixed with implements of stone and bone and other relics highly carbonized. The second is represented above the bottom by a series of piles with burnt heads, and in the bottom by a layer of charcoal mixed with corn, apples, cloth, bones, pottery and implements of stone and bone, separated from the first layer of charcoal by 3 ft. of peaty sediment intermixed with relics of the occupation of the platform. The piles of the third settlement do not reach down to the shell marl, but are fixed in the layers representing the first and second settlements. They are formed of split oak trunks, while those of the two first settlements are round stems chiefly of soft wood. The huts of this last settlement appear to have had cattle stalls between them, the droppings and litter forming heaps at the lake bottom. The bones of the animals consumed as food at this station were found in such numbers that 5 tons were collected in the construction of a watercourse which crossed the site. Among the wooden objects recovered from the relic beds were tubs, plates, ladles and spoons, a flail for threshing corn, a last for stretching shoes of hide, celt handles, clubs, long-bows of yew, floats and implements of fishing and a dug-out canoe 12 ft. long. No spindle-whorls were found, but there were many varieties of cloth, platted and woven, bundles of yarn and balls of string. Among the tools of bone and stag’s horn were awls, needles, harpoons, scraping tools and haftings for stone axe-heads. The implements of stone were chiefly axe-heads and arrow-heads. Of clay and earthenware there were many varieties of domestic dishes, cups and pipkins, and crucibles or melting pots made of clay and horse dung and still retaining the drossy coating of the melted bronze.

The settlement of Auvernier in the Lake of Neuchâtel is one of the richest and most considerable stations of the Bronze age. It has yielded four bronze swords, ten socketed spear-heads, forty celts or axe-heads and sickles, fifty knives, twenty socketed chisels, four hammers and an anvil, sixty rings for the arms and legs, several highly ornate torques or twisted neck rings, and upwards of two hundred hair pins of various sizes up to 16 in. in length, some having spherical heads in which plates of gold were set. Moulds for sickles, lance-heads and bracelets were found cut in stone or made in baked clay. From four to five hundred vessels of pottery finely made and elegantly shaped are indicated by the fragments recovered from the relic bed. The Lac de Bourget, in Savoy, has eight settlements, all of the Bronze age. These have yielded upwards of 4000 implements, weapons and ornaments of bronze, among which were a large proportion of moulds and founders’ materials. A few stone implements suggest the transition from stone to bronze; and the occasional occurrence of iron weapons and pottery of Gallo-Roman origin indicates the survival of some of the settlements to Roman times.

The relative antiquity of the earlier settlements of the Stone and Bronze ages is not capable of being deduced from existing evidence. “We may venture to place them,” says Dr F. Keller, “in an age when iron and bronze had been long known, but had not come into our districts in such plenty as to be used for the common purposes of household life, at a time when amber had already taken its place as an ornament and had become an object of traffic.” It is now considered that the people who erected the lake dwellings of Central Europe were also the people who were spread over the mainland. The forms and the ornamentation of the implements and weapons of stone and bronze found in the lake dwellings are the same as those of the implements and weapons in these materials found in the soil of the adjacent regions, and both groups must therefore be ascribed to the industry of one and the same people. Whether dwelling on the land or dwelling in the lake, they have exhibited so many indications of capacity, intelligence, industry and social organization that they cannot be considered as presenting, even in their Stone age, a very low condition of culture or civilization. Their axes were made of tough stones, sawn from the block and ground to the fitting shape. They were fixed by the butt in a socket of stag’s horn, mortised into a handle of wood. Their knives and saws of flint were mounted in wooden handles and fixed with asphalt. They made and used an endless variety of bone tools. Their pottery, though roughly finished, is well made, the vessels often of large size and capable of standing the fire as cooking utensils. For domestic dishes they also made wooden tubs, plates, spoons, ladles and the like. The industries of spinning and weaving were largely practised. They made nets and fishing lines, and used canoes. They practised agriculture, cultivating several varieties of wheat and barley, besides millet and flax. They kept horses, cattle, sheep, goats and swine. Their clothing was partly of linen and partly of woollen fabrics and the skins of their beasts. Their food was nutritious and varied, their dwellings neither unhealthy nor incommodious. They lived in the security and comfort obtained by social organization, and were apparently intelligent, industrious and progressive communities.

There is no indication of an abrupt change from the use of stone to the use of metal such as might have occurred had the knowledge of copper and bronze, and the methods of working them, been introduced through the conquest of the original inhabitants by an alien race of superior culture and civilization. The improved cultural conditions become apparent in the multiplication of the varieties of tools, weapons and ornaments made possible by the more adaptable qualities of the new material; and that the development of the Bronze age culture in the lake dwellings followed the same course as in the surrounding regions where the people dwelt on the dry land is evident from the correspondence of the types of implements, weapons, ornaments and utensils common to both these conditions of life.

Other classes of prehistoric pile-structures akin to the lake dwellings are the Terremare of Italy and the Terpen of Holland. Both of these are settlements of wooden huts erected on piles, not over the water, but on flat land subject to inundations. The terremare (so named from the marly soil of which they are composed) appear as mounds, sometimes of very considerable extent, which when dug into disclose the remains and relic beds of the ancient settlements. They are most abundant in the plains of northern Italy traversed by the Po and its tributaries, though similar constructions have been found in Hungary in the valley of the Theiss. These pile-villages were often surrounded by an earthen rampart within which the huts were erected in more or less regular order. Many of them present evidence of having been more than

once destroyed by fire and reconstructed, while others show one or more reconstructions at higher levels on the same site. The contents of the relic beds indicate that they belong for the most part to the age of bronze, although in some cases they may be referred to the latter part of the Stone age. Their inhabitants practised agriculture and kept the common domestic animals, while their tools, weapons and ornaments were mainly of similar character to those of the contemporary lake dwellers of the adjoining regions. Some of the Italian terremare show quadrangular constructions made like the modern log houses, of undressed tree trunks superposed longitudinally and overlapping at the ends, as at Castione in the province of Parma. A similar mode of construction is found in the pile-village on the banks of the Save, near Donja Dolina in Bosnia, described in 1904 by Dr Truhelka. Here the larger houses had platforms in front of them forming terraces at different levels descending towards the river. There was a cemetery adjacent to the village in which both unburnt and cremated interments occurred, the former predominating. From the general character of the relics this settlement appeared to belong to the early Iron age. The Terpen of Holland appear as mounds somewhat similar to those of the terremare, and were also pile structures, on low or marshy lands subject to inundations from the sea. Unlike the terremare and the lake dwellings they do not seem to belong to the prehistoric ages, but yield indications of occupation in post-Roman and medieval times.

AUTHORITIES.—The materials for the investigation of this singular phase of prehistoric life were first collected and systematized by Dr Ferdinand Keller (1800-1881), of Zürich, and printed in *Mittheilungen der Antiquarischen Gesellschaft in Zürich*, vols, ix.-xxii., 4to (1855-1886). The substance of these reports has been issued as a separate work in England, *The Lake Dwellings of Switzerland and other parts of Europe*, by Dr Ferdinand Keller, translated and arranged by John Edward Lee, 2nd ed. (2 vols. 8vo, London, 1878). Other works on the same subject are Frédéric Troyon, *Habitations lacustres des temps anciens et modernes* (Lausanne, 1860); E. Desor, *Les Palafittes ou constructions lacustres du lac de Neuchâtel* (Paris, 1865); E. Desor and L. Favre, *Le Bel Âge du bronze lacustre en Suisse* (Paris, 1874); A. Perrin, *Étude préhistorique sur la Savoie spécialement à l'époque lacustre* (*Les Palafittes du lac de Bourget*, Paris, 1870); Ernest Chantre, *Les Palafittes ou constructions lacustres du lac de Paladru* (Chambery, 1871); Bartolomeo Gastaldi, *Lake Habitations and prehistoric Remains in the Turbaries and Marl-beds of Northern and Central Italy*, translated by C. H. Chambers (London, 1865); Sir John Lubbock (Lord Avebury), *Prehistoric Times* (4th ed., London, 1878); Robert Munro, *The Lake-Dwellings of Europe* (London, 1890), with a bibliography of the subject.

(J. AN.)

LAKE GENEVA, a city of Walworth county, Wisconsin, U.S.A., 65 m. N.W. of Chicago. Pop. (1900) 2585, of whom 468 were foreign-born; (1905) 3449; (1910) 3079. It is served by the Chicago & Northwestern railway. The city is picturesquely situated on the shores of Lake Geneva (9 m. long and 1½ to 3 m. wide), a beautiful body of remarkably clear water, fed by springs, and encircled by rolling hills covered with thick groves of hardwood trees. The region is famous as a summer resort, particularly for Chicago people. The city is the seat of Oakwood Sanitarium, and at Williams Bay, 6 m. distant, is the Yerkes Observatory of the University of Chicago. Dairying is the most important industrial interest. The first settlement on Lake Geneva was made about 1833. The city was chartered in 1893.

LAKE OF THE WOODS, a lake in the south-west of the province of Ontario, Canada, bordering west on the province of Manitoba, and south on the state of Minnesota. It is of extremely irregular shape, and contains many islands. Its length is 70 m., breadth 10 to 50 m., area 1500 sq. m. It lies in the centre of the Laurentian region between Lakes Winnipeg and Superior, and an area of 36,000 sq. m. drains to it. It collects the waters of many rivers, the chief being Rainy river from the east, draining Rainy Lake. By the Winnipeg river on the north-east it discharges into Lake Winnipeg. At its source Winnipeg river is 1057 ft. above the sea, and drops 347 ft. in its course of 165 m. The scenery both on and around the lake is exceedingly beautiful, and the islands are largely occupied by the summer residences of city merchants. Kenora, a flourishing town at the source of the Winnipeg river, is the centre of the numerous lumbering and mining enterprises of the vicinity.

LAKE PLACID, a village in Essex county, New York, U.S.A., on the W. shore of Mirror Lake, near the S. end of Lake Placid, about 42 m. N.W. of Ticonderoga. Pop. (1905) 1514; (1910) 1682. The village is

served by the Delaware & Hudson railway. The region is one of the most attractive in the Adirondacks, and is a much frequented summer resort. There are four good golf courses here, and the village has a well-built club house, called the "Neighborhood House." The village lies on the narrow strip of land (about ⅓ m.) between Mirror Lake (about 1 m. long, N. and S., and ⅓ m. wide), and Lake Placid, about 5 m. long (N.N.E. by S.S.W.), and about 1½ m. (maximum) broad; its altitude is 1864 ft. The lake is roughly divided, from N. to S. by three islands—Moose, the largest, and Hawk, both privately owned, and Buck—and is a beautiful sheet of water in a picturesque setting of forests and heavily wooded hills and mountains. Among the principal peaks in the vicinity are Whiteface Mountain (4871 ft.), about 3 m. N.W. of the N. end of the lake; McKenzie Mountain (3872 ft.), about 1 m. to the W., and Pulpit Mountain (2658 ft.), on the E. shore. The summit of Whiteface Mountain commands a fine view, with Gothic (4738 ft.), Saddleback (4530 ft.), Basin (4825 ft.), Marcy (5344 ft.), and McIntyre (5210 ft.) mountains about 10 m. to the S. and Lake Champlain to the E., and to the N.E. may be seen, on clear days, the spires of Montreal. In the valleys E. and S. are the headwaters of the famous Ausable river. About 2 m. E. of the village, at North Elba, is the grave of the abolitionist, John Brown, with its huge boulder monument, and near it is another monument which bears the names of the 20 persons who bought the John Brown farm and gave it to the state. The railway to the village was completed in 1893. The village was incorporated in 1900.

LAKEWOOD, a village of Ocean county, New Jersey, U.S.A., in the township of Lakewood, 59 m. S. by W. of New York city, and 8 m. from the coast, on the Central Railroad of New Jersey. Pop. (1900) of the township, including the village, 3094; (1905) 4265; (1910) 5149. Lakewood is a fashionable health and winter resort, and is situated in the midst of a pine forest, with two small lakes, and many charming walks and drives. In the village there are a number of fine residences, large hotels, a library and a hospital. The winter temperature is 10-12° F. warmer than in New York. The township of Lakewood was incorporated in 1892.

LAKH (from the Sans. *laksha*, one hundred thousand), a term used in British India, in a colloquial sense to signify a lakh of rupees (written 1,00,000), which at the face value of the rupee would be worth £10,000, but now is worth only £6666. The term is also largely used in trade returns. A hundred lakhs make a crore.

LAKHIMPUR, a district of British India in the extreme east of the province of Eastern Bengal and Assam. Area, 4529 sq. m. It lies along both banks of the Brahmaputra for about 400 m.; it is bounded N. by the Daphla, Miri, Abor and Mishmi hills, E. by the Mishmi and Kachin hills, S. by the watershed of the Patkai range and the Lohit branch of the Brahmaputra, and W. by the districts of Darrang and Sibsagar. The Brahmaputra is navigable for steamers in all seasons as far as Dibrugarh, in the rainy season as far as Sadiya; its navigable tributaries within the district are the Subansiri, Dibru and Dihing. The deputy-commissioner in charge exercises political control over numerous tribes beyond the inner surveyed border. The most important of these tribes are the Miris, Abors, Mishmis, Khamtis, Kachins and Nagas. In 1901 the population was 371,396, an increase of 46% in the decade. The district has enjoyed remarkable and continuous prosperity. At each successive census the percentage of increase has been over 40, the present population being more than three times as great as that of 1872. This increase is chiefly due to the numerous tea gardens and to the coal mines and other enterprises of the Assam Railways and Trading Company. Lakhimpur was the first district into which tea cultivation was introduced by the government, and the Assam Company began operations here in 1840. The railway, known as the Dibru-Sadiya line, runs from Dibrugarh to Makum, with two branches to Talap and Margherita, and has been connected across the hills with the Assam-Bengal railway. The coal is of excellent quality, and is exported by river as far as Calcutta. The chief oil-wells are at Digboi. The oil is refined at Margherita, producing a good quality of kerosene oil and first-class paraffin, with wax and other by-products. The company also manufactures bricks and pipes of various kinds. Another industry is cutting timber, for the manufacture of tea-chests, &c.

Lakhimpur figures largely in the annals of Assam as the region where successive invaders from the east first reached the Brahmaputra. The Bara Bhuiyas, originally from the western provinces of India, were driven out by the Chutias (a Shan race), and these in their turn gave place to their more powerful

brethren, the Ahoms, in the 13th century. The Burmese, who had ruined the native kingdoms, at the end of the 18th century, were in 1825 expelled by the British, who placed the southern part of the country, together with Sibsagar under the rule of Raja Purandhar Singh; but it was not till 1838 that the whole was taken under direct British administration. The headquarters are at Dibrugarh.

See *Lakhimpur District Gazetteer* (Calcutta, 1905).

LAKSHMI (Sans. for "mark," "sign," generally used in composition with *punya*, "prosperous"; hence "good sign," "good fortune"), in Hindu mythology, the wife of Vishnu worshipped as the goddess of love, beauty and prosperity. She has many other names, the chief being *Loka mata* ("mother of the world"), *Padma* ("the lotus"), *Padma laya* ("she who dwells on a lotus") and *Jaladhija* ("the ocean-born"). She is represented as of a bright golden colour and seated on a lotus. She is said to have been born from the sea of milk when it was churned from ambrosia. Many quaint myths surround her birth. In the Rig Veda her name does not occur as a goddess.

LALAING, JACQUES DE (*c.* 1420-1453), Flemish knight, was originally in the service of the duke of Cleves and afterwards in that of the duke of Burgundy, Philip III., the Good, gaining great renown by his prowess in the tiltyard. The duke of Burgundy entrusted him with embassies to the pope and the king of France (1451), and subsequently sent him to put down the revolt of the inhabitants of Ghent, in which expedition he was killed. His biography, *Le Livre des faits de messire Jacques de Lalaing*, which has been published several times, is mainly the work of the Burgundian herald and chronicler Jean le Fèvre, better known as *Toison d'or*; the Flemish historiographer Georges Chastellain and the herald Charolais also took part in its compilation.

LALANDE, JOSEPH JÉRÔME LEFRANÇAIS DE (1732-1807), French astronomer, was born at Bourg (department of Ain), on the 11th of July 1732. His parents sent him to Paris to study law; but the accident of lodging in the Hôtel Cluny, where J. N. Delisle had his observatory, drew him to astronomy, and he became the zealous and favoured pupil of both Delisle and Pierre Lemonnier. He, however, completed his legal studies, and was about to return to Bourg to practise there as an advocate, when Lemonnier obtained permission to send him to Berlin, to make observations on the lunar parallax in concert with those of N. L. Lacaille at the Cape of Good Hope. The successful execution of his task procured for him, before he was twenty-one, admission to the Academy of Berlin, and the post of adjunct astronomer to that of Paris. He now devoted himself to the improvement of the planetary theory, publishing in 1759 a corrected edition of Halley's tables, with a history of the celebrated comet whose return in that year he had aided Clairault to calculate. In 1762 J. N. Delisle resigned in his favour the chair of astronomy in the Collège de France, the duties of which were discharged by Lalande for forty-six years. His house became an astronomical seminary, and amongst his pupils were J. B. J. Delambre, G. Piazzi, P. Mechain, and his own nephew Michel Lalande. By his publications in connexion with the transit of 1769 he won great and, in a measure, deserved fame. But his love of notoriety and impetuous temper compromised the respect due to his scientific zeal, though these faults were partially balanced by his generosity and benevolence. He died on the 4th of April 1807.

Although his investigations were conducted with diligence rather than genius, the career of Lalande must be regarded as of eminent service to astronomy. As a lecturer and writer he gave to the science unexampled popularity; his planetary tables, into which he introduced corrections for mutual perturbations, were the best available up to the end of the 18th century; and the Lalande prize, instituted by him in 1802 for the chief astronomical performance of each year, still testifies to his enthusiasm for his favourite pursuit. Amongst his voluminous works are *Traité d'astronomie* (2 vols., 1764; enlarged edition, 4 vols., 1771-1781; 3rd ed., 3 vols., 1792); *Histoire céleste française* (1801), giving the places of 50,000 stars; *Bibliographie astronomique* (1803), with a history of astronomy from 1781 to 1802; *Astronomie des dames* (1785); *Abrégé de navigation* (1793); *Voyage d'un françois en Italie* (1769), a valuable record of his travels in 1765-1766. He communicated above one hundred and fifty papers to the Paris Academy of Sciences, edited the *Connoissance des temps* (1759-1774), and again (1794-1807), and wrote the concluding 2 vols. of the 2nd edition of Montucla's *Histoire des mathématiques* (1802).

See *Mémoires de l'Institut*, t. viii. (1807) (J. B. J. Delambre); Delambre, *Hist. de l'astr. au XVIII^e siècle*, p.

547; *Magazin encyclopédique*, ii. 288 (1810) (Mme de Salm); J. S. Bailly, *Hist. de l'astr. moderne*, t. iii. (ed. 1785); J. Mädler, *Geschichte der Himmelskunde*, ii. 141; R. Wolf, *Gesch. der Astronomie*; J. J. Lalande, *Bibl. astr.* p. 428; J. C. Poggendorff, *Biog. Lit. Handwörterbuch*; M. Marie, *Hist. des sciences*, ix. 35.

LALÍN, a town of north-western Spain, in the province of Pontevedra. Pop. (1900) 16,238. Lalín is the centre of the trade in agricultural products of the fertile highlands between the Deza and Arnego rivers. The local industries are tanning and the manufacture of paper. Near Lalín are the ruins of the Gothic abbey of Carboeiro.

LA LINEA, or La Linea de la Concepcion, a town of Spain, in the province of Cadiz, between Gibraltar and San Roque. Pop. (1900) 31,802. La Linea, which derives its name from the *line* or boundary dividing Spanish territory from the district of Gibraltar, is a town of comparatively modern date and was formerly looked upon as a suburb of San Roque. It is now a distinct frontier post and headquarters of the Spanish commandant of the lines of Gibraltar. The fortifications erected here in the 16th century were dismantled by the British in 1810, to prevent the landing of French invaders, and all the existing buildings are modern. They include barracks, casinos, a theatre and a bull-ring, much frequented by the inhabitants and garrison of Gibraltar. La Linea has some trade in cereals, fruit and vegetables; it is the residence of large numbers of labourers employed in Gibraltar.

LALITPUR, a town of British India, in Jhansi district, United Provinces. Pop. (1901) 11,560. It has a station on the Great Indian Peninsula railway, and a large trade in oil-seeds, hides and *ghi*. It contains several beautiful Hindu and Jain temples. It was formerly the headquarters of a district of the same name, which was incorporated with that of Jhansi in 1891. The Bundela chiefs of Lalitpur were among those who most eagerly joined the Mutiny, and it was only after a severe struggle that the district was pacified.

LALLY, THOMAS ARTHUR, Comte de, Baron de Tollendal (1702-1766), French general, was born at Romans, Dauphiné, in January 1702, being the son of Sir Gerard O'Lally, an Irish Jacobite who married a French lady of noble family, from whom the son inherited his titles. Entering the French army in 1721 he served in the war of 1734 against Austria; he was present at Dettingen (1743), and commanded the regiment de Lally in the famous Irish brigade at Fontenoy (May 1745). He was made a brigadier on the field by Louis XV. He had previously been mixed up in several Jacobite plots, and in 1745 accompanied Charles Edward to Scotland, serving as aide-de-camp at the battle of Falkirk (January 1746). Escaping to France, he served with Marshal Saxe in the Low Countries, and at the capture of Maestricht (1748) was made a *maréchal de camp*. When war broke out with England in 1756 Lally was given the command of a French expedition to India. He reached Pondicherry in April 1758, and at the outset met with some trifling military success. He was a man of courage and a capable general; but his pride and ferocity made him disliked by his officers and hated by his soldiers, while he regarded the natives as slaves, despised their assistance, and trampled on their traditions of caste. In consequence everything went wrong with him. He was unsuccessful in an attack on Tanjore, and had to retire from the siege of Madras (1758) owing to the timely arrival of the British fleet. He was defeated by Sir Eyre Coote at Wandiwash (1760), and besieged in Pondicherry and forced to capitulate (1761). He was sent as a prisoner of war to England. While in London, he heard that he was accused in France of treachery, and insisted, against advice, on returning on parole to stand his trial. He was kept prisoner for nearly two years before the trial began; then, after many painful delays, he was sentenced to death (May 6, 1766), and three days later beheaded. Louis XV. tried to throw the responsibility for what was undoubtedly a judicial murder on his ministers and the public, but his policy needed a scapegoat, and he was probably well content not to exercise his authority to save an almost friendless foreigner.

See G. B. Malleson, *The Career of Count Lally* (1865); "Z's" (the marquis de Lally-Tollendal) article in the *Biographie Michaud*; and Voltaire's *Œuvres complètes*. The legal documents are preserved in the Bibliothèque Nationale.

LALLY-TOLLENDAL, TROPHIME GÉRARD, Marquis de (1751-1830), was born at Paris on the 5th of March 1751. He was the legitimized son of the comte de Lally and only discovered the secret of his birth on the day of his father's execution, when he resolved to devote himself to clearing his father's memory. He was supported by Voltaire, and in 1778 succeeded in persuading Louis XVI. to annul the decree which had sentenced the comte de Lally; but the parlement of Rouen, to which the case was referred back, in 1784 again decided in favour of Lally's guilt. The case was retried by other courts, but Lally's innocence was never fully admitted by the French judges. In 1779 Lally-Tollendal bought the office of *Grand bailli* of Étampes, and in 1789 was a deputy to the states-general for the *noblesse* of Paris. He played some part in the early stages of the Revolution, but was too conservative to be in sympathy with all even of its earlier developments. He threw himself into opposition to the "tyranny" of Mirabeau, and condemned the epidemic of renunciation which in the session of the 4th of August 1789 destroyed the traditional institutions of France. Later in the year he emigrated to England. During the trial of Louis XVI. by the National Convention (1793) he offered to defend the king, but was not allowed to return to France. He did not return till the time of the Consulate. Louis XVIII. created him a peer of France, and in 1816 he became a member of the French Academy. From that time until his death, on the 11th of March 1830, he devoted himself to philanthropic work, especially identifying himself with prison reform.

See his *Plaidoyer pour Louis XVI.* (London, 1793); Lally-Tollendal was also in part responsible for the *Mémoires*, attributed to Joseph Weber, concerning Marie Antoinette (1804); he further edited the article on his father in the *Biographie Michaud*; see also Arnault, *Discours prononcé aux funérailles de M. le marquis de Lally-Tollendal le 13 mars 1830* (Paris); Gauthier de Brecy, *Nécrologie de M. le marquis de Lally-Tollendal* (Paris, undated); Voltaire, *Œuvres complètes* (Paris, 1889), in which see the analytical table of contents, vol. ii.

LALO, EDOUARD (1823-1892), French composer, was born at Lille, on the 27th of January 1823. He began his musical studies at the conservatoire at Lille, and in Paris attended the violin classes of Habeneck. For several years Lalo led a modest and retired existence, playing the viola in the quartet party organized by Armingaud and Jacquard, and in composing chamber music. His early works include two trios, a quartet, and several pieces for violin and pianoforte. In 1867 he took part in an operatic competition, an opera from his pen, entitled *Fiesque*, obtaining the third place out of forty-three. This work was accepted for production at the Paris Opéra, but delays occurred, and nothing was done. *Fiesque* was next offered to the Théâtre de la Monnaie, Brussels, and was about to be produced there when the manager became bankrupt. Thus, when nearly fifty years of age, Lalo found himself in difficulties. *Fiesque* was never performed, but the composer published the pianoforte score, and eventually employed some of the music in other works. After the Franco-German war French composers found their opportunity in the concert-room. Lalo was one of these, and during the succeeding ten years several interesting works from his pen were produced, among them a sonata for violoncello, a "divertissement" for orchestra, a violin concerto and the *Symphonie Espagnole* for violin and orchestra, one of his best-known compositions. In the meanwhile he had written a second opera, *Le Roi d'Ys*, which he hoped would be produced at the Opéra. The administration offered him the "scenario" of a ballet instead. Lalo was obliged to be content with this, and set to work with so much energy that he fell ill, the last scenes of the ballet being orchestrated by Gounod. *Namouna*, the ballet in question, was produced at the Opéra in 1882. Six years later, on the 7th of May 1888, *Le Roi d'Ys* was brought out at the Opéra Comique, and Lalo was at last enabled to taste the sweets of success. Unfortunately, fame came to him too late in life. A pianoforte concerto and the music to *Néron*, a pantomimic piece played at the Hippodrome in 1891, were his last two works. He had begun a new opera, but had only written the first act when, on the 23rd of April 1892, he died. This opera, *La Jacquerie*, was finished by Arthur Coquard, and was produced in 1895 at Monte Carlo, Aix-les-Bains and finally in Paris. Lalo had distinct originality, discernible in his employment of curious rhythmic devices. His music is ever ingenious and brilliantly effective.

LA MADDALENA, an island 2½ m. from the N.E. coast of Sardinia. Pop. (1901) 8361. Napoleon bombarded it in 1793 without success, and Nelson made it his headquarters for some time. It is now an important naval station of the Italian fleet, the anchorage being good, and is strongly fortified. A bridge and an embankment connect it with Caprera. It appears to have been inhabited in Roman times.

LĀMĀISM, a system of doctrine partly religious, partly political. Religiously it is the corrupt form of Buddhism prevalent in Tibet and Mongolia. It stands in a relationship to primitive Buddhism similar to that in which Roman Catholicism, so long as the temporal power of the pope was still in existence, stood to primitive Christianity. The ethical and metaphysical ideas most conspicuous in the doctrines of Lāmāism are not confined to the highlands of central Asia, they are accepted in great measure also in Japan and China. It is the union of these ideas with a hierarchical system, and with the temporal sovereignty of the head of that system in Tibet, which constitutes what is distinctively understood by the term Lāmāism. Lāmāism has acquired a special interest to the student of comparative history through the instructive parallel which its history presents to that of the Church of Rome.

The central point of primitive Buddhism was the doctrine of "Arahatship"—a system of ethical and mental self-culture, in which deliverance was found from all the mysteries and sorrows of life in a change of heart to be reached here on earth. This doctrine seems to have been held very nearly in its original purity from the time when it was propounded by Gotama in the 6th century B.C. to the period in which northern India was conquered by the Huns about the commencement of the Christian era. Soon after that time there arose a school of Buddhist teachers who called their doctrine the "Great Vehicle." It was not in any contradiction to the older doctrine, which they contemptuously called the "Little Vehicle," but included it all, and was based upon it. The distinguishing characteristic of the newer school was the importance which it attached to "Bodhisatship." The older school had taught that Gotama, who had propounded the doctrine of Arahatship, was a Buddha, that only a Buddha is capable of discovering that doctrine, and that a Buddha is a man who by self-denying efforts, continued through many hundreds of different births, has acquired the so-called *Ten Pāramitās* or cardinal virtues in such perfection that he is able, when sin and ignorance have gained the upper hand throughout the world, to save the human race from impending ruin. But until the process of perfection has been completed, until the moment when at last the sage, sitting under the Wisdom tree acquires that particular insight or wisdom which is called Enlightenment or Buddhahood, he is still only a Bodhisat. The link of connexion between the various Bodhisats in the future Buddha's successive births is not a soul which is transferred from body to body, but the *karma*, or character, which each successive Bodhisat inherits from his predecessors in the long chain of existences. Now the older school also held, in the first place, that, when a man had, in this life, attained to Arahatship, his karma would not pass on to any other individual in another life—or in other words, that after Arahatship there would be no rebirth; and, secondly, that four thousand years after the Buddha had proclaimed the *Dhamma* or doctrine of Arahatship, his teaching would have died away, and another Buddha would be required to bring mankind once more to a knowledge of the truth. The leaders of the Great Vehicle urged their followers to seek to attain, not so much to Arahatship, which would involve only their own salvation, but to Bodhisatship, by the attainment of which they would be conferring the blessings of the Dhamma upon countless multitudes in the long ages of the future. By thus laying stress upon Bodhisatship, rather than upon Arahatship, the new school, though they doubtless merely thought themselves to be carrying the older orthodox doctrines to their logical conclusion, were really changing the central point of Buddhism, and were altering the direction of their mental vision. It was of no avail that they adhered in other respects in the main to the older teaching, that they professed to hold to the same ethical system, that they adhered, except in a few unimportant details, to the old regulations of the order of the Buddhist mendicant recluses. The ancient books, preserved in the *Pāli Pitakas*, being mainly occupied with the details of Arahatship, lost their exclusive value in the eyes of those whose attention was being directed to the details of Bodhisatship. And the opinion that every leader in their religious circles, every teacher distinguished among them for his sanctity of life, or for his extensive learning, was a Bodhisat, who might have and who probably had inherited the karma of some great teacher of old, opened the door to a flood of superstitious fancies.

The "Great Vehicle."

It is worthy of note that the new school found its earliest professors and its greatest expounders in a part of India outside the districts to which the personal influence of Gotama and of his immediate followers had been confined. The home of early Buddhism was round about Kosala and Magadha; in the district, that is to say, north and south of the Ganges between where Allahabad now lies on the west and Rajgir on the east. The home of the Great Vehicle was, at first, in the countries farther to the north and west. Buddhism arose in countries where Sanskrit was never more than a learned tongue, and where the exclusive claims of the Brahmins had never been universally admitted. The Great Vehicle arose in the very stronghold of Brahminism, and among a people to whom Sanskrit, like Latin in the middle ages in Europe, was the literary *lingua franca*. The new literature therefore, which the new movement called forth, was written, and has been preserved, in Sanskrit—its principal books of *Dharma*, or doctrine, being the following nine: (1) *Prajñā-pāramitā*; (2) *Gaṇḍa-vyūha*; (3) *Daśa-bhūmīś-vara*; (4) *Samādhi-rāja*; (5) *Lankāvatāra*; (6) *Saddharma-puṇḍarīka*; (7) *Tathāgata-guhyaka*; (8) *Lalita-vistara*; (9) *Suvarṇa-prabhāsa*. The date of none of these works is known with any certainty, but it is highly improbable that any one of them is older than the 6th century after the death of Gotama. Copies of all of them were brought to Europe by Mr B. H. Hodgson, and other copies have been received since then; but only one of them has as

yet been published in Europe (the *Lalita Vistara*, edited by Lofmann), and only two have been translated into any European language. These are the *Lalita Vistara*, translated into French, through the Tibetan, by M. Foucaux, and the *Saddharma Puṇḍarīka*, translated into English by Professor Kern. The former is legendary work, partly in verse, on the life of Gotama, the historical Buddha; and the latter, also partly in verse, is devoted to proving the essential identity of the Great and the Little Vehicles, and the equal authenticity of both as doctrines enunciated by the master himself.

Of the authors of these nine works, as of all the older Buddhist works with one or two exceptions, nothing has been ascertained. The founder of the system of the Great Vehicle is, however, often referred to under the name of Nāgārjuna, whose probable date is about A.D. 200.

Together with Nāgārjuna, other early teachers of the Great Vehicle whose names are known are Vasumitra, Vasubandhu, Āryadeva, Dharmapāla and Guṇamati—all of whom were looked upon as Bodhisats. As the newer school did not venture so far as to claim as Bodhisats the disciples stated in the older books to have been the contemporaries of Gotama (they being precisely the persons known as Arahats), they attempted to give the appearance of age to the Bodhisat theory by representing the Buddha as being surrounded, not only by his human companions the Arahats, but also by fabulous beings, whom they represented as the Bodhisats existing at that time. In the opening words of each Mahāyāna treatise a list is given of such Bodhisats, who were beginning, together with the historical Bodhisats, to occupy a position in the Buddhist church of those times similar to that occupied by the saints in the corresponding period of the history of Christianity in the Church of Rome. And these lists of fabulous Bodhisats have now a distinct historical importance. For they grow in length in the later works; and it is often possible by comparing them one with another to fix, not the date, but the comparative age of the books in which they occur. Thus it is a fair inference to draw from the shortness of the list in the opening words of the *Lalita Vistara*, as compared with that in the first sections of the *Saddharma Puṇḍarīka*, that the latter work is much the younger of the two, a conclusion supported also by other considerations.

Among the Bodhisats mentioned in the *Saddharma Puṇḍarīka*, and not mentioned in the *Lalita Vistara*, as attendant on the Buddha are Mañju-śrī and Avalokiteśvara. That these saints were already acknowledged by the followers of the Great Vehicle at the beginning of the 5th century is clear from the fact that Fa Hien, who visited India about that time, says that “men of the Great Vehicle” were then worshipping them at Mathura, not far from Delhi (F. H., chap. xvi.). These were supposed to be celestial beings who, inspired by love of the human race, had taken the so-called Great Resolve to become future Buddhas, and who therefore descended from heaven when the actual Buddha was on earth, to pay reverence to him, and to learn of him. The belief in them probably arose out of the doctrine of the older school, which did not deny the existence of the various creations of previous mythology and speculation, but allowed of their actual existence as spiritual beings, and only deprived them of all power over the lives of men, and declared them to be temporary beings liable, like men, to sin and ignorance, and requiring, like men, the salvation of Arahatship. Among them the later Buddhists seem to have placed their numerous Bodhisats; and to have paid especial reverence to Mañju-śrī as the personification of wisdom, and to Avalokiteśwara as the personification of overruling love. The former was afterwards identified with the mythical first Buddhist missionary, who is supposed to have introduced civilization into Tibet about two hundred and fifty years after the death of the Buddha.

The way was now open to a rapid fall from the simplicity of early Buddhism, in which men’s attention was directed to the various parts of the system of self-culture, to a belief in a whole pantheon of saints or angels, which appealed more strongly to the half-civilized races among whom the Great Vehicle was now professed. A theory sprang up which was supposed to explain the marvellous powers of the Buddhas by representing them as only the outward appearance, the reflection, as it were, or emanation, of ethereal Buddhas dwelling in the skies. These were called *Dhyāni Buddhas*, and their number was supposed to be, like that of the Buddhas, innumerable. Only five of them, however, occupied any space in the speculative world in which the ideas of the later Buddhists had now begun to move. But, being Buddhas, they were supposed to have their Bodhisats; and thus out of the five last Buddhas of the earlier teaching there grew up five mystic trinities, each group consisting of one of these five Buddhas, his prototype in heaven the Dhyāni Buddha, and his celestial Bodhisat. Among these hypothetical beings, the creations of a sickly scholasticism, hollow abstractions without life or reality, the particular trinity in which the historical Gotama was assigned a subordinate place naturally occupied the most exalted rank. Amitābha, the Dhyāni-Buddha of this trinity, soon began to fill the largest place in the minds of the new school; and Avalokiteśwara, his Bodhisat, was looked upon with a reverence somewhat less than his former glory. It is needless to add that, under the overpowering influence of these vain imaginations, the earnest moral teachings of Gotama became more and more hidden from view. The imaginary saints grew and flourished. Each new creation, each new step in the theory, demanded another, until the whole sky was filled with forgeries of the brain, and the nobler and simpler lessons of the founder of the religion were hidden beneath the glittering stream of metaphysical subtleties.

The five mystic trinities.

Still worse results followed on the change of the earlier point of view. The acute minds of the Buddhist pandits, no longer occupied with the practical lessons of Arahatship, turned their attention, as far as it was not engaged upon their hierarchy of mythological beings, to questions of metaphysical speculation, which, in the earliest Buddhism, are not only discouraged but forbidden. We find long treatises on the nature of being, idealistic dreams which have as little to do with the Bodhisatship that is concerned with the salvation of the world as with the Arahatship that is concerned with the perfect life. Only one lower step was possible, and that was not long in being taken. The animism common alike to the untaught Huns and to their Hindu conquerors, but condemned in early Buddhism, was allowed to revive. As the stronger side of Gotama’s teaching was neglected, the debasing belief in rites and ceremonies, and charms and incantations, which had been the especial object of his scorn, began to spread like the Bīrana weed

warmed by a tropical sun in marsh and muddy soil. As in India, after the expulsion of Buddhism, the degrading worship of Śiva and his dusky bride had been incorporated into Hinduism from the savage devil worship of Āryan and of non-Āryan tribes, so, as pure Buddhism died away in the north, the *Tantra* system, a mixture of magic and witchcraft and sorcery, was incorporated into the corrupted Buddhism.

The Tantra system.

The founder of this system seems to have been Asanga, an influential monk of Peshāwar, who wrote the first text-book of the creed, the *Yogāchchāra Bhūmi Śāstra*, in the 6th century A.D. Hsüan Tsang, who travelled in the first half of the 7th, found the monastery where Asanga had lived in ruins, and says that he had lived one thousand years after the Buddha.[1] Asanga managed with great dexterity to reconcile the two opposing systems by placing a number of Śaivite gods or devils, both male and female, in the inferior heavens of the then prevalent Buddhism, and by representing them as worshippers and supporters of the Buddha and of Avalokiteśvara. He thus made it possible for the half-converted and rude tribes to remain Buddhists while they brought offerings, and even bloody offerings, to these more congenial shrines, and while their practical belief had no relation at all to the Truths or the Noble Eightfold Path, but busied itself almost wholly with obtaining magic powers (*Siddhi*), by means of magic phrases (*Dhārani*), and magic circles (*Maṇḍala*). Asanga's happy idea bore but too ample fruit. In his own country and Nepāl, the new wine, sweet and luscious to the taste of savages, completely disqualified them from enjoying any purer drink; and now in both countries Śaivism is supreme, and Buddhism is even nominally extinct, except in some outlying districts of Nepāl. But this full effect has only been worked out in the lapse of ages; the Tantra literature has also had its growth and its development, and some unhappy scholar of a future age may have to trace its loathsome history. The nauseous taste repelled even the self-sacrificing industry of Burnouf, when he found the later Tantra books to be as immoral as they are absurd. "The pen," he says, "refuses to transcribe doctrines as miserable in respect of form as they are odious and degrading in respect of meaning."

Such had been the decline and fall of Buddhism considered as an ethical system before its introduction into Tibet. The manner in which its order of mendicant recluses, at first founded to afford better opportunities to those who wished to carry out that system in practical life, developed at last into a hierarchical monarchy will best be understood by a sketch of the history of Tibet.

Early political history.

Its real history commences with Srong Tsan Gampo, who was born a little after 600 A.D., and who is said in the Chinese chronicles to have entered, in 634, into diplomatic relationship with Tai Tsung, one of the emperors of the Tang dynasty. He was the founder of the present capital of Tibet, now known as Lhasa; and in the year 622 (the same year as that in which Mahomet fled from Mecca) he began the formal introduction of Buddhism into Tibet. For this purpose he sent the minister Thumi Sambhota, afterwards looked upon as an incarnation of Mañju-śrī, to India, there to collect the sacred books, and to learn and translate them. Thumi Sambhota accordingly invented an alphabet for the Tibetan language on the model of the Indian alphabets then in use. And, aided by the king, who is represented to have been an industrious student and translator, he wrote the first books by which Buddhism became known in his native land. The most famous of the works ascribed to him is the *Mani Kambum*, "the Myriad of Precious Words"—a treatise chiefly on religion, but which also contains an account of the introduction of Buddhism into Tibet, and of the closing part of the life of Srong Tsan Gampo. He is also very probably the author of another very ancient standard work of Tibetan Buddhism, the *Samatog*, a short digest of Buddhist morality, on which the civil laws of Tibet have been founded. It is said in the *Mani Kambum* to have fallen from heaven in a casket (Tibetan, *samatog*), and, like the last-mentioned work, is only known to us in meagre abstract.

King Srong Tsan Gampo's zeal for Buddhism was shared and supported by his two queens, Bribsun, a princess from Nepāl, and Wen Ching, a princess from China. They are related to have brought with them sacred relics, books and pictures, for whose better preservation two large monasteries were erected. These are the cloisters of La Brang (Jokhang) and Ra Moché, still, though much changed and enlarged, the most sacred abbeys in Tibet, and the glory of Lhasa. The two queens have become semi-divine personages, and are worshipped under the name of the two *Dārā-Eke*, the "glorious mothers," being regarded as incarnations of the wife of Śiva, representing respectively two of the qualities which she personifies, divine vengeance and divine love. The former is worshipped by the Mongolians as *Okkin Tengri*, "the Virgin Goddess"; but in Tibet and China the rôle of the divine virgin is filled by *Kwan Yin*, a personification of Avalokiteśvara as the heavenly word, who is often represented with a child in her arms. Srong Tsan Gampo has also become a saint, being looked upon as an incarnation of Avalokiteśvara; and the description in the ecclesiastical historians of the measures he took for the welfare of his subjects do great credit to their ideal of the perfect Buddhist king. He is said to have spent his long reign in the building of reservoirs, bridges and canals; in the promotion of agriculture, horticulture and manufactures; in the establishment of schools and colleges; and in the maintenance of justice and the encouragement of virtue. But the degree of his success must have been slight. For after the death of himself and of his wives Buddhism gradually decayed, and was subjected by succeeding kings to cruel persecutions; and it was not till more than half a century afterwards, under King Kir Song de Tsan, who reigned 740-786, that true religion is acknowledged by the ecclesiastical historians to have become firmly established in the land.

The Tibetan sacred books.

This monarch again sent to India to replace the sacred books that had been lost, and to invite Buddhist pandits to translate them. The most distinguished of those who came were Śānta Rakshita, Padma Sambhava and Kamala Śīla, for whom, and for their companions, the king built a splendid monastery still existing, at Samje, about three days' journey south-east of Lhasa. It was to them that the Tibetans owed the great collection of what are still regarded as their sacred books—the *Kandjur*. It consists of 100 volumes containing 689 works, of which there are two or three complete sets in Europe, one of them in the India Office library. A detailed analysis of these scriptures has been published by the celebrated Hungarian scholar Csoma de Körös, whose authoritative work has been republished in French with complete indices and very useful notes by M. Léon Feer. These

volumes contain about a dozen works of the oldest school of Buddhism, the Hīnayāna, and about 300 works, mostly very short, belonging to the Tantra school. But the great bulk of the collection consists of Mahāyāna books, belonging to all the previously existing varieties of that widely extended Buddhist sect; and, as the Sanskrit originals of many of these writings are now lost, the Tibetan translations will be of great value, not only for the history of Lāmāism, but also for the history of the later forms of Indian Buddhism.

The last king's second son, Lang Darma, concluded in May 822 a treaty with the then emperor of China (the twelfth of the Tang dynasty), a record of which was engraved on a stone put up in the above-mentioned great convent of La Brang (Jokhang), and is still to be seen there.[2] He is described in the church chronicles as an incarnation of the evil spirit, and is said to have succeeded in suppressing Buddhism throughout the greater part of the land. The period from Srong Tsan Gampo down to the death of Lang Darma, who was murdered about A.D. 850, in a civil war, is called in the Buddhist books "the first introduction of religion." It was followed by more than a century of civil disorder and wars, during which the exiled Buddhist monks attempted unsuccessfully again and again to return. Many are the stories of martyrs and confessors who are believed to have lived in these troublous times, and their efforts were at last crowned with success, for in the century commencing with the reign of Bilamgur in 971 there took place "the second introduction of religion" into Tibet, more especially under the guidance of the pandit Atīsha, who came to Tibet in 1041, and of his famous native pupil and follower Brom Ston. The long period of depression seems not to have been without a beneficial influence on the persecuted Buddhist church, for these teachers are reported to have placed the Tantra system more in the background, and to have adhered more strongly to the purer forms of the Mahāyāna development of the ancient faith.

The temporal sovereignty of the Lāmas.

For about three hundred years the Buddhist church of Tibet was left in peace, subjecting the country more and more completely to its control, and growing in power and in wealth. During this time it achieved its greatest victory, and underwent the most important change in its character and organization. After the reintroduction of Buddhism into the "kingdom of snow," the ancient dynasty never recovered its power. Its representatives continued for some time to claim the sovereignty; but the country was practically very much in the condition of Germany at about the same time—chieftains of almost independent power ruled from their castles on the hill-tops over the adjacent valleys, engaged in petty wars, and conducted plundering expeditions against the neighbouring tenants, whilst the great abbeys were places of refuge for the studious or religious, and their heads were the only rivals to the barons in social state, and in many respects the only protectors and friends of the people. Meanwhile Jenghiz Khān had founded the Mongol empire, and his grandson Kublai Khān became a convert to the Buddhism of the Tibetan Lāmas. He granted to the abbot of the Sākya monastery in southern Tibet the title of tributary sovereign of the country, head of the Buddhist church, and overlord over the numerous barons and abbots, and in return was officially crowned by the abbot as ruler over the extensive domain of the Mongol empire. Thus was the foundation laid at one and the same time of the temporal sovereignty of the Lāmas of Tibet, and of the suzerainty over Tibet of the emperors of China. One of the first acts of the "head of the church" was the printing of a carefully revised edition of the Tibetan Scriptures—an undertaking which occupied altogether nearly thirty years and was not completed till 1306.

Under Kublai's successors in China the Buddhist cause flourished greatly, and the Sākya Lāmas extended their power both at home and abroad. The dignity of abbot at Sākya became hereditary, the abbots breaking so far the Buddhist rule of celibacy that they remained married until they had begotten a son and heir. But rather more than half a century afterwards their power was threatened by a formidable rival at home, a Buddhist reformer.

The Luther of Tibet.

Tsongkapa, the Luther of Tibet, was born about 1357 on the spot where the famous monastery of Kunbum now stands. He very early entered the order, and studied at Sākya, Brigung and other monasteries. He then spent eight years as a hermit in Takpo in southern Tibet, where the comparatively purer teaching of Atīsha (referred to above) was still prevalent. About 1390 he appeared as a public teacher and reformer in Lhasa, and before his death in 1419 there were three huge monasteries there containing 30,000 of his disciples, besides others in other parts of the country. His voluminous works, of which the most famous are the *Sumbun* and the *Lam Nim Tshenpo*, exist in printed Tibetan copies in Europe, but have not yet been translated or analysed. But the principal lines on which his reformation proceeded are sufficiently attested. He insisted in the first place on the complete carrying out of the ancient rules of the order as to the celibacy of its members, and as to simplicity in dress. One result of the second of these two reforms was to make it necessary for every monk openly to declare himself either in favour of or against the new views. For Tsongkapa and his followers wore the yellow or orange-coloured garments which had been the distinguishing mark of the order in the lifetime of its founder, and in support of the ancient rules Tsongkapa reinstated the fortnightly rehearsal of the *Pātimokkha* or "disburdenment" in regular assemblies of the order at Lhasa—a practice which had fallen into desuetude. He also restored the custom of the first disciples to hold the so-called *Vassa* or yearly retirement, and the public meeting of the order at its close. In all these respects he was simply following the directions of the Vinaya, or regulations of the order, as established probably in the time of Gotama himself, and as certainly handed down from the earliest times in the piṭakas or sacred books. Further, he set his face against the Tantra system, and against the animistic superstitions which had been allowed to creep into life again. He laid stress on the self-culture involved in the practice of the pāramitās or cardinal virtues, and established an annual national fast or week of prayer to be held during the first days of each year. This last institution indeed is not found in the ancient Vinaya, but was almost certainly modelled on the traditional account of the similar assemblies convoked by Asoka and other Buddhist sovereigns in India every fifth year. Laymen as well as monks take part in the proceedings, the details of which are unknown to us except from the accounts of the Catholic missionaries—Fathers Huc and Gabet—who describe the principal ceremonial as,

in outward appearance, wonderfully like the high mass. In doctrine the great Tibetan teacher, who had no access to the Pāli Piṭakas, adhered in the main to the purer forms of the Mahāyāna school; in questions of church government he took little part, and did not dispute the titular supremacy of the Sākya Lāmas. But the effects of his teaching weakened their power. The "orange-hoods," as his followers were called, rapidly gained in numbers and influence, until they so overshadowed the "red-hoods," as the followers of the older sect were called, that in the middle of the 15th century the emperor of China acknowledged the two leaders of the new sect at that time as the titular overlords of the church and tributary rulers over the realm of Tibet. These two leaders were then known as the *Dalai Lāma* and the *Pantshen Lāma*, and were the abbots of the great monasteries at Gedun Dubpa, near Lhasa, and at Tashi Lunpo, in Farther Tibet, respectively. Since that time the abbots of these monasteries have continued to exercise the sovereignty over Tibet.

As there has been no further change in the doctrine, and no further reformation in discipline, we may leave the ecclesiastical history of Lāmāism since that date unnoticed, and consider some principal points on the constitution of the Lāmāism of to-day. And first as to the mode of electing successors to the two Great Lāmas. It will have been noticed that it was an old idea of the northern Buddhists to look upon distinguished members of the order as incarnations of Avalokiteśvara, of Mañju-śrī, or of Amitābha. These beings were supposed to possess the power, whilst they continued to live in heaven, of appearing on earth in a *Nirmāna-kāya*, or apparitional body. In the same way the Pantshen Lāma is looked upon as an incarnation, the Nirmāna-kāya, of Amitābha, who had previously appeared under the outward form of Tshonkapa himself; and the Dalai Lāma is looked upon as an incarnation of Avalokiteśvara. Theoretically, therefore, the former, as the spiritual successor of the great teacher and also of Amitābha, who occupies the higher place in the mythology of the Great Vehicle, would be superior to the latter, as the spiritual representative of Avalokiteśvara. But practically the Dalai Lāma, owing to his position in the capital,[3] has the political supremacy, and is actually called the *Gyalpo Rinpotshe*, "the glorious king"—his companion being content with the title *Pantshen Rinpotshe*, "the glorious teacher." When either of them dies it is necessary for the other to ascertain in whose body the celestial being whose outward form has been dissolved has been pleased again to incarnate himself. For that purpose the names of all male children born just after the death of the deceased Great Lāma are laid before his survivor. He chooses three out of the whole number; their names are thrown into a golden casket provided for that purpose by a former emperor of China. The Chutuktus, or abbots of the great monasteries, then assemble, and after a week of prayer, the lots are drawn in their presence and in presence of the surviving Great Lāma and of the Chinese political resident. The child whose name is first drawn is the future Great Lāma; the other two receive each of them 500 pieces of silver. The Chutuktus just mentioned correspond in many respects to the Roman cardinals. Like the Great Lāmas, they bear the title of Rinpotshe or Glorious, and are looked upon as incarnations of one or other of the celestial Bodhisats of the Great Vehicle mythology. Their number varies from ten to a hundred; and it is uncertain whether the honour is inherent in the abbacy of certain of the greatest cloisters, or whether the Dalai Lāma exercises the right of choosing them. Under these high officials of the Tibetan hierarchy there come the Chubil Khāns, who fill the post of abbot to the lesser monasteries, and are also incarnations. Their number is very large; there are few monasteries in Tibet or in Mongolia which do not claim to possess one of these living Buddhas. Besides these mystical persons there are in the Tibetan church other ranks and degrees, corresponding to the deacon, full priest, dean and doctor of divinity in the West. At the great yearly festival at Lhasa they make in the cathedral an imposing array, not much less magnificent than that of the clergy in Rome; for the ancient simplicity of dress has disappeared in the growing differences of rank, and each division of the spiritual army is distinguished in Tibet, as in the West, by a special uniform. The political authority of the Dalai Lāma is confined to Tibet itself, but he is the acknowledged head also of the Buddhist church throughout Mongolia and China. He has no supremacy over his co-religionists in Japan, and even in China there are many Buddhists who are not practically under his control or influence.

Constitution of Lāmāism.

The best work on Lāmāism is still Köppen's *Die Lamaische Hierarchie und Kirche* (Berlin, 1859). See also Bushell, "The Early History of Tibet," in the *Journal of the Royal Asiatic Society*, 1879-1880, vol. xii.; Sanang Setzen's *History of the East Mongols* (in Mongolian, translated into German by J. Schmidt, *Geschichte der Ost-Mongolen*); "Analyse du Kandjur," by M. Léon Feer, in *Annales du Musée Gaimet* (1881); Schott, *Ueber den Buddhismus in Hoch-Asien*; Gutzlaff, *Geschichte des Chinesischen Reiches*; Hue and Gabet, *Souvenirs d'un voyage dans la Tartarie, le Tibet, et la Chine* (Paris, 1858); Pallas's *Sammlung historischer Nachrichten über die Mongolischen Völkerschaften*; Bābu Sarat Chunder Das's "Contributions on the Religion and History of Tibet," in the *Journal of the Bengal Asiatic Society*, 1881; L. A. Waddell, *The Buddhism of Tibet* (London, 1895); A. H. Francke, *History of Western Tibet* (London, 1907); A. Grünwedel, *Mythologie des Buddhismus in Tibet und der Mongolei* (Berlin, 1900).

(T. W. R. D.)

1 Watters's *Yūan Chwāng*, edited by Rhys Davids and Bushell, i. 210, 356, 271.

2 Published with facsimile and translation and notes in the *Journal of the Royal Asiatic Society* for 1879-1880, vol. xii.

3 This statement representing the substantial and historical position, is retained, in spite of the crises of March 1910, when the Dalai Lāma took refuge from the Chinese in India, and of 1904, when the British expedition occupied Lhasa and the Dalai Lāma fled to China (see Tibet).

LAMALOU-LES-BAINS, a watering-place of southern France in the department of Hérault, 53½ m. W. of Montpellier by rail, in a valley of the southern Cévennes. Pop. (1906) 720. The waters, which are both hot and cold, are used in cases of rheumatism, sciatica, locomotor ataxy and nervous maladies.

LAMA-MIAO, or DOLON-NOR, a city of the province of Chih-li, China, 150 m. N. of Peking, in a barren sandy plain watered by the Urtingol, a tributary of the Shang-tu-ko. The town proper, almost exclusively occupied by Chinese, is about a mile in length by half a mile in breadth, has narrow and dirty streets, and contains a population of about 26,000. Unlike the ordinary Chinese town of the same rank, it is not walled. A busy trade is carried on between the Chinese and the Mongolians, who bring in their cattle, sheep, camels, hides and wool to barter for tea, tobacco, cotton and silk. At some distance from the Chinese town lies the Mongolian quarter, with two groups of lama temples and villages occupied by about 2300 priests. Dr Williamson (*Journeys in North China*, 1870) described the chief temple as a huge oblong building with an interior not unlike a Gothic church. Lama-miao is the seat of a manufactory of bronze idols and other articles of ritual, which find their way to all parts of Mongolia and Tibet. The craftsmen work in their own houses.

LAMAR, LUCIUS QUINTUS CINCINNATUS (1825-1893), American statesman and judge, was born at the old "Lamar Homestead," in Putnam county, Georgia, on the 17th of September 1825. His father, Lucius Q. C. Lamar (1797-1834), was an able lawyer, a judge of the superior court of Georgia, and the compiler of the *Laws of Georgia from 1810 to 1819* (1821). In 1845 young Lamar graduated from Emory College (Oxford, Ga.), and in 1847 was admitted to the bar. In 1849 he removed to Oxford, Mississippi, and in 1850-1852 was adjunct professor of mathematics in the state university. In 1852 he removed to Covington, Ga., to practise law, and in 1853 was elected a member of the Georgia House of Representatives. In 1855 he returned to Mississippi, and two years later became a member of the National House of Representatives, where he served until December 1860, when he withdrew to become a candidate for election to the "secession" convention of Mississippi. He was elected to the convention, and drafted for it the Mississippi ordinance of secession. In the summer of 1860 he had accepted an appointment to the chair of ethics and metaphysics in the university of Mississippi, but, having been appointed a lieutenant-colonel in the Confederate Army in the spring of 1861, he resigned his professorship. The colonel of his regiment (Nineteenth Mississippi) was killed early in the battle of Williamsburg, on the 5th of May 1862, and the command then fell to Lamar, but in October he resigned from the army. In November 1862 he was appointed by President Jefferson Davis special commissioner of the Confederacy to Russia; but he did not proceed farther than Paris, and his mission was soon terminated by the refusal of the Confederate Senate to confirm his appointment. In 1866 he was again appointed to the chair of ethics and metaphysics in the university of Mississippi, and in the next year was transferred to the chair of law, but in 1870, Republicans having become trustees of the university upon the readmission of the state into the Union, he resigned. From 1873 to 1877 he was again a Democratic representative in Congress; from 1877 to 1885 he was a United States senator; from 1885 to January 1888 he was secretary of the interior; and from 1888 until his death at Macon, Ga., on the 23rd of January 1893, he was an associate justice of the Supreme Court of the United States. In Congress Lamar fought the silver and greenback craze and argued forcibly against the protective tariff; in the department of the interior he introduced various reforms; and on the Supreme Court bench his dissenting opinion in the *Neagle Case* (based upon a denial that certain powers belonging to Congress, but not exercised, were by implication vested in the department of justice) is famous. But he is perhaps best known for the part he took after the Civil War in helping to effect a reconciliation between the North and the South. During the early secession movement he strove to arouse the white people of the South from their indifference, declaring that secession alone could save them from a doom similar to that of the former whites of San Domingo. He probably never changed his convictions as to the righteousness of the "lost cause"; but he accepted the result of the war as a final settlement of the differences leading to it, and strove to restore the South in the Union, and to effect the reunion of the nation in feeling as well as in government. This is in part seen from such speeches as his eulogy on Charles Sumner (27th of April 1874), his leadership in reorganizing the Democratic party of his own state, and his counsels of peace in the disputed presidential election of 1876.

See Edward Mayes, *Lucius Q. C. Lamar: His Life, Times and Speeches* (Nashville, Tenn., 1896).

LAMARCK, JEAN BAPTISTE PIERRE ANTOINE DE MONET, Chevalier de (1744-1829), French naturalist, was born on the 1st of August 1744, at Bazantin, a village of Picardy. He was an eleventh child; and his father, lord of the manor and of old family, but of limited means, having placed three sons in the army, destined this one for the church, and sent him to the Jesuits at Amiens, where he continued till his father's death. After this he would remain with the Jesuits no longer, and, not yet seventeen years of age, started for the seat of war at Bergen-op-Zoom, before which place one of his brothers had already been killed. Mounted on an old horse, with a boy from the village as attendant, and furnished by a lady with a letter of introduction to a colonel, he reached his destination on the evening before a battle. Next morning the colonel found that the new and very diminutive volunteer had posted himself in the front rank of a body of grenadiers, and could not be induced to quit the position. In the battle, the company which he had joined became exposed to the fire of the enemy's artillery, and in the confusion of retreat was forgotten. All the officers and subalterns were killed, and not more than fourteen men were left, when the oldest grenadiers seeing there were no more French in sight proposed to the young volunteer so soon become commandant to withdraw his men. This he refused to do without orders. These at last arrived; and for his bravery he was made an officer on the spot, and soon after was named to a lieutenancy.

After the peace, the regiment was sent to Monaco. There one of his comrades playfully lifted him by the head, and to this it was imputed that he was seized with disease of the glands of the neck, so severe as to put a stop to his military career. He went to Paris and began the study of medicine, supporting himself by working in a banker's office. He early became interested in meteorology and in physical and chemical speculations of a chimerical kind, but happily threw his main strength into botany, and in 1778 published his *Flore française*, a work in which by a dichotomous system of contrasting characters he enabled the student with facility to determine species. This work, which went through several editions and long kept the field, gained for its author immediate popularity as well as admission to the Academy of Sciences.

In 1781 and 1782, under the title of botanist to the king, an appointment obtained for him by Buffon, whose son accompanied him, he travelled through various countries of Europe, extending his knowledge of natural history; and on his return he began those elaborate contributions to botany on which his reputation in that science principally rests, namely, the *Dictionnaire de Botanique* and the *Illustrations de Genres*, voluminous works contributed to the *Encyclopédie Méthodique* (1785). In 1793, in consequence of changes in the organization of the natural history department at the Jardin du Roi, where he had held a botanical appointment since 1788, Lamarck was presented to a zoological chair, and called on to lecture on the *Insecta* and *Vermes* of Linnaeus, the animals for which he introduced the term *Invertebrata*. Thus driven, comparatively late in life, to devote his principal attention to zoology instead of botany, he had the misfortune soon after to suffer from impaired vision; and the malady resulted subsequently in total blindness. Yet his greatest zoological work, the *Histoire naturelle des animaux sans vertèbres*, was published from 1815 to 1822, with the assistance, in the last two volumes, of his eldest daughter and of P. A. Latreille (1762-1833). A volume of plates of the fossil shells of the neighbourhood of Paris was collected in 1823 from his memoirs in the *Annales des Muséums*. He died on the 18th of December 1829.

The character of Lamarck as a naturalist is remarkable alike for its excellences and its defects. His excellences were width of scope, fertility of ideas and a pre-eminent faculty of precise description, arising not only from a singularly terse style, but from a clear insight into both the distinctive features and the resemblances of forms. That part of his zoological work which constitutes his solid claim to the highest honour as a zoologist is to be found in his extensive and detailed labours in the departments of living and fossil *Invertebrata*. His endeavours at classification of the great groups were necessarily defective on account of the imperfect knowledge possessed in his time in regard to many of them, *e.g.* echinoderms, ascidians and intestinal worms; yet they are not without interest, particularly on account of the comprehensive attempt to unite in one great division as *Articulata* all those groups that appeared to present a segmented construction. Moreover, Lamarck was the first to distinguish vertebrate from invertebrate animals by the presence of a vertebral column, and among the Invertebrata to found the groups *Crustacea*, *Arachnida* and *Annelida*. In 1785 (*Hist. del' Acad.*) he evinced his appreciation of the necessity of natural orders in botany by an attempt at the classification of plants, interesting, though crude and falling immeasurably short of the system which grew in the hands of his intimate friend A. L. de Jussieu. The problem of taxonomy has never been put more philosophically than he subsequently put it in his *Animaux sans vertèbres*: "What arrangement must be given to the general distribution of animals to make it conformable to the order of nature in the production of these beings?"

The most prominent defect in Lamarck must be admitted to have been want of control in speculation. Doubtless the speculative tendency furnished a powerful incentive to work, but it outran the legitimate deductions from observation, and led him into the production of volumes of worthless chemistry without experimental basis, as well as into spending much time on fruitless meteorological predictions. His *Annuaires Météorologiques* were published yearly from 1800 to 1810, and were not discontinued until after an unnecessarily public and brutal tirade from Napoleon, administered on the occasion of being presented with one of his works on natural history.

To the general reader the name of Lamarck is chiefly interesting on account of his theory of the origin of life and of the diversities of animal forms. The idea, which appears to have been favoured by Buffon before him, that species were not through all time unalterable, and that the more complex might have been developed from pre-existent simpler forms, became with Lamarck a belief or, as he imagined, a demonstration. Spontaneous generation, he considered, might be easily conceived as resulting from such agencies as heat and electricity causing in small gelatinous bodies an utricular structure, and inducing a "singular tension," a kind of "éréthisme" or "orgasme"; and, having thus accounted for the first

appearance of life, he explained the whole organization of animals and formation of different organs by four laws (introduction to his *Histoire naturelle des animaux sans vertèbres*, 1815):—

1. “Life by its proper forces tends continually to increase the volume of every body possessing it, and to enlarge its parts, up to a limit which it brings about.

2. “The production of a new organ in an animal body results from the supervention of a new want (*besoin*) continuing to make itself felt, and a new movement which this want gives birth to and encourages.

3. “The development of organs and their force of action are constantly in ratio to the employment of these organs.

4. “All which has been acquired, laid down, or changed in the organization of individuals in the course of their life is conserved by generation and transmitted to the new individuals which proceed from those which have undergone those changes.”

The second law is often referred to as Lamarck’s hypothesis of the evolution of organs in animals by appetence or longing, although he does not teach that the animal’s desires affect its conformation directly, but that altered wants lead to altered habits, which result in the formation of new organs as well as in modification, growth or dwindling of those previously existing. Thus, he suggests that, ruminants being pursued by carnivora, their legs have grown slender; and, their legs being only fit for support, while their jaws are weak, they have made attack with the crown of the head, and the determination of fluids thither has led to the growth of horns. So also the stretching of the giraffe’s neck to reach the foliage he supposes to have led to its elongation; and the kangaroo, sitting upright to support the young in its pouch, he imagines to have had its fore-limbs dwarfed by disuse, and its hind legs and tail exaggerated by using them in leaping. The fourth law expresses the inheritance of acquired characters, which is denied by August Weismann and his followers. For a more detailed account of Lamarck’s place in the history of the doctrine of evolution, see Evolution.

LA MARGHERITA, CLEMENTE SOLARO, Count del (1792-1869), Piedmontese statesman, was born at Mondovi. He studied law at Siena and Turin, but Piedmont was at that time under French domination, and being devoted to the house of Savoy he refused to take his degree, as this proceeding would have obliged him to recognize the authority of the usurper; after the restoration of the Sardinian kingdom, however, he graduated. In 1816 he entered the diplomatic service. Later he returned to Turin, and succeeded in gaining the confidence and esteem of King Charles Albert, who in 1835 appointed him minister of foreign affairs. A fervent Roman Catholic, devoted to the pope and to the Jesuits, friendly to Austria and firmly attached to the principles of autocracy, he strongly opposed every attempt at political innovation, and was in consequence bitterly hated by the liberals. When the popular agitation in favour of constitutional reform first broke out the king felt obliged to dispense with La Margherita’s services, although he had conducted public affairs with considerable ability and absolute loyalty, even upholding the dignity of the kingdom in the face of the arrogant attitude of the cabinet of Vienna. He expounded his political creed and his policy as minister to Charles Albert (from February 1835 to October 1847) in his *Memorandum storico-politico*, published in 1851, a document of great interest for the study of the conditions of Piedmont and Italy at that time. In 1853 he was elected deputy for San Quirico, but he persisted in regarding his mandate as derived from the royal authority rather than as an emanation of the popular will. As leader of the Clerical Right in the parliament he strongly opposed Cavour’s policy, which was eventually to lead to Italian unity, and on the establishment of the kingdom of Italy he retired from public life.

LA MARMORA, ALFONSO FERRERO (1804-1878), Italian general and statesman, was born at Turin on the 18th of November 1804. He entered the Sardinian army in 1823, and was a captain in March 1848, when he gained distinction and the rank of major at the siege of Peschiera. On the 5th of August 1848 he liberated Charles Albert, king of Sardinia, from the Milan revolutionaries, and in October was promoted general and appointed minister of war. After suppressing the revolt of Genoa in 1849, he again assumed in November 1849 the portfolio of war, which, save during the period of his command of the Crimean expedition, he retained until 1859. Having reconstructed the Piedmontese army, he took part in the war of 1859 against Austria; and in July of that year succeeded Cavour in the premiership. In 1860 he was sent to Berlin and St Petersburg to arrange for the recognition of the kingdom of Italy, and subsequently he held the offices of governor of Milan and royal lieutenant at Naples, until, in September 1864, he succeeded Minghetti as premier. In this capacity he modified the scope of the September Convention by a note in which he claimed for Italy full freedom of action in respect of national aspirations to the possession of Rome, a document of which Visconti Venosta afterwards took advantage when justifying the Italian occupation of Rome in 1870. In April 1866 La Marmora concluded an alliance with

Prussia against Austria, and, on the outbreak of war in June, took command of an army corps, but was defeated at Custozza on the 23rd of June. Accused of treason by his fellow-countrymen, and of duplicity by the Prussians, he eventually published in defence of his tactics (1873) a series of documents entitled *Un po' più di luce sugli eventi dell' anno* 1866 (More light on the events of 1866) a step which caused irritation in Germany, and exposed him to the charge of having violated state secrets. Meanwhile he had been sent to Paris in 1867 to oppose the French expedition to Rome, and in 1870, after the occupation of Rome by the Italians, had been appointed lieutenant-royal of the new capital. He died at Florence on the 5th of January 1878. La Marmora's writings include *Un episodio del risorgimento italiano* (Florence, 1875); and *I segreti di stato nel governo constituzionale* (Florence, 1877).

See G. Massani, *Il generale Alfonso La Marmora* (Milan, 1880).

LAMARTINE, ALPHONSE MARIE LOUIS DE PRAT DE (1790-1869), French poet, historian and statesman, was born at Mâcon on the 21st of October 1790. The order of his surnames is a controversial matter, and they are sometimes reversed. The family of Lamartine was good, and the title of Prat was taken from an estate in Franche Comté. His father was imprisoned during the Terror, and only released owing to the events of the 9th Thermidor. Lamartine's early education was received from his mother. He was sent to school at Lyons in 1805, but not being happy there was transferred to the care of the Pères de la Foi at Belley, where he remained until 1809. For some time afterwards he lived at home, reading romantic and poetical literature, but in 1811 he set out for Italy, where he seems to have sojourned nearly two years. His family having been steady royalists, he entered the Gardes du corps at the return of the Bourbons, and during the Hundred Days he sought refuge first in Switzerland and then at Aix-en-Savoie, where he fell in love, with abundant results of the poetical kind. After Waterloo he returned to Paris. In 1818-1819 he revisited Switzerland, Savoy and Italy, the death of his beloved affording him new subjects for verse. After some difficulties he had his first book, the *Méditations, poétiques et religieuses*, published (1820). It was exceedingly popular, and helped him to make a position. He had left the army for some time; he now entered the diplomatic service and was appointed secretary to the embassy at Naples. On his way to his post he married, in 1823, at Geneva a young English lady, Marianne Birch, who had both money and beauty, and in the same year his *Nouvelles méditations poétiques* appeared.

In 1824 he was transferred to Florence, where he remained five years. His *Last Canto of Childe Harold* appeared in 1825, and he had to fight a duel (in which he was wounded) with an Italian officer, Colonel Pepe, in consequence of a phrase in it. Charles X., on whose coronation he wrote a poem, gave him the order of the Legion of Honour. The *Harmonies poétiques et religieuses* appeared in 1829, when he had left Florence. Having refused an appointment in Paris under the Polignac ministry, he went on a special mission to Prince Leopold of Saxe-Coburg. In the same year he was elected to the Academy. Lamartine was in Switzerland, not in Paris, at the time of the Revolution of July, and, though he put forth a pamphlet on "Rational Policy," he did not at that crisis take any active part in politics, refusing, however, to continue his diplomatic services under the new government. In 1832 he set out with his wife and daughter for Palestine, having been unsuccessful in his candidature for a seat in the chamber. His daughter Julia died at Beirut, and before long he received the news of his election by a constituency (Bergues) in the department of the Nord. He returned through Turkey and Germany, and made his first speech shortly after the beginning of 1834. Thereafter he spoke constantly, and acquired considerable reputation as an orator,—bringing out, moreover, many books in prose and verse. His Eastern travels (*Voyage en Orient*) appeared in 1835, his *Chute d'un ange* and *Jocelyn* in 1837, and his *Recueillements*, the last remarkable volume of his poetry, in 1839. As the reign of Louis Philippe went on, Lamartine, who had previously been a liberal royalist, something after the fashion of Chateaubriand, became more and more democratic in his opinions. He set about his greatest prose work, the *Histoire des Girondins*, which at first appeared periodically, and was published as a whole in 1847. Like many other French histories, it was a pamphlet as well as a chronicle, and the subjects of Lamartine's pen became his models in politics.

At the revolution of February Lamartine was one of the first to declare for a provisional government, and became a member of it, with the post of minister for foreign affairs. He was elected for the new constituent assembly in ten different departments, and was chosen one of the five members of the Executive Committee. For a few months indeed Lamartine, from being a distinguished man of letters, an official of inferior rank in diplomacy, and an eloquent but unpractical speaker in parliament, became one of the foremost men in Europe. His inexperience in the routine work of government, the utterly unpractical nature of his colleagues, and the turbulence of the Parisian mob, proved fatal to his chances. He gave some proofs of statesmanlike ability, and his eloquence was repeatedly called into requisition to pacify the Parisians. But no one can permanently carry on the government of a great country by speeches from the balcony of a house in the capital, and Lamartine found himself in a dilemma. So long as he held aloof from Ledru-Rollin and the more radical of his colleagues, the disunion resulting weakened the government; as soon as he effected an approximation to them the middle classes fell off from him. The quelling of the insurrection of the 15th of May was his last successful act. A month later the renewal of active disturbances brought on the fighting of June, and Lamartine's influence was extinguished in favour of Cavaignac. Moreover, his chance of renewed political pre-eminence was gone. He had been tried and found wanting, having neither the virtues nor the vices of his situation. In January 1849, though he was nominated for the presidency, only a few thousand votes were given to him, and three months later he was

not even elected to the Legislative Assembly.

The remaining story of Lamartine's life is somewhat melancholy. He had never been a rich man, nor had he been a saving one, and during his period of popularity and office he had incurred great expenses. He now set to work to repair his fortune by unremitting literary labour. He brought out in the *Presse* (1849) a series of *Confidences*, and somewhat later a kind of autobiography, entitled *Raphael*. He wrote several historical works of more or less importance, the *History of the Revolution of 1848*, *The History of the Restoration*, *The History of Turkey*, *The History of Russia*, besides a large number of small biographical and miscellaneous works. In 1858 a subscription was opened for his benefit. Two years afterwards, following the example of Chateaubriand, he supervised an elaborate edition of his own works in forty-one volumes. This occupied five years, and while he was engaged on it his wife died (1863). He was now over seventy; his powers had deserted him, and even if they had not the public taste had entirely changed. His efforts had not succeeded in placing him in a position of independence; and at last, in 1867, the government of the Empire (from which he had perforce stood aloof, though he never considered it necessary to adopt the active protesting attitude of Edgar Quinet and Victor Hugo) came to his assistance, a vote of £20,000 being proposed in April of that year for his benefit by Émile Ollivier. This was creditable to both parties, for Lamartine, both as a distinguished man of letters and as a past servant of the state, had every claim to the bounty of his country. But he was reproached for accepting it by the extreme republicans and irreconcilables. He did not enjoy it long, dying on the 28th of February 1869.

As a statesman Lamartine was placed during his brief tenure of office in a position from which it would have been almost impossible for any man, who was not prepared and able to play the dictator, to emerge with credit. At no time in history were unpractical crotchets so rife in the heads of men as in 1848. But Lamartine could hardly have guided the ship of state safely even in much calmer weather. He was amiable and even estimable, the chief fault of his character being vanity and an incurable tendency towards theatrical effect, which makes his travels, memoirs and other personal records as well as his historical works radically untrustworthy. Nor does it appear that he had any settled political ideas. He did good by moderating the revolutionary and destructive ardour of the Parisian populace in 1848; but he had been perhaps more responsible than any other single person for bringing about the events of that year by the vague and frothy republican declamation of his *Histoire des Girondins*.

More must be said of his literary position. Lamartine had the advantage of coming at a time when the literary field, at least in the departments of belles lettres, was almost empty. The feeble school of descriptive writers, epic poets of the extreme decadence, fabulists and miscellaneous verse-makers, which the Empire had nourished could satisfy no one. Madame de Staël was dead; Chateaubriand, though alive, was something of a classic, and had not effected a full revolution. Lamartine did not himself go the complete length of the Romantic revival, but he went far in that direction. He availed himself of the reviving interest in legitimism and Catholicism which was represented by Bonald and Joseph de Maistre, of the nature worship of Rousseau and Bernardin de Saint Pierre, of the sentimentalism of Madame de Staël, of the medievalism and the romance of Chateaubriand and Scott, of the *maladie du siècle* of Chateaubriand and Byron. Perhaps if his matter be very closely analysed it will be found that he added hardly anything of his own. But if the parts of the mixture were like other things the mixture itself was not. It seemed indeed to the immediate generation so original that tradition has it that the *Méditations* were refused by a publisher because they were in none of the accepted styles. They appeared when Lamartine was nearly thirty years old. The best of them, and the best thing that Lamartine ever did, is the famous *Lac*, describing his return to the little mountain tarn of Le Bourget after the death of his mistress, with whom he had visited it in other days. The verse is exquisitely harmonious, the sentiments conventional but refined and delicate, the imagery well chosen and gracefully expressed. There is an unquestionable want of vigour, but to readers of that day the want of vigour was entirely compensated by the presence of freshness and grace. Lamartine's chief misfortune in poetry was not only that his note was a somewhat weak one, but that he could strike but one. The four volumes of the *Méditations*, the *Harmonies* and the *Recueillements*, which contained the prime of his verse, are perhaps the most monotonous reading to be found anywhere in work of equal bulk by a poet of equal talent. They contain nothing but meditative lyrical pieces, almost any one of which is typical of the whole, though there is considerable variation of merit. The two narrative poems which succeeded the early lyrics, *Jocelyn* and the *Chute d'un ange*, were, according to Lamartine's original plan, parts of a vast "Epic of the Ages," some further fragments of which survive. *Jocelyn* had at one time more popularity in England than most French verse. *La Chute d'un ange*, in which the Byronic influence is more obvious than in any other of Lamartine's works, and in which some have also seen that of Alfred de Vigny, is more ambitious in theme, and less regulated by scrupulous conditions of delicacy in handling, than most of its author's poetry. It does, however, little more than prove that such audacities were not for him.

As a prose writer Lamartine was very fertile. His characteristics in his prose fiction and descriptive work are not very different from those of his poetry. He is always and everywhere sentimental, though very frequently, as in his shorter prose tales (*The Stone Mason of Saint-Point*, *Graziella*, &c.), he is graceful as well as sentimental. In his histories the effect is worse. It has been hinted that Lamartine's personal narratives are doubtfully trustworthy; with regard to his Eastern travels some of the episodes were stigmatized as mere inventions. In his histories proper the special motive for embellishment disappears, but the habit of inaccuracy remains. As an historian he belongs exclusively to the rhetorical school as distinguished from the philosophical on the one hand and the documentary on the other.

It is not surprising when these characteristics of Lamartine's work are appreciated to find that his fame declined with singular rapidity in France. As a poet he had lost his reputation many years before he died. He was entirely eclipsed by the brilliant and vigorous school who succeeded him with Victor Hugo at their head. His power of initiative in poetry was very small, and the range of poetic ground which he could cover strictly limited. He could only carry the picturesque sentimentalism of Rousseau, Bernardin de Saint Pierre and Chateaubriand a little farther, and clothe it in language and verse a little less antiquated than that of Chênedollé and Millevoye. He has been said to be a French Cowper, and the parallel holds good in respect of versification and of his relative position to the more daringly innovating school that followed, though not

in respect of individual peculiarities. Lamartine in short occupied a kind of half-way house between the 18th century and the Romantic movement, and he never got any farther. When Matthew Arnold questioned his importance in conversation with Sainte-Beuve, the answer was, "He is important to *us*," and it was a true answer; but the limitation is obvious. In more recent years, however, efforts have been made by Brunetière and others to remove it. The usual revolution of critical as of other taste, the oblivion of personal and political unpopularity, and above all the reaction against Hugo and the extreme Romantics, have been the main agents in this. Lamartine has been extolled as a pattern of combined passion and restraint, as a model of nobility of sentiment, and as a harmonizer of pure French classicism in taste and expression with much, if not all, the better part of Romanticism itself. These oscillations of opinion are frequent, if not universal, and it is only after more than one or two swings that the pendulum remains at the perpendicular. The above remarks are an attempt to correct extravagance in either direction. But it is difficult to believe that Lamartine can ever permanently take rank among the first order of poets.

The edition mentioned is the most complete one of Lamartine, but there are many issues of his separate works. After his death some poems and *Mémoires inédits* of his youth were published, and also two volumes of correspondence, while in 1893 Mlle V. de Lamartine added a volume of *Lettres* to him. The change of views above referred to may be studied in the detached articles of MM. Brunetière, Faguet, Lemaître, &c., and in the more substantive work of Ch. de Pomairols, *Lamartine* (1889); E. Deschanel, *Lamartine* (1893); E. Zyrowski, *Lamartine* (1896); and perhaps best of all in the Preface to Emile Legouis' Clarendon Press edition of *Jocelyn* (1906), where a vigorous effort is made to combat the idea of Lamartine's sentimentality and femininity as a poet.

(G. Sa.)

LAMB, CHARLES (1775-1834), English essayist and critic, was born in Crown Office Row, Inner Temple, London, on the 10th of February 1775. His father, John Lamb, a Lincolnshire man, who filled the situation of clerk and servant-companion to Samuel Salt, a member of parliament and one of the benchers of the Inner Temple, was successful in obtaining for Charles, the youngest of three surviving children, a presentation to Christ's Hospital, where the boy remained from his eighth to his fifteenth year (1782-1789). Here he had for a schoolfellow Samuel Taylor Coleridge, his senior by rather more than two years, and a close and tender friendship began which lasted for the rest of the lives of both. When the time came for leaving school, where he had learned some Greek and acquired considerable facility in Latin composition, Lamb, after a brief stay at home (probably spent, as his school holidays had often been, over old English authors in Salt's library) was condemned to the labours of the desk—"an inconquerable impediment" in his speech disqualifying him for the clerical profession, which, as the school exhibitions were usually only given to those preparing for the church, thus deprived him of the only means by which he could have obtained a university education. For a short time he was in the office of Joseph Paice, a London merchant, and then for twenty-three weeks, until the 8th of February 1792, he held a small post in the Examiner's Office of the South Sea House, where his brother John was established, a period which, although his age was but sixteen, was to provide him nearly thirty years later with materials for the first of the *Essays of Elia*. On the 5th of April 1792, he entered the Accountant's Office in the East India House, where during the next three and thirty years the hundred official folios of what he used to call his true "works" were produced.

Of the years 1792-1795 we know little. At the end of 1794 he saw much of Coleridge and joined him in writing sonnets in the *Morning Post*, addressed to eminent persons: early in 1795 he met Southey and was much in the company of James White, whom he probably helped in the composition of the *Original Letters of Sir John Falstaff*; and at the end of the year for a short time he became so unhinged mentally as to necessitate confinement in an asylum. The cause, it is probable, was an unsuccessful love affair with Ann Simmons, the Hertfordshire maiden to whom his first sonnets are addressed, whom he would have seen when on his visits as a youth to Blakesware House, near Widford, the country home of the Plumer family, of which Lamb's grandmother, Mary Field, was for many years, until her death in 1792, sole custodian.

It was in the late summer of 1796 that a dreadful calamity came upon the Lambs, which seemed to blight all Lamb's prospects in the very morning of life. On the 22nd of September his sister Mary, "worn down to a state of extreme nervous misery by attention to needlework by day and to her mother at night," was suddenly seized with acute mania, in which she stabbed her mother to the heart. The calm self-mastery and loving self-renunciation which Charles Lamb, by constitution excitable, nervous and self-mistrustful, displayed at this crisis in his own history and in that of those nearest him, will ever give him an imperishable claim to the reverence and affection of all who are capable of appreciating the heroisms of common life. With the help of friends he succeeded in obtaining his sister's release from the lifelong restraint to which she would otherwise have been doomed, on the express condition that he himself should undertake the responsibility for her safe keeping. It proved no light charge: for though no one was capable of affording a more intelligent or affectionate companionship than Mary Lamb during her periods of health, there was ever present the apprehension of the recurrence of her malady; and when from time to time the premonitory symptoms had become unmistakable, there was no alternative but her removal, which took place in quietness and tears. How deeply the whole course of Lamb's domestic life must have been affected by his singular loyalty as a brother needs not to be pointed out.

Lamb's first appearance as an author was made in the year of the great tragedy of his life (1796), when there were published in the volume of *Poems on Various Subjects* by Coleridge four sonnets by "Mr Charles Lamb of the India House." In the following year he contributed, with Charles Lloyd, a pupil of

Coleridge, some pieces in blank verse to the second edition of Coleridge's *Poems*. In 1797 his short summer holiday was spent with Coleridge at Nether Stowey, where he met the Wordsworths, William and Dorothy, and established a friendship with both which only his own death terminated. In 1798, under the influence of Henry Mackenzie's novel *Julie de Roubigné*, he published a short and pathetic prose tale entitled *Rosamund Gray*, in which it is possible to trace beneath disguised conditions references to the misfortunes of the author's own family, and many personal touches; and in the same year he joined Lloyd in a volume of *Blank Verse*, to which Lamb contributed poems occasioned by the death of his mother and his aunt Sarah Lamb, among them being his best-known lyric, "The Old Familiar Faces." In this year, 1798, he achieved the unexpected publicity of an attack by the *Anti-Jacobin* upon him as an associate of Coleridge and Southey (to whose *Annual Anthology* he had contributed) in their Jacobin machinations. In 1799, on the death of her father, Mary Lamb came to live again with her brother, their home then being in Pentonville; but it was not until 1800 that they really settled together, their first independent joint home being at Mitre Court Buildings in the Temple, where they lived until 1809. At the end of 1801, or beginning of 1802, appeared Lamb's first play *John Woodvil*, on which he set great store, a slight dramatic piece written in the style of the earlier Elizabethan period and containing some genuine poetry and happy delineation of the gentler emotions, but as a whole deficient in plot, vigour and character; it was held up to ridicule by the *Edinburgh Review* as a specimen of the rudest condition of the drama, a work by "a man of the age of Thespis." The dramatic spirit, however, was not thus easily quenched in Lamb, and his next effort was a farce, *Mr H——*, the point of which lay in the hero's anxiety to conceal his name "Hogsflesh"; but it did not survive the first night of its appearance at Drury Lane, in December 1806. Its author bore the failure with rare equanimity and good humour—even to joining in the hissing—and soon struck into new and more successful fields of literary exertion. Before, however, passing to these it should be mentioned that he made various efforts to earn money by journalism, partly by humorous articles, partly as dramatic critic, but chiefly as a contributor of sarcastic or funny paragraphs, "sparing neither man nor woman," in the *Morning Post*, principally in 1803.

In 1807 appeared *Tales founded on the Plays of Shakespeare*, written by Charles and Mary Lamb, in which Charles was responsible for the tragedies and Mary for the comedies; and in 1808, *Specimens of English Dramatic Poets who lived about the time of Shakespeare*, with short but felicitous critical notes. It was this work which laid the foundation of Lamb's reputation as a critic, for it was filled with imaginative understanding of the old playwrights, and a warm, discerning and novel appreciation of their great merits. In the same year, 1808, Mary Lamb, assisted by her brother, published *Poetry for Children*, and a collection of short school-girl tales under the title *Mrs Leicester's School*; and to the same date belongs *The Adventures of Ulysses*, designed by Lamb as a companion to *The Adventures of Telemachus*. In 1810 began to appear Leigh Hunt's quarterly periodical, *The Reflector*, in which Lamb published much (including the fine essays on the tragedies of Shakespeare and on Hogarth) that subsequently appeared in the first collective edition of his *Works*, which he put forth in 1818.

Between 1811, when *The Reflector* ceased, and 1820, he wrote almost nothing. In these years we may imagine him at his most social period, playing much whist and entertaining his friends on Wednesday or Thursday nights; meanwhile gathering that reputation as a conversationalist or inspirer of conversation in others, which Hazlitt, who was at one time one of Lamb's closest friends, has done so much to celebrate. When in 1818 appeared the *Works* in two volumes, it may be that Lamb considered his literary career over. Before coming to 1820, and an event which was in reality to be the beginning of that career as it is generally known—the establishment of the *London Magazine*—it should be recorded that in the summer of 1819 Lamb, with his sister's full consent, proposed marriage to Fanny Kelly, the actress, who was then in her thirtieth year. Miss Kelly could not accept, giving as one reason her devotion to her mother. Lamb bore the rebuff with characteristic humour and fortitude.

The establishment of the *London Magazine* in 1820 stimulated Lamb to the production of a series of new essays (the *Essays of Elia*) which may be said to form the chief corner-stone in the small but classic temple of his fame. The first of these, as it fell out, was a description of the old South Sea House, with which Lamb happened to have associated the name of a "gay light-hearted foreigner" called Elia, who was a clerk in the days of his service there. The pseudonym adopted on this occasion was retained for the subsequent contributions, which appeared collectively in a volume of essays called *Elia*, in 1823. After a career of five years the *London Magazine* came to an end; and about the same period Lamb's long connexion with the India House terminated, a pension of £450 (£441 net) having been assigned to him. The increased leisure, however, for which he had long sighed, did not prove favourable to literary production, which henceforth was limited to a few trifling contributions to the *New Monthly* and other serials, and the excavation of gems from the mass of dramatic literature bequeathed to the British Museum by David Garrick, which Lamb laboriously read through in 1827, an occupation which supplied him for a time with the regular hours of work he missed so much. The malady of his sister, which continued to increase with ever shortening intervals of relief, broke in painfully on his lettered ease and comfort; and it is unfortunately impossible to ignore the deteriorating effects of an over-free indulgence in the use of alcohol, and, in early life, tobacco, on a temperament such as his. His removal on account of his sister to the quiet of the country at Enfield, by tending to withdraw him from the stimulating society of the large circle of literary friends who had helped to make his weekly or monthly "at homes" so remarkable, doubtless also tended to intensify his listlessness and helplessness. One of the brightest elements in the closing years of his life was the friendship and companionship of Emma Isola, whom he and his sister had adopted, and whose marriage in 1833 to Edward Moxon, the publisher, though a source of unselfish joy to Lamb, left him more than ever alone. While living at Edmonton, whither he had moved in 1833 so that his sister might have the continual care of Mr and Mrs Walden, who were accustomed to patients of weak intellect, Lamb was overtaken by an attack of erysipelas brought on by an accidental fall as he was walking on the London road. After a few days' illness he died on the 27th of December, 1834. The sudden death of one so widely known, admired and beloved, fell on the public as well as on his own attached circle

with all the poignancy of a personal calamity and a private grief. His memory wanted no tribute that affection could bestow, and Wordsworth commemorated in simple and solemn verse the genius, virtues and fraternal devotion of his early friend.

Charles Lamb is entitled to a place as an essayist beside Montaigne, Sir Thomas Browne, Steele and Addison. He unites many of the characteristics of each of these writers—refined and exquisite humour, a genuine and cordial vein of pleasantry and heart-touching pathos. His fancy is distinguished by great delicacy and tenderness; and even his conceits are imbued with human feeling and passion. He had an extreme and almost exclusive partiality for earlier prose writers, particularly for Fuller, Browne and Burton, as well as for the dramatists of Shakespeare's time; and the care with which he studied them is apparent in all he ever wrote. It shines out conspicuously in his style, which has an antique air and is redolent of the peculiarities of the 17th century. Its quaintness has subjected the author to the charge of affectation, but there is nothing really affected in his writings. His style is not so much an imitation as a reflexion of the older writers; for in spirit he made himself their contemporary. A confirmed habit of studying them in preference to modern literature had made something of their style natural to him; and long experience had rendered it not only easy and familiar but habitual. It was not a masquerade dress he wore, but the costume which showed the man to most advantage. With thought and meaning often profound, though clothed in simple language, every sentence of his essays is pregnant.

He played a considerable part in reviving the dramatic writers of the Shakesperian age; for he preceded Gifford and others in wiping the dust of ages from their works. In his brief comments on each specimen he displays exquisite powers of discrimination: his discernment of the true meaning of his author is almost infallible. His work was a departure in criticism. Former editors had supplied textual criticism and alternative readings: Lamb's object was to show how our ancestors felt when they placed themselves by the power of imagination in trying situations, in the conflicts of duty or passion or the strife of contending duties; what sorts of loves and enmities theirs were.

As a poet Lamb is not entitled to so high a place as that which can be claimed for him as essayist and critic. His dependence on Elizabethan models is here also manifest, but in such a way as to bring into all the greater prominence his native deficiency in "the accomplishment of verse." Yet it is impossible, once having read, ever to forget the tenderness and grace of such poems as "Hester," "The Old Familiar Faces," and the lines "On an infant dying as soon as born" or the quaint humour of "A Farewell to Tobacco." As a letter writer Lamb ranks very high, and when in a nonsensical mood there is none to touch him.

Editions and memoirs of Lamb are numerous. The *Letters*, with a sketch of his life by Sir Thomas Noon Talfourd, appeared in 1837; the *Final Memorials of Charles Lamb* by the same hand, after Mary Lamb's death, in 1848; Barry Cornwall's *Charles Lamb: A Memoir*, in 1866. Mr P. Fitzgerald's *Charles Lamb: his Friends, his Haunts and his Books* (1866); W. Carew Hazlitt's *Mary and Charles Lamb* (1874). Mr Fitzgerald and Mr Hazlitt have also both edited the *Letters*, and Mr Fitzgerald brought Talfourd to date with an edition of Lamb's works in 1870-1876. Later and fuller editions are those of Canon Ainger in 12 volumes, Mr Macdonald in 12 volumes and Mr E. V. Lucas in 7 volumes, to which in 1905 was added *The Life of Charles Lamb*, in 2 volumes.

(E. V. L.)

LAMB

(a word common to Teutonic languages; cf. Ger. *Lamm*), the young of sheep. The Paschal Lamb or Agnus Dei is used as a symbol of Jesus Christ, the Lamb of God (John i. 29), and "lamb," like "flock," is often used figuratively of the members of a Christian church or community, with an allusion to Jesus' charge to Peter (John xxi. 15). The "lamb and flag" is an heraldic emblem, the dexter fore-leg of the lamb supporting a staff bearing a banner charged with the St George's cross. This was one of the crests of the Knights Templars, used on seals as early as 1241; it was adopted as a badge or crest by the Middle Temple, the Inner Temple using another crest of the Templars, the winged horse or Pegasus. The old Tangier regiment, now the Queen's Royal West Surrey Regiment, bore a Paschal Lamb as its badge. From their colonel, Percy Kirke (*q.v.*), they were known as Kirke's Lambs. The exaggerated reputation of the regiment for brutality, both in Tangier and in England after Sedgmoor, lent irony to the nickname.

LAMBALLE, MARIE THÉRÈSE LOUISE OF SAVOY-CARIGNANO, PRINCESSE DE

(1749-1792), fourth daughter of Louis Victor of Carignano (d. 1774) (great-grandfather of King Charles Albert of Sardinia), and of Christine Henriette of Hesse-Rheinfels-Rothenburg, was born at Turin on the 8th of September 1749. In 1767 she was married to Louis Alexandre Stanislaus de Bourbon, prince of Lamballe, son of the duke of Penthièvre, a grandson of Louis XIV.'s natural son the count of Toulouse. Her husband dying the following year, she retired with her father-in-law to Rambouillet, where she lived until the marriage of the dauphin, when she returned to court. Marie Antoinette, charmed by her gentle and naïve manners, singled her out for a companion and confidante. The impetuous character of the

dauphiness found in Madame de Lamballe that submissive temperament which yields to force of environment, and the two became fast friends. After her accession Marie Antoinette, in spite of the king's opposition, had her appointed superintendent of the royal household. Between 1776 and 1785 the comtesse de Polignac succeeded in supplanting her; but when the queen tired of the avarice of the Polignacs, she turned again to Madame de Lamballe. From 1785 to the Revolution she was Marie Antoinette's closest friend and the pliant instrument of her caprices. She came with the queen to the Tuileries and as her salon served as a meeting-place for the queen and the members of the Assembly whom she wished to gain over, the people believed her to be the soul of all the intrigues. After a visit to England in 1791 to appeal for help for the royal family she made her will and returned to the Tuileries, where she continued her services to the queen until the 10th of August, when she shared her imprisonment in the Temple. On the 19th of August she was transferred to La Force, and having refused to take the oath against the monarchy, she was on the 3rd of September delivered over to the fury of the populace, after which her head was placed on a pike and carried before the windows of the queen.

See George Bertin, *Madame de Lamballe* (Paris, 1888); Austin Dobson, *Four Frenchwomen* (1890); B. C. Hardy, *Princesse de Lamballe* (1908); Comte de Lescure, *La Princesse de Lamballe ... d'après des documents inédits* (1864); some letters of the princess published by Ch. Schmidt in *La Révolution française* (vol. xxxix., 1900); L. Lambeau, *Essais sur la mort de madame la princesse de Lamballe* (1902); Sir F. Montefiore, *The Princesse de Lamballe* (1896). *The Secret Memoirs of the Royal Family of France ... now first published from the Journal, Letters and Conversations of the Princesse de Lamballe* (London, 2 vols., 1826) have since appeared in various editions in English and in French. They are attributed to Catherine Hyde, Marchioness Govion-Broglio-Solari, and are apocryphal.

LAMBALLE, a town of north-western France, in the department of Côtes-du-Nord, on the Gouessant 13 m. E.S.E. of St Brieuc by rail. Pop. (1906) 4347. Crowning the eminence on which the town is built is a beautiful Gothic church (13th and 14th centuries), once the chapel of the castle of the counts of Penthièvre. La Noue, the famous Huguenot leader, was mortally wounded in 1591 in the siege of the castle, which was dismantled in 1626 by Richelieu. Of the other buildings, the church of St Martin (11th, 15th and 16th centuries) is the chief. Lamballe has an important *haras* (depot for stallions) and carries on trade in grain, tanning and leather-dressing; earthenware is manufactured in the environs. Lamballe was the capital of the territory of the counts of Penthièvre, who in 1569 were made dukes.

LAMBAYEQUE, a coast department of northern Peru, bounded N. by Piura, E. and S. by Cajamarca and Libertad. Area, 4614 sq. m. Pop. (1906 estimate) 93,070. It belongs to the arid region of the coast, and is settled along the river valleys where irrigation is possible. It is one of the chief sugar-producing departments of Peru, and in some valleys, especially near Ferreñafe, rice is largely produced. Four railways connect its principal producing centres with the small ports of Eten and Pimentel, viz.: Eten to Ferreñafe, 27 m.; Eten to Cayalti, 23 m.; Pimentel to Lambayeque, 15 m.; and Chiclayo to Pátapo, 15 m. The principal towns are Chiclayo, the departmental capital, with a population (1906 estimate) of 10,500, Ferreñafe 6000, and Lambayeque 4500.

LAMBEAUX, JEF (Joseph Marie Thomas), (1852-1908), Belgian sculptor, was born at Antwerp. He studied at the Antwerp Academy of Fine Arts, and was a pupil of Jean Geefs. His first work, "War," was exhibited in 1871, and was followed by a long series of humorous groups, including "Children dancing," "Say 'Good Morning,'" "The Lucky Number" and "An Accident" (1875). He then went to Paris, where he executed for the Belgian salons "The Beggar" and "The Blind Pauper," and produced "The Kiss" (1881), generally regarded as his masterpiece. After visiting Italy, where he was much impressed by the works of Jean Bologne, he showed a strong predilection for effects of force and motion. Other notable works are his fountain at Antwerp (1886), "Robbing the Eagle's Eyrie" (1890), "Drunkenness" (1893), "The Triumph of Woman," "The Bitten Faun" (which created a great stir at the Exposition Universelle at Liége in 1905), and "The Human Passions," a colossal marble bas-relief, elaborated from a sketch exhibited in 1889. Of his numerous busts may be mentioned those of Hendrik Conscience, and of Charles Bals, the burgomaster of Brussels. He died on the 6th of June 1908.

LAMBERMONT, AUGUSTE, Baron (1819-1905), Belgian statesman, was born at Dion-le-Val in Brabant on the 25th of March 1819. He came of a family of small farmer proprietors, who had held land during three centuries. He was intended for the priesthood and entered the seminary of Floreffe, but his energies claimed a more active sphere. He left the monastery for Louvain University. Here he studied law, and also prepared himself for the military examinations. At that juncture the first Carlist war broke out, and Lambermont hastened to the scene of action. His services were accepted (April 1838) and he was entrusted with the command of two small cannon. He also acted as A.D.C. to Colonel Durando. He greatly distinguished himself, and for his intrepidity on one occasion he was decorated with the Cross of the highest military Order of St Ferdinand. Returning to Belgium he entered the Ministry for Foreign Affairs in 1842. He served in this department sixty-three years. He was closely associated with several of the most important questions in Belgian history during the last half of the 19th century—notably the freeing of the Scheldt. He was one of the very first Belgians to see the importance of developing the trade of their country, and at his own request he was attached to the commercial branch of the foreign office. The tolls imposed by the Dutch on navigation on the Scheldt strangled Belgian trade, for Antwerp was the only port of the country. The Dutch had the right to make this levy under treaties going back to the treaty of Munster in 1648, and they clung to it still more tenaciously after Belgium separated herself in 1830-1831 from the united kingdom of the Netherlands—the London conference in 1839 fixing the toll payable to Holland at 1.50 florins (3s.) per ton. From 1856 to 1863 Lambermont devoted most of his energies to the removal of this impediment. In 1856 he drew up a plan of action, and he prosecuted it with untiring perseverance until he saw it embodied in an international convention seven years later. Twenty-one powers and states attended a conference held on the question at Brussels in 1863, and on the 15th of July the treaty freeing the Scheldt was signed. For this achievement Lambermont was made a baron. Among other important conferences in which Lambermont took a leading part were those of Brussels (1874) on the usages of war, Berlin (1884-1885) on Africa and the Congo region, and Brussels (1890) on Central African Affairs and the Slave Trade. He was joint reporter with Baron de Courcel of the Berlin conference in 1884-1885, and on several occasions he was chosen as arbitrator by one or other of the great European powers. But his great achievement was the freeing of the Scheldt, and in token of its gratitude the city of Antwerp erected a fine monument to his memory. He died on the 7th of March 1905.

LAMBERT, DANIEL (1770-1809), an Englishman famous for his great size, was born near Leicester on the 13th of March 1770, the son of the keeper of the jail, to which post he succeeded in 1791. About this time his size and weight increased enormously, and though he had led an active and athletic life he weighed in 1793 thirty-two stone (448 lb). In 1806 he resolved to profit by his notoriety, and resigning his office went up to London and exhibited himself. He died on the 21st of July 1809, and at the time measured 5 ft. 11 in. in height and weighed 52¾ stone (739 lb). His waistcoat, now in the Kings Lynn Museum, measures 102 in. round the waist. His coffin contained 112 ft. of elm and was built on wheels. His name has been used as a synonym for immensity. George Meredith describes London as the “Daniel Lambert of cities,” and Herbert Spencer uses the phrase “a Daniel Lambert of learning.” His enormous proportions were depicted on a number of tavern signs, but the best portrait of him, a large mezzotint, is preserved at the British Museum in Lyson’s *Collectanea*.

LAMBERT, FRANCIS (*c.* 1486-1530), Protestant reformer, was the son of a papal official at Avignon, where he was born between 1485 and 1487. At the age of 15 he entered the Franciscan monastery at Avignon, and after 1517 he was an itinerant preacher, travelling through France, Italy and Switzerland. His study of the Scriptures shook his faith in Roman Catholic theology, and by 1522 he had abandoned his order, and became known to the leaders of the Reformation in Switzerland and Germany. He did not, however, identify himself either with Zwinglianism or Lutheranism; he disputed with Zwingli at Zürich in 1522, and then made his way to Eisenach and Wittenberg, where he married in 1523. He returned to Strassburg in 1524, being anxious to spread the doctrines of the Reformation among the French-speaking population of the neighbourhood. By the Germans he was distrusted, and in 1526 his activities were prohibited by the city of Strassburg. He was, however, befriended by Jacob Sturm, who recommended him to the Landgraf Philip of Hesse, the most liberal of the German reforming princes. With Philip’s encouragement he drafted that scheme of ecclesiastical reform for which he is famous. Its basis was essentially democratic and congregational, though it provided for the government of the whole church

by means of a synod. Pastors were to be elected by the congregation, and the whole system of canon-law was repudiated. This scheme was submitted by Philip to a synod at Homburg; but Luther intervened and persuaded the Landgraf to abandon it. It was far too democratic to commend itself to the Lutherans, who had by this time bound the Lutheran cause to the support of princes rather than to that of the people. Philip continued to favour Lambert, who was appointed professor and head of the theological faculty in the Landgraf's new university of Marburg. Patrick Hamilton (*q.v.*), the Scottish martyr, was one of his pupils; and it was at Lambert's instigation that Hamilton composed his *Loci communes*, or *Patrick's Pleas* as they were popularly called in Scotland. Lambert was also one of the divines who took part in the great conference of Marburg in 1529; he had long wavered between the Lutheran and the Zwinglian view of the Lord's Supper, but at this conference he definitely adopted the Zwinglian view. He died of the plague on the 18th of April 1530, and was buried at Marburg.

A catalogue of Lambert's writings is given in Haag's *La France protestante*. See also lives of Lambert by Baum (Strassburg, 1840); F. W. Hessencamp (Elberfeld, 1860), Stieve (Breslau, 1867) and Louis Ruffet (Paris, 1873); Lorimer, *Life of Patrick Hamilton* (1857); A. L. Richter, *Die evangelischen Kirchenordnungen des 16. Jahrh*. (Weimar, 1846); Hessencamp, *Hessische Kirchenordnungen im Zeitalter der Reformation*; Philip of *Hesse's Correspondence with Bucer*, ed. M. Lenz; Lindsay, *Hist. Reformation*; *Allgemeine deutsche Biographie*.

(A. F. P.)

LAMBERT, JOHANN HEINRICH

(1728-1777), German physicist, mathematician and astronomer, was born at Mulhausen, Alsace, on the 26th of August 1728. He was the son of a tailor; and the slight elementary instruction he obtained at the free school of his native town was supplemented by his own private reading. He became book-keeper at Montbéliard ironworks, and subsequently (1745) secretary to Professor Iselin, the editor of a newspaper at Basel, who three years later recommended him as private tutor to the family of Count A. von Salis of Coire. Coming thus into virtual possession of a good library, Lambert had peculiar opportunities for improving himself in his literary and scientific studies. In 1759, after completing with his pupils a tour of two years' duration through Göttingen, Utrecht, Paris, Marseilles and Turin, he resigned his tutorship and settled at Augsburg. Munich, Erlangen, Coire and Leipzig became for brief successive intervals his home. In 1764 he removed to Berlin, where he received many favours at the hand of Frederick the Great and was elected a member of the Royal Academy of Sciences of Berlin, and in 1774 edited the Berlin *Ephemeris*. He died of consumption on the 25th of September 1777. His publications show him to have been a man of original and active mind with a singular facility in applying mathematics to practical questions.

His mathematical discoveries were extended and overshadowed by his contemporaries. His development of the equation $x^m + px = q$ in an infinite series was extended by Leonhard Euler, and particularly by Joseph Louis Lagrange. In 1761 he proved the irrationality of π; a simpler proof was given somewhat later by Legendre. The introduction of hyperbolic functions into trigonometry was also due to him. His geometrical discoveries are of great value, his *Die freie Perspective* (1759-1774) being a work of great merit. Astronomy was also enriched by his investigations, and he was led to several remarkable theorems on conics which bear his name. The most important are: (1) To express the time of describing an elliptic arc under the Newtonian law of gravitation in terms of the focal distances of the initial and final points, and the length of the chord joining them. (2) A theorem relating to the apparent curvature of the geocentric path of a comet.

Lambert's most important work, *Pyrometrie* (Berlin, 1779), is a systematic treatise on heat, containing the records and full discussion of many of his own experiments. Worthy of special notice also are *Photometria* (Augsburg, 1760), *Insigniores orbitae cometarum proprietates* (Augsburg, 1761), and *Beiträge zum Gebrauche der Mathematik und deren Anwendung* (4 vols., Berlin, 1765-1772).

The *Memoirs* of the Berlin Academy from 1761 to 1784 contain many of his papers, which treat of such subjects as resistance of fluids, magnetism, comets, probabilities, the problem of three bodies, meteorology, &c. In the *Acta Helvetica* (1752-1760) and in the *Nova acta erudita* (1763-1769) several of his contributions appear. In Bode's *Jahrbuch* (1776-1780) he discusses nutation, aberration of light, Saturn's rings and comets; in the *Nova acta Helvetica* (1787) he has a long paper "Sur le son des corps élastiques," in Bernoulli and Hindenburg's *Magazin* (1787-1788) he treats of the roots of equation and of parallel lines; and in Hindenburg's *Archiv* (1798-1799) he writes on optics and perspective. Many of these pieces were published posthumously. Recognized as among the first mathematicians of his day, he was also widely known for the universality and depth of his philological and philosophical knowledge. The most valuable of his logical and philosophical memoirs were published collectively in 2 vols. (1782).

See Huber's *Lambert nach seinem Leben und Wirken*; M. Chasles, *Geschichte der Geometrie*; and Baensch, Lamberts *Philosophie und seine Stellung zu Kant* (1902).

LAMBERT [*alias* NICHOLSON], JOHN (d. 1538), English Protestant martyr, was born at Norwich and educated at Cambridge, where he graduated B.A. and was admitted in 1521 a fellow of Queen's College on the nomination of Catherine of Aragon. After acting for some years as a "mass-priest," his views were unsettled by the arguments of Bilney and Arthur; and episcopal persecution compelled him, according to his own account, to assume the name Lambert instead of Nicholson. He likewise removed to Antwerp, where he became chaplain to the English factory, and formed a friendship with Frith and Tyndale. Returning to England in 1531, he came under the notice of Archbishop Warham, who questioned him closely on his religious beliefs. Warham's death in August 1532 relieved Lambert from immediate danger, and he earned a living for some years by teaching Latin and Greek near the Stocks Market in London. The duke of Norfolk and other reactionaries accused him of heresy in 1536, but reforming tendencies were still in the ascendant, and Lambert escaped. In 1538, however, the reaction had begun, and Lambert was its first victim. He singled himself out for persecution by denying the Real Presence: and Henry VIII., who had just rejected the Lutheran proposals for a theological union, was in no mood to tolerate worse heresies. Lambert had challenged some views expressed by Dr John Taylor, afterwards bishop of Lincoln; and Cranmer as archbishop condemned Lambert's opinions. He appealed to the king as supreme head of the Church, and on the 16th of November Henry heard the case in person before a large assembly of spiritual and temporal peers. For five hours Lambert disputed with the king and ten bishops; and then, as he boldly denied that the Eucharist was the body of Christ, he was condemned to death by Cromwell as vicegerent. Henry's condescension and patience produced a great impression on his Catholic subjects; but Cromwell is said by Foxe to have asked Lambert's pardon before his execution, and Cranmer eventually adopted the views he condemned in Lambert. Lambert was burnt at Smithfield on the 22nd of November.

See *Letters and Papers of Henry VIII.*; Foxe's *Acts and Monuments*; Froude, *History*; Dixon, *Church History*; Gairdner, *Lollardy and the Reformation*, *Dict. of Nat. Biog.* and authorities there cited.

(A. F. P.)

LAMBERT, JOHN (1619-1694), English general in the Great Rebellion, was born at Calton Hall, Kirkby Malham, in the West Riding of Yorkshire. His family was of ancient lineage, and long settled in the county. He studied law, but did not make it his profession. In 1639 he married Frances, daughter of Sir William Lister. At the opening of the Civil War he took up arms for the parliament, and in September 1642 was appointed a captain of horse in the army commanded by Ferdinando, Lord Fairfax. A year later he had become colonel of a regiment of horse, and he distinguished himself at the siege of Hull in October, 1643. Early in 1644 he did good service at the battles of Nantwich and Bradford. At Marston Moor Lambert's own regiment was routed by the charge of Goring's horse; but he cut his way through with a few troops and joined Cromwell on the other side of the field. When the New Model army was formed in the beginning of 1645, Colonel Lambert was appointed to succeed Fairfax in command of the northern forces. General Poyntz, however, soon replaced him, and under this officer he served in the Yorkshire campaign of 1645, receiving a wound before Pontefract. In 1646 he was given a regiment in the New Model, serving with Fairfax in the west of England, and he was a commissioner, with Cromwell and others, for the surrender of Oxford in the same year. "It is evident," says C. H. Firth (*Dict. Nat. Biog.*), "that he was from the first regarded as an officer of exceptional capacity and specially selected for semi-political employments."

When the quarrel between the army and the parliament began, Lambert threw himself warmly into the army's cause. He assisted Ireton in drawing up the several addresses and remonstrances issued by the army, both men having had some experience in the law, and being "of a subtle and working brain." Early in August 1647 Lambert was sent by Fairfax as major-general to take charge of the forces in the northern counties. His wise and just managing of affairs in those parts is commended by Whitelocke. He suppressed a mutiny among his troops, kept strict discipline and hunted down the moss-troopers who infested the moorland country.

When the Scottish army under the marquis of Hamilton invaded England in the summer of 1648, Lambert was engaged in suppressing the Royalist rising in his district. The arrival of the Scots obliged him to retreat; but Lambert displayed the greatest energy and did not cease to harass the invaders till Cromwell came up from Wales and with him destroyed the Scottish army in the three days' fighting from Preston to Warrington. After the battle Lambert's cavalry headed the chase, pursuing the defeated army *à outrance*, and finally surrounded it at Uttoxeter, where Hamilton surrendered to Lambert on the 25th of August. He then led the advance of Cromwell's army into Scotland, where he was left in charge on Cromwell's return. From December 1648 to March 1649 he was engaged in the siege of Pontefract Castle; Lambert was thus absent from London at the time of Pride's Purge and the trial and execution of the king.

When Cromwell was appointed to the command of the war in Scotland (July 1650), Lambert went with him as major-general and second in command. He was wounded at Musselburgh, but returned to the front in time to take a conspicuous share in the victory of Dunbar. He himself defeated the "Protesters" or "Western Whigs" at Hamilton, on the 1st of December 1650. In July 1651 he was sent into Fife to get in the rear and flank of the Scottish army near Falkirk, and force them to decisive action by cutting off their supplies. This mission, in the course of which Lambert won an important victory at Inverkeithing, was executed with entire success, whereupon Charles II., as Lambert had foreseen, made for England. For the events of the Worcester campaign, which quickly followed, see GREAT REBELLION. Lambert's part in the general plan was carried out most brilliantly, and in the crowning victory of Worcester he commanded the

right wing of the English army, and had his horse shot under him. Parliament now conferred on him a grant of lands in Scotland worth £1000 per annum.

In October 1651 Lambert was made a commissioner to settle the affairs of Scotland, and on the death of Ireton he was appointed lord deputy of Ireland (January 1652). He accepted the office with pleasure, and made magnificent preparations; parliament, however, soon afterwards reconstituted the Irish administration and Lambert refused to accept office on the new terms. Henceforward he began to oppose the Rump. In the council of officers he headed the party desiring representative government, as opposed to Harrison who favoured a selected oligarchy of "God-fearing" men, but both hated what remained of the Long parliament, and joined in urging Cromwell to dissolve it by force. At the same time Lambert was consulted by the parliamentary leaders as to the possibility of dismissing Cromwell from his command, and on the 15th of March 1653 Cromwell refused to see him, speaking of him contemptuously as "bottomless Lambert." On the 20th of April, however, Lambert accompanied Cromwell when he dismissed the council of state, on the same day as the forcible expulsion of the parliament. Lambert now favoured the formation of a small executive council, to be followed by an elective parliament whose powers should be limited by a written instrument of government. Being at this time the ruling spirit in the council of state, and the idol of the army, there were some who looked on him as a possible rival of Cromwell for the chief executive power, while the royalists for a short time had hopes of his support. He was invited, with Cromwell, Harrison and Desborough, to sit in the nominated parliament of 1653; and when the unpopularity of that assembly increased, Cromwell drew nearer to Lambert. In November 1653 Lambert presided over a meeting of officers, when the question of constitutional settlement was discussed, and a proposal made for the forcible expulsion of the nominated parliament. On the 1st of December he urged Cromwell to assume the title of king, which the latter refused. On the 12th the parliament resigned its powers into Cromwell's hands, and on the 13th Lambert obtained the consent of the officers to the Instrument of Government (*q.v.*), in the framing of which he had taken a leading part. He was one of the seven officers nominated to seats in the council created by the Instrument. In the foreign policy of the protectorate he was the most clamorous of those who called for alliance with Spain and war with France in 1653, and he firmly withstood Cromwell's design for an expedition to the West Indies.

In the debates in parliament on the Instrument of Government in 1654 Lambert proposed that the office of protector should be made hereditary, but was defeated by a majority which included members of Cromwell's family. In the parliament of this year, and again in 1656, Lord Lambert, as he was now styled, sat as member for the West Riding. He was one of the major-generals appointed in August 1655 to command the militia in the ten districts into which it was proposed to divide England, and who were to be responsible for the maintenance of order and the administration of the law in their several districts. Lambert took a prominent part in the committee of council which drew up instructions to the major-generals, and he was probably the originator, and certainly the organizer, of the system of police which these officers were to control. Gardiner conjectures that it was through divergence of opinion between the protector and Lambert in connexion with these "instructions" that the estrangement between the two men began. At all events, although Lambert had himself at an earlier date requested Cromwell to take the royal dignity, when the proposal to declare Oliver king was started in parliament (February 1657) he at once declared strongly against it. A hundred officers headed by Fleetwood and Lambert waited on the protector, and begged him to put a stop to the proceedings. Lambert was not convinced by Cromwell's arguments, and their complete estrangement, personal as well as political, followed. On his refusal to take the oath of allegiance to the protector, Lambert was deprived of his commissions, receiving, however, a pension of £2000 a year. He retired to his garden at Wimbledon, and appeared no more in public during Oliver Cromwell's lifetime; but shortly before his death Cromwell sought a reconciliation, and Lambert and his wife visited him at Whitehall.

When Richard Cromwell was proclaimed protector his chief difficulty lay with the army, over which he exercised no effective control. Lambert, though holding no military commission, was the most popular of the old Cromwellian generals with the rank and file of the army, and it was very generally believed that he would instal himself in Oliver's seat of power. Richard's adherents tried to conciliate him, and the royalist leaders made overtures to him, even proposing that Charles II. should marry Lambert's daughter. Lambert at first gave a lukewarm support to Richard Cromwell, and took no part in the intrigues of the officers at Fleetwood's residence, Wallingford House. He was a member of the parliament which met in January 1659, and when it was dissolved in April under compulsion of Fleetwood and Desborough, he was restored to his commands. He headed the deputation to Lenthall in May inviting the return of the Rump, which led to the tame retirement of Richard Cromwell into obscurity; and he was appointed a member of the committee of safety and of the council of state. When the parliament, desirous of controlling the power of the army, withheld from Fleetwood the right of nominating officers, Lambert was named one of a council of seven charged with this duty. The parliament's evident distrust of the soldiers caused much discontent in the army; while the entire absence of real authority encouraged the royalists to make overt attempts to restore Charles II., the most serious of which, under Sir George Booth and the earl of Derby, was crushed by Lambert near Chester on the 19th of August. He promoted a petition from his army that Fleetwood might be made lord-general and himself major-general. The republican party in the House took offence. The Commons (October 12th, 1659) cashiered Lambert and other officers, and retained Fleetwood as chief of a military council under the authority of the speaker. On the next day Lambert caused the doors of the House to be shut and the members kept out. On the 26th a "committee of safety" was appointed, of which he was a member. He was also appointed major-general of all the forces in England and Scotland, Fleetwood being general. Lambert was now sent with a large force to meet Monk, who was in command of the English forces in Scotland, and either negotiate with him or force him to terms. Monk, however, set his army in motion southward. Lambert's army began to melt away, and he was kept in suspense by Monk till his whole army fell from him and he returned to London almost alone. Monk marched to London unopposed. The "excluded" Presbyterian members were recalled. Lambert was sent to the Tower (March

3rd, 1660), from which he escaped a month later. He tried to rekindle the civil war in favour of the Commonwealth, but was speedily recaptured and sent back to the Tower (April 24th). On the Restoration he was exempted from danger of life by an address of both Houses to the king, but the next parliament (1662) charged him with high treason. Thenceforward for the rest of his life Lambert remained in custody in Guernsey. He died in 1694.

Lambert would have left a better name in history if he had been a cavalier. His genial, ardent and excitable nature, easily raised and easily depressed, was more akin to the royalist than to the puritan spirit. Vain and sometimes overbearing, as well as ambitious, he believed that Cromwell could not stand without him; and when Cromwell was dead, he imagined himself entitled and fitted to succeed him. Yet his ambition was less selfish than that of Monk. Lambert is accused of no ill faith, no want of generosity, no cold and calculating policy. As a soldier he was far more than a fighting general and possessed many of the qualities of a great general. He was, moreover, an able writer and speaker, and an accomplished negotiator and took pleasure in quiet and domestic pursuits. He learnt his love of gardening from Lord Fairfax, who was also his master in the art of war. He painted flowers, besides cultivating them, and incurred the blame of Mrs Hutchinson by "dressing his flowers in his garden and working at the needle with his wife and his maids." He made no special profession of religion; but no imputation is cast upon his moral character by his detractors. It has been said that he became a Roman Catholic before his death.

LAMBERT OF HERSFELD (d. *c.* 1088), German chronicler, was probably a Thuringian by birth and became a monk in the Benedictine abbey of Hersfeld in 1058. As he was ordained priest at Aschaffenburg he is sometimes called Lambert of Aschaffenburg, or Schafnaburg. He made a pilgrimage to the Holy Land, and visited various monasteries of his order; but he is famous as the author of some *Annales*. From the creation of the world until about 1040 these *Annales* are a jejune copy of other annals, but from 1040 to their conclusion in 1077 they are interesting for the history of Germany and the papacy. The important events during the earlier part of the reign of the emperor Henry IV., including the visit to Canossa and the battle of Hohenburg, are vividly described. Their tone is hostile to Henry IV. and friendly to the papacy; their Latin style is excellent. The *Annales* were first published in 1525 and are printed in the *Monumenta Germaniae historica*, Bände iii. and v. (Hanover and Berlin, 1826 fol.). Formerly Lambert's reputation for accuracy and impartiality was very high, but both qualities have been somewhat discredited.

Lambert is also regarded as the author of the *Historia Hersfeldensis*, the extant fragments of which are published in Band v. of the *Monumenta* of a *Vita Lulli*, Lullus, archbishop of Mainz, being the founder of the abbey of Hersfeld; and of a *Carmen de bello Saxonico*. His *Opera* have been edited with an introduction by O. Holder-Egger (Hanover, 1894).

See H. Delbrück, *Über die Glaubwürdigkeit Lamberts von Hersfeld* (Bonn, 1873); A. Eigenbrodt, *Lampert von Hersfeld und die neuere Quellenforschung* (Cassel, 1896); L. von Ranke, *Zur Kritik frankisch-deutscher Reichsannalisten* (Berlin, 1854); W. Wattenbach, *Deutschlands Geschichtsquellen* Band ii. (Berlin, 1906) and A. Potthast, *Bibliotheca Historica* (Berlin, 1896).

LAMBESSA, the ancient Lambaesa, a village of Algeria, in the arrondissement of Batna and department of Constantine, 7 m. S.E. of Batna and 17 W. of Timgad. The modern village, the centre of an agricultural colony founded in 1848, is noteworthy for its great convict establishment (built about 1850). The remains of the Roman town, and more especially of the Roman camp, in spite of wanton vandalism, are among the most interesting ruins in northern Africa. They are now preserved by the *Service des Monuments historiques* and excavations have resulted in many interesting discoveries. The ruins are situated on the lower terraces of the Jebel Aures, and consist of triumphal arches (one to Septimius Severus, another to Commodus), temples, aqueducts, vestiges of an amphitheatre, baths and an immense quantity of masonry belonging to private houses. To the north and east lie extensive cemeteries with the stones standing in their original alignments; to the west is a similar area, from which, however, the stones have been largely removed for building the modern village. Of the temple of Aesculapius only one column is standing, though in the middle of the 19th century its façade was entire. The capitol or temple dedicated to Jupiter, Juno and Minerva, which has been cleared of débris, has a portico with eight columns. On level ground about two-thirds of a mile from the centre of the ancient town stands the camp, its site now partly occupied by the penitentiary and its gardens. It measures 1640 ft. N. to S. by 1476 ft. E. to W., and in the middle rise the ruins of a building commonly called, but incorrectly, the praetorium. This noble building, which dates from A.D. 268, is 92 ft. long by 66 ft. broad and 49 ft. high; its southern façade has a splendid peristyle half the height of the wall, consisting of a front row of massive Ionic columns and an engaged row of Corinthian pilasters. Behind this building (which was roofed), is a large court giving access to other buildings, one being the arsenal. In it have been found many thousands of projectiles. To the S.E. are the remains of the baths. The ruins of both city and camp have yielded many inscriptions (Renier edited 1500,

and there are 4185 in the *Corpus Inscr. Lat.* vol. viii.); and, though a very large proportion are epitaphs of the barest kind, the more important pieces supply an outline of the history of the place. Over 2500 inscriptions relating to the camp have been deciphered. In a museum in the village are objects of antiquity discovered in the vicinity. Besides inscriptions, statues, &c., are some fine mosaics found in 1905 near the arch of Septimius Severus. The statues include those of Aesculapius and Hygieia, taken from the temple of Aesculapius.

Lambaesa was a military foundation. The camp of the third legion (Legio III. Augusta), to which it owes its origin, appears to have been established between A.D. 123 and 129, in the time of Hadrian, whose address to his soldiers was found inscribed on a pillar in a second camp to the west of the great camp still extant. By 166 mention is made of the decurions of a vicus, 10 curiae of which are known by name; and the vicus became a municipium probably at the time when it was made the capital of the newly founded province of Numidia. The legion was removed by Gordianus, but restored by Valerianus and Gallienus; and its final departure did not take place till after 392. The town soon afterwards declined. It never became the seat of a bishop, and no Christian inscriptions have been found among the ruins.

About 2 m. S. of Lambessa are the ruins of Markuna, the ancient Verecunda, including two triumphal arches.

See S. Gsell, *Les Monuments antiques de l'Algérie* (Paris, 1901) and *L'Algérie dans l'antiquité* (Algiers, 1903); L. Renier, *Inscriptions romaines de l'Algérie* (Paris, 1855); Gustav Wilmann, "Die röm. Lagerstadt Afrikas," in *Commentationes phil. in honorem Th. Mommseni* (Berlin, 1877); Sir L. Playfair, *Travels in the Footsteps of Bruce* (London, 1877); A. Graham, *Roman Africa* (London, 1902).

LAMBETH, a southern metropolitan borough of London, England, bounded N.W. by the river Thames, N.E. by Southwark, E. by Camberwell and W. by Wandsworth and Battersea, and extending S. to the boundary of the county of London. Pop. (1901) 301,895. The name is commonly confined to the northern part of the borough, bordering the river; but the principal districts included are Kennington and Vauxhall (north central), Brixton (central) and part of Norwood (south). Four road-bridges cross the Thames within the limits of the borough, namely Waterloo, Westminster, Lambeth and Vauxhall, of which the first, a fine stone structure, dates from 1817, and is the oldest Thames bridge standing within the county of London. The main thoroughfare runs S. from Westminster Bridge Road as Kennington Road, continuing as Brixton Road and Brixton Hill, Clapham Road branching S.W. from it at Kennington. Several thoroughfares also converge upon Vauxhall Bridge, and from a point near this down to Westminster Bridge the river is bordered by the fine Albert Embankment.

Early records present the name *Lamb-hythe* in various forms. The suffix is common along the river in the meaning of a haven, but the prefix is less clear; a Saxon word signifying mud is suggested. Brixton and Kennington are mentioned in Domesday; and in Vauxhall is concealed the name of Falkes de Breauté, an unscrupulous adventurer of the time of John and Henry III. exiled in 1225. The manor of North Lambeth was given to the bishopric of Rochester in the time of Edward the Confessor, and the bishops had a house here till the 16th century. They did not, however, retain the manor beyond the close of the 12th century, when it was acquired by the see of Canterbury. The palace of the archbishops is still here, and forms, with the parish church, a picturesque group of buildings, lying close to the river opposite the majestic Houses of Parliament, and to some extent joining with them to make of this reach of the Thames one of the finest prospects in London. The oldest part of the palace remaining is the Early English chapel. The so-called Lollard's Tower, which retains evidence of its use as a prison, dates *c.* 1440. There is a fine Tudor gatehouse of brick, and the hall is dated 1663. The portion now inhabited by the archbishops was erected in 1834 and fronts a spacious quadrangle. Among the portraits of the archbishops here are examples by Holbein, Van Dyck, Hogarth and Reynolds. There is a valuable library. The church of St Mary was rebuilt *c.* 1850, though the ancient monuments preserved give it an appearance of antiquity. Here are tombs of some of the archbishops, including Bancroft (d. 1610), and of the two Tradescants, collectors, and a memorial to Elias Ashmole, whose name is preserved in the Ashmolean Museum at Oxford University, to which he presented the collections of his friend the younger Tradescant (d. 1662). In the present Westminster Bridge Road was a circus, well known in the later 18th and early 19th centuries as Astley's, and near Vauxhall Bridge were the celebrated Vauxhall Gardens.

The principal modern pleasure grounds are Kennington Park (20 acres), and Brockwell Park (127 acres) south of Brixton, and near the southern end of Kennington Road is Kennington Oval, the ground of the Surrey County Cricket Club, the scene of its home matches and of other important fixtures. Among institutions the principal is St Thomas' Hospital, the extensive buildings of which front the Albert Embankment. The original foundation dated from 1213, was situated in Southwark, and was connected with the priory of Bermondsey. The existing buildings, subsequently enlarged, were opened in 1871, are divided into a series of blocks, and include a medical school. Other hospitals are the Royal, for children and women, Waterloo Road, the Lying-in Hospital, York Road, and the South-western fever hospital in Stockwell. There are technical institutes in Brixton and Norwood; and on Brixton Hill is Brixton Prison. In the northern part of the borough are numerous factories, including the great Doulton pottery works. The parliamentary borough of Lambeth has four divisions, North, Kennington, Brixton and Norwood, each returning one member. The borough council consists of a mayor, 10 aldermen and 60 councillors. Area, 4080.4 acres.

LAMBETH CONFERENCES, the name given to the periodical assemblies of bishops of the Anglican Communion (Pan-Anglican synods), which since 1867 have met at Lambeth Palace, the London residence of the archbishop of Canterbury. The idea of these meetings was first suggested in a letter to the archbishop of Canterbury by Bishop Hopkins of Vermont in 1851, but the immediate impulse came from the colonial Church in Canada. In 1865 the synod of that province, in an urgent letter to the archbishop of Canterbury (Dr Longley), represented the unsettlement of members of the Canadian Church caused by recent legal decisions of the Privy Council, and their alarm lest the revived action of Convocation "should leave us governed by canons different from those in force in England and Ireland, and thus cause us to drift into the status of an independent branch of the Catholic Church." They therefore requested him to call a "national synod of the bishops of the Anglican Church at home and abroad," to meet under his leadership. After consulting both houses of the Convocation of Canterbury, Archbishop Longley assented, and convened all the bishops of the Anglican Communion (then 144 in number) to meet at Lambeth in 1867. Many Anglican bishops (amongst them the archbishop of York and most of his suffragans) felt so doubtful as to the wisdom of such an assembly that they refused to attend it, and Dean Stanley declined to allow Westminster Abbey to be used for the closing service, giving as his reasons the partial character of the assembly, uncertainty as to the effect of its measures and "the presence of prelates not belonging to our Church." Archbishop Longley said in his opening address, however, that they had no desire to assume "the functions of a general synod of all the churches in full communion with the Church of England," but merely to "discuss matters of practical interest, and pronounce what we deem expedient in resolutions which may serve as safe guides to future action." Experience has shown how valuable and wise this course was. The resolutions of the Lambeth Conferences have never been regarded as synodical decrees, but their weight has increased with each conference. Apprehensions such as those which possessed the mind of Dean Stanley have long passed away.

Seventy-six bishops accepted the primate's invitation to the first conference, which met at Lambeth on the 24th of September 1867, and sat for four days, the sessions being in private. The archbishop opened the conference with an address: deliberation followed; committees were appointed to report on special questions; resolutions were adopted, and an encyclical letter was addressed to the faithful of the Anglican Communion. Each of the subsequent conferences has been first received in Canterbury cathedral and addressed by the archbishop from the chair of St Augustine. It has then met at Lambeth, and after sitting for five days for deliberation upon the fixed subjects and appointment of committees, has adjourned, to meet again at the end of a fortnight and sit for five days more, to receive reports, adopt resolutions and to put forth the encyclical letter.

I. *First Conference* (September 24-28, 1867), convened and presided over by Archbishop Longley. The proposed order of subjects was entirely altered in view of the Colenso case, for which urgency was claimed; and most of the time was spent in discussing it. Of the thirteen resolutions adopted by the conference, two have direct reference to this case; the rest have to do with the creation of new sees and missionary jurisdictions, commendatory letters, and a "voluntary spiritual tribunal" in cases of doctrine and the due subordination of synods. The reports of the committees were not ready, and were carried forward to the conference of 1878.

II. *Second Conference* (July 2-27, 1878), convened and presided over by Archbishop Tait. On this occasion no hesitation appears to have been felt; 100 bishops were present, and the opening sermon was preached by the archbishop of York. The reports of the five special committees (based in part upon those of the committee of 1867) were embodied in the encyclical letter, viz. on the best mode of maintaining union, voluntary boards of arbitration, missionary bishops and missionaries, continental chaplains and the report of a committee on difficulties submitted to the conference.

III. *Third Conference* (July 3-27, 1888), convened and presided over by Archbishop Benson; 145 bishops present; the chief subject of consideration being the position of communities which do not possess the historic episcopate. In addition to the encyclical letter, nineteen resolutions were put forth, and the reports of twelve special committees are appended upon which they are based, the subjects being intemperance, purity, divorce, polygamy, observance of Sunday, socialism, care of emigrants, mutual relations of dioceses of the Anglican Communion, home reunion, Scandinavian Church, Old Catholics, &c., Eastern Churches, standards of doctrine and worship. Perhaps the most important of these is the famous "Lambeth Quadrilateral," which laid down a fourfold basis for home reunion—the Holy Scriptures, the Apostles' and Nicene creeds, the two sacraments ordained by Christ himself and the historic episcopate.

IV. *Fourth Conference* (July 5-31, 1897), convened by Archbishop Benson, presided over by Archbishop Temple; 194 bishops present. One of the chief subjects for consideration was the creation of a "tribunal of reference"; but the resolutions on this subject were withdrawn, owing, it is said, to the opposition of the American bishops, and a more general resolution in favour of a "consultative body" was substituted. The encyclical letter is accompanied by sixty-three resolutions (which include careful provision for provincial organization and the extension of the title "archbishop" to all metropolitans, a "thankful recognition of the revival of brotherhoods and sisterhoods, and of the office of deaconess," and a desire to promote friendly relations with the Eastern Churches and the various Old Catholic bodies), and the reports of the eleven committees are subjoined.

V. *Fifth Conference* (July 6-August 5, 1908), convened by Archbishop Randall Davidson, who presided; 241 bishops were present. The chief subjects of discussion were: the relations of faith and modern thought, the supply and training of the clergy, education, foreign missions, revision and "enrichment" of

the Prayer-Book, the relation of the Church to "ministries of healing" (Christian Science, &c.), the questions of marriage and divorce, organization of the Anglican Church, reunion with other Churches. The results of the deliberations were embodied in seventy-eight resolutions, which were appended to the encyclical issued, in the name of the conference, by the Archbishop of Canterbury on the 8th of August.

The fifth Lambeth conference, following as it did close on the great Pan-Anglican congress, is remarkable mainly as a proof of the growth of the influence and many-sided activity of the Anglican Church, and as a conspicuous manifestation of her characteristic principles. Of the seventy-eight resolutions none is in any sense epoch-making, and their spirit is that of the traditional Anglican *via media*. In general they are characterized by a firm adherence to the fundamental articles of Catholic orthodoxy, tempered by a tolerant attitude towards those not of "the household of the faith." The report of the committee on faith and modern thought is "a faithful attempt to show how the claim of our Lord Jesus Christ, which the Church is set to present to each generation, may, under the characteristic conditions of our time, best command allegiance." On the question of education (Res. 11-19) the conference reaffirmed strongly the necessity for definite Christian teaching in schools, "secular systems" being condemned as "educationally as well as morally unsound, since they fail to co-ordinate the training of the whole nature of the child" (Res. 11). The resolutions on questions affecting foreign missions (20-26) deal with *e.g.* the overlapping of episcopal jurisdictions (22) and the establishment of Churches on lines of race or colour, which is condemned (20). The resolutions on questions of marriage and divorce (37-43) reaffirm the traditional attitude of the Church; it is, however, interesting to note that the resolution (40) deprecating the remarriage in church of the innocent party to a divorce was carried only by eighty-seven votes to eighty-four. In resolutions 44 to 53 the conference deals with the duty of the Church towards modern democratic ideals and social problems; affirms the responsibility of investors for the character and conditions of the concerns in which their money is placed (49); "while frankly acknowledging the moral gains sometimes won by war" strongly supports the extension of international arbitration (52); and emphasizes the duty of a stricter observance of Sunday (53). On the question of reunion, the ideal of corporate unity was reaffirmed (58). It was decided to send a deputation of bishops with a letter of greeting to the national council of the Russian Church about to be assembled (60) and certain conditions were laid down for inter-communion with certain of the Churches of the Orthodox Eastern Communion (62) and the "ancient separated Churches of the East" (63-65). Resolution 67 warned Anglicans from contracting marriages, under actual conditions, with Roman Catholics. By resolution 68 the conference stated its desire to "maintain and strengthen the friendly relations" between the Churches of the Anglican Communion and "the ancient Church of Holland" (Jansenist, see UTRECHT) and the old Catholic Churches; and resolutions 70-73 made elaborate provisions for a projected corporate union between the Anglican Church and the *Unitas Fratrum* (Moravian Brethren). As to "home reunion," however, it was made perfectly clear that this would only be possible "on lines suggested by such precedents as those of 1610," *i.e.* by the Presbyterian Churches accepting the episcopal model. So far as the organization of the Anglican Church is concerned, the most important outcome of the conference was the reconstruction of the Central Consultative Body on representative lines (54-56); this body to consist of the archbishop of Canterbury and seventeen bishops appointed by the various Churches of the Anglican Communion throughout the world. A notable feature of the conference was the presence of the Swedish bishop of Kalmar, who presented a letter from the archbishop of Upsala, as a tentative advance towards closer relations between the Anglican Church and the Evangelical Church of Sweden.

See Archbishop R. T. Davidson, *The Lambeth Conferences of 1867, 1878 and 1888* (London, 1896); *Conference of Bishops of the Anglican Communion, Encyclical Letter*, &c. (London, 1897 and 1908).

LAMBINUS, DIONYSIUS, the Latinized name of DENIS LAMBIN (1520-1572), French classical scholar, born at Montreuil-sur-mer in Picardy. Having devoted several years to classical studies during a residence in Italy, he was invited to Paris in 1650 to fill the professorship of Latin in the Collège de France, which he soon afterwards exchanged for that of Greek. His lectures were frequently interrupted by his ill-health and the religious disturbances of the time. His death (September 1572) is said to have been caused by his apprehension that he might share the fate of his friend Peter Ramus (Pierre de la Ramée), who had been killed in the massacre of St Bartholomew. Lambinus was one of the greatest scholars of his age, and his editions of classical authors are still useful. In textual criticism he was a conservative, but by no means a slavish one; indeed, his opponents accused him of rashness in emendation. His chief defect is that he refers vaguely to his MSS. without specifying the source of his readings, so that their relative importance cannot be estimated. But his commentaries, with their wealth of illustration and parallel passages, are a mine of information. In the opinion of the best scholars, he preserved the happy mean in his annotations, although his own countrymen have coined the word *lambiner* to express trifling and diffuseness.

His chief editions are: Horace (1561); Lucretius (1564), on which see H. A. J. Munro's preface to his edition; Cicero (1566); Cornelius Nepos (1569); Demosthenes (1570), completing the unfinished work of Guillaume Morel; Plautus (1576).

See Peter Lazer, *De Dionysio Lambino narratio*, printed in Orelli's *Onomasticon Tullianum* (i. 1836), and *Trium disertissimorum virorum praefationes ac epistolae familiares aliquot: Mureti, Lambini, Regii* (Paris, 1579); also Sandys, *Hist. of Classical Scholarship* (1908, ii. 188), and A. Horawitz in Ersch and Gruber's *Allgemeine Encyclopädie*.

LAMBOURN, a market town in the Newbury parliamentary division of Berkshire, England, 65 m. W. of London, the terminus of the Lambourn Valley light railway from Newbury. Pop. (1901) 2071. It lies high up the narrow valley of the Lambourn, a tributary of the Kennet famous for its trout-fishing, among the Berkshire Downs. The church of St Michael is cruciform and principally late Norman, but has numerous additions of later periods and has been considerably altered by modern restoration. The inmates of an almshouse founded by John Estbury, *c.* 1500, by his desire still hold service daily at his tomb in the church. A Perpendicular market-cross stands without the church. The town has agricultural trade, but its chief importance is derived from large training stables in the neighbourhood. To the north of the town is a large group of *tumuli* known as the Seven Barrows, ascertained by excavation to be a British burial-place.

LAMECH למך, the biblical patriarch, appears in each of the antediluvian genealogies, Gen. iv. 16-24 J., and Gen. v. P. In the former he is a descendant of Cain, and through his sons the author of primitive civilization; in the latter he is the father of Noah. But it is now generally held that these two genealogies are variant adaptations of the Babylonian list of primitive kings (see Enoch). It is doubtful whether Lamech is to be identified with the name of any one of these kings; he may have been introduced into the genealogy from another tradition.

In the older narrative in Gen. iv. Lamech's family are the originators of various advances in civilization; he himself is the first to marry more than one wife, 'Adah ("ornament," perhaps specially "dawn") and Zillah ("shadow"). He has three sons Jabal, Jubal, and Tubal, the last-named qualified by the addition of Cain (= "smith"[1]). The assonance of these names is probably intentional, cf. the brothers Hasan and Hosein of early Mahommedan history. Jabal institutes the life of nomadic shepherds, Jubal is the inventor of music, Tubal-Cain the first smith. Jabal and Jubal may be forms of a root used in Hebrew and Phoenician for ram and ram's horn (*i.e.* trumpet), and underlying our "jubilee." Tubal may be the eponymous ancestor of the people of that name mentioned in Ezekiel in connexion with "vessels of bronze."[2] All three names are sometimes derived from יבל in the sense of offspring, so that they would be three different words for "son," and there are numerous other theories as to their etymology. Lamech has also a daughter Naamah ("gracious," "pleasant," "comely"; cf. No'mân, a name of the deity Adonis). This narrative clearly intends to account for the origin of these various arts as they existed in the narrator's time; it is not likely that he thought of these discoveries as separated from his own age by a universal flood; nor does the tone of the narrative suggest that the primitive tradition thought of these pioneers of civilization as members of an accursed family. Probably the passage was originally independent of the document which told of Cain and Abel and of the Flood; Jabal may be a variant of Abel. An ancient poem is connected with this genealogy:

"Adah and Zillah, hear my voice;
Ye wives of Lamech, give ear unto my speech.
I slay a man for a wound,
A young man for a stroke;
For Cain's vengeance is sevenfold,
But Lamech's seventy-fold and seven."

In view of the connexion, the poem is interpreted as expressing Lamech's exultation at the advantage he expects to derive from Tubal-Cain's new inventions; the worker in bronze will forge for him new and formidable weapons, so that he will be able to take signal vengeance for the least injury. But the poem probably had originally nothing to do with the genealogy. It may have been a piece of folk-song celebrating the prowess of the tribe of Lamech; or it may have had some relation to a story of Cain and Abel in which Cain was a hero and not a villain.

The genealogy in Gen. v. belongs to the Priestly Code, *c.* 450 B.C., and may be due to a revision of ancient tradition in the light of Babylonian archaeology. It is noteworthy that according to the numbers in the Samaritan MSS. Lamech dies in the year of the Flood.

The origin of the name Lamech and its original meaning are doubtful. It was probably the name of a tribe or deity, or both. According to C. J. Ball,[3] Lamech is an adaptation of the Babylonian *Lamga*, a title of Sin the moon god, and synonymous with *Ubara* in the name Ubara-Tutu, the Otiartes of Berossus, who is the ninth of the ten primitive Babylonian kings, and the father of the hero of the Babylonian flood story, just as Lamech is the ninth patriarch, and the father of Noah. Spurrell[4] states that Lamech cannot be explained from the Hebrew, but may possibly be connected with the Arabic *yalmakun*, "a strong young man."

Outside of Genesis, Lamech is only mentioned in the Bible in 1 Chron. i. 3, Luke iii. 36. Later Jewish tradition expanded and interpreted the story in its usual fashion.

(W. H. Be.)

1 The text of Gen. iv. 22 is partly corrupt; and it is possible that the text used by the Septuagint did not contain Cain.

2 Gen. x. 2, Ezek. xxvii. 13.

3 *Genesis*, in Haupt's *Sacred Books of the Old Testament* on iv. 19, cf. also the notes on 20-22, for Lamech's family. The identification of Lamech with *Lamga* is also suggested by Sayce, *Expository Times*, vii. 367. Cf. also Cheyne, "Cainites" in *Encyc. Biblica*.

4 *Notes on the Hebrew Text of Genesis, in loco.*

LAMEGO, a city of northern Portugal, in the district of Vizeu and formerly included in the province of Beira; 6 m. by road S. of the river Douro and 42 m. E. of Oporto. Pop. (1900) 9471. The nearest railway station is Peso da Regoa, on the opposite side of the Douro and on the Barca d'Alva-Oporto railway. Lamego is an ancient and picturesque city, in the midst of a beautiful mountain region. Its principal buildings are the 14th-century Gothic cathedral, Moorish citadel, Roman baths and a church which occupies the site of a mosque, and, though intrinsically commonplace, is celebrated in Portugal as the seat of the legendary cortes of 1143 or 1144 (see PORTUGAL, *History*). The principal industries are viticulture and the rearing of swine, which furnish the so-called "Lisbon hams." Lamego was a Moorish frontier fortress of some importance in the 9th and 10th centuries. It was captured in 1057 by Ferdinand I. of Castile and Leon.

LAMELLIBRANCHIA (Lat. *lamella*, a small or thin plate, and Gr. βράγχια, gills), the fourth of the five classes of animals constituting the phylum Mollusca (*q.v.*). The Lamellibranchia are mainly characterized by the rudimentary condition of the head, and the retention of the primitive bilateral symmetry, the latter feature being accentuated by the lateral compression of the body and the development of the shell as two bilaterally symmetrical plates or valves covering each one side of the animal. The foot is commonly a simple cylindrical or ploughshare-shaped organ, used for boring in sand and mud, and more rarely presents a crawling disk similar to that of Gastropoda; in some forms it is aborted. The paired ctenidia are very greatly developed right and left of the elongated body, and form the most prominent organ of the group. Their function is chiefly not respiratory but nutritive, since it is by the currents produced by their ciliated surface that food-particles are brought to the feebly-developed mouth and buccal cavity.

The Lamellibranchia present as a whole a somewhat uniform structure. The chief points in which they vary are—(1) in the structure of the ctenidia or branchial plates; (2) in the presence of one or of two chief muscles, the fibres of which run across the animal's body from one valve of the shell to the other (adductors); (3) in the greater or less elaboration of the posterior portion of the mantle-skirt so as to form a pair of tubes, by one of which water is introduced into the sub-pallial chamber, whilst by the other it is expelled; (4) in the perfect or deficient symmetry of the two valves of the shell and the connected soft parts, as compared with one another; (5) in the development of the foot as a disk-like crawling organ (*Arca*, *Nucula*, *Pectunculus*, *Trigonia*, *Lepton*, *Galeomma*), as a simple plough-like or tongue-shaped organ (*Unionidae*, &c.), as a re-curved saltatory organ (*Cardium*, &c.), as a long burrowing cylinder (*Solenidae*, &c.), or its partial (Mytilacea) or even complete abortion (Ostraeacea).

The essential Molluscan organs are, with these exceptions, uniformly well developed. The mantle-skirt is always long, and hides the rest of the animal from view, its dependent margins meeting in the middle line below the ventral surface when the animal is retracted; it is, as it were, slit in the median line before and behind so as to form two flaps, a right and a left; on these the right and the left calcareous valves of the shell are borne respectively, connected by an uncalcified part of the shell called the ligament. In many embryo Lamellibranchs a centro-dorsal primitive shell-gland or follicle has been detected. The mouth lies in the median line anteriorly, the anus in the median line posteriorly.

Both ctenidia, right and left, are invariably present, the axis of each taking origin from the side of the body as in the schematic archi-Mollusc (see fig. 15). A pair of renal tubes opening right and left, rather far forward on the sides of the body, are always present. Each opens by its internal extremity into the pericardium. A pair of genital apertures, connected by genital ducts with the paired gonads, are found right and left near the nephridial pores, except in a few cases where the genital duct joins that of the renal organ (*Spondylus*). The sexes are often, but not always, distinct. No accessory glands or copulatory organs are ever present in Lamellibranchs. The ctenidia often act as brood-pouches.

A dorsal contractile heart, with symmetrical right and left auricles receiving aerated blood from the ctenidia and mantle-skirt, is present, being unequally developed only in those few forms which are inequivalve. The typical pericardium is well developed. It, as in other Mollusca, is not a blood-space but

develops from the coelom, and it communicates with the exterior by the pair of renal tubes. As in Cephalopoda (and possibly other Mollusca) water can be introduced through the nephridia into this space. The alimentary canal keeps very nearly to the median vertical plane whilst exhibiting a number of flexures and loopings in this plane. A pair of large glandular outgrowths, the so-called “liver” or great digestive gland, exists as in other Molluscs. A pair of pedal otocysts, and a pair of osphradia at the base of the gills, appear to be always present. A typical nervous system is present (fig. 19), consisting of a cerebro-pleural ganglion-pair, united by connectives to a pedal ganglion-pair and a visceral ganglion-pair (parieto-splanchnic).

A pyloric caecum connected with the stomach is commonly found, containing a tough flexible cylinder of transparent cartilaginous appearance, called the “crystalline style” (*Mactra*). In many Lamellibranchs a gland is found on the hinder surface of the foot in the mid line, which secretes a substance which sets into the form of threads—the so-called “byssus”—by means of which the animal can fix itself. Sometimes this gland is found in the young and not in the adult (*Anodonta*, *Unio*, *Cyclas*). In some Lamellibranchs (*Pecten*, *Spondylus*, *Pholas*, *Mactra*, *Tellina*, *Pectunculus*, *Galeomma*, &c.), although cephalic eyes are generally absent, special eyes are developed on the free margin of the mantle-skirt, apparently by the modification of tentacles commonly found there. There are no pores in the foot or elsewhere in Lamellibranchia by which water can pass into and out of the vascular system, as formerly asserted.

The Lamellibranchia live chiefly in the sea, some in fresh waters. A very few have the power of swimming by opening and shutting the valves of the shell (*Pecten*, *Lima*); most can crawl slowly or burrow rapidly; others are, when adult, permanently fixed to stones or rocks either by the shell or the byssus. In development some Lamellibranchia pass through a free-swimming trochosphere stage with pre-oral ciliated band; other fresh-water forms which carry the young in brood-pouches formed by the ctenidia have suppressed this larval phase.

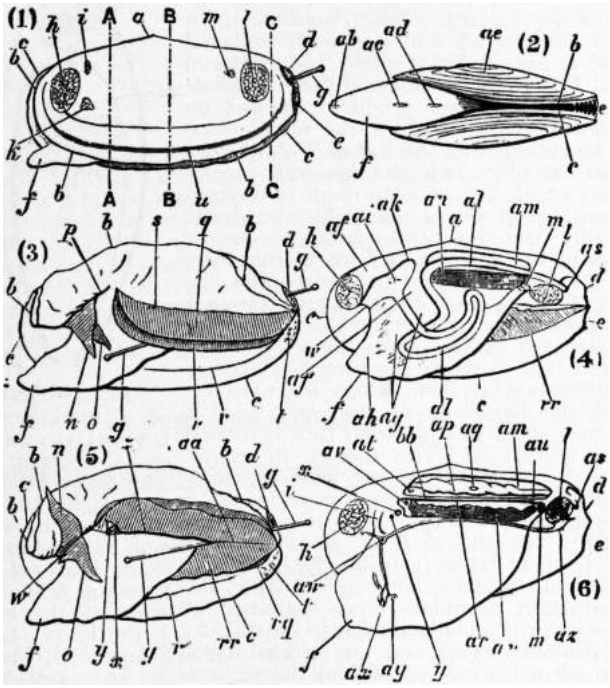


Fig. 1.—Diagrams of the external form and anatomy of *Anodonta cygnea*, the Pond-Mussel; in figures 1, 3, 4, 5, 6 the animal is seen from the left side, the centro-dorsal region uppermost. (1) Animal removed from its shell, a probe *g* passed into the sub-pallial chamber through the excurrent siphonal notch. (2) View from the ventral surface of an Anodon with its foot expanded and issuing from between the gaping shells. (3) The left mantle-flap reflected upwards so as to expose the sides of the body. (4) Diagrammatic section of Anodon to show the course of the alimentary canal. (5) The two gill-plates of the left side reflected upwards so as to expose the fissure between foot and gill where the probe *g* passes. (6) Diagram to show the positions of the nerve-ganglia, heart and nephridia.

Letters in all the figures as follows:

a, Centro-dorsal area.
b, Margin of the left mantle-flap.
c, Margin of the right mantle-flap.
d, Excurrent siphonal notch of the mantle margin.
e, Incurrent siphonal notch of the mantle margin.
f, Foot.
g, Probe passed into the superior division of the sub-pallial chamber through the excurrent
aa, Line of concrescence of the inner lamella of the right inner gill-plate with the inner lamella of the left inner gill-plate.
ab, ac, ad, Three pit-like depressions in the median line of the foot supposed by some writers to be pores admitting water into the vascular system.
ae, Left shell valve.
af, Space occupied by liver.
ag, Space occupied by gonad.

siphonal notch, and issuing by the side of the foot into the inferior division of the sub-pallial chamber.

h, Anterior (pallial) adductor muscle of the shells.

i, Anterior retractor muscle of the foot.

k, Protractor muscle of the foot.

l, Posterior (pedal) adductor muscle of the shells.

m, Posterior retractor muscle of the foot.

n, Anterior labial tentacle.

o, Posterior labial tentacle.

p, Base-line of origin of the reflected mantle-flap from the side of the body.

q, Left external gill-plate.

r, Left internal gill-plate.

rr, Internal lamella of the right inner gill-plate.

rg, Right outer gill-plate.

s, Line of concrescence of the outer lamella of the left outer gill-plate with the left mantle-flap.

t, Pallial tentacles.

u, The thickened muscular pallial margin which adheres to the shell and forms the pallial line of the left side.

v, That of the right side.

w, The mouth.

x, Aperture of the left organ of Bojanus (nephridium) exposed by cutting the attachment of the inner lamella of the inner gill-plate.

y, Aperture of the genital duct.

z, Fissure between the free edge of the inner lamella of the inner gill-plate and the side of the foot, through which the probe *g* passes into the upper division of the sub-pallial space.

ah, Muscular substance of the foot.

ai, Duct of the liver on the wall of the stomach.

ak, Stomach.

al, Rectum traversing the ventricle of the heart.

am, Pericardium.

an, Glandular portion of the left nephridium.

ap, Ventricle of the heart.

aq, Aperture by which the left auricle joins the ventricle.

ar, Non-glandular portion of the left nephridium.

as, Anus.

at, Pore leading from the pericardium into the glandular sac of the left nephridium.

au, Pore leading from the glandular into the non-glandular portion of the left nephridium.

av, Internal pore leading from the non-glandular portion of the left nephridium to the external pore *x*.

aw, Left cerebro-pleuro-visceral ganglion.

ax, Left pedal ganglion.

ay, Left otocyst.

az, Left olfactory ganglion (parieto-splanchnic).

bb, Floor of the pericardium separating that space from the non-glandular portion of the nephridia.

As an example of the organization of a Lamellibranch, we shall review the structure of the common pond-mussel or swan mussel (*Anodonta cygnea*), comparing it with other Lamellibranchia.

The swan-mussel has superficially a perfectly developed bilateral symmetry. The left side of the animal is seen as when removed from its shell in fig. 1 (1). The valves of the shell have been removed by severing their adhesions to the muscular areae *h*, *i*, *k*, *l*, *m*, *u*. The free edge of the left half of the mantle-skirt *b* is represented as a little contracted in order to show the exactly similar free edge of the right half of the mantle-skirt *c*. These edges are not attached to, although they touch, one another; each flap (right or left) can be freely thrown back in the way carried out in fig. 1 (3) for that of the left side. This is not always the case with Lamellibranchs; there is in the group a tendency for the corresponding edges of the mantle-skirt to fuse together by concrescence, and so to form a more or less completely closed bag, as in the Scaphopoda (*Dentalium*). In this way the notches *d*, *e* of the hinder part of the mantle-skirt of *Anodonta* are in the siphonate forms converted into two separate holes, the edges of the mantle being elsewhere fused together along this hinder margin. Further than this, the part of the mantle-skirt bounding the two holes is frequently drawn out so as to form a pair of tubes which project from the shell (figs. 8, 29). In such Lamellibranchs as the oysters, scallops and many others which have the edges of the mantle-skirt quite free, there are numerous tentacles upon those edges. In *Anodonta* these pallial tentacles are confined to a small area surrounding the inferior siphonal notch (fig. 1 [3], *t*). When the edges of the mantle ventral to the inhalant orifice are united, an anterior aperture is left for the protrusion of the foot, and thus there are three pallial apertures altogether, and species in this condition are called “Tripora.” This is the usual condition in the Eulamellibranchia and Septibranchia. When the pedal aperture is small and far forward there may be a fourth aperture in the region of the fusion behind the pedal aperture. This occurs in *Solen*, and such forms are called “Quadrifora.”

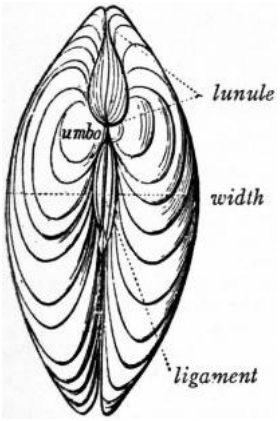


FIG. 2.—View of the two Valves of the Shell of *Cytherea* (one of the Sinupalliate Isomya), from the dorsal aspect.

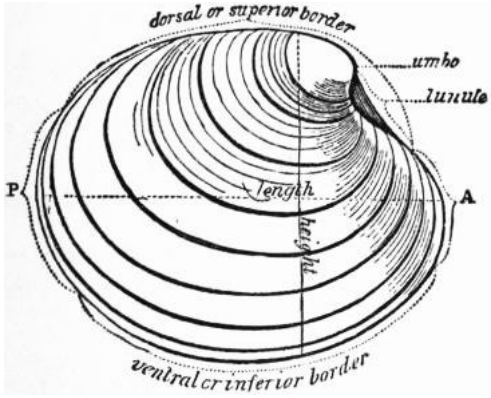


FIG. 3.—Right Valve of the same Shell from the Outer Face.

The centro-dorsal point *a* of the animal of *Anodonta* (fig. 1 [1]) is called the umbonal area; the great anterior muscular surface *h* is that of the anterior adductor muscle, the posterior similar surface *i* is that of the posterior adductor muscle; the long line of attachment *u* is the simple "pallial muscle,"—a thickened ridge which is seen to run parallel to the margin of the mantle-skirt in this Lamellibranch. In siphonate forms the pallial muscle is not simple, but is indented posteriorly by a sinus formed by the muscles which retract the siphons.

It is the approximate equality in the size of the anterior and posterior adductor muscles which led to the name Isomya for the group to which *Anodonta* belongs. The hinder adductor muscle is always large in Lamellibranchs, but the anterior adductor may be very small (Heteromya), or absent altogether (Monomya). The anterior adductor muscle is in front of the mouth and alimentary tract altogether, and must be regarded as a special and peculiar development of the median anterior part of the mantle-flap. The posterior adductor is ventral and anterior to the anus. The former classification based on these differences in the adductor muscles is now abandoned, having proved to be an unnatural one. A single family may include isomyarian, anisomyarian and monomyarian forms, and the latter in development pass through stages in which they resemble the first two. In fact all Lamellibranchs begin with a condition in which there is only one adductor, and that not the posterior but the anterior. This is called the protomonomyarian stage. Then the posterior adductor develops, and becomes equal to the anterior, and finally in some cases the anterior becomes smaller or disappears. The single adductor muscle of the Monomya is separated by a difference of fibre into two portions, but neither of these can be regarded as possibly representing the anterior adductor of the other Lamellibranchs. One of these portions is more ligamentous and serves to keep the two shells constantly attached to one another, whilst the more fleshy portion serves to close the shell rapidly when it has been gaping.

In removing the valves of the shell from an *Anodonta*, it is necessary not only to cut through the muscular attachments of the body-wall to the shell but to sever also a strong elastic ligament, or spring resembling india-rubber, joining the two shells about the umbonal area. The shell of *Anodonta* does not present these parts in the most strongly marked condition, and accordingly our figures (figs. 2, 3, 4) represent the valves of the sinupalliate genus *Cytherea*. The corresponding parts are recognizable in *Anodonta*. Referring to the figures (2, 3) for an explanation of terms applicable to the parts of the valve and the markings on its inner surface—corresponding to the muscular areas already noted on the surface of the animal's body—we must specially note here the position of that denticulated thickening of the dorsal margin of the valve which is called the hinge (fig. 4). By this hinge one valve is closely fitted to the other. Below this hinge each shell becomes concave, above it each shell rises a little to form the umbo, and it is into this ridge-like upgrowth of each valve that the elastic ligament or spring is fixed (fig. 4). As shown in the diagram (fig. 5) representing a transverse section of the two valves of a Lamellibranch, the two shells form a double lever, of which the toothed-hinge is the fulcrum. The adductor muscles placed in the concavity of the shells act upon the long arms of the lever at a mechanical advantage; their contraction keeps the shells shut, and stretches the ligament or spring *h*. On the other hand, the ligament *h* acts upon the short arm formed by the umbonal ridge of the shells; whenever the adductors relax, the elastic substance of the ligament contracts, and the shells gape. It is on this account that the valves of a dead Lamellibranch always gape; the elastic ligament is no longer counteracted by the effort of the adductors. The state of closure of the valves of the shell is not, therefore, one of rest; when it is at rest—that is, when there is no muscular effort—the valves of a Lamellibranch are slightly gaping, and are closed by the action of the adductors when the animal is disturbed. The ligament is simple in *Anodonta*; in many Lamellibranchs it is separated into two layers, an outer and an inner (thicker and denser). That the condition of gaping of the shell-valves is essential to the life of the Lamellibranch appears from the fact that food to nourish it, water to aerate its blood, and spermatozoa to fertilize its eggs, are all introduced into this gaping chamber by currents of water, set going by the highly-developed ctenidia. The current of water enters into the sub-pallial space at the spot marked *e* in fig. 1 (1), and, after passing as far forward as the mouth *w* in fig. 1 (5), takes an outward course and leaves the sub-pallial space by the upper notch *d*. These notches are known in *Anodonta* as the afferent and efferent siphonal notches respectively, and correspond to the long tube-like afferent inferior and efferent superior "siphons" formed by the mantle in many other Lamellibranchs (fig. 8).

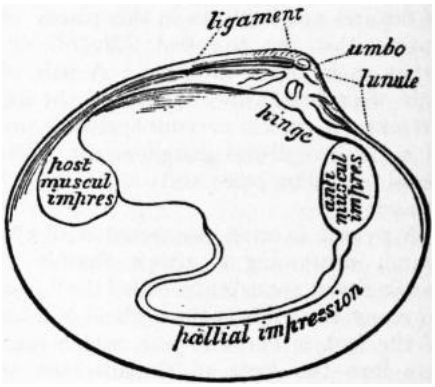


FIG. 4.—Left Valve of the same Shell from the Inner Face. (Figs. 2, 3, 4 from Owen.)

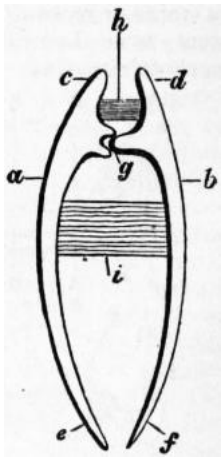


FIG. 5.—Diagram of a section of a Lamellibranch's shells, ligament and adductor muscle. *a*, *b*, right and left valves of the shell; *c*, *d*, the umbones or short arms of the lever; *e*, *f*, the long arms of the lever; *g*, the hinge; *h*, the ligament; *i*, the adductor muscle.

Whilst the valves of the shell are equal in *Anodonta* we find in many Lamellibranchs (*Ostraea*, *Chama*, *Corbula*, &c.) one valve larger, and the other smaller and sometimes flat, whilst the larger shell may be fixed to rock or to stones (*Ostraea*, &c.). A further variation consists in the development of additional shelly plates upon the dorsal line between the two large valves (*Pholadidae*). In *Pholas dactylus* we find a pair of umbonal plates, a dors-umbonal plate and a dorsal plate. It is to be remembered that the whole of the cuticular hard product produced on the dorsal surface and on the mantle-flaps is to be regarded as the "shell," of which a median band-like area, the ligament, usually remains uncalcified, so as to result in the production of two valves united by the elastic ligament. But the shelly substance does not always in boring forms adhere to this form after its first growth. In *Aspergillum* the whole of the tubular mantle area secretes a continuous shelly tube, although in the young condition two valves were present. These are seen (fig. 7) set in the firm substance of the adult tubular shell, which has even replaced the ligament, so that the tube is complete. In *Teredo* a similar tube is formed as the animal elongates (boring in wood), the original shell-valves not adhering to it but remaining movable and provided with a special muscular apparatus in place of a ligament. In the shell of Lamellibranchs three distinct layers can be distinguished: an external chitinous, non-calcified layer, the periostracum; a middle layer composed of calcareous prisms perpendicular to the surface, the prismatic layer; and an internal layer composed of laminae parallel to the surface, the nacreous layer. The last is secreted by the whole surface of the mantle except the border, and additions to its thickness continue to be made through life. The periostracum is produced by the extreme edge of the mantle border, the prismatic layer by the part of the border within the edge. These two layers, therefore, when once formed cannot increase in thickness; as the mantle grows in extent its border passes beyond the formed parts of the two outer layers, and the latter are covered internally by a deposit of nacreous matter. Special deposits of the nacreous matter around foreign bodies form pearls, the foreign nucleus being usually of parasitic origin (see PEARL).

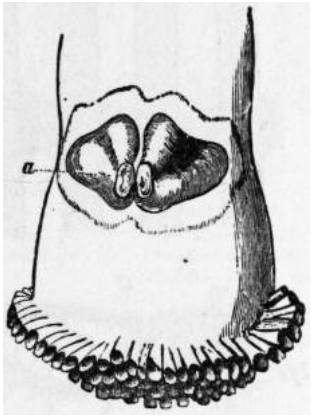


FIG. 7.—Shell of *Aspergillum vaginiferum* to show the

FIG. 6.—Shell of *Aspergillum vaginiferum*. (From Owen.)

original valves *a*, now embedded in a continuous calcification of tubular form. (From Owen.)

Let us now examine the organs which lie beneath the mantle-skirt of *Anodonta*, and are bathed by the current of water which circulates through it. This can be done by lifting up and throwing back the left half of the mantle-skirt as is represented in fig. 1 (3). We thus expose the plough-like foot (*f*), the two left labial tentacles, and the two left gill-plates or left ctenidium. In fig. 1 (5), one of the labial tentacles *n* is also thrown back to show the mouth *w*, and the two left gill-plates are reflected to show the gill-plates of the right side (*rr*, *rq*) projecting behind the foot, the inner or median plate of each side being united by concrescence to its fellow of the opposite side along a continuous line (*aa*). The left inner gill-plate is also snipped to show the subjacent orifices of the left renal organ *x*, and of the genital gland (testis or ovary) *y*. The foot thus exposed in *Anodonta* is a simple muscular tongue-like organ. It can be protruded between the flaps of the mantle (fig. 1 [1] [2]) so as to issue from the shell, and by its action the *Anodonta* can slowly crawl or burrow in soft mud or sand. Other Lamellibranchs may have a larger foot relatively than has *Anodonta*. In *Arca* it has a sole-like surface. In *Arca* too and many others it carries a byssus-forming gland and a byssus-cementing gland. In the cockles, in *Cardium* and in *Trigonia*, it is capable of a sudden stroke, which causes the animal to jump when out of the water, in the latter genus to a height of four feet. In *Mytilus* the foot is reduced to little more than a tubercle carrying the apertures of these glands. In the oyster it is absent altogether.

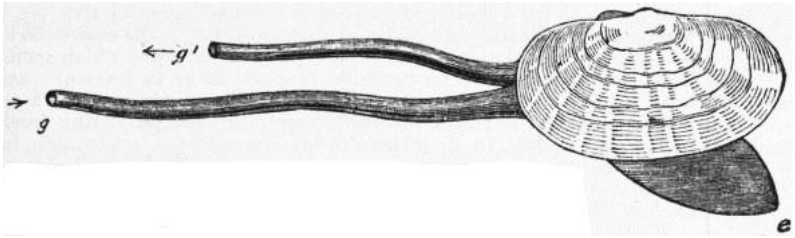


FIG. 8.—*Psammobia florida*, right side, showing expanded foot *e*, and *g* incurrent and *g'* excurrent siphons. (From Owen.)

The labial tentacles or palps of *Anodonta* (*n*, *o* in fig. 1 [3], [5]) are highly vascular flat processes richly supplied with nerves. The left anterior tentacle (seen in the figure) is joined at its base in front of the mouth (*w*) to the right anterior tentacle, and similarly the left (*o*) and right posterior tentacles are joined behind the mouth. Those of *Arca* (*i*, *k* in fig. 9) show this relation to the mouth (*a*). These organs are characteristic of all Lamellibranchs; they do not vary except in size, being sometimes drawn out to streamer-like dimensions. Their appearance and position suggest that they are in some way related morphologically to the gill-plates, the anterior labial tentacle being a continuation of the outer gill-plate, and the posterior a continuation of the inner gill-plate. There is no embryological evidence to support this suggested connexion, and, as will appear immediately, the history of the gill-plates in various forms of Lamellibranchs does not directly favour it. The palps are really derived from part of the velar area of the larva.

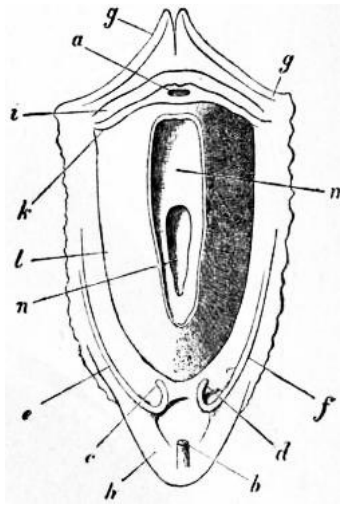


FIG. 9.—View from the ventral (pedal) aspect of the animal of *Arca noae*, the mantle-flap and gill-filaments having been cut away. (Lankester.)

a, Mouth.
b, Anus.
c, Free spirally turned extremity of the gill-axis or ctenidial axis of the right side.
d, Do. of the left side.
e, *f*, Anterior portions of these axes fused by concrescence to the wall of the body.
g, Anterior adductor muscle.
h, Posterior adductor.
i, Anterior labial tentacle.
k, Posterior labial tentacle.
l, Base line of the foot.
m, Sole of the foot.
n, Callosity.

The gill-plates have a structure very different from that of the labial tentacles, and one which in *Anodonta* is singularly complicated as compared with the condition presented by these organs in some other Lamellibranchs, and with what must have been their original condition in the ancestors of the whole series of living Lamellibranchia. The phenomenon of "concrescence" which we have already had to note as showing itself so importantly in regard to the free edges of the mantle-skirt and the formation of the siphons, is what, above all things, has complicated the structure of the Lamellibranch ctenidium. Our present knowledge of the interesting series of modifications through which the Lamellibranch gill-plates have developed to their most complicated form is due to R. H. Peck, K. Mitsukuri and W. G. Ridewood. The Molluscan ctenidium is typically a plume-like structure, consisting of a vascular axis, on each side of which is set a row of numerous lamelliform or filamentous processes. These processes are hollow, and receive the venous blood from, and return it again aerated into, the hollow axis, in which an afferent and an efferent blood-vessel may be differentiated. In the genus *Nucula* (fig. 10) we have an example of a Lamellibranch retaining this plume-like form of gill. In the Arcacea (*e.g. Arca* and *Pectunculus*) the lateral processes which are set on the axis of the ctenidium are not lamellae, but are slightly flattened, very long tubes or hollow filaments. These filaments are so fine and are set so closely together that they appear to form a continuous membrane until examined with a lens. The microscope shows that the neighbouring filaments are held together by patches of cilia, called "ciliated junctions," which interlock with one another just as two brushes may be made to do. In fig. 11, A a portion of four filaments of a ctenidium of the sea-mussel

(*Mytilus*) is represented, having precisely the same structure as those of *Arca*. The filaments of the gill (ctenidium) of *Mytilus* and *Arca* thus form two closely set rows which depend from the axis of the gill like two parallel plates. Further, their structure is profoundly modified by the curious condition of the free ends of the depending filaments. These are actually reflected at a sharp angle—doubled on themselves in fact—and thus form an additional row of filaments (see fig. 11 B). Consequently, each primitive filament has a descending and an ascending ramus, and instead of each row forming a simple plate, the plate is double, consisting of a descending and an ascending lamella. As the axis of the ctenidium lies by the side of the body, and is very frequently connate with the body, as so often happens in Gastropods also, we find it convenient to speak of the two plate-like structures formed on each ctenidial axis as the outer and the inner gill-plate; each of these is composed of two lamellae, an outer (the reflected) and an adaxial in the case of the outer gill-plate, and an adaxial and an inner (the reflected) in the case of the inner gill-plate. This is the condition seen in *Arca* and *Mytilus*, the so-called plates dividing upon the slightest touch into their constituent filaments, which are but loosely conjoined by their "ciliated junctions." Complications follow upon this in other forms. Even in *Mytilus* and *Arca* a connexion is here and there formed between the ascending and descending rami of a filament by hollow extensible outgrowths called "interlamellar junctions" (*il. j* in B, fig. 11). Nevertheless the filament is a complete tube formed of chitinous substance and clothed externally by ciliated epithelium, internally by endothelium and lacunar tissue—a form of connective tissue—as shown in fig. 11, C. Now let us suppose as happens in the genus *Dreissensia*—a genus not far removed from *Mytilus*—that the ciliated inter-filamentar junctions (fig. 12) give place to solid permanent inter-filamentar junctions, so that the filaments are converted, as it were, into a trellis-work. Then let us suppose that the interlamellar junctions already noted in *Mytilus* become very numerous, large and irregular; by them the two trellis-works of filaments would be united so as to leave only a sponge-like set of spaces between them. Within the trabeculae of the sponge-work blood circulates, and between the trabeculae the water passes, having entered by the apertures left in the trellis-work formed by the united gill-filaments (fig. 14). The larger the intralamellar spongy growth becomes, the more do the original gill-filaments lose the character of blood-holding tubes, and tend to become dense elastic rods for the simple purpose of supporting the spongy growth. This is seen both in the section of *Dreissensia* gill (fig. 12) and in those of *Anodonta* (fig. 13, A, B, C). In the drawing of *Dreissensia* the individual filaments *f*, *f*, *f* are cut across in one lamella at the horizon of an inter-filamentar junction, in the other (lower in the figure) at a point where they are free. The chitinous substance *ch* is observed to be greatly thickened as compared with what it is in fig. 11, C, tending in fact to obliterate altogether the lumen of the filament. And in *Anodonta* (fig. 13, C) this obliteration is effected. In *Anodonta*, besides being thickened, the skeletal substance of the filament develops a specially dense, rod-like body on each side of each filament. Although the structure of the ctenidium is thus highly complicated in *Anodonta*, it is yet more so in some of the siphonate genera of Lamellibranchs. The filaments take on a secondary grouping, the surface of the lamella being thrown into a series of half-cylindrical ridges, each consisting of ten or twenty filaments; a filament of much greater strength and thickness than the others may be placed between each pair of groups. In *Anodonta*, as in many other Lamellibranchs, the ova and hatched embryos are carried for a time in the ctenidia or gill apparatus, and in this particular case the space between the two lamellae of the outer gill-plate is that which serves to receive the ova (fig. 13, A). The young are nourished by a substance formed by the cells which cover the spongy interlamellar outgrowths.

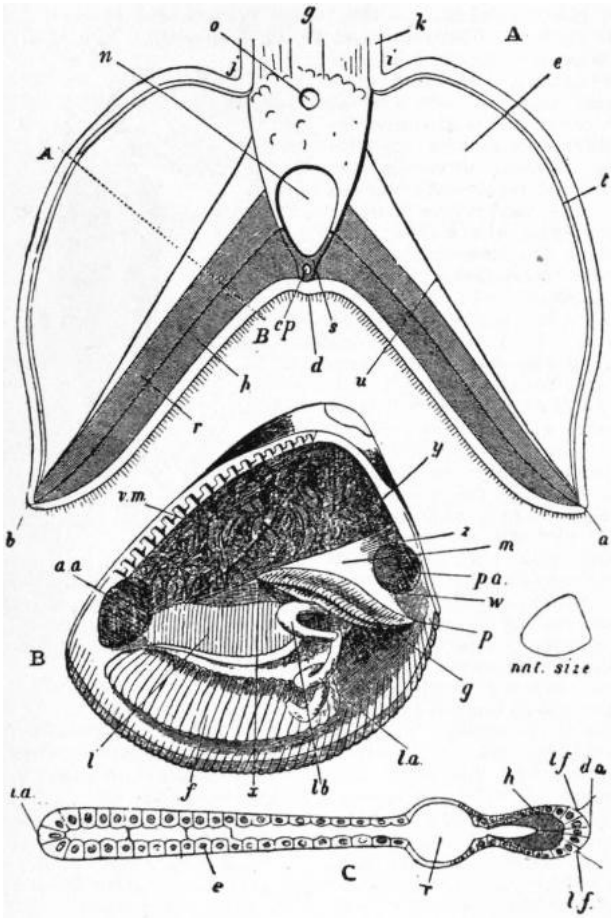


Fig. 10.—Structure of the Ctenidia of *Nucula*. (After Mitsukuri.)
See also fig. 2.

A. Section across the axis of a ctenidium with a pair of plates—flattened and shortened filaments—attached.

i, j, k, g, Are placed on or near the membrane which attaches the axis of the ctenidium to the side of the body.

a, b, Free extremities of the plates (filaments).

d, Mid-line of the inferior border.

e, Surface of the plate.

t, Its upper border.

h, Chitinous lining of the plate.

r, Dilated blood-space.

u, Fibrous tract.

o, Upper blood-vessel of the axis.

n, Lower blood-vessel of the axis.

s, Chitinous framework of the axis.

cp, Canal in the same.

A, B, Line along which the cross-section C of the plate is taken.

B. Animal of a male *Nucula proxima*, Say, as seen when the left valve of the shell and the left half of the mantle-skirt are removed.

a, a, Anterior adductor muscle.

p.a, Posterior adductor muscle.

v.m, Visceral mass.

f, Foot.

g, Gill.

l, Labial Tentacle.

l.a, Filamentous appendage of the labial tentacle.

lb, Hood-like appendage of the labial tentacle.

m, Membrane suspending the gill and attached to the body along the line *x, y, z, w*.

p, Posterior end of the gill (ctenidium).

C. Section across one of the gill-plates (*A, B*, in A) comparable with fig. 11 C.

i.a, Outer border.

d.a, Axial border.

l.f, Latero-frontal epithelium.

e, Epithelium of general surface.

r, Dilated blood-space.

h, Chitinous lining (compare A).

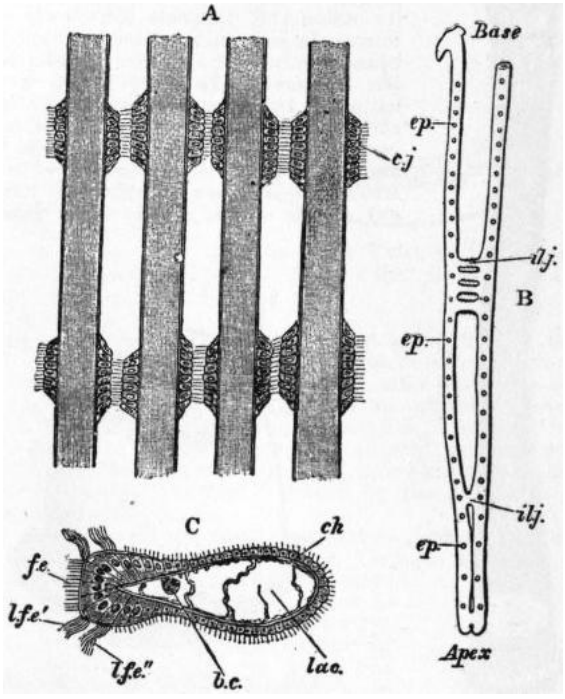


FIG. 11.—Filaments of the Ctenidium of *Mytilus edulis*. (After R. H. Peck.)

A, Part of four filaments seen from the outer face in order to show the ciliated junctions *c.j.*

B, Diagram of the posterior face of a single complete filament with descending ramus and ascending ramus ending in a hook-like process; *ep., ep.*, the ciliated junctions; *il, j.*, interlamellar junction.

C, Transverse section of a filament taken so as to cut neither a ciliated junction nor an interlamellar junction. *f.e.*, Frontal epithelium; *l.f.e'., l.f.e''.*, the two rows of latero-frontal epithelial cells with long cilia; *ch*, chitinous tubular lining of the filament; *lac.*, blood lacuna traversed by a few processes of connective tissue cells; *b.c.*, blood-corpuscle.

Other points in the modification of the typical ctenidium must be noted in order to understand the ctenidium of *Anodonta*. The axis of each ctenidium, right and left, starts from a point well forward near the labial tentacles, but it is at first only a ridge, and does not project as a free cylindrical axis until the back part of the foot is reached. This is difficult to see in *Anodonta*, but if the mantle-skirt be entirely cleared away, and if the dependent lamellae which spring from the ctenidial axis be carefully cropped so as to leave the axis itself intact, we obtain the form shown in fig. 15, where *g* and *h* are respectively the left and the right ctenidial axes projecting freely beyond the body. In *Arca* this can be seen with far less trouble, for the filaments are more easily removed than are the consolidated lamellae formed by the filaments of *Anodonta*, and in *Arca* the free axes of the ctenidia are large and firm in texture (fig. 9, *c*, *d*).

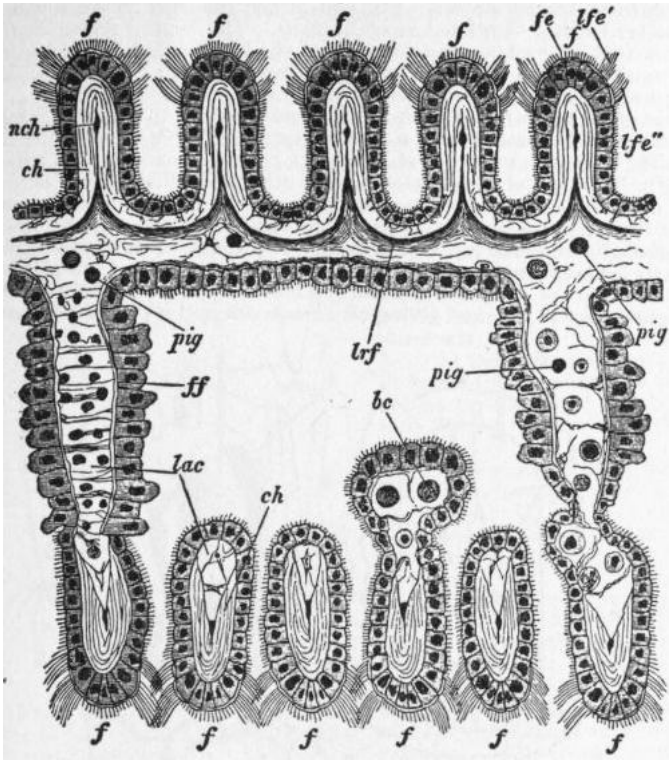


FIG. 12.—Transverse Section of the Outer Gill-plate of *Dreissensia polymorpha*. (After R. H. Peck.)

f, Constituent gill-filaments.
ff, Fibrous sub-epidermic tissue.
ch, Chitonous substance of the filaments.
nch, Cells related to the chitonous substance.
lac, Lacunar tissue.
pig, Pigment-cells.
bc, Blood-corpuscles.
fe, Frontal epithelium.
lfe', *lfe"*, Two rows of latero-frontal epithelial cells with long cilia.
lrf, Fibrous, possibly muscular, substance of the inter-filamentar junctions.

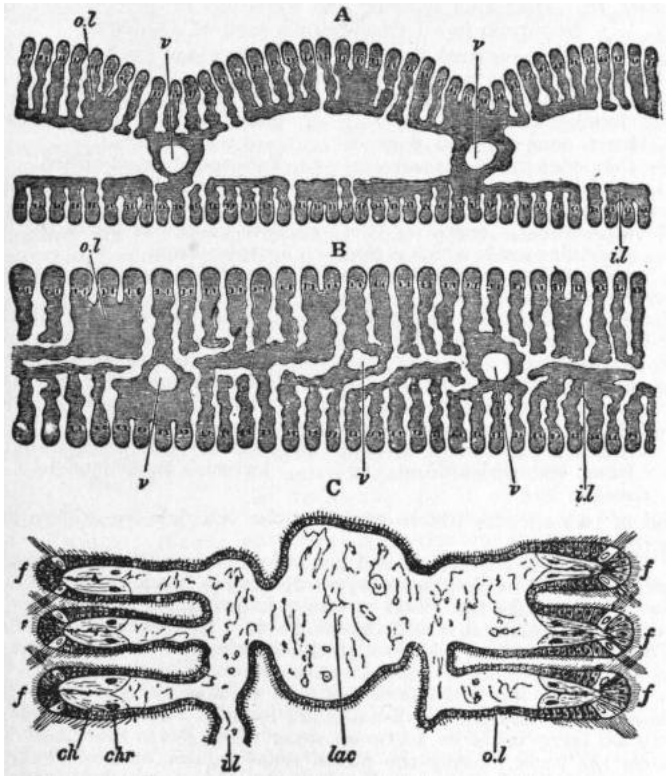


FIG. 13.—Transverse Sections of Gill-plates of *Anodonta*. (After R. H. Peck.)

A, Outer gill-plate.
B, Inner gill-plate.
C, A portion of B more highly magnified.
o.l, Outer lamella.
i.l, Inner lamella.
v, Blood-vessel.
f, Constituent filaments.
lac, Lacunar tissue.
ch, Chitonous substance of the filament.
chr, Chitonous rod embedded in the softer substance *ch*.

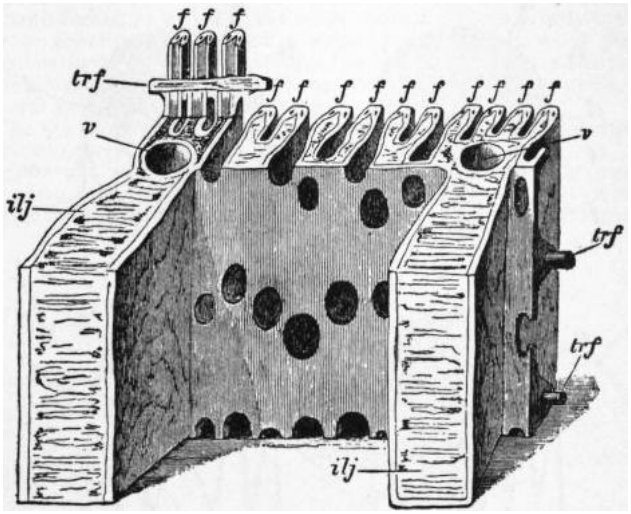


FIG. 14.—Gill-lamellae of *Anodonta*. (After R. H. Peck.)

Diagram of a block cut from the outer lamella of the outer gill-plate and seen from the interlamellar surface. *f*, Constituent filaments; *trf*, fibrous tissue of the transverse inter-filamentar junctions; *v*, blood-vessel *ilj*, Inter-lamellar junction. The series of oval holes on the back of the lamella are the water-pores which open between the filaments in irregular rows separated horizontally by the transverse inter-filamentar junctions.

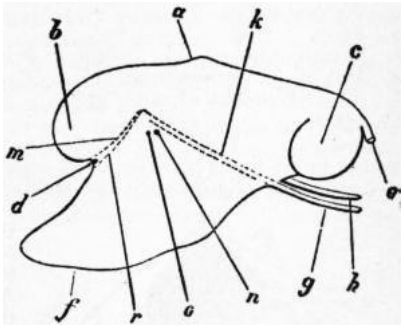


FIG. 15.—Diagram of a view from the left side of the animal of *Anodonta cygnaea*, from which the mantle-skirt, the labial tentacles and the gill-filaments have been entirely removed so as to show the relations of the axis of the gill-plumes or ctenidia *g*, *h*. (Original.)

a, Centro-dorsal area.
b, Anterior adductor muscle.
c, Posterior adductor muscle.
d, Mouth.
e, Anus.
f, Foot.
g, Free portion of the axis of left ctenidium.
h, Axis of right ctenidium.
k, Portion of the axis of the left ctenidium which is fused with the base of the foot, the two dotted lines indicating the origins of the two rows of gill-filaments.
m, Line of origin of the anterior labial tentacle.
n, Nephridial aperture.
o, Genital aperture.
r, Line of origin of the posterior labial tentacle.

If we were to make a vertical section across the long axis of a Lamellibranch which had the axis of its ctenidium free from its origin onwards, we should find such relations as are shown in the diagram fig. 16, A. The gill axis *d* is seen lying in the sub-pallial chamber between the foot *b* and the mantle *c*. From it

depend the gill-filaments or lamellae—formed by united filaments—drawn as black lines *f*. On the left side these lamellae are represented as having only a small reflected growth, on the right side the reflected ramus or lamella is complete (*fr* and *er*). The actual condition in *Anodonta* at the region where the gills begin anteriorly is shown in fig. 16, B. The axis of the ctenidium is seen to be adherent to, or fused by concrescence with, the body-wall, and moreover on each side the outer lamella of the outer gill-plate is fused to the mantle, whilst the inner lamella of the inner gill-plate is fused to the foot. If we take another section nearer the hinder margin of the foot, we get the arrangement shown diagrammatically in fig. 16, C, 117
and more correctly in fig. 17. In this region the inner lamellae of the inner gill-plates are no longer affixed to the foot. Passing still farther back behind the foot, we find in *Anodonta* the condition shown in the section D, fig. 16. The axes *i* are now free; the outer lamellae of the outer gill-plates (*er*) still adhere by concrescence to the mantle-skirt, whilst the inner lamellae of the inner gill-plates meet one another and fuse by concrescence at *g*. In the lateral view of the animal with reflected mantle-skirt and gill-plates, the line of concrescence of the inner lamellae of the inner gill-plates is readily seen; it is marked *aa* in fig. 1 (5). In the same figure the free part of the inner lamella of the inner gill-plate resting on the foot is marked *z*, whilst the attached part—the most anterior—has been snipped with scissors so as to show the genital and nephridial apertures *x* and *y*. The concrescence, then, of the free edge of the reflected lamellae of the gill-plates of Anodon is very extensive. It is important, because such a concrescence is by no means universal, and does not occur, for example, in *Mytilus* or in *Arca*; further, because when its occurrence is once appreciated, the reduction of the gill-plates of *Anodonta* to the plume-type of the simplest ctenidium presents no difficulty; and, lastly, it has importance in reference to its physiological significance. The mechanical result of the concrescence of the outer lamellae to the mantle-flap, and of the inner lamellae to one another as shown in section D, fig. 16, is that the sub-pallial space is divided into two spaces by a horizontal septum. The upper space (*i*) communicates with the outer world by the excurrent or superior 118
siphonal notch of the mantle (fig. 1, *d*); the lower space communicates by the lower siphonal notch (*e* in fig. 1). The only communication between the two spaces, excepting through the trellis-work of the gill-plates, is by the slit (*z* in fig. 1 (5)) left by the non-concrescence of a part of the inner lamella of the inner gill-plate with the foot. A probe (*g*) is introduced through this slit-like passage, and it is seen to pass out by the excurrent siphonal notch. It is through this passage, or indirectly through the pores of the gill-plates, that the water introduced into the lower sub-pallial space must pass on its way to the excurrent siphonal notch. Such a subdivision of the pallial chamber, and direction of the currents set up within it do not exist in a number of Lamellibranchs which have the gill-lamellae comparatively free (*Mytilus*, *Arca*, *Trigonia*, &c.), and it is in these forms that there is least modification by concrescence of the primary filamentous elements of the lamellae.

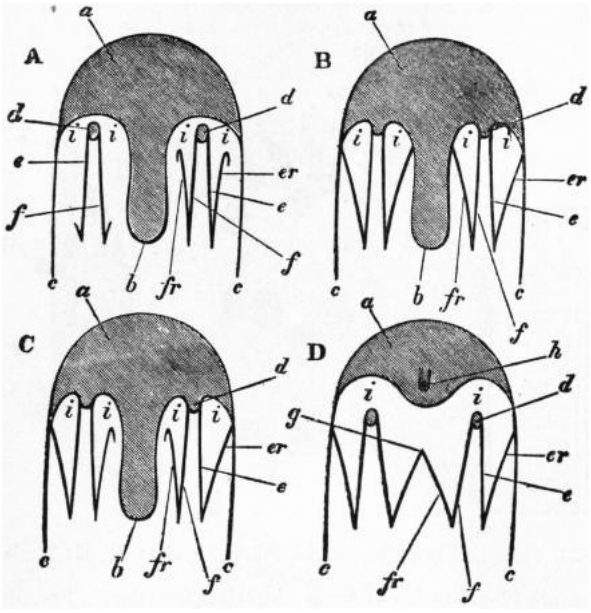


FIG. 16.—Diagrams of Transverse Sections of a Lamellibranch to show the Adhesion, by Concrescence, of the Gill-Lamellae to the Mantle-flaps, to the foot and to one another. (Lankester.)

A, Shows two conditions with free gill-axis.
B, Condition at foremost region in *Anodonta*.
C, Hind region of foot in *Anodonta*.
D, Region altogether posterior to the foot in *Anodonta*.
a, Visceral mass.
b, Foot.
c, Mantle flap.
d, Axis of gill or ctenidium.
e, Adaxial lamella of outer gill-plate.
er, Reflected lamella of outer gill-plate.
f, Adaxial lamella of inner gill-plate.
fr, Reflected lamella of inner gill-plate.
g, Line of concrescence of the reflected lamellae of the two inner gill-plates.
h, Rectum.
i, Supra-branchial space of the sub-pallial chamber.

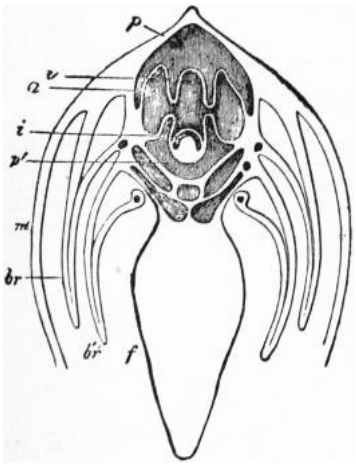


FIG. 17.—Vertical Section through an *Anodonta*, about the mid-region of the Foot.

m, Mantle-flap.
br, Outer, *b'r'*, inner gill-plate—each composed of two lamellae.
f, Foot.
v, Ventricle of the heart.
a, Auricle.
p, *p'*, Pericardial cavity.
i, Intestine.

In the 9th edition of this Encyclopaedia Professor (Sir) E. R. Lankester suggested that these differences of gill-structure would furnish characters of classificatory value, and this suggestion has been followed out by Dr Paul Pelseneer in the classification now generally adopted.

The alimentary canal of *Anodonta* is shown in fig. 1 (4). The mouth is placed between the anterior adductor and the foot; the anus opens on a median papilla overlying the posterior adductor, and discharges into the superior pallial chamber along which the excurrent stream passes. The coil of the intestine in *Anodonta* is similar to that of other Lamellibranchs. The rectum traverses the pericardium, and has the ventricle of the heart wrapped, as it were, around it. This is not an unusual arrangement in Lamellibranchs, and a similar disposition occurs in some Gastropoda (*Haliotis*). A pair of ducts (*ai*) lead from the first enlargement of the alimentary tract called stomach into a pair of large digestive glands, the so-called liver, the branches of which are closely packed in this region (*af*). The food of the *Anodonta*, as of other Lamellibranchs, consists of microscopic animal and vegetable organisms, brought to the mouth by the stream which sets into the sub-pallial chamber at the lower siphonal notch (*e* in fig. 1). Probably a straining of water from solid particles is effected by the lattice-work of the ctenidia or gill-plates.

The heart of *Anodonta* consists of a median ventricle embracing the rectum (fig. 18, A), and giving off an anterior and a posterior artery, and of two auricles which open into the ventricle by orifices protected by valves.

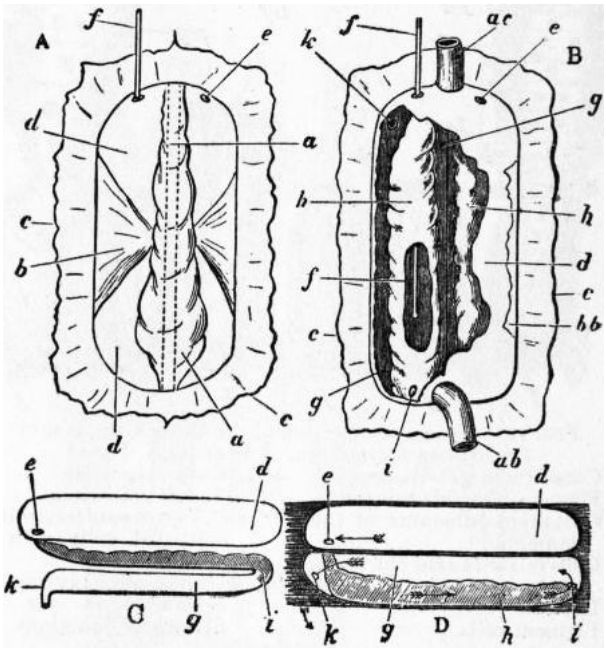


FIG. 18.—Diagrams showing the Relations of Pericardium and Nephridia in a Lamellibranch such as *Anodonta*.

A, Pericardium opened dorsally so as to expose the heart and the floor of the pericardial chamber *d*.
a, Ventricle of the heart.
b, Auricle.
bb, Cut remnant of the auricle.

B, Heart removed and floor of the pericardium cut away on the left side so as to open the non-glandular sac of the nephridium, exposing the glandular sac *b*, which is also cut into so as to show the probe *f*.
C, Ideal pericardium and nephridium viewed laterally.
D, Lateral view showing the actual relation of the glandular and non-glandular sacs of the nephridium. The arrows indicate the course of fluid from the pericardium outwards.
c, Dorsal wall of the pericardium cut and reflected.
e, Reno-pericardial orifice.
f, Probe introduced into the left reno-pericardial orifice.
g, Non-glandular sac of the left nephridium.
h, Glandular sac of the left nephridium.
i, Pore leading from the glandular into the non-glandular sac of the left nephridium.
k, Pore leading from the non-glandular sac to the exterior.
ac, Anterior.
ab, Posterior, cut remnants of the intestine and ventricle.

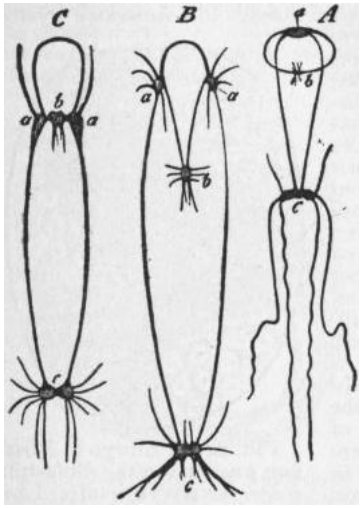


FIG. 19.—Nerve-ganglia and Cords of three Lamellibranchs. (From Gegenbaur.)

A, Of *Teredo*.
B, Of *Anodonta*.
C, Of *Pecten*.
a, Cerebral ganglion-pair (= cerebro-pleuro-visceral).
b, Pedal ganglion-pair.
c, Olfactory (osphradial) ganglion-pair.

FIG. 20.—Otocyst of *Cyclas*. (From Gegenbaur.)

c, Capsule.
e, Ciliated cells lining the same.
o, Otolith.

The blood is colourless, and has colourless amoeboid corpuscles floating in it. In *Ceratisolen legumen*, various species of *Arca* and a few other species the blood is crimson, owing to the presence of corpuscles impregnated with haemoglobin. In *Anodonta* the blood is driven by the ventricle through the arteries into vessel-like spaces, which soon become irregular lacunae surrounding the viscera, but in parts—*e.g.* the labial tentacles and walls of the gut—very fine vessels with endothelial cell-lining are found. The blood makes its way by large veins to a venous sinus which lies in the middle line below the heart, having the paired renal organs (nephridia) placed between it and that organ. Hence it passes through the vessels of the glandular walls of the nephridia right and left into the gill-lamellae, whence it returns through many openings into the widely-stretched auricles. In the filaments of the gill of Protobranchia and many Filibranchia the tubular cavity is divided by a more or less complete fibrous septum into two channels, for an afferent and efferent blood-current. The ventricle and auricles of *Anodonta* lie in a pericardium which is clothed with a pavement endothelium (*d*, fig. 18). It does not contain blood or communicate directly with the blood-system; this isolation of the pericardium we have noted already in Gastropods and Cephalopods. A good case for the examination of the question as to whether blood enters the pericardium of Lamellibranchs, or escapes from the foot, or by the renal organs when the animal suddenly contracts, is furnished by the *Ceratisolen legumen*, which has red blood-corpuscles. According to observations made by Penrose on an uninjured *Ceratisolen legumen*, no red corpuscles are to be seen in the pericardial space, although the heart is filled with them, and no such corpuscles are ever discharged by the animal when it is irritated.

The pair of renal organs of *Anodonta*, called in Lamellibranchs the organs of Bojanus, lie below the membranous floor of the pericardium, and open into it by two well-marked apertures (*e* and *f* in fig. 18). Each nephridium, after being bent upon itself as shown in fig. 18, C, D, opens to the exterior by a pore placed at the point marked *x* in fig. 1 (5) (6). One half of each nephridium is of a dark-green colour and glandular (*h* in fig. 18). This opens into the reflected portion which overlies it as shown in the diagram fig. 18, D, *i*; the latter has non-glandular walls, and opens by the pore *k* to the exterior. The renal organs may be more ramified in other Lamellibranchs than they are in *Anodonta*. In some they are difficult to discover. That of the common oyster was described by Hoek. Each nephridium in the oyster is a pyriform sac, which communicates by a narrow canal with the urino-genital groove placed to the front of the great adductor muscle; by a second narrow canal it communicates with the pericardium. From all parts of the pyriform sac narrow stalk-like tubes are given off, ending in abundant widely-spread branching glandular caeca, which form the essential renal secreting apparatus. The genital duct opens by a pore into the urino-genital groove of the oyster (the same arrangement being repeated on each side of the body) close to but distinct from the aperture of the nephridial canal. Hence, except for the formation of a urino-genital groove, the apertures are placed as they are in *Anodonta*. Previously to Hoek's discovery a brown-coloured investment of the auricles of the heart of the oyster had been supposed to represent the nephridia in a rudimentary state. This investment, which occurs also in many Filibranchia, forms the pericardial glands, comparable to the pericardial accessory glandular growths of Cephalopoda. In *Unionidae* and several other forms the pericardial glands are extended into diverticula of the pericardium which penetrate the mantle and constitute the organ of Heber. The glands secrete hippuric acid which

passes from the pericardium into the renal organs.

Nervous System and Sense-Organs.—In *Anodonta* there are three well-developed pairs of nerve ganglia (fig. 19, B, and fig. 1 (6)). An anterior pair, lying one on each side of the mouth (fig. 19, B, *a*) and connected in front of it by a commissure, are the representatives of the cerebral and pleural ganglia of the typical Mollusc, which are not here differentiated as they are in Gastropods. A pair placed close together in the foot (fig. 19, B, *b*, and fig. 1 (6), *ax*) are the typical pedal ganglia; they are joined to the cerebro-pleural ganglia by connectives.

Posteriorly beneath the posterior adductors, and covered only by a thin layer of elongated epidermal cells, are the visceral ganglia. United with these ganglia on the outer sides are the osphradial ganglia, above which the epithelium is modified to form a pair of sense-organs, corresponding to the osphradia of other Molluscs. In some Lamellibranchs the osphradial ganglia receive nerve-fibres, not from the visceral ganglia, but from the cerebral ganglia along the visceral commissure. Formerly the posterior pair of ganglia were identified as simply the osphradial ganglia, and the anterior pair as the cerebral, pleural and visceral ganglia united into a single pair. But it has since been discovered that in the Protobranchia the cerebral ganglia and the pleural are distinct, each giving origin to its own connective which runs to the pedal ganglion. The cerebro-pedal and pleuro-pedal connectives, however, in these cases are only separate in the initial parts of their course, and unite together for the lower half of their length, or for nearly the whole length. Moreover, in many forms, in which in the adult condition there is only a single pair of anterior ganglia and a single pedal connective, a pleural ganglion distinct from the cerebral has been recognized in the course of development. There is, however, no evidence of the union of a visceral pair with the cerebro-pleural.

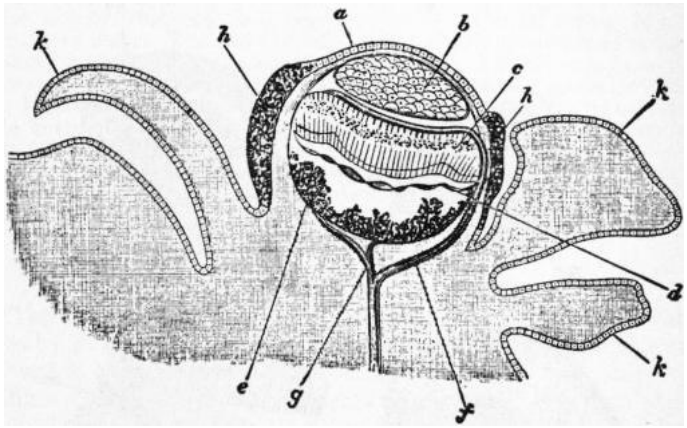


FIG. 21.—Pallial Eye of *Spondylus*. (From Hickson.)

a, Prae-corneal epithelium.
b, Cellular lens.
c, Retinal body.
d, Tapetum.
e, Pigment.
f, Retinal nerve.
g, Complementary nerve.
h, Epithelial cells filled with pigment.
k, Tentacle.

The sense-organs of *Anodonta* other than the osphradia consist of a pair of otocysts attached to the pedal ganglia (fig. 1 (6), *ay*). The otocysts of *Cyclas* are peculiarly favourable for study on account of the transparency of the small foot in which they lie, and may be taken as typical of those of Lamellibranchs generally. The structure of one is exhibited in fig. 20. A single otolith is present as in the veliger embryos of Opisthobranchia. In Filibranchia and many Protobranchia the otocyst (or statocyst) contains numerous particles (otoconia). The organs are developed as invaginations of the epidermis of the foot, and in the majority of the Protobranchia the orifice of invagination remains open throughout life; this is also the case in *Mytilus* including the common mussel.

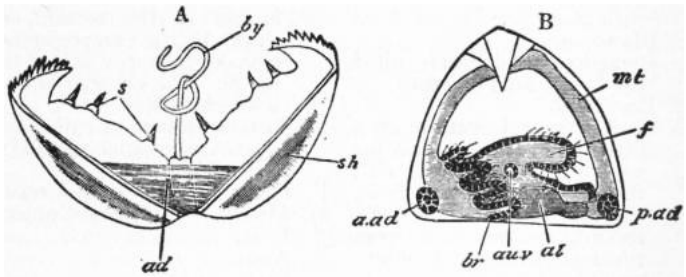


FIG. 22.—Two Stages in the Development of *Anodonta*. (From Balfour.)
Both figures represent the glochidium stage.

A, When free swimming, shows the two dentigerous valves widely open.
B, A later stage, after fixture to the fin of a fish.
sh, Shell.
ad, Adductor muscle.
s, Teeth of the shell.
by, Byssus.
a.ad, Anterior adductor.
p.ad, Posterior adductor.
mt, Mantle-flap.
f, Foot.
br, Branchial filaments.
au.v, Otocyst.
al, Alimentary canal.

Anodonta has no eyes of any sort, and the tentacles on the mantle edge are limited to its posterior border. This deficiency is very usual in the class; at the same time, many Lamellibranchs have tentacles on the edge of the mantle supplied by a pair of large well-developed nerves, which are given off from the cerebro-pleural ganglion-pair, and very frequently some of these tentacles have undergone a special metamorphosis converting them into highly-organized eyes. Such eyes on the mantle-edge are found in *Pecten*, *Spondylus*, *Lima*, *Pinna*, *Pectunculus*, *Modiola*, *Cardium*, *Tellina*, *Mactra*, *Venus*, *Solen*, *Pholas* and *Galeomma*. They are totally distinct from the cephalic eyes of typical Mollusca, and have a different structure and historical development. They have originated not as pits but as tentacles. They agree with the dorsal eyes of *Oncidium* (Pulmonata) in the curious fact that the optic nerve penetrates the capsule of the eye and passes in front of the retinal body (fig. 21), so that its fibres join the anterior faces of the nerve-end cells as in Vertebrates, instead of their posterior faces as in the cephalic eyes of Mollusca and Arthropoda; moreover, the lens is not a cuticular product but a cellular structure, which, again, is a feature of agreement with the Vertebrate eye. It must, however, be distinctly borne in mind that there is a fundamental difference between the eye of Vertebrates and of all other groups in the fact that in the Vertebrata the retinal body is itself a part of the central nervous system, and not a separate modification of the epidermis—myelonic as opposed to epidermic. The structure of the reputed eyes of several of the above-named genera has not been carefully examined. In *Pecten* and *Spondylus*, however, they have been fully studied (see fig. 21, and explanation). Rudimentary cephalic eyes occur in the *Mytilidae* and in *Avicula* at the base of the first filament of the inner gill, each consisting of a pigmented epithelial fossa containing a cuticular lens. In the *Arcidae* the pallial eyes are compound or faceted somewhat like those of Arthropods.

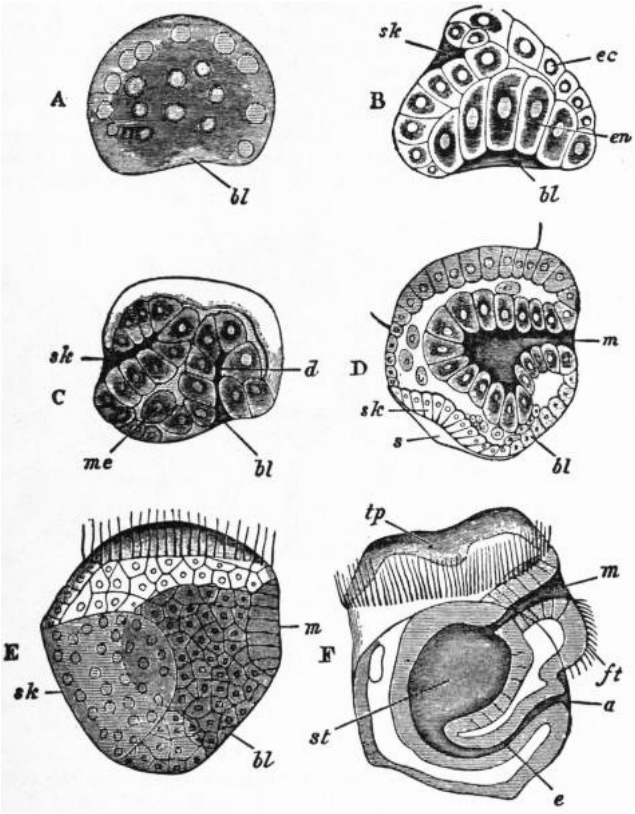


FIG. 23.—Development of the Oyster, *Ostrea edulis*. (Modified from Horst.)

A, Blastula stage (one-cell-layered sac), with commencing invagination of the wall of the sac at *bl*, the blastopore.

B, Optical section of a somewhat later stage, in which a second invagination has begun—namely, that of the shell-gland *sk*.

bl, Blastopore.

en, Invaginated endoderm (wall of the future arch-enteron).

ec, Ectoderm.

C, Similar optical section at a little later stage. The invagination connected with the blastopore is now more contracted, *d*; and cells, *me*, forming the mesoblast from which the cœlom and muscular and skeleto-trophic tissues develop, are

D, Similar section of a later stage. The blastopore, *bl*, has closed; the anus will subsequently perforate the corresponding area. A new aperture, *m*, the mouth, has eaten its way into the invaginated endodermal sac, and the cells pushed in with it constitute the stomodaeum. The shell-gland, *sk*, is flattened out, and a delicate shell, *s*, appears on its surface. The ciliated velar ring is cut in the section, as shown by the two projecting cilia on the upper part of the figure. The embryo is now a Trochosphere.

E, Surface view of an embryo at a period almost identical with that of D.

F, Later embryo seen as a

separated.

transparent object.
m, Mouth.
ft, Foot.
a, Anus.
e, Intestine.
st, Stomach.
tp, Velar area of the prostomium. The extent of the shell and commencing upgrowth of the mantle-skirt is indicated by a line forming a curve from *a* to F.

N.B.—In this development, as in that of *Pisidium* (fig. 25), no part of the blastopore persists either as mouth or as anus, but the aperture closes—the pedicle of invagination, or narrow neck of the invaginated arch-enteron, becoming the intestine. The mouth and the anus are formed as independent in-pushings, the mouth with stomodaeum first, and the short anal proctodaeum much later. This interpretation of the appearances is contrary to that of Horst, from whom our drawings of the oyster's development are taken. The account given by the American William K. Brooks differs greatly as to matter of fact from that of Horst, and appears to be erroneous in some respects.

Generative Organs.—The gonads of *Anodonta* are placed in distinct male and female individuals. In some Lamellibranchs—for instance, the European Oyster and the *Pisidium pusillum*—the sexes are united in the same individual; but here, as in most hermaphrodite animals, the two sexual elements are not ripe in the same individual at the same moment. It has been conclusively shown that the *Ostrea edulis* does not fertilize itself. The American Oyster (*O. virginiana*) and the Portuguese Oyster (*O. angulata*) have the sexes separate, and fertilization is effected in the open water after the discharge of the ova and the spermatozoa from the females and males respectively. In the *Ostrea edulis* fertilization of the eggs is effected at the moment of their escape from the uro-genital groove, or even before, by means of spermatozoa drawn into the sub-pallial chamber by the incurrent ciliary stream, and the embryos pass through the early stages of development whilst entangled between the gill-lamellae of the female parent (fig. 23). In *Anodonta* the eggs pass into the space between the two lamellae of the outer gill-plate, and are there fertilized, and advance whilst still in this position to the glochidium phase of development (fig. 22). They may be found here in thousands in the summer and autumn months. The gonads themselves are extremely simple arborescent glands which open to the exterior by two simple ducts, one right and one left, continuous with the tubular branches of the gonads. In the most primitive Lamellibranchs there is no separate generative aperture but the gonads discharge into the renal cavity, as in *Patella* among Gastropods. This is the case in the Protobranchia, *e.g. Solenomya*, in which the gonad opens into the reno-pericardial duct. But the generative products do not pass through the whole length of the renal tube: there is a direct opening from the pericardial end of the tube to the distal end, and the ova or sperms pass through this. In *Arca*, in *Anomiidae* and in *Pectinidae* the gonad opens into the external part of the renal tube. The next stage of modification is seen in *Ostraea*, *Cyclas* and some *Lucinidae*, in which the generative and renal ducts open into a cloacal slit on the surface of the body. In *Mytilus* the two apertures are on a common papilla, in other cases the two apertures are as in *Anodonta*. The Anatinacea and *Poromya* among the Septibranchia are, however, peculiar in having two genital apertures on each side, one male and one female. These forms are hermaphrodite, with an ovary and testis completely separate from each other on each side of the body, each having its own duct and aperture.

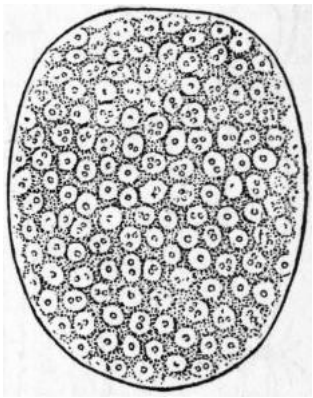


FIG. 24.—Embryo of *Pisidium pusillum* in the diblastula stage, surface view (after Lankester). The embryo has increased in size by accumulation of liquid between the outer and the invaginated cells. The blastopore has closed.

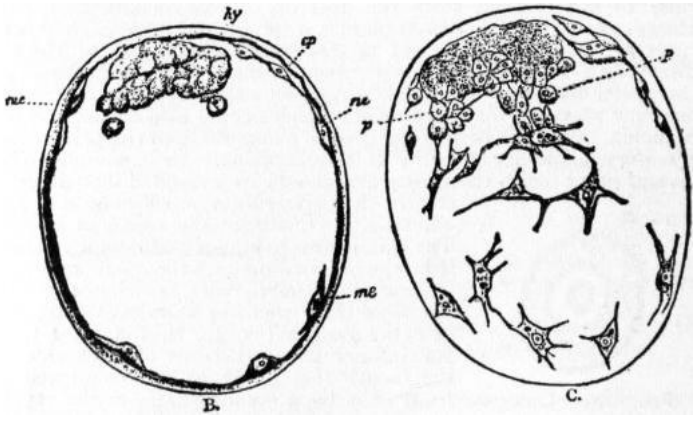


FIG. 25.—B, Same embryo as fig. 24, in optical median section, showing the invaginated cells *hy* which form the arch-enteron, and the mesoblastic cells *me* which are budded off from the surface of the mass *hy*, and apply themselves to the inner surface of the epiblastic cell-layer *ep*. C. The same embryo focused so as to show the mesoblastic cells which immediately underlie the outer cell-layer.

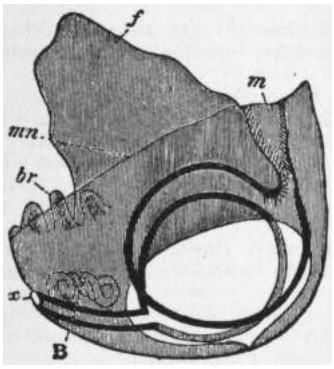
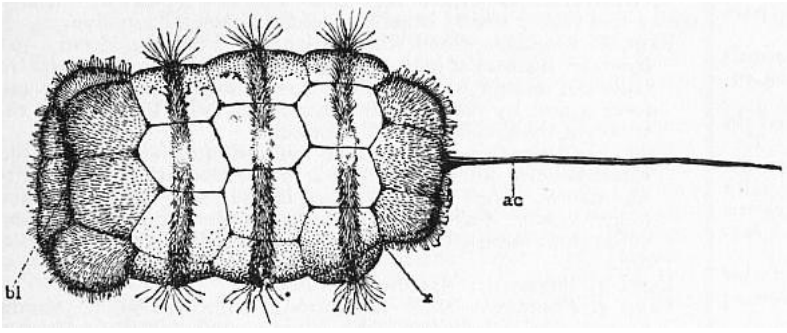


FIG.26.—Diagram of Embryo of *Pisidium*. The unshaded area gives the position of the shell-valve. (After Lankester.)

m, Mouth.
x, Anus.
f, Foot.
br, Branchial filaments.
mn, Margin of the mantle-skirt.
B, Organ of Bojanus.

The development of *Anodonta* is remarkable for the curious larval form known as *glochidium* (fig. 22). The glochidium quits the gill-pouch of its parent and swims by alternate opening and shutting of the valves of its shell, as do adult *Pecten* and *Lima*, trailing at the same time a long byssus thread. This byssus is not homologous with that of other Lamellibranchs, but originates from a single glandular epithelial cell embedded in the tissues on the dorsal anterior side of the adductor muscle. By this it is brought into contact with the fin of a fish, such as perch, stickleback or others, and effects a hold thereon by means of the toothed edge of its shells. Here it becomes encysted, and is nourished by the exudations of the fish. It remains in this condition for a period of two to six weeks, and during this time the permanent organs are developed from the cells of two symmetrical cavities behind the adductor muscle. The early larva of *Anodonta* is not unlike the trochosphere of other Lamellibranchs, but the mouth is wanting. The glochidium is formed by the precocious development of the anterior adductor and the retardation of all the other organs except the shell. Other Lamellibranchs exhibit either a trochosphere larva which becomes a veliger differing only from the Gastropod's and Pteropod's veliger in having bilateral shell-calcifications instead of a single central one; or, like *Anodonta*, they may develop within the gill-plates of the mother, though without presenting such a specialized larva as the glochidium. An example of the former is seen in the development of the European oyster, to the figure of which and its explanation the reader is specially referred (fig. 23). An example of the latter is seen in a common little fresh-water bivalve, the *Pisidium pusillum*, which has been studied by Lankester. The gastrula is formed in this case by invagination. The embryonic cells continue to divide, and form an oval vesicle containing liquid (fig. 24); within this, at one pole, is seen the mass of invaginated cells (fig. 25, *hy*). These invaginated cells are the arch-enteron; they proliferate and give off branching cells, which apply themselves (fig. 25, C) to the inner face of the vesicle, thus forming the mesoblast. The outer single layer of cells which constitutes the surface of the vesicle is the ectoderm or epiblast. The little mass of hypoblast or enteric cell-mass now enlarges, but remains connected with the cicatrix of the blastopore or orifice of invagination by a stalk, the rectal peduncle. The enteron itself becomes bilobed and is joined by a new invagination, that of the mouth and stomodaeum. The mesoblast multiplies its cells, which become partly muscular and partly skeleto-trophic. Centro-dorsally now appears the embryonic shell-gland. The pharynx or stomodaeum is still small, the foot not yet prominent. A later stage is seen in fig. 26, where the pharynx is widely open and the foot prominent. No ciliated velum or pre-oral (cephalic) lobe ever develops. The shell-gland disappears, the mantle-skirt is raised as a ridge, the paired shell-valves are secreted, the anus opens by a proctodaeal ingrowth into the rectal peduncle, and the rudiments of the gills (*br*) and of the renal organs (B) appear (fig. 26, lateral view), and thus the chief organs and general form of the adult are acquired. Later changes consist in the growth of the shell-valves over the whole area of the mantle-flaps, and in the multiplication of the gill-filaments and their consolidation to form gill-plates. It is important to note that the gill-filaments are formed one by one *posteriorly*. The labial tentacles are formed late. In the allied genus *Cyclas*, a byssus gland is formed in the foot and subsequently disappears, but no such gland occurs in *Pisidium*.



After Drew, in Lankester's *Treatise on Zoology*. (A. & C. Black.)

FIG. 27.—Surface view of a forty-five hour embryo of *Yoldia limatula*. *a.c*, Apical cilia. *bl*, Blastopore. *x*, Depression where the cells that form the cerebral ganglia come to the surface.

An extraordinary modification of the veliger occurs in the development of *Nucula* and *Yoldia* and probably other members of the same families. After the formation of the gastrula by epibole the larva becomes enclosed by an ectodermic test covering the whole of the original surface of the body, including the shell-gland, and leaving only a small opening at the posterior end in which the stomodaeum and proctodaeum are formed. In *Yoldia* and *Nucula proxima* the test consists of five rows of flattened cells, the three median rows bearing circlets of long cilia. At the anterior end of the test is the apical plate from the centre of which projects a long flagellum as in many other Lamellibranch larvae. In *Nucula delphinodonta* the test is uniformly covered with short cilia, and there is no flagellum. When the larval development is completed the test is cast off, its cells breaking apart and falling to pieces leaving the young animal with a well-developed shell exposed and the internal organs in an advanced state. The test is really a ciliated velum developed in the normal position at the apical pole but reflected backwards in such a way as to cover the original ectoderm except at the posterior end. In *Yoldia* and *Nucula proxima* the ova are set free in the water and the test-larvae are free-swimming, but in *Nucula delphinodonta* the female forms a thin-walled egg-case of mucus attached to the posterior end of the shell and in communication with the pallial

chamber; in this case the eggs develop and the test-larva is enclosed. A similar modification of the velum occurs in *Dentalium* and in *Myzomenia* among the Amphineura.

Classification of Lamellibranchia

The classification originally based on the structure of the gills by P. Pelseneer included five orders, viz.: the Protobranchia in which the gill-filaments are flattened and not reflected; the Filibranchia in which the filaments are long and reflected, with non-vascular junctions; the Pseudolamellibranchia in which the gill-lamellae are vertically folded, the inter-filamentar and interlamellar junctions being vascular or non-vascular; the Eulamellibranchia in which the inter-filamentar and interlamellar junctions are vascular; and lastly the Septibranchia in which the gills are reduced to a horizontal partition. The Pseudolamellibranchia included the oyster, scallop and their allies which formerly constituted the order Monomyaria, having only a single large adductor muscle or in addition a very small anterior adductor. The researches of W. G. Ridewood have shown that in gill-structure the Pectinacea agree with the Filibranchia and the Ostraeacea with the Eulamellibranchia, and accordingly the order Pseudolamellibranchia is now suppressed and its members divided between the two other orders mentioned. The four orders now retained exhibit successive stages in the modification of the ctenidia by reflection and concrescence of the filament, but other organs, such as the heart, adductors, renal organs, may not show corresponding stages. On the contrary considerable differences in these organs may occur within any single order. The Protobranchia, however, possess several primitive characters besides that of the branchiae. In them the foot has a flat ventral surface used for creeping, as in Gastropods, the byssus gland is but slightly developed, the pleural ganglia are distinct, there is a relic of the pharyngeal cavity, in some forms with a pair of glandular sacs, the gonads retain their primitive connexion with the renal cavities, and the otocysts are open.

Order I. Protobranchia

In addition to the characters given above, it may be noted that the mantle is provided with a hypobranchial gland on the outer side of each gill, the auricles are muscular, the kidneys are glandular through their whole length, the sexes are separate.

Fam. 1. *Solenomyidae.*—One row of branchial filaments is directed dorsally, the other ventrally; the mantle has a long postero-ventral suture and a single posterior aperture; the labial palps of each side are fused together; shell elongate; hinge without teeth; periostracum thick. *Solenomya.*

Fam. 2. *Nuculidae.*—Labial palps free, very broad, and provided with a posterior appendage; branchial filaments transverse; shell has an angular dorsal border; mantle open along its whole border. *Nucula. Acila. Pronucula.*

Fam. 3. *Ledidae.*—Like the *Nuculidae*, but mantle has two posterior sutures and two united siphons. *Leda. Yoldia. Malletia.*

Fam. 4. *Ctenodontidae.*—Extinct; Silurian.

The fossil group Palaeoconcha is connected with the Protobranchia through the Solenomyidae. It contains the following extinct families.

Fam. 1. *Praecardiidae.*—Shell equivalve with hinge dentition as in *Arca. Praecardium*; Silurian and Devonian.

Fam. 2. *Antipleuridae.*—Shell inequivalve. *Antipleura*; Silurian.

Fam. 3. *Cardiolidae.*—Shell equivalve and ventricose; hinge without teeth. *Cardiola*; Silurian and Devonian.

Fam. 4. *Grammysiidae.*—Shell thin, equivalve, oval or elongate; hinge without teeth. *Grammysia*; Silurian and Devonian. *Protomya*; Devonian. *Cardiomorpha*; Silurian to Carboniferous.

Fam. 5. *Vlastidae.*—Shell very inequivalve; hinge without teeth. *Vlasta*; Silurian.

Fam. 6. *Solenopsidae.*—Shell equivalve, greatly elongated, umbones very far forward. *Solenopsis*; Devonian to Trias.

Order II. Filibranchia

Gill-filament ventrally directed and reflected, connected by ciliated junctions. Foot generally provided with a highly developed byssogenous apparatus.

Sub-order I.—*Anomiacea.*

Very asymmetrical, with a single large posterior adductor. The heart is not contained in the pericardium, lies dorsad of the rectum and gives off a single aorta anteriorly. The reflected borders of the inner gill-plates of either side are fused together in the middle line. The gonads open into the kidneys and the right gonad extends into the mantle. Shell thin; animal fixed.

Fam. 1. *Anomiidae.*—Foot small; inferior (right) valve of adult perforated to allow passage of the byssus. *Anomia*; byssus large and calcified; British. *Placuna*; byssus atrophied in adult. *Hypotrema*. *Carolia*. *Ephippium*. *Placunanomia*.

Sub-order II.—*Arcacea.*

Symmetrical; mantle open throughout its extent; generally with well developed anterior and posterior

adductors. The heart lies in the pericardium and gives off two aortae. Gills without interlamellar junctions. Renal and genital apertures separate.

Fam. 1. *Arcidae.*—Borders of the mantle bear compound pallial eyes. The labial palps are direct continuations of the lips. Hinge pliodont, that is to say, it has numerous teeth on either side of the umbones and the teeth are perpendicular to the edge. *Arca*; foot byssiferous; British. *Pectunculus*; foot without byssus; British. *Scaphula*; freshwater; India. *Argina. Bathyarca. Barbatia. Senilia. Anadara. Adacnarca.*

Fam. 2. *Parallelodontidae.*—Shell as in *Arca*, but the posterior hinge teeth elongated and parallel to the cardinal border. *Cucullaea*; recent and fossil from the Jurassic. All the other genera are fossil: *Parallelodon*; Devonian to Tertiary. *Carbonaria*; Carboniferous, &c.

Fam. 3. *Limopsidae.*—Shell orbicular, hinge curved, ligament longer transversely than antero-posteriorly; foot elongate, pointed anteriorly and posteriorly. *Limopsis. Trinacria*; Tertiary.

Fam. 4. *Philobryidae.*—Shell thin, very inequilateral, anterior part atrophied, umbones projecting. *Philobrya.*

Fam. 5. *Cyrtodontidae.*—Extinct; shell equivalve and inequilateral, short, convex. *Cyrtodonta*; Silurian and Devonian. *Cypricardites*, Silurian. *Vanuxemia*; Silurian.

Fam. 6. *Trigoniidae.*—Shell thick; foot elongated, pointed in front and behind, ventral border sharp; byssus absent. *Trigonia*; shell sub-triangular, umbones directed backwards. This genus was very abundant in the Secondary epoch, especially in Jurassic seas. There are six living species, all in Australian seas. Living specimens were first discovered in 1827. *Schizodus*; Permian. *Myophoria*; Trias.

Fam. 7. *Lyrodesmidae.*—Extinct; shell inequilateral, posterior side shorter; hinge short, teeth in form of a fan. *Lyrodesma*; Silurian.

Sub-order III.—*Mytilacea.*

Symmetrical, the anterior adductor small or absent. Heart gives off only an anterior aorta. Surface of gills smooth, gill-filaments all similar, with interlamellar junctions. Gonads generally extend into mantle and open at sides of kidneys. Foot linguiform and byssiferous.

Fam. 1. *Mytilidae.*—Shell inequilateral, anterior end short; hinge without teeth; ligament external. Mantle has a posterior suture. Cephalic eyes present. *Mytilus*; British. *Modiola*; British. *Lithodomus. Modiolaria*; British. *Crenella. Stavelia. Dacrydium. Myrina. Idas. Septifer.*

Fam. 2. *Modiolopsidae.*—Extinct; Silurian to Cretaceous; adductor muscles sub-equal. *Modiolopsis.—Modiomorpha. Myoconcha.*

Fam. 3. *Pernidae.*—Shell very inequilateral; ligament subdivided; mantle open throughout; anterior adductor absent. *Perna. Crenatula*; inhabits sponges. *Bakewellia. Gervilleia*; Trias to Eocene. *Odontoperna*; Trias. *Inoceramus*; Jurassic to Cretaceous.

Sub-order IV.—*Pectinacea.*

Monomyarian, with open mantle. Gills folded and the filaments at summits and bases of the folds are different from the others. Gonads contained in the visceral mass and generally open into renal cavities. Foot usually rudimentary.

Fam. 1. *Vulsellidae.*—Shell high; hinge toothless; foot without byssus. *Vulsella.*

Fam. 2. *Aviculidae.*—Shell very inequilateral; cardinal border straight with two auriculae, the posterior the longer. Foot with a very stout byssus. Gills fused to the mantle. *Avicula*; British. *Meleagrina.* Pearls are obtained from a species of this genus in the Persian Gulf, Indian Ocean, &c. *Malleus.* Several extinct genera.

Fam. 3. *Prasinidae.*—Shell inequilateral, with anterior umbones and prominent anterior auricula; cardinal border arched. *Prasina.*

Fam. 4. *Pterineidae.*—Extinct; Palaeozoic.

Fam. 5. *Lunulicardiidae.*—Extinct; Silurian and Devonian.

Fam. 6. *Conocardiidae.*—Extinct; Silurian to Carboniferous.

Fam. 7. *Ambonychiidae.*—Extinct; Silurian and Devonian. The last two families are dimyarian, with small anterior adductor.

Fam. 8. *Myalinidae.*—Extinct; Silurian to Cretaceous; adductors sub-equal.

Fam. 9. *Amussiidae.*—Shell orbicular, smooth externally with radiating costae internally. Gills without interlamellar junctions. *Amussium.*

Fam. 10. *Spondylidae.*—Shell very inequivalve, fixed by the right valve which is the larger. No byssus. *Spondylus*; shell with spiny ribs, adherent by the spines. *Plicatula.*

Fam. 11. *Pectinidae.*—Shell with radiating ribs; dorsal border with two auriculae. Foot byssiferous. Mantle borders with well developed eyes. *Pecten*; shell orbicular, with equal auriculae; without a byssal sinus; British. *Chlamys*; anterior auricula the larger and with a byssal sinus; British. *Pedum. Hinnites. Pseudamussium. Camptonectes. Hyalopecten*; abyssal.

Sub-order V.—*Dimyacea.*

Dimyarian, with orbicular and almost equilateral shell; adherent; hinge without teeth and ligament internal. Gills with free non-reflected filaments.

Fam. *Dimyidae.*—Characters of the sub-order. *Dimya*; recent in abyssal depths and fossil since the Jurassic.

Order III. Eulamellibranchia

Edges of the mantle generally united by one or two sutures. Two adductors usually present. Branchial filaments united by vascular inter-filamentar junctions and vascular interlamellar junctions; the latter contain the afferent vessels. The gonads always have their own proper external apertures.

Sub-order I.—*Ostraeacea.*

Monomyarian or with a very small anterior adductor. Mantle open; foot rather small; branchiae folded; shell inequivalve.

Fam. 1. *Limidae.*—Shell with auriculae. Foot digitiform, with byssus. Borders of mantle with long and numerous tentacles. Gills not united with mantle. *Lima*; members of this genus form a nest by means of the byssus, or swim by clapping the valves of the shell together. *Limaea.*

Fam. 2. *Ostraeidae.*—Foot much reduced and without byssus. Heart usually on the ventral side of the rectum. Gills fused to the mantle. Shell irregular, fixed in the young by the left and larger valve. *Ostraea*; foot absent in the adult; edible and cultivated; some species, as the British *O. edulis*, are hermaphrodite.

Fam. 3. *Eligmidae.*—Extinct; Jurassic.

Fam. 4. *Pinnidae.*—Shell elongated, truncated and gaping posteriorly. Dimyarian, with a very small anterior adductor. Foot with byssus. *Pinna*; British. *Cyrtopinna. Aviculopinna*; fossil, Carboniferous and Permian. *Pinnigena*; Jurassic and Cretaceous. *Atrina*; fossil and recent, from Carboniferous to present day.

Sub-order II.—*Submytilacea.*

Mantle only slightly closed; usually there is only a single suture. Siphons absent or very short. Gills smooth. Nearly always dimyarian. Shell equivalve, with an external ligament.

Fam. 1. *Dreissensiidae.*—Shell elongated; hinge without teeth; summits of valves with an internal septum. Siphons short. *Dreissensia*; lives in fresh water, but originated from the Caspian Sea; introduced into England about 1824.

Fam. 2. *Modiolarcidae.*—Foot with a plantar surface; the two branchial plates serve as incubatory pouches. *Modiolarca.*

Fam. 3. *Astartidae.*—Shell concentrically striated; foot elongate, without byssus. *Astarte*; British. *Woodia. Opis*; Secondary. *Prosocoelus*; Devonian.

Fam. 4. *Crassatellidae.*—Shell thick, with concentric striae, ligament external; foot short. *Crassatella. Cuna.*

Fam. 5. *Carditidae.*—Shell thick, with radiating costae; foot carinated, often byssiferous. *Cardita. Thecalia. Milneria. Venericardia.*

Fam. 6. *Condylocardiidae.*—Like *Carditidae*, but with an external ligament. *Condylocardia. Carditella. Carditopsis.*

Fam. 7. *Cyprinidae.*—Mantle open in front, with two pallial sutures; external gill-plates smaller than the internal. *Cyprina*; British. *Cypricardia. Pleurophorus*; Devonian to Trias. *Anisocardia*; Jurassic to Tertiary. *Veniella*; Cretaceous to Tertiary.

Fam. 8. *Isocardiidae.*—Mantle largely closed, pedal orifice small; gill-plates of equal size; shell globular, with prominent and coiled umbones. *Isocardia*; British.

Fam. 9. *Callocardiidae.*—Siphons present; external gill-plate smaller than the internal; umbones not prominent. *Callocardia*; abyssal.

Fam. 10. *Lucinidae.*—Labial palps very small; gills without an external plate. *Lucina*; British. *Montacuta*; British. *Cryptodon*.

Fam. 11. *Corbidae.*—Shell thick, with denticulated borders; anal aperture with valve but no siphon; foot elongated and pointed. *Corbis. Gonodon*; Trias and Jurassic. *Mutiella*; Upper Cretaceous.

Fam. 12. *Ungulinidae.*—Foot greatly elongated, vermiform, ending in a glandular enlargement. *Ungulina. Diplodonta*; British. *Axinus*; British.

Fam. 13. *Cyrenellidae.*—Two elongated, united, non-retractile siphons; freshwater. *Cyrenella. Joanisiella.*

Fam. 14. *Tancrediidae.*—Shell elongate, sub-triangular. Extinct. *Tancredia*; Trias to Cretaceous. *Meekia*; Cretaceous.

Fam. 15. *Unicardiidae.*—Shell sub-orbicular, nearly equilateral, with concentric striae. Extinct, Carboniferous to Cretaceous. *Unicardium. Scaldia. Pseudedmondia.*

Fam. 16. *Leptonidae.*—Shell thin; no siphons; foot long and byssiferous; marine; hermaphrodite and incubatory. *Kellya*; British. *Lepton*; commensal with the Crustacean *Gebia*; British. *Erycina*; Tertiary. *Pythina. Scacchia. Sportella. Cyamium.*

Fam. 17. *Galeommidae.*—Mantle reflected over shell; shell thin, gaping; adductors much reduced. *Galeomma*; British. *Scintilla. Hindsiella. Ephippodonta*; commensal with shrimp *Axius*. The three following genera with an internal shell probably belong to this family:—*Chlamydoconcha*. *Scioberetia*; commensal with a Spatangid. *Entovalva*; parasitic in *Synapta*.

Fam. 18. *Kellyellidae.*—Shell ovoid; anal aperture with very short siphon; foot elongated. *Kellyella. Turtonia*; British. *Allopagus*; Eocene. *Lutetia*; Eocene.

Fam. 19. *Cyrenidae.*—Two siphons, more or less united, with papillose orifices; pallial line with a sinus; freshwater. *Cyrena. Corbicula. Batissa. Velorita. Galatea. Fischeria.*

Fam. 20. *Cycladidae.*—One siphon or two free siphons with simple orifices; pallial line simple; hermaphrodite, embryos incubated in external gill-plate; freshwater, *Cyclas*; British. *Pisidium*; British.

Fam. 21. *Rangiidae.*—Two short siphons, shell with prominent umbones and internal ligament. *Rangia*; brackish water, Florida.

Fam. 22. *Cardiniidae.*—Shell elongated, inequilateral. Extinct. *Cardinia*; Trias and Jurassic. *Anthracosia*; Carboniferous and Permian. *Anoplophora*; Trias. *Pachycardia*; Trias.

Fam. 23. *Megalodontidae.*—Shell inequilateral, thick; posterior adductor impression on a myophorous apophysis. Extinct. *Megalodon*; Devonian to Jurassic. *Pachyrisma*; Trias and Jurassic. *Durga*; Jurassic. *Dicerocardium*; Jurassic.

Fam. 24. *Unionidae.*—Shell equilateral; mantle with a single pallial suture and no siphons; freshwater; larva a glochidium. *Unio*; British. *Anodonta*; British. *Pseudodon. Quadrula. Arconaia. Monocondylea. Solenaia. Mycetopus.*

Fam. 25. *Mutelidae.*—Differs from *Unionidae* in having two pallial sutures; freshwater. *Muleta. Pliodon. Spatha. Iridina. Hyria. Castalia. Aplodon. Plagiodon.*

Fam. 26. *Aetheriidae.*—Shell irregular, generally fixed in the adult; foot absent; freshwater. *Aetheria. Mulleria. Bartlettia.*

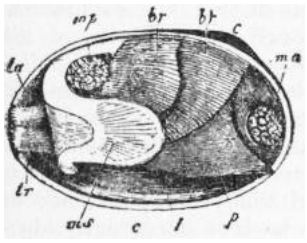


FIG. 28.—Lateral view of a *Mactra*, the right valve of the shell and right mantle-flap removed, and the siphons retracted. (From Gegenbaur.)

br, *br'*, Outer and inner gill-plates.
t, Labial tentacle.
ta, *tr*, Upper and lower siphons.
ms, Siphonal muscle of the mantle-flap.
ma, Anterior adductor muscle.
mp, Posterior adductor muscle.
p, Foot.
c, Umbo.

Sub-order III.—*Tellinacea.*

Mantle not extensively closed; two pallial sutures and two well-developed siphons. Gills smooth. Foot compressed and elongated. Labial palps very large. Dimyarian; pallial line with a deep sinus.

Fam. 1. *Tellinidae.*—External gill-plate directed upwards; siphons separate and elongated; foot with byssus; palps very large; ligament external. *Tellina*; British. *Gastrana*; British. *Capsa. Macoma.*

Fam. 2. *Scrobiculariidae.*—External gill-plates directed upwards; siphons separate and excessively long; foot without byssus. *Scrobicularia*; estuarine; British. *Syndosmya*; British. *Cumingia*.

Fam. 3. *Donacidae.*—External gill-plate directed ventrally; siphons separate, of moderate length, anal siphon the longer. *Donax*; British. *Iphigeneia.*

Fam. 4. *Mesodesmatidae.*—External gill-plate directed ventrally; siphons separate and equal. *Mesodesma. Ervilia*; British.

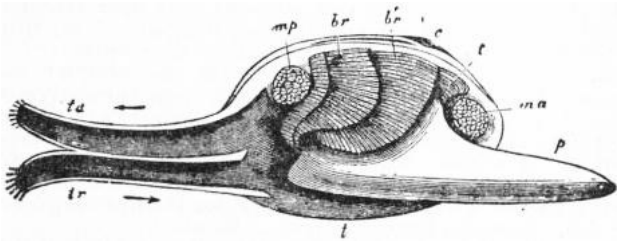


FIG. 29.—The same animal as fig. 28, with its foot and siphons expanded. Letters as in fig. 28. (From Gegenbaur.)

Fam. 5. *Cardiliidae.*—Shell very high and short; dimyarian; posterior adductor impression on a prominent apophysis. *Cardilia.*

Fam. 6. *Mactridae.*—External gill-plate directed ventrally; siphons united, invested by a chitinous sheath; foot long, bent at an angle, without byssus. *Mactra*; British (figs. 28, 29). *Mulinia. Harvella. Raeta. Eastonia. Heterocardia. Vanganella.*

Sub-order IV.—*Veneracea.*

Two pallial sutures, siphons somewhat elongated and partially or wholly united. Gills slightly folded. A bulb on the posterior aorta. Ligament external.

Fam. 1. *Veneridae.*—Foot well developed; pallial sinus shallow or absent. *Venus*; British. *Dosinia*; British. *Tapes*; British. *Cyclina. Lucinopsis*; British. *Meretrix. Circe*; British. *Venerupis.*

Fam. 2. *Petricolidae.*—Boring forms with a reduced foot; shell elongated, with deep pallial sinus. *Petricola. P. pholadiformis*, originally an inhabitant of the coast of the United States, has been acclimatized for some years in the North Sea.

Fam. 3. *Glaucomyidae.*—Siphons very long and united; foot small; shell thin, with deep pallial sinus; fresh or brackish water. *Glaucomya. Tanysiphon.*

Sub-order V.—*Cardiacea.*

Two pallial sutures. Siphons generally short. Foot cylindrical, more or less elongated, byssogenous. Gills much folded. Shell equivalve, with radiating costae and external ligament.

Fam. 1. *Cardiidae.*—Mantle slightly closed; siphons very short, surrounded by papillae which often bear eyes; foot very long, geniculated; pallial line without sinus; two adductors, *Cardium*; British. *Pseudo-kellya. Byssocardium*; Eocene. *Lithocardium*; Eocene.

Fam. 2. *Limnocardiidae.*—Siphons very long, united throughout; shell gaping; two adductors; brackish waters. *Limnocardium*; Caspian Sea and fossil from the Tertiary. *Archicardium*; Tertiary.

Fam. 3. *Tridacnidae.*—Mantle closed to a considerable extent; apertures distant from each other; no siphons; a single adductor; shell thick. *Tridacna. Hippopus.*

Sub-order VI.—*Chamacea.*

Asymmetrical, inequivalve, fixed, with extensive pallial sutures; no siphons. Two adductors. Foot reduced and without byssus. Shell thick, without pallial sinus.

Fam. 1. *Chamidae.*—Shell with sub-equal valves and prominent umbones more or less spirally coiled; ligament external. *Chama. Diceras*; Jurassic. *Requienia*; Cretaceous. *Matheronia*; Cretaceous.

Fam. 2. *Caprinidae.*—Shell inequivalve; fixed valve spiral or conical; free valve coiled or spiral; Cretaceous. *Caprina. Caprotina. Caprinula*, &c.

Fam. 3. *Monopleuridae.*—Shell very inequivalve; fixed valve conical or spiral; free valve operculiform; Cretaceous. *Monopleuron. Baylea.* The two following families, together known as Rudistae, are closely allied to the preceding; they are extinct marine forms from Secondary deposits. They were fixed by the conical elongated right valve; the free left valve is not spiral, and is furnished with prominent apophyses to which the adductors were attached.

Fam. 4. *Radiolitidae.*—Shell conical or biconvex, without canals in the external layer. *Radiolites. Biradiolites.*

Fam. 5. *Hippuritidae.*—Fixed valve long, cylindro-conical, with three longitudinal furrows which correspond internally to two pillars for support of the siphons. *Hippurites. Arnaudia.*

Sub-order VII.—*Myacea.*

Mantle closed to a considerable extent; siphons well developed; gills much folded and frequently prolonged into the branchial siphon. Foot compressed and generally byssiferous. Shell gaping, with a pallial sinus.

Fam. 1. *Psammobiidae.*—Siphons very long and quite separate; foot large; shell oval, elongated, ligament external. *Psammobia*; British. *Sanguinolaria. Asaphis. Elizia. Solenotellina.*

Fam. 2. *Myidae.*—Siphons united for the greater part of their length, and with a circlet of tentacles near their extremities; foot reduced; shell gaping; ligament internal. *Mya*; British. *Sphenia*; British. *Tugonia. Platyodon. Cryptomya.*

Fam. 3. *Corbulidae.*—Shell sub-trigonal, inequivalve; pallial sinus shallow; siphons short, united, completely retractile; foot large, pointed, often byssiferous. *Corbulomya. Paramya. Erodona* and *Himella* are fluviatile forms from South America.

Fam. 4. *Lutrariidae.*—Mantle extensively closed; a fourth pallial aperture behind the foot; siphons long and united; shell elongated, a spoon-shaped projection for the ligament on each valve. *Lutraria*; British. *Tresus. Standella.*

Fam. 5. *Solenidae.*—Elongated burrowing forms; foot cylindrical, powerful, without byssus; shell long, truncated and gaping at each end. *Solenocurtus*; British. *Tagelus*; estuarine. *Ceratisolen*; British. *Cultellus*; British. *Siliqua. Solen*; British. *Ensis*; British.

Fam. 6. *Saxicavidae.*—Mantle extensively closed, with a small pedal orifice; siphons long, united, covered by a chitinous sheath; gills prolonged into the branchial siphon; foot small; shell gaping. *Saxicava*; British. *Glycimeris. Cyrtodaria.*

Fam. 7. *Gastrochaenidae.*—Shell thin, gaping widely at the posterior end; anterior adductor much reduced; mantle extensively closed; siphons long, united. *Gastrochaena*; British. *Fistulana.*

Sub-order VIII.—*Adesmacea.*

Ligament wanting; shell gaping, with a styloid apophysis in the umbonal cavities. Gills prolonged into the branchial siphon. Mantle largely closed, siphons long, united. Foot short, truncated, discoid, without byssus.

Fam. 1. *Pholadidae.*—Shell containing all the organs; heart traversed by the rectum; two aortae. Shell with a pallial sinus; dorsal region protected by accessory plates. *Pholas*; British. *Pholadidea*; British. *Jouannetia. Xylophaga*; British. *Martesia.*

Fam. 2. *Teredinidae.*—Shell globular, covering only a small portion of the vermiform body; heart on ventral side of rectum; a single aorta; siphons long, united and furnished with two posterior calcareous "pallets." *Teredo*; British. *Xylotrya.*

Sub-order IX.—*Anatinacea.*

Hermaphrodite, the ovaries and testes distinct, with separate apertures. Foot rather small. Mantle frequently presents a fourth orifice. External gill-plate directed dorsally and without reflected lamella. Hinge without teeth.

Fam. 1. *Thracidae.*—Mantle with a fourth aperture; siphons long, quite separate, completely retractile and invertible. *Thracia*; British. *Asthenothaerus.*

Fam. 2. *Periplomidae.*—Siphons separate, naked, completely retractile but not invertible. *Periploma. Cochlodesma. Tyleria.*

Fam. 3. *Anatinidae.*—Siphons long, united, covered by a chitinous sheath, not completely retractile. *Anatina. Plectomya*; Jurassic and Cretaceous.

Fam. 4. *Pholadomyidae.*—Mantle with fourth aperture; siphons very long, completely united, naked, incompletely retractile; foot small, with posterior appendage. *Pholadomya.*

Fam. 5. *Arcomyidae.*—Extinct; Secondary and Tertiary. *Arcomya. Goniomya.*

Fam. 6. *Pholadellidae.*—Extinct; Palaeozoic. *Pholadella. Phytimya. Allorisma.*

Fam. 7. *Pleuromyidae.*—Extinct; Secondary. *Pleuromya. Gresslya. Ceromya.*

Fam. 8. *Pandoridae.*—Shell thin, inequivalve, free; ligament internal; siphons very short. *Pandora*; British. *Coelodon. Clidiophora.*

Fam. 9. *Myochamidae.*—Shell very inequivalve, solid, with a pallial sinus; siphons short; foot small. *Myochama. Myodora.*

Fam. 10. *Chamostraeidae.*—A fourth pallial aperture present; pedal aperture small; siphons very short and separate; shell fixed by the right valve, irregular. *Chamostraea.*

Fam. 11. *Clavagellidae.*—Pedal aperture very small, foot rudimentary; valves continued backwards into a calcareous tube secreted by the siphons. *Clavagella. Brechites* (*Aspergillum*).

Fam. 12. *Lyonsiidae.*—Foot byssiferous; siphons short, invertible. *Lyonsia*; British. *Entodesma. Mytilimeria.*

Fam. 13. *Verticordiidae.*—Siphons short, gills papillose; foot small; shell globular. Many species abyssal. *Verlicordia. Euciroa. Lyonsiella. Halicardia.*

Order IV. Septibranchia

Gills have lost their respiratory function, and are transformed into a muscular septum on each side between mantle and foot. All marine, live at considerable depths, and are carnivorous.

Fam. 1. *Poromyidae.*—Siphons short and separate; branchial siphon with a large valve; branchial septum bears two groups of orifices on either side; hermaphrodite. *Poromya*; British. *Dermatomya. Liopistha*; Cretaceous.

Fam. 2. *Cetoconchidae.*—Branchial septum with three groups of orifices on each side; siphons short, separate, branchial siphon with a valve. *Cetoconcha* (*Silenia*).

Fam. 3. *Cuspidariidae.*—Branchial septum with four or five pairs of very narrow symmetrical orifices; siphons long, united, their extremities surrounded by tentacles; sexes separate. *Cuspidaria*; British.

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(E. R. L.; J. T. C.)

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